Tuesday, 25 October 2022

(10.30 am)

MR JUSTICE GOSS: Jury in, please.

(In the presence of the jury)

... [Omitted] ...

MR JOHNSON: My Lord, I recall Dr Dewi Evans, please.

DR DEWI EVANS (recalled)

Examination-in-chief by MR JOHNSON

MR JOHNSON: Thank you, Dr Evans. You're still on oath.

A. Yes.

Q. Now, I would like to go from generalities, which you were telling us about last time, to specifics if we can, and just so that you understand and the jury understands how we're going to deal with this, I'm going to ask you questions about [Baby A] first of all, then you will withdraw and Dr Bohin will give evidence about [Baby A].

A. Okay.

Q. Then I'll recall you to deal with [Baby B] and you will be asked questions in cross-examination by Mr Myers, and after you have finished we'll get on to [redacted].

A. Okay, thank you.

Q. (Overspeaking) same exercise.

MR JUSTICE GOSS: So you understand, there won't be any cross-examination of you between the two children.

A. Yes.

MR JOHNSON: Thank you.

Now, Dr Evans, is it right that you have written four separate statements relating to the case of [Baby A]?

A. Yes.

Q. The most -- the two most recent are simply covering technicalities which cover documents that you were given after the first two statements you made?

A. Yes, they are.

Q. You have also made an overarching statement which pulls together evidence relating to all the children?

A. Yes.

Q. And I'm not going to deal with that at this stage. I will deal with that at the end of the evidence --

A. Yes.

Q. -- and the prosecution case, when the jury have heard about all the other children.

So what I would like to concentrate on are -- is the evidence that you have put into two reports. The first was written on 7 November 2017 and the second written on 31 May 2018.

A. Yes.

Q. Have you got copies of those reports to hand --

A. Yes, I have.

Q. -- if required? Thank you.

Now, I would just like the jury to understand, first of all, what your purpose was in your initial report?

What had you been asked to do by the police?

A. Yes. I became involved with this case in July 2017 via the NCA, that's the National Crime Agency, and they provide links between people from my kind of background who prepare work -- prepare reports for the police authorities. So as a result of a discussion between myself and the NCA, I visited Cheshire Police, and my role -- and their concern was that there had been a number of deaths in the Countess of Chester Hospital which were unusual in that there were far more deaths than they would expect, and that the deaths were -- followed collapses of babies that were otherwise quite stable, and not only were the babies stable, but following the collapse, in many of the cases, resuscitation was not successful and the baby died.

Therefore, given what we discussed a couple of weeks ago regarding my hands-on neonatology background and experience, I thought, yes, I can help, advise, review the case notes, and form an opinion as to what could have led to the collapse of the [Babies A & B] and others, but let's stick with the [Babies A & B], and why was it that despite very prompt resuscitation in [Baby A]'s case, it was unsuccessful and he died, having, a short time previously, been very well.

So therefore my role was to look at the clinical evidence.

Q. Yes, okay.

Initially at least, was this a sort of sifting process?

A. This was a preliminary process. I obtained copies of the case notes later that year and I prepared a large number of reports during November 2017, and this was one of the first ones. [Baby A]'s case was the first I carried out where the baby had died and where the cause of, firstly, the collapse and, secondly, the death I found quite disturbing and quite unusual.

Q. Yes, all right.

Now, as the case -- and by "the case" I mean the wider case -- has progressed, have you received more information?

A. Yes, I have. My -- this goes off all the time. But all of my reports said: this is a preliminary report and I will provide additional reports if I receive, you know, more information regarding this case or any of the others. Yes.

Q. And I'm talking in general terms at the moment, and not child-specific terms.

A. Yes.

Q. But that additional information, has it from time to time been specific information relating to individual children --

A. Yes.

Q. -- first of all?

A. Yes.

Q. So, for example, as the wider case has progressed, you have been sent witness accounts and that sort of thing from time to time?

A. Yes.

Q. Has that accumulation of information that you have received also included relevant information that bears directly on other children but has a relevance to a specific child as well? So it's directly -- putting that more clearly, it's directly relevant to a third party child, but because of similarities or differences, it has a relevance to the child under consideration?

A. Yes. As I went through the cases, a pattern became apparent. In other words, I was seeing the same thing in other cases. And in certain cases the additional items of information reinforced my original opinion regarding the cause of the collapse. In other cases the additional information, not in this case but in other cases, the additional information led to me changing my mind about the cause of the collapse or, you know, what had gone on.

So therefore, you know, we're clinicians, we rely wholly on evidence, and so in this particular case with the twins the additional -- the extra information I received over the next couple of years reinforced my opinion as to what had led to the collapse of the twin babies, yes.

Q. Okay. What I would like to do is now concentrate on

your more recent report, okay. So that the report of 31 May 2018 which, for anybody's note, is to be found at I744.

Now, as part of your --

MR JUSTICE GOSS: Sorry to interrupt, just so that the jury aren't -- you don't have I744? Exactly. That's what was worrying me. So I want to make it clear. What it is, it's a report, but the witness is going to speak to his report. So it's his evidence. As I have said to you, it's on the evidence that is placed before you.

Where there is reference to documents, as I anticipate there may be reference to documents, you will be told which documents a reference is being made to. All right.

MR JOHNSON: Do your reports, generally speaking, follow a formula?

A. Yes, they do. Because I had to deal with a number of cases and I had no idea as to, you know, the time of any event, I did my report in date of birth order, which are more or less the same order that we've gone through them over the last couple of weeks, but not quite.

So, for instance, my report on [Baby B] preceded the one on [Baby A] because she was the first twin. And if you look at all of my witness statements, this is just to be useful, the first page contains a line called "my reference" and for [Baby A] it has [Baby A], and before that there's a digit, 05. So

he was the fifth of the cases I dealt with.

And for 14 of the 17 cases, my preliminary report or my screening report, if you like, was -- were completed in 2017.

The two insulin cases, which, you know, we've heard about, they were prepared later and there was one other case as well that I prepared later.

But 14 of the 17 cases we're dealing with here, my preliminary -- my preliminary report, screening report, was completed in November 2017.

Q. Yes, thank you.

So one of the first things that you are obliged to set out in your report is the documentation or material that you have received on which you reach your opinion?

A. Yes.

Q. Is that right?

A. Yes.

Q. And that is listed in your reports, and one of -- under paragraph 3. One of the matters that you refer to is the post-mortem images of [Baby A]. Now, they are the radiographs, one of which the jury saw last Friday when Dr Owen Arthurs gave evidence?

A. Yes.

Q. Do you remember that?

A. Yes, yes, yes.

Q. And I would just like, if we can, please -- and I am afraid I didn't give Mr Murphy advance warning of this

don't know -- can we just put on to the screen that particular image, just to remind the jury what it is I'm talking about.

Thank you.

Now, I'm sure the jury will remember this, Dr Evans. I think you saw Dr Arthurs giving evidence; is that right?

A. I did.

Q. And you saw Dr Arthurs refer to what he referred to as gas bubbles in one of the major vessels which are in a line above where we can see the spine of [Baby A] in that image?

A. Yes.

Q. Now, first of all, is this a picture that you received as part of the documentation?

A. It was. The quality was not as good as this --

Q. Yes.

A. -- but I did see it.

Q. Yes. Did you, as a matter of fact, from the point of view of a paediatrician, notice the gas bubbles that Dr Arthurs has told us about?

A. No, no, no, this is very specialised stuff, and even with this quality X-ray, I don't think I would have picked that up as something abnormal.

Q. No, all right, thank you.

Now, if we could remove that image, please.

As part of the material you received, you also were

given the composite medical records of [Baby A]; is that right?

A. Yes.

Q. And whether or not it's true in [Baby A]'s case, from time to time we will come across some of the children in this case where additional medical records have been retrieved by the police after your reports?

A. Yes.

Q. And they have been -- you have dealt with those in supplemental reports?

A. I have dealt with them and I think the other point to be made is that the -- the copies that the police obtained originally were not in the ideal order. They were -- you know, the documents were not in date order, which made it a little bit difficult to interpret from time to time because they were not -- some -- quite a lot of them were out of sequence, which was a bit annoying.

So the police actually got them in all in really perfect order so the reports we are talking about, you know, the ones that start J something, they are in good chronological order. But I didn't have the benefit of the -- of that quality of clinical notes when I was looking at these cases.

Q. Okay.

Now, I just want to deal with the formal statements that you had in [Baby A]'s case by the time you came to write your report on 31 May --

A. Yes.

Q. -- last year.

You were given --

A. 2018.

Q. Did I say last year?

MR JUSTICE GOSS: Yes, you did.

MR JOHNSON: 2018, yes, sorry, you're quite right.

You were given a number of statements from medical staff that had been involved with [Baby A]'s care; is that right?

A. Yes.

Q. You were also given a detailed report of Dr Beech, who was a paediatric registrar present at [Baby A]'s resuscitation?

A. Yes.

Q. You were given the statement of Dr Brunton, who was a registrar who dealt with [Baby A] the night -- on the night of 7 June; is that right?

A. Yes.

Q. Dr Brunton's report also covered [Baby A]'s readings at 6.45 on 8 June and the handover from the night shift on which [Baby A] had been born to the day shift on the 8th?

A. Yes.

Q. You also say a statement from the consultant Dr Saladi?

A. Yes.

Q. The statement of Dr Sally Ogden --

A. Yes.

Q. -- who worked on the day shift of the 8th?

A. Yes.

Q. And you also noted [Baby A]'s blood gas values on the day shift --

A. Yes.

Q. -- as being normal?

A. Yes.

Q. The fact he was in air on the day shift, didn't require additional oxygen, and his respiratory rates, as recorded in those observation documents that we see every hour on the hour?

A. Yes.

Q. Yes. You had material from Dr Ogden and/or Dr MacCarrick relating to passing the first UVC?

A. Yes.

Q. Just to remind us what a UVC is, please?

A. It's an umbilical vein catheter or cannula.

Q. Yes. And yesterday Dr Jayaram, the consultant paediatrician, told us that the catheter passing into the hepatic, the liver, vein was a matter of pure chance. Can you just explain to the jury how these things work?

A. Yes, I can. With newborn babies the umbilical vein, which is the vein that supplies blood before the baby is born, is a very easy access point for giving intravenous drugs or fluids.

So therefore it's much easier to put a cannula into

an umbilical vein than to try and find a vein in an arm or leg. Therefore it's practical to pass a cannula into the umbilical vein.

Now, once it goes through the umbilical vein, you hope that it will go through into the vena cava.

Q. What is the vena cava?

A. The vena cava is the main vein that supplies blood that comes from the lower limbs, from the legs, up to the heart.

Q. So it's taking blood back to the heart?

A. Taking blood back to the heart. It's the big, big vein in the body.

Q. Is that one of the great vessels that were being spoken of by Dr Arthurs?

A. Yes.

Q. What is the other great vessel?

A. The other great vessel is the aorta, and the aorta is the great vessel, the big blood vessel, that takes blood from the heart to all parts of the body.

Q. Yes.

A. So the aorta distributes blood that is oxygenated, supplying to the body, and then once the body has taken up the oxygen, the blood is returned to the heart via the vena cava, via this big vessel.

Q. And the aorta, is that an artery?

A. Yes.

Q. Easy to remember. And an artery is -- an artery takes

blood from the heart, a vein returns blood to the heart?

A. Yes. The aorta delivers blood from the left side of the heart to the body, and the veins return blood to the heart, to the right side of the body, and then on to the lungs --

Q. Yes.

A. -- where the blood is oxygenated in the lungs, and then from there to the left side of the body, and pumped around the heart.

Q. Thank you.

A. That's the basic plumbing.

Q. Yes, thank you. So aorta, artery; vena cava, vein. An easy way for people like me to remember.

So that concerns the -- so I think I slightly diverted you from the question I originally asked, which was: what is the problem once you get into the umbilical vein with either going into the great vessel, the vena cava, or alternatively into the hepatic vein?

A. Yes. You hope it gets into the vena cava. You've no control over where it goes. So unfortunately sometimes it goes into the portal system, the liver system. It was described as going into the wrong place. I would prefer to describe it as going into the place that's not ideal. It still works, it still works, but it's not ideal, and therefore usually if it gets into the liver side -- let's put it that way -- if it gets into the liver side, usually the plan is to remove it and have

another go to see if it gets into the vena cava.

But although it's not ideal -- having a cannula going in there, it still works. You know, you can still give fluids through it if you have to.

Q. What is the problem with it going into the liver? Why does that reduce the efficacy of whatever it is that you're putting in?

A. Well, the blood flow to the vena cava is far better. So you've got a nice continuous blood flow. So you're not going to get any complications.

Q. Is the reason it's -- what is the reason why you can't direct it into the vena cava rather than it ending up in the hepatic vein?

A. I don't know it's just that sometimes they go the wrong way.

Q. Is it the equivalent of putting something down a tube and just hoping that when it reaches a junction it goes the right way?

A. Yes. Cardiologists these days, they do these catheters and they have got direct vision of where everything is going.

MR JUSTICE GOSS: Internal cameras, so they can see it?

A. We haven't got that system.

MR JOHNSON: Okay.

So that's what Dr Jayaram told us about putting in a UVC and removing it. Then the second UVC was reinserted at 16.30.

I want to come to Dr Harkness and his evidence next, please. Can we go to the notes, please.

Let's deal with it this way: you will remember Dr Harkness' evidence concerning putting in a long line?

A. Yes, I have been here all the time next door --

Q. Yes.

A. -- so I have listened to all the evidence, yes.

Q. And was what Dr Harkness did standard treatment in the circumstances as they were being presented to him?

A. Yes, yes, routine stuff.

Q. And so far as that is concerned, what is the point -- what was the point of putting in this long line?

A. Right. The importance of a long line is that -- you can put a peripheral line into a vein or you can put a long line in.

Q. What is the difference between --

A. The difference is this: if you put a peripheral line in, blood vessels -- veins in small babies are very friable. So therefore, if you squirt some fluid through it, it will break. The word we use is tissue. Whereas if you put a long line in, the tip of the cannula ends up in a larger blood vessel and therefore, with a bit of luck, it will stay there for a few days.

Of course, the fewer occasions you need to pass a cannula into a small baby, the better, because it's technically quite challenging anyway. It's quite difficult getting a long line in. It needs quite a bit

of skill and experience, but once it's in, it's in, and that saves nurses, doctors and babies a lot of stress.

Q. Yes. Now, at paragraph 36 of your report of 31 May you deal with potential problems of long lines.

A. Yes.

Q. A word to which we were introduced yesterday by Dr Jayaram was tamponade.

A. Tamponade, yes.

Q. And Dr Jayaram, I think, described it as being a perforation in the heart. Well, you tell us what a tamponade is.

A. Yes. The heart is surrounded by the pericardium. The pericardium is simply a lining around the heart. And usually there is no gap between the lining of the heart and the outside part of the heart tissue itself.

But if you can get -- if fluid or anything gets in between the outside of the heart and the inside of the pericardium, this lining, it will constrict and restrict the ability of the heart to contract properly, and it's literally a deadly serious condition. If there's enough fluid there, usually fluid -- could be blood, could be fluid -- then it restricts the heart contraction and, you know, will lead to a deterioration in the child's condition and death.

Q. Is there a clinically recognised potential connection between the insertion of a long line and a tamponade?

A. Yes, there is. It's usually something -- there was

quite a bit of publicity about this some years ago because there was a number of cases of babies who died from cardiac tamponade as a result of this creeping of the end of the long line through to the heart, penetrating the heart, and then the fluid going into the space between the pericardium and the heart. I'm sad to say in Swansea we had a case of that nature where a baby died from cardiac tamponade.

So this is years and years ago and I'm not aware of any cases recently because of more care -- because of the awareness of this creeping phenomenon, but usually this is something that occurs in a long line that's been in for quite some time. It's not something that you get in a long line that's been in an hour or two. So we're talking long lines in for several days.

Q. I think Dr Harkness told us if there has been this sort of perforation injury caused by either the wire or the end of the long line itself, it shows up on a post-mortem autopsy?

A. Well, it would show up on even -- more obvious would be the evidence of the tamponade. In other words you would be able to see fluid or blood or whatever, you know, within -- outside of the heart itself and within the pericardium. So therefore diagnosed -- diagnosing cardiac tamponade at post-mortem would be a pretty straightforward thing to do.

Q. Okay. Have you seen any evidence in this case to

support that as a suggestion for what happened, as a cause for what happened to [Baby A]?

A. None at all, no.

Q. Now, we all heard evidence that at about 9.20 pm [Baby A] was found to be apnoeic, not breathing?

A. Yes.

Q. I'm sorry. 8.20. I'm seeing one thing and saying another. My fault. All right.

We heard about the treatment that was given to him?

A. Yes.

Q. It may help just to remind the jury. If we can, could we go, please, to Dr Harkness' notes which are at tile 183. The jury will see straight away why I said 9 and not 8. These were notes made -- if you look -- when we look at the notes, you will see they were made at 9.20.

It's the previous page which is -- it is my fault.

We can see that Dr Harkness was called to [Baby A] at 20.26. Bagging it started via the Neopuff. Good chest movement seen. He then took us through the steps that he took in an effort to resuscitate [Baby A]. Do you remember that evidence?

A. Yes, I do.

Q. Was the treatment that was given to [Baby A] appropriate in all the circumstances?

A. This was very good standard resuscitation procedure. It's what you would expect in any neonatal unit in 2015.

Q. Now, we heard yesterday from Dr Jayaram, the consultant, about the various possibilities that were running through his head when he came to assist Dr Harkness a few minutes later. Again, were the possibilities which he was considering appropriate to the circumstances?

A. Yes, they were. He went through a sequence of possibilities. I don't think I need to go through them.

Q. No.

A. But that is what I would expect any experienced paediatrician to do: is it this, is it this? In other words, 1, 2, 3, 4. I think he mentioned the four Hs and the four Ts. Great. A nice way of remembering all these things. So that's exactly what we would all do.

Q. Now, for the -- to help other people's notes, I'm going to deal with your observation section of your reports, Dr Evans, which is paragraph 32 onwards.

A. I have come without my mouse today.

Right, yes.

Q. Now, did you review the medical records relating to [Baby A]'s progress from his birth on the 7th to his collapse after 8 pm on the 8th?

A. I did.

Q. And have you listened carefully to the evidence that's been given in this trial concerning that period of time?

A. I have, yes.

Q. What view have you reached as to [Baby A]'s state of

health just before the time he collapsed?

A. Right. By the -- just before he collapsed, [Baby A] was in a stable condition. In my report I described it as perfectly satisfactory. "Perfectly satisfactory" is one of my little sayings. Probably better to describe it as being stable or satisfactory, but it was as well -- he was as well as could be expected. All the markers of well-being were very satisfactory.

What I mean is he was in air. So he was not requiring additional oxygen. His oxygen saturation was up in the high 90s, which is great. His heart rate was within normal limits. He wasn't requiring anything in terms of, you know, breathing support and his respiratory rate was slightly above the norm -- normal range.

So that was the only marker that was outside the normal range, but again, from a clinical perspective, what one tends to do is look at the overall well-being of the baby and so those markers -- I mean really by that time he, [Baby A], had survived the most dangerous journey of his life, really. You know, he was, you know -- I think this is why people get involved with baby care really, because, you know, by this time he -- you know, he'd -- would he have needed care because he was too small to feed himself, etc, but he was -- he was doing really, really well and I think everybody on the unit would have been really, really pleased with the way

he was.

Q. Yes.

Now, so far as the repeated effort to insert the UVC was concerned, in your opinion, did that have any effect on [Baby A]'s deterioration?

A. No. It didn't cause his deterioration at all. It's an upsetting procedure, obviously. You have doctors poking around in your tum with cannulas. So -- but it would not have caused his deterioration, no.

Q. Equally, did Dr Harkness' insertion of the long line have any effect on [Baby A]'s deterioration?

A. None at all.

Q. We've heard of a phenomenon called apnoea of prematurity.

A. We have.

Q. Could you just explain -- just remind us what that means in practical terms, please?

A. Yes. Premature babies sometimes forget to breathe, which is simply a way of putting it. Premature baby breathing is not always regular in and out, in and out, in and out, as you would expect with a full-sized baby. So therefore, with apnoea of prematurity, the breathing might be -- become more and more shallow with each breath, and then they might, you know, stop altogether. And then they start again and that is a pattern that we associate with prematurity.

If they forget to start again, which happens, that

is apnoea of prematurity. It is a condition that every nurse is aware of, every doctor is aware of, so we know all about it.

Q. What remedial efforts need to be taken for a baby that is exhibiting apnoea of prematurity?

A. Very easy. It depends on other parameters. If the baby just started -- stopped breathing, the nursing attendant would maybe move a leg.

Q. Dr Jayaram said poke the baby. Is that --

A. Yes. I think that's a bit of vernacular, but yes. Just get the baby, you know, to jig up a bit, and that usually works. That works most of the time. And it's not a concerning matter if they start breathing straight away because these babies are connected to continuous monitoring. In other words, you don't measure the respiration every hour. You can see the wave pattern, as I described the other week, on a monitor. So you can see if the baby is breathing satisfactorily.

Q. Yes. Now, you have heard the evidence from the witnesses concerning what I'll paraphrase as a "flitting rash". I'll give no further description than that.

A. Yes.

Q. In the context of what happened to [Baby A], what in your view is the reason for his collapse and death?

A. Right. At the time I prepared my report, of course, I was not aware of, you know, the rash. It was much -- I knew nothing about the rash.

Q. It's not in the notes, is it?

A. No, there's nothing in the notes. I have heard all of this over the last couple of days, but it wasn't in the notes. So -- but I heard very -- I heard the descriptions of this rash and, in my opinion, I think the rash can be -- [Baby A]'s collapse fits together and go with a -- is sufficient to make a diagnosis that his collapse was the result of an air embolus. In other words, air had somehow got into his circulation.

I'd formed this opinion without knowing about the rash. I'd formed this opinion without anybody suggesting to me that anyone had made any -- expressed any concerns about air embolism at all, you know, in this case or any of the others.

Q. Yes. I'll deal with air embolus in a second. But so far as other potential causes of death, was there anything that was, so far as you were concerned, a credible explanation for what had happened?

A. Cause of collapse rather than cause of death?

Q. Yes, sorry.

A. We're always on the lookout for sepsis, for infection in babies, because prem babies are at risk of infection. There was no evidence of infection.

Hypoxia, lack of oxygen. There was no evidence of that. His sats, in other words his oxygen saturations, could not have been better, high 90s. So there was no evidence of that.

He was breathing well. You know, that's fine. And there was a bit of hiatus with regard to the fluid. You know, there was a period of about 4 hours, I think, where he didn't have fluid. His fluid rate at the time was 4ml an hour. So he lost 16ml -- potentially 16ml of fluid, but that in a baby, who was otherwise well, would not cause a sudden onset unexpected collapse.

Q. Now, Dr Jayaram yesterday said that if the baby is dehydrated, there are consequences so far as the respiratory rate is concerned or the heart rate?

A. Heart rate.

Q. Heart rate, I beg your pardon.

A. All doctors are familiar with dealing with patients of all ages who come in in a "collapsed" state to A&E where they've lost blood, you know, trauma. And in those cases -- or severe gastroenteritis in children, still common.

And in those babies, if they are severely ill as a result of loss of fluid, loss of, you know, diarrhoea, vomiting, loss of blood, the heart rate goes up.

So the heart rate was not high. The heart rate was pretty steady in [Baby A]'s case right until the time he collapsed.

So therefore although the failure to give him 4ml of fluid per hour --

Q. I think it's 4ml per kilo --

A. No, for him it was per hour. Day 1 at 60ml per kilo per

24 hours. He was 1.6 kilo, so that's about 100ml per day. So 24 hours, it's 4ml per kilo. So that's the way we work it out.

So therefore although he was devoid of fluid for 4 hours, the fact that he was on constant monitoring and the monitoring was great, you know, within normal limits, that was not an issue in relation to his collapsing.

Q. Okay. Now, air embolus. How does an air embolus kill somebody? What is the mechanics of it?

A. The mechanics is pretty straightforward. It interferes with the blood supply to the heart and lungs, to the lungs, and so the mechanism is the same as a clot from a -- that goes into the lung, what we know as a pulmonary embolus. It blocks off blood supply and kills you.

Q. Now, we heard evidence concerning this purple or pink appearance that was -- that was flitting.

A. Yes.

Q. I want to ask you about an academic paper to which Dr Jayaram was referred yesterday. All right? I just would like to put that page up on the screen, please.

It's the second page that he was shown. Thank you.

Can we expand that left-hand column, please.

Now, you will remember, I'm sure, Dr Evans, that it was being suggested to Dr Jayaram yesterday that he in effect had lifted the explanation that appears in this

academic paper and imposed it into his description. In other words, where it says:

"In one of our own cases we noted bright pink vessels against a generally cyanosed cutaneous background."

That was the part that was quoted to him yesterday.

A. Yes.

Q. I want to ask you about the next sentence, please. It reads on follows:

"This we attributed to direct oxygenation of erythrocytes..."

What is that word?

A. Erythrocytes, red blood cells.

Q. "... adjacent to free air in the vascular system, while the tissues continued to be poorly perfused and oxygenated."

Can you translate that into language that I can understand, please?

A. Yes. It's straightforward, really.

Q. Well, for you!

A. Right. Yes. First of all, just briefly about this paper, that is paper by Lee and Tanswell. And it's probably the best known paper in relation to pulmonary vascular air embolism in the newborn. It's published in 1989. So despite being over 30 years ago, it's a very well-known paper -- and the other reason it's well-known for British paediatricians is it was published in the

Archives of Disease in Childhood, which is a monthly academic journal that all paediatricians receive.

So therefore it's the most -- so the Archives are the most widely read journal from paediatricians. Anyway, just to -- so this is not some obscure journal, you know, that nobody ever reads.

Right. In terms of this description, if babies collapse they become hypoxic, and the usual change in colour is they go blue. Okay? So they become cyanosed.

If their blood pressure drops, they may go white. You know, because there's no circulation. So therefore the colour changes you find in collapsed babies, collapsed children, is a combination of blue and white because they are white if there's no blood getting into the peripheries, into the skin, and they're blue if the blood that does get there is hypoxic, in other words lacking in oxygen. So that's what we're used to seeing in babies who collapse because of infection or any other cause, whatever.

So therefore what we've got here is:

"Bright pink vessels against a generally cyanosed cutaneous..."

You know, relating to the skin. So the fact that it's bright pink, now, that is remarkable. It's very unusual. It shouldn't be pink. You know, or if it's pink, why has the baby collapsed? It doesn't make sense.

Their interpretation is absolutely correct. They attribute it to the direct oxygenation of red blood cells -- in other words, red blood cells have got oxygen in them -- and adjacent to free air in the vascular system. In other words, there's air in the circulation. You know, air or oxygen in the circulation.

Q. So air is 21% oxygen?

A. And air is 21% oxygen. So this is remarkable. You should never, ever, ever have air in your circulation because of -- because it's dangerous.

And if the tissues continue to be purely perfused and oxygenated -- so they are really saying this makes no sense because we've got pink colouration and yet we've got collapsed patients. This shouldn't happen.

And they attribute it, quite correctly, to the fact that the cause is air embolism: air has got into the circulation.

Q. So it is the blood, essentially, unoxygenated, but the red blood cells oxygenate themselves from the air, in other words the 21% of the air, that's in the

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bloodstream?

A. Yes. Yes.

Q. That's the answer?

A. Yes.

Q. Now, initially, Dr Evans, you offered a potential alternative cause of [Baby A]'s collapse and death. Can

we just deal with that. First of all, what it was, and secondly, whether you still suggest that that is a possibility.

A. No. Right. This was the -- the twins in the first cases I dealt with were presented in this way, and it's not a criticism. None of us knew what had happened. In other words, we were -- you know, we just had no idea why these babies had collapsed.

So one of -- so what crossed my mind was obstruction in breathing, smothering. The other possibility which I mentioned, part of the differential diagnosis that we -- you know, that doctors do is that he'd received an injection of some noxious substance. But I just mentioned that, I have dismissed that.

Q. You're not suggesting that, on the evidence as you now know it to be, that that's a creditable alternative?

A. No. If somebody asked me, give me five or six reasons why this baby could have collapsed, it would be one of the reasons. But no.

Q. I'm sorry, you finish your answer.

A. No, I finished.

Q. Can I just deal with a term that you have used because it's likely we're going to hear it again during the evidence, so I'm asking you to define a differential diagnosis.

A. Yes.

Q. What is a differential diagnosis to a medic?

A. Yes. If you have a patient, any patient, who presents with an illness, there may well be three or four reasons to explain this illness. Babies are physiologically fairly simple individuals. So in a baby who has collapsed, the differential diagnosis would include hypoxia, lack of oxygen, sepsis, infection, airway obstruction, again causing hypoxia. So we would go through a list. We've discussed tamponade. That's another.

So therefore there's a whole list of potential conditions that could compromise the stability of your baby. And that list of conditions is what we call a differential diagnosis.

Q. All right. So is it another way in effect of putting what Dr Jayaram was articulating in the witness box yesterday, he was going through possibilities?

A. Yes.

Q. This is the method by which your profession, in effect, works in real time?

A. Yes. It's thinking out loud.

Q. Yes.

Finally on [Baby A], please, Dr Evans, the means by which air could have been inserted into a baby's circulation. From what you know of the way in which [Baby A] was being treated, what are the possibilities?

A. Well, there are only two, really -- sorry, there's only one, really. The air would have gone through an

intravenous line. And that can only occur in two ways: accidentally or on purpose. And that's it. Yes, so those are the only two explanations.

Some time ago I obtained a copy of all the intravenous bits and pieces of equipment used at the Chester hospital, which we're all familiar with. We are all familiar with these lines from visiting people in hospital, an intravenous bag line. I won't go through the whole bit.

But doctors, nurses, we're so obsessive about ensuring that air does not get into the system, you know, we're absolutely obsessive about it, and always have been, and it's much better now than --

So having rigged up the system that was used in Chester, and it's in a room in this court, in this building, so we could demonstrate it if necessary.

I rigged it all up. There's no way air could have got into [Baby A] by accident. You know, the fail-safe systems, the monitoring, the alarm set-ups, which have been present for, you know, a couple of decades, I suppose, ensures that this is not something that can occur accidentally.

MR JOHNSON: Thank you. Well, I'm going to recall you a bit later to deal with [Baby B]'s case if I may, and Mr Myers is putting over his questioning until we've dealt with [Baby B]. So those are all the questions I have at this stage.

A. So now Dr Bohin is coming in?

MR JOHNSON: Yes, please.

MR JUSTICE GOSS: I'm just going to see -- do you want to have a short break before we carry on or do you want to carry on for another 40 minutes?

(Pause)

MR JUSTICE GOSS: Right, good, we'll carry on.

MR JOHNSON: Thank you for now, Dr Evans.

MR JUSTICE GOSS: So thank you, Dr Evans. That's it for the time being, but you will be coming back later, some time this afternoon. Thank you very much indeed. But take your documents with you.

... [Omitted] ...

(2.10 pm)

MR JUSTICE GOSS: Dr Evans.

(In the presence of the jury)

Cross-examination by MR MYERS

MR MYERS: Dr Evans, at the point we're at now, you have been provided with all the exhibits relating to the medical evidence of the children in this trial, haven't you?

A. Yes.

Q. And so far as we know, you've had access to all the witness statements dealing with the medical aspects of the case?

A. As far as I know, yes.

Q. As far as you know.

And as the trial has been proceeding in front of the jury, you have been able to watch it, albeit from another courtroom on the link?

A. Yes.

Q. So you've been able to follow what has been happening?

A. Yes.

Q. Your involvement in this investigation began in 2017, did it?

A. It did.

Q. And it's continued over the years since then, hasn't it?

A. Yes.

Q. At the moment you're giving evidence about [Babies A & B]?

A. Yes.

Q. And also some of the general issues relating to air embolus?

A. Yes.

Q. You've prepared and provided a very large number of reports, inevitably, over the years, haven't you?

A. Yes.

Q. And what you say about air embolus generally features across dozens of them, doesn't it?

A. Well, a number of them, yes.

Q. Yes, a number of them then, however you like to put it.

MR JUSTICE GOSS: Well, dozens is 24-plus.

MR MYERS: It could well be dozens, actually, given the

children you have looked at. The reports have covered particular children where it has been an issue in your view, haven't they?

A. Yes.

Q. And they have also covered reports which have dealt with specific aspects of air embolus, haven't they?

A. Yes.

MR JUSTICE GOSS: I was just checking that you mean literally, not a figure of speech.

MR MYERS: No, literally dozens, my Lord, but I'm grateful for checking that. It wasn't a figure of speech.

With that in mind, could you tell us, what do you say are the features that support a diagnosis of air embolus?

A. Sorry, can you say that again? What --

Q. What are the features --

A. Oh, right.

Q. -- the characteristics to support a diagnosis of air embolus?

A. Right. The first is that it occurs in a patient of any age where there is access to the circulation via an external line; in other words, an intravenous cannula. So there has to be some kind of access there, firstly.

The second point and the most important point is that an air embolus will lead to a sudden and unexpected collapse. A patient otherwise stable, irrespective of age, otherwise stable, suddenly collapses -- and by

collapse I mean stopping breathing, change of colour, cyanosis and bradycardia -- in other words reduced heart rate -- and death. And this occurs all of a sudden.

There are additional features, and as with all of clinical medicine, you don't get all of these features in all of the cases. And as we've heard this week and last, the two major associated features are those of unusual skin discolouration, and I won't elaborate on that because I think we've explained that, and also the presence of air in the great vessels or air in various parts of the body. It could be the heart, could be the vein, could be the aorta. So those are the compounding features that lead to a diagnosis of air embolus.

The other point, which is also important from a clinical point of view, is that this collapse occurs not only out of the blue, but there is no other explanation that fits with the diagnosis of collapse.

The final point is that -- and this applies obviously to patients in hospital -- is that resuscitation is unsuccessful. Because of the way doctors are trained, you know, resuscitating patients is part of our bread and butter, so the procedures that we use to resuscitate babies, children, adults, are well known, well drilled into us. But when the resuscitation does not work, leading to the death of your patient, then that adds to one's confirmation of the diagnosis of air embolism.

Q. Thank you. Just in terms of your position with it, can I ask, when did you last see a case of air embolus in clinical practice?

A. In my 30 years as a consultant paediatrician in Swansea, we had no cases of air embolus in the neonatal unit, and we had no cases of air embolus with which I was involved in the neonatal unit or anywhere else.

In relation to -- which is something I'm pretty proud of, by the way.

In relation to Swansea generally, one of the great tragedies that occurred to us in Swansea is a baby who suffered an air embolus as a complication of what should have been a routine surgical procedure. This was a babu of a few weeks old who was having an operation for a condition called pyloric stenosis. Part of the surgical procedure is making a nick in the lower aspect of the stomach without actually causing a perforation. What the surgeon does is ask the anaesthetist to inject air into the stomach to ensure there is no leak. It's routine.

For one reason or another, instead of injecting air both the stomach, he attached the syringe to the intravenous line, injected air into the circulation, the poor baby collapsed there and then, and resuscitation was unsuccessful, and the baby died. As you can imagine, this was absolutely awful. It was haunting. It led to a trial, a criminal trial, etc. And I think

it's something that, despite not having anything to do with this particular baby, it's something that you never, ever forget.

Q. Understandably.

A. So that's the closest I've got to a baby with air embolus: it is that rare and unusual.

Q. In fact that's something you refer to in one of your general reports, isn't it?

A. Yes.

Q. You refer to it in --

A. It's awful.

Q. -- a report of 3 June 2019. For those who are keeping a note, if it's relevant, it's page 475 of the statement. And in that case the baby collapsed very quickly; is that correct?

A. Again, I have not seen the report, but yes. Yes.

Q. And resuscitation was not successful and the baby died?

A. Yes.

Q. As it happens, there's certainly nothing you put in your report on that occasion, Dr Evans, suggesting there was any kind of discolouration that you have identified that was linked to that?

A. I have not seen the report. I have not been involved in any way with this case. All I know is it happened.

Q. You're unaware of any discolouration or indication?

A. I have no idea.

Q. So in terms of your clinical experience, there's no what

could be said to be hands-on experience of diagnosing object encountering air embolus, is there, or how it presents?

A. Absolutely not, and I think that's something I'm very relieved and pleased about, actually.

Q. We understand that, but in terms of how you're describing what you see in this case, you're not comparing that against any clinical personal experience, are you?

A. Good heavens, no.

Q. No. In reaching conclusions about air embolus in this case, would it be right to say that to some extent you've relied upon what could be called a diagnosis of exclusion?

A. Yes.

Q. And a diagnosis of exclusion is where a clinician looks at what he or she considers to be the available alternatives?

A. Yes.

Q. And having discounted those that appear to be available, is then left with one or two options, maybe just one, and so in that way they reach a diagnosis in that route?

A. Yes.

Q. And that's a diagnosis of exclusion?

A. In this particular case there is more to it than a diagnosis of exclusion because we know about the discolouration. I'm happy to discuss that with you, and

we know about Dr Arthur's reports about air in the great vessels.

So therefore in this -- when I formed my initial diagnosis, because I had reached the conclusion -- I reached a diagnosis of air embolus without knowing about the discolouration -- and we're talking about [Baby A] --

Q. In fact I'm talking generally at the moment. I will be coming to [Baby A].

A. So in general it's a diagnosis of exclusion, but if you then discover additional items of information, discolouration is one, air on X-ray is another, and as Dr Owen Arthurs said, you don't need abnormal X-rays to confirm the diagnosis. So that just simply firms up your diagnosis.

Q. All right. So you're able to proceed -- no hands-on experience. I'm not -- I'm just pointing that out. You're not comparing it with anything, but you're able to proceed by way of a diagnosis of exclusion and you can look for supporting features where they exist.

You've also sought to rely upon research into this area where it's available, haven't you?

A. Right. It is quite important to say that, yes. Part of clinical practice is a term we heard last week, evidence-based medicine.

Q. Yes, I asked Dr Owen Arthurs about with it, or Professor Owen Arthurs.

A. Evidence-based medicine basically has four tiers: one's own experience is one; higher up is what you read in textbooks; and higher up still is what you read in medical peer-reviewed journals.

The problem with air embolus is that you have to rely firstly on -- well, very often on isolated case reports, one case here, one case there. You have to rely on the fact that medical teams are honest enough to disclose that a child under their care died of air embolus because one tends not to spread news about the mistakes we make.

And most important of all, I think, in this -- with regard to air embolus, as we've -- as I said this morning, the main paper we refer -- the paper we refer to most commonly is the one by Lee and Tanswell, 1989. There are very little new publications regarding air embolus in babies. That is not a criticism, that's a compliment.

You can't produce research papers or publish papers on conditions that don't occur. And we have become obsessive, meticulous, throughout our careers in relation to avoiding getting air into the circulation of sick babies and sick children.

So -- so therefore -- so it's not a matter of having to apologise for quoting research papers that are 30 years old or more, nor is it a weakness, I believe, in quoting papers that involve one -- you know, just one

case, for instance.

One of the papers I published was from Pakistan, I think, where they don't do post-mortems. So therefore the assistance that we get in the situation of this nature from research papers is inevitably relatively limited.

Q. What I just wanted to establish was that research papers play a part in what you do and they do, don't they?

A. It does.

Q. Before I move on, I just want to ask you about one thing you said. You said:

"We don't spread news about the mistakes we make."

Who is the "we" when you said:

"We don't spread news about the mistakes we make."

A. I think it's a royal we. It's a royal we.

Q. Well, "we" is who?

A. It's a royal medical we. You know, it's human nature, I think, to share information with your nearest and dearest as far as your medical colleagues are concerned. You refer to the coroner, as has happened in many cases here. So you deal with it in that way and you have to run it past the -- you know, the health board, the health trust. But it's not something that you publish in the press -- public press and media.

Q. All right. So is it fair to say that people might be a little slow to acknowledge where they've made mistakes?

A. Yes, absolutely.

Q. Now, when you consider a case that comes before you and there's been a serious deterioration or a death, I was going to suggest to you there's a number of options or conclusions you can draw. These are just initial points. We will get to the detail of everything in a little bit, Dr Evans.

Where there is a serious deterioration or a death, that may be due to an identified medical condition; that's one option, isn't it?

A. That's correct, yes.

Q. I'm suggesting these are all things you must keep in mind when you're in a position that you're in?

A. Yes.

Q. They may be due to a medical condition that is currently known but hasn't actually been identified in the proceedings, in the investigations associated with them?

A. Well, if it's not been identified it can't be known.

Q. You know, Dr Evans, there is space sometimes for uncertainty in medical diagnosis, isn't there?

A. Yes. That's a different point altogether.

Q. Well, is it the case that there may be a situation that is due to a medical condition that is known but not identified?

A. Such as?

Q. Well, for example, a genetic condition. Tell us about the genetic testing in this case or metabolic testing?

A. Genetic conditions causing air embolus, okay.

Q. No, you asked me. I'm answering your question: has there been genetic metabolic testing in this case?

A. As far as I know, no.

Q. No, right.

A. But I am unaware of any genetic -- for what it's worth, I am unaware of any genetic condition that would lead to (overspeaking) --

Q. So it's important to keep in mind a medical condition that is currently known but may be currently unidentified?

A. It happens, yes.

Q. Sometimes you have to keep in mind it may be due to a medical condition that is currently unknown, sometimes?

A. Well, these are hypotheticals, aren't they?

Q. Yes, they are there. There may be a problem in care given that has played a part in what takes place?

A. In --

Q. In the care that has been given or treatment.

A. Yes, yes, that's a possibility.

Q. That might be difficult to identify if people are slow to spread news about it, mightn't it?

A. No, it would be difficult to identify if someone -- if a patient presents with -- in a way they have never seen before.

Q. It may be due to deliberate inflicted harm, of course?

A. Absolutely.

Q. Sometimes the right outcome is to consider that ultimately it cannot be ascertained from the available evidence. It is unascertained.

A. That is a term I'm familiar with, yes.

Q. Well, you have been appearing as an expert witness before the courts for many years, haven't you, Dr Evans?

A. I have.

Q. And you are familiar that pathologists, for example, will find the cause of death unascertained?

A. That is true.

Q. Indeed, you surely will have had reports where you have found the explanation is unascertained?

A. That is correct.

Q. So that's always a possibility, isn't it?

A. Yes, it is.

Q. I'm just looking at the range of where you can get to when you look at a situation; do you understand?

A. Yes.

Q. Would you agree it's important not to focus disproportionately upon a conclusion of deliberate harm if there's no direct evidence of it?

A. Would it -- can you say that again.

Q. I'll rephrase it: it's important not to hurry to a conclusion of deliberate harm if there's no direct evidence; would you agree?

A. You never hurry to a diagnosis that has such serious

consequences.

Q. And would you agree that the fact there is an allegation of deliberate harm should not be the starting point when you approach a clinical pathological situation to form an opinion?

A. Absolutely.

Q. When you were asked to review the cases, and asked for your involvement in this investigation, you told us the NCA were the agency that contacted you; that's the National Crime Agency?

A. Yes.

Q. Did they provide you with the theory that deliberate harm had been done?

A. No. By the time that I had -- the NCA got me involved in this case, I had prepared nearly 50 reports for police authorities on other issues on top of all my other stuff with the Family Court, etc. So therefore I was someone who was known to them as someone who dealt with -- you know, with suspicious events.

Clearly the fact that the police were involved, you know, I would be have a bit naive not to appreciate that somebody was concerned about what was going on. And, you know, so they didn't tell me anything about what with happened. All I was told was -- and I think this was in the papers actually -- all I was told was there's a hospital in Chester where lots of babies have died and this is a hospital where three or four babies die per

year, you know, which is -- you know, about the average for a baby unit of that size -- but somehow or other, over a very short period of time, they'd had loads of -- they'd had far more deaths, which is a worry. Several of the deaths were unexplained, which is even more of a worry. Several of the deaths occurred in babies who were otherwise -- who were previously stable, which adds to the worry. And several of the babies who had collapsed, resuscitation was unsuccessful, which is even more of a worry. So therefore we had a constellation of worries here and so the medical team got the police in.

So that's the -- that is how it is. And by the way, before -- and so when I went to see them, I said, look, just give me the clinical notes of all the babies within this window, this 12-month period. Give me the notes of all the babies who have died, all the babies who have collapsed, not died, notes of any baby, you know, where something has happened that you're -- where you can't explain it.

So it had nothing to do with investigating a crime. It was investigating a clinical condition. It's quite important actually. It's different.

All of my reports are based on investigating a clinical condition. My reports are clinical conditions. I'm not there investigating crimes; the police do that. I'm there, because of my medical expertise, to see if I can assist in forming an opinion

regarding what's gone on. And I have done a number of reports where things were suspicious -- for police authorities elsewhere where it was obvious to me that some child had sustained some kind of unusual accident, but it was an accident, and therefore the police were able to close the file and, you know, that was that. So that happens as well. So it isn't that if I'm involved, you know, we're going to end up with somebody being charged with a serious offence.

So in this particular case that's where we started from. The disadvantage that the Cheshire Police had, and I had, at the beginning was that, you know, these babies had just collapsed and we had no idea why.

What I told them, and I think this is quite important from a diagnostic point of view, I said, look, if a baby collapsed -- collapses, something has happened. It might be the end result of an infection. It might be the end result of, you know, a brain haemorrhage. It might be the end result of a collapsed lung. You know, there are all sorts of reasons why babies collapse.

But if I can get all the reports, I will work out a timeline for you. That's the way I did all of these reports. That's the way I do all the reports I do.

I'll work out a timeline for you. Right, this baby was well up until a particular time and then suddenly he crashes.

Now, on the whole babies don't do that. You know, they don't suddenly crash. And on the occasion that they do, they deteriorate quickly, as we have heard already, you can resuscitate them quite easily.

So therefore what I said was, look, I'll go through all these notes for you and I'll identify every point where a baby has deteriorated, okay. That's the first thing I did.

The second thing I did, I said, right, let's see why these babies collapsed. Now, we will deal with this in another cases in this trial. There were a number of deteriorations where it was obvious why a baby had deteriorated: there was evidence of infection, evidence of a blocked tube, a collapsed lung maybe, pneumothorax. So --

Q. Sorry to interrupt, Dr Evans, may I just interrupt to ask, are you saying this is everything you've been told when this began (overspeaking) --

A. No, this is what I did. This is what I did.

Q. If you just pause, I don't mean to be rude, but the question I asked was your state of mind, asking about what you thought when you were first approached by the NCA.

A. No, my state of mind was very clear, which I think is why I'm still in demand as an independent medical witness. My state of mind was very clear: let's find out the diagnosis, let's find out what on earth is going

on. Nothing to do with, you know, crimes or anything of that nature. Let's find out what's going on, let's identify any specific collapse. You know, let's see if I can explain all of this.

And there were occasions when I could explain it and there were -- and there were occasions where there was something that I found deeply suspicious, and, you know, we will -- if we are speaking generally, Mr Myers, there were cases that were -- there were incidents that I found disturbing. I don't want to talk about that today because that's for other cases.

So therefore when I investigate a case, when doctors investigate a case, you are only talking about one case. So I -- so in my initial scrutiny, you know -- you know, that is obviously was -- didn't cover everything, in my initial scrutiny I looked at 28 cases. Twenty-eight. And then they were followed by another five. So there were 33 in all, 33 in all, and then the two insulin ones came later.

So therefore I looked at loads of cases. In certain cases the reason why the little baby had died was very obvious. I recall there was one case where the baby was born severely asphyxiated, severe brain damage from birth, unsurvivable.

There was another baby -- there were other babies who had significant congenital malformations, incompatible with life.

Q. I don't want to take you away from the topic (overspeaking), Dr Evans?

A. Yes, but that's the way clinicians approach things. Okay?

So it's quite important, I think, for members of the jury to appreciate that I was not investigating a suspect who was an individual who was suspected of inflicting harm on a baby. I was not doing that at all because, for the obvious reason, I was unaware of any suspect. The name Lucy Letby meant nothing to me. I didn't know any of these people. Air embolus had never crossed the radar of anybody in Chester, as far as I knew. The other events that we've spoken about, none of that was remotely run past me.

I had a -- I was on the easiest position and the most difficult. Easiest in that I had a blank sheet, "What on earth is going on here, Dr Evans? That's for you." Helping the police with their enquiries, if you like, Mr Myers.

I had no idea -- we had no idea and therefore I relied entirely on the evidence -- the evidence I could see from my -- from the clinical notes and applying my clinical experience to form an opinion as to the cause.

So that is -- you know, that's how I did it.

Q. Can I just ask you to answer this, I don't mean to be rude, but as directly as you can, Dr Evans: is there any

possibility that you might have allowed the suspicion of harm, when you were asked to look at these, to have led you to look for possible mechanisms in some cases?

A. No, no. I wasn't looking for harm, I was looking for a cause.

Q. For example, when you were told the babies were stable and just collapsed, was that your starting point?

A. No.

Q. Did you have telephone conversations with the officers of the NCA?

A. No.

Q. None?

A. As far as these babies are concerned, it was having a chat with my -- my contact at the NCA, da da da, let's go to Chester. So I spoke to her and said we don't know what is going on. Basically nobody knew what was going on as far as I could tell.

So I said, look, I can't tell what is going on, what I suggest is this -- this is before I, if you like, accepted the instruction to do anything for Cheshire Police.

What happened was they got in touch with -- the NCA and I got in touch, and Cheshire Police rung me, I think, and I said, look, let's -- I'll come up and see you. So I -- so -- I'll come up and see you.

So I drove up from Carmarthen, where I live, on a sunny day in July, and said look, I'll come and see

you, I'll come and talk to you, I don't know whether I'm of any use to you, all I want you to do, bring me a case, bring one case file, just to give me a sort of idea of what's going on here.

Q. During the course of any discussion before you wrote the reports on [Baby A] or [Baby B], was the expression "air embolus" used at any point?

A. No, no.

Q. Not at all?

A. The first person who thought about air embolus in this particular case, as far as I know, was me.

Q. Well, we know that we have heard already from Dr Jayaram that the doctors at the hospital had already -- it seemed one or more had turned their mind to that at some point during that period. We know that, don't we?

A. Do we?

Q. You listened to the evidence yesterday?

A. Yes, but that was afterwards.

Q. No, during the period after [Baby D]. I asked Dr Jayaram about it.

A. I can't remember that.

Q. Well, if you can't remember, that's how the paper was raised with him. Do you remember that yesterday, going to the paper? Do you remember going to the research paper with Dr Jayaram?

A. I remember that.

Q. Yes. And my questions to him about going to look at

this after the death of [Baby D] in June 2015 and how he and his colleagues were talking about this, pulmonary vascular embolism?

A. But I knew nothing about any this.

Q. So when you had your chat with your contact at the NCA, did they not say at any point, "The doctors there think maybe it involves air embolisms?" Did they not give you that much of a steer?

A. Not -- they didn't give me any steer at all. And I need to compliment the NCA, they never give you a steer. They just tell you, look, you deal with the police. They are very good, straight people.

Q. You do recall me asking Dr Jayaram yesterday, just so you're not at any disadvantage about the paper he went to look at?

A. I can't remember the date. Yes, I heard that. Yes, I think there was far too much emotion in that, by the way. But, you know, I was only listening next door.

But I think what Dr Jayaram said was all of this followed -- I mean, I can't remember whether he said it was in 2017 or 2018 or whatever. I didn't -- I read about -- this morning Mr Johnson mentioned my second report where I quoted Dr Jayaram's -- Dr Jayaram's observations regarding the flitting abnormalities and things.

If I could help --

Q. Could I put it this way, Dr Evans, In have asked you

whether there was any conversation when you were approached by the NCA about air embolism and you say no?

A. I can't remember any.

Q. About air embolus, you say no?

A. It's -- I can't remember any.

Q. Right.

A. Okay. I have been involved in this case -- this is the sixth year, so if I've overlooked something or other, that's -- you know. But I can't remember anything.

But I think to help, Mr Myers here, I've got this, okay. Just a minute. Wrong one. Wrong twin.

Q. I would like to move on to [Baby A], but by all means if there's something else you would like to say about this. My questions have been very simple: did your contact at the NCA make any reference to air embolus when talking to you? Your answer, Dr Evans, is no, isn't it?

A. No, not at all.

Q. Shall we move on to [Baby A]?

A. That is what I was hoping we would do.

If I could perhaps, before we go on, we will discuss in some detail -- no, you carry on. We'll come to this, I'm sure.

Q. We know that you've produced a number of reports with regard to [Baby A], haven't you, Dr Evans?

A. Yes.

Q. I just want to be clear about some of the conclusions

which you've presented in them before we look at his case.

A. Mm-hm.

Q. In the report of 31 May 2018, which is the one we've been looking at principally this morning --

A. Let me open that up, please.

Q. Yes.

(Pause)

A. Right, yes, I've got that.

Q. Your conclusion in that is that:

"The collapse was the result of inappropriate therapy within a minute or two before the deterioration."

A. Something like that, yes.

Q. Well, it's not something like that. It's paragraph 38, Dr Evans:

"In my opinion [Baby A]'s demise was the result of his receiving inappropriate therapy prior to his collapse, probably within a minute or two prior to his deterioration."

A. Yes, his collapse. And the next sentence goes:

"His collapse is consistent with his receiving an air embolus."

Yes.

Q. Yes. You say that's consistent with an air embolus, and that is the rapidity of his collapse; is that correct?

A. Yes.

Q. Very fast-acting indeed?

A. Yes.

Q. Your view was that it was probably a bolus of air down the IV line?

A. Yes.

Q. That is in paragraph 39.

A. Yes.

Q. Now, you've explained how this is all based upon babies who were stable before collapse has happened.

A. Yes.

Q. Just reminding ourselves where [Baby A] is concerned, we know he was very pre-term, 31 weeks and 2 days, wasn't

112

he?

A. Yes.

Q. And 1.6 kilos?

A. Yes.

Q. So low birth weight. And I think you acknowledge there are inherently problems that pre-term babies face that can make them quite fragile.

A. Yes. I have heard that term. I don't think I have ever described a baby as being fragile. I think they are at increased risk, they are dependent. Fragile is too emotive, for me, as a term. It's not one I have ever used, I don't think, in relation to babies.

Q. They are prone to complications, aren't they?

A. That's why we have neonatal units, yes.

Q. That's right, they're prone to complication, aren't they?

A. Yes. Yes.

Q. Now, to look at what you say about [Baby A] and his starting point in this case, it's a sad fact that he lived for barely 24 hours; that's right, isn't it?

A. Yes.

Q. And so when we are considering the problems that he encountered, do you agree we need to keep in mind, sadly, how short the timescale is that we're working with?

A. Yes, yes.

Q. And in a timescale like that, there isn't a great length of time for serious problems to make themselves obvious, is there?

A. The fact that he was as stable as he was prior to his collapse meant that he had survived the most perilous part of his life. And I'll go -- and in other words -- yes. So by the time that he was -- just prior to his collapse --

Q. I wonder if I could just ask you -- you've explained that. I wonder if I could respond to what you say about him being stable because that's what I would like to ask you about, Dr Evans, and I would ask you to help the jury with.

A. Yes.

Q. You -- when you were dealing with the question of how

stable [Baby A] was to start with, began by saying:

"I have said his condition was perfectly satisfactory. It's better to say he was stable."

A. Yes.

Q. Just so the jury can unravel what that means, in your reports you began by saying [Baby A] was in a perfectly satisfactory condition, didn't you?

A. Mm-hm.

Q. You accept now, do you, that that's probably pitching it a little bit too high, isn't it?

A. No, I think -- well, I'd rather call -- I don't want to get engaged in semantics here, but if you want to stick with perfectly satisfactory, I would say he was perfectly satisfactory for -- for his position at the time. In other words for a baby of his prematurity, aged 24 hours, his condition was satisfactory. If you want to make me look -- perfectly satisfactory, that's fine, but he was -- he was really good.

Q. You agree when he was born he needed rescue breaths before he was taken --

A. He did.

Q. His rate of breathing was poor immediately after birth and he needed inflation breaths, didn't he?

A. Yes.

Q. He was all right after about 4 minutes?

A. Yes.

Q. By 9 pm -- I can go to the notes if you need them, but

by 9 pm on the 7th there were pauses in his breathing when he wasn't being stimulated; yes?

A. Yes.

Q. That's a potential problem, isn't it?

A. Irregular breathing patterns are very common in premature babies. It's something that we -- one deals with on a regular basis, and it's not a cause for concern in a baby unit because they are on full monitoring.

Q. He was on, in fact, CPAP, wasn't he, to prevent the airways from collapsing?

A. At the beginning he was, yes.

Q. If we look at the clinical notes, please, they're at slide 84 and it's page 1062. It's slide 84 in the [Baby A] profile.

A. 1062?

Q. 1062?

A. I've got it.

Q. My monitor doesn't appear to be working.

A. Yes.

Q. It will appear in a moment, the ones in front of you.

(Pause)

It's coming on.

(Pause)

Thank you.

If we just look at the top of that, please, Dr Evans, just to give us an idea of where we are on the

morning of 8 June 2015, perhaps we can enlarge under where it says "Problems", Mr Murphy.

A. All right, pre-term --

Q. Can we just let everybody see it, Dr Evans. If we just look at the top, this is the note from the clinical records saying "Problems". "Pre-term", which is in itself a problem, potentially, isn't it?

A. Of course it is.

Q. "RDS", that's respiratory distress syndrome. That's a problem potentially?

A. Yes.

Q. "Establishing feeds." That's a problem. "Suspected sepsis" at this point?

A. Yes.

Q. And it's got maternal antiphospholipid syndrome and we are going to hear more about that and that's not something I'm focusing on in these questions. I'm not suggesting that's the issue here.

But certainly at this point there are legitimate concerns as to his progress, aren't there?

A. No, there are. These are -- I'd rather call them issues rather than problems, but let's not get into semantics.

This is what any competent junior doctor would list as the issues facing [Baby A] at the time he arrived in the neonatal unit. In other words, we've to deal with the fact that he's pre-term, we have got to deal with the fact that he might have breathing difficulties, we

have to establish his feeds because his sucking/swallowing reflex isn't mature. He's at risk of suspected sepsis, and then there is this unusual condition of maternal antiphospholipid syndrome.

By the way, I don't want to get involved with the antiphospholipid syndrome because I know there is a haematologist who knows far more about this, and this is not -- this is outside of my expertise.

Q. We're not raising any issue with that as it happens in any event, as I just said.

A. So therefore this is -- for any baby of 31 weeks, the doctor would write these things down.

Q. Now, if we just look at slide 32, it's a little bit before this, the clinical notes at slide 32, page 1061.

A. 1061, yes.

Q. We will just wait for it to come up on the screens, Dr Evans.

A. Yes. I'm relying on my own.

Q. That's all right.

(Pause)

If we scroll down, we can see an X-ray review?

A. Yes.

Q. If we look at that, just before 1 in the morning on 8 June, Dr Brunton, and it says "RDS-type picture"?

A. Yes.

Q. So this isn't just something that's being written in the notes as a formula or something any competent clinician

would say, we have got here from an X-ray something which is certainly consistent with respiratory distress syndrome, haven't we, on the X-ray?

A. I have seen the X-ray. I have seen the report. There's nothing -- it's not too bad, actually.

Q. It's the sort of thing which might lead to some difficulty with breathing though, isn't it, RDS?

A. This is why we put babies on CPAP.

Q. But in terms of where you're saying he's stable and whatever, just look at the various factors --

A. No, no, this is at 0 --

Q. This is at 00.45 in the morning of 8 June.

A. Yes. So this is -- he was born at 8.30 pm. Yes, 4 hours old. He's 4 hours old. This is the X-ray at 4 hours. My comment regarding stable relates to him at 23 hours of age.

Q. We know -- we've got blood gas readings up to as far as they go, and they are at tile or slide 29, page 1125, so let's have a look at that, please.

A. 1125.

Q. Slide 29 for those of us on the iPads.

A. Yes.

Q. Just enlarge the top half so that we can see that, Mr Murphy.

If we look down there, this is moving forwards now. We've had the X-ray. Just after midnight on the 8th. If we look at 6.37, look across to lactate. That's on

the high side, isn't it?

A. 2.6. Pretty marginal. Again -- again, from a clinical point of view, it's very important not to -- it's very important to look at the whole picture. Therefore, if you have a whole load of blood tests, you know, one or two might be slightly outside, you know, accepted, you know, the norm. 2.6. So it's over 2.

Q. Yes, and at -- what is that, 2.30, it's risen a bit more to 2.7, hasn't it?

A. It's the same.

Q. Does it not -- would it not bother you if you were looking after a baby to see the lactate increasing above the recommended range?

A. Not particularly. Well, it's not -- let's look at the whole -- let's look at the whole results, okay, for 14.13, I think they are. You've got a pH of 7.37, spot on normal. You've got PCO2 of 5.15. Spot on normal. It's a capillary gas, so you can't interpret the oxygen level. It's 4.66 but you can't interpret that.

Q. (Overspeaking) is a little low, isn't it?

A. No, no, you cannot interpret that. Okay? You cannot interpret --

Q. Why is that one not interpreted? It's low, isn't it?

A. No, it's not. It's a capillary sample, you can't interpret it. All right? Listen.

Then you've got a bicarbonate of 22.3, which is normal, and a base deficit of 2/2.5, which, is you know,

less than 5, which is fine.

So therefore you've got this blood picture and you have a glucose, by the way, of 5.5 which is again normal.

Therefore you've got one, two, three -- one, two, three, four -- you've got five normal tests and one that is on the margins of being slightly up a bit.

Q. Just so the jury follow --

A. Just a minute. And then on -- in addition, and I'm sure we'll come to this, in addition to that, even more usefully, I think, we've got this constant monitoring, heart rate, oxygen saturation, and they are also normal, and, as Dr Bohin said earlier, he's handling well.

Q. We are going to go there, don't worry, Dr Evans.

A. We'll go there.

Q. Can I just check with oxygen: the standard range is 7.5 to 10 for blood gas, isn't it?

A. For an arterial sample you would like it to be more than 7.

Q. More than 7?

A. More than 7, 8, 9.

Q. Ten?

A. Eleven, 12.

Q. Right. You say you don't really count this because it is from a heel prick?

A. Yes.

Q. In any view, the oxygen is dropping from what it was at

6.37, isn't it?

A. As I have said, I am not going to interpret an oxygen value from a capillary sample.

Q. Okay.

A. Let me say that for all babies, for all times, I'm not going to do it.

Q. We don't have any readings, do we, as we get to the period we are most interested in, in terms of, sadly, the deterioration at about 8 o'clock?

A. We do actually.

Q. Do we have any on this chart?

A. No.

Q. You tell us where the readings are.

A. On the neonatal --

Q. Are you talking about the respirations and heart rate and things like that?

A. Yes.

Q. I'm going to that. I'm talking about blood gas readings, Dr Evans.

A. Sticking a needle into a baby's heel hurts, so you can't do it every few minutes or so, so therefore -- it's done quite frequently in this particular case, which is fine, that's not a criticism.

If I saw these gases at 14.00 hours, 2 pm, and my baby at this time was in air, I would not be rushing to stick needles into that baby any time soon unless there was a change in his condition. That is what we call

good clinical practice.

Q. How long can you leave --

A. You don't stick needles in babies unless you have to, or unless there's a very good reason for it.

Q. How long would you leave it for?

A. Until or unless something happens that makes you concerned that there's something the matter with the baby.

Q. Let's take a look at 1123, please, which is the observations chart.

A. 1123.

Q. Provided on that --

A. That's the one I was talking about.

Q. We will come to that in a moment.

That is slide 28 I've got down, but they appear in more places than one. So slide 28, if we could put that on, please.

We can see -- let's just increase the size on the -- in the yellow sections, please, Mr Murphy. We're familiar roughly with what we're dealing with here now.

Yes, you made reference to what Dr Bohin said before lunchtime. She said it was stable and not escalating having. That's her words, not escalating --

A. Correct.

Q. -- the respirations on the chart, what we see.

A. Let's go through them from the top down. That's the easiest way to --

MR JUSTICE GOSS: I think it would be better if you're actually asked a question and you answer the question, rather than just speaking to the document.

MR MYERS: I would be grateful for that.

Let me direct the question, Dr Evans, to assist with what we're looking at.

We're talking about stability. Right? And you made reference to Dr Bohin. I made note of what she said, which was, "Extremely stable, not escalating".

Now, if you look at the respirations, first of all, please, those are not extremely stable, are they?

A. I disagree. Because the -- his respiratory rate is in the yellow bit, it's higher than the accepted normal range, it's 70-plus rather than 60, 50 or 60. But if you have any feature that is outside the normal range, you need to find out what the probable cause for this is. And you need -- as in every case, you need to interpret one individual criteria, marker, in relation to everything else.

So what we've got here, if you look at -- yes. So if you look at the respirations there, right, from the beginning. So in the first third they are all in the yellow, if you put it that way, and somebody has written down there "unsettled", I think. And then it falls to about 60, and then from -- I don't know, let's see -- 11, noon, say, from noon, it toodles along at about 70.

Q. Well, it's escalating in the afternoon, isn't it?

A. It's higher than it was. But there's a perfectly good explanation for that.

Q. It's all stable -- it's all in the yellow patch, isn't it?

A. Yes.

Q. Why is it yellow, that bit?

A. There's a perfectly good reason for that.

Q. Well, what is it?

A. Well, the doctors have been fiddling around with him, putting umbilical catheters in.

Q. Why is that section yellow? I wasn't clear, why is it yellow?

MR JUSTICE GOSS: I think he was giving you a perfectly good explanation.

MR MYERS: I apologise.

MR JUSTICE GOSS: He was giving you the explanation for it. I think. I'm not the witness.

A. If you go through the medical notes, medical charts at this time, you will find that the doctors are doing what they can to, you know, make sure this baby stayed stable. So they have been putting umbilical catheters in. It's ended up in the wrong place. Nobody's fault. It happens.

Then around 6 o'clock, from what Dr Harkness said, they put an IV line in, a long line in. Sticking a needle in anybody's vein hurts, it's uncomfortable, you're handling the baby. Therefore all of this will

make anybody, not just a little baby, you know, a bit unsettled, so therefore his respiratory rate goes up.

So what's important in clinical practice is that if you've got a feature that's outside the normal range, that you find an explanation for it. And there is an explanation for it.

This baby was being handled, quite correctly, by the way, but it meant that he was being fiddled around with because of the difficulties with cannulas and the difficulties and then getting the IV line in.

Q. Let me --

A. So there we are. So that's -- so therefore -- so that in itself is an explanation, but even more important, all the other markers are normal or stable.

Q. Now, do you agree, first of all, the respirations are at least elevated for almost the whole of that period, Dr Evans?

A. Yes, they are.

Q. Do you agree that they move down, they move up?

A. Yes, they are.

Q. So the first thing is you agree, as we look at it, that is not steady. It's not at one level, is it?

A. It's variable.

Q. Do you agree, as we look at it in the afternoon, it is escalating? Yes or no? Tell us if you don't. We can see it. What do you say?

A. It's gone up -- it's moving between 75 and 80.

Q. There isn't a lot of chart left, is there?

A. It's not escalating.

Q. Do you agree that when it goes on to the yellow, that's done because it draws attention to something that might be a problem?

A. In isolation, I don't think you can make a diagnosis from an isolation. I don't know what we're getting at. But you've got an isolated increased respiratory rate in a baby who is pre-term -- who is pre-term and everything else is nice and normal.

Q. Do you agree that his respiration goes up? You might expect ordinarily heart rate to go up together with it.

A. Yes.

Q. His heart rate doesn't go up, does it?

A. No.

Q. That's odd, isn't it?

A. No.

Q. You have just said you would expect it to go up and now you are saying it is not odd?

A. I would expect the heart rate to go up if -- let's rephrase that.

If his heart rate had gone up as well, then I would be concerned about the baby. I would be concerned that he was then not stable. But in fact his heart rate is about as normal as it can be.

So therefore heart rate is a very, very good -- very, very good marker of well-being in a little babe.

Therefore we have got this increased respiratory in isolation. Am I worried about it? No. Why am I not worried about it? Because he was in a neonatal unit with experienced nurses and doctors to look after him, and on top of that -- on top of that, he's not even requiring additional oxygen.

And that, for a prem baby, coming up to 24 hours of age, the fact he's able to breathe without additional oxygen and his saturations look -- at 97, 98, 99%, that's abouts a good as it gets. Okay?

So therefore his respiratory rate is above the normal range, but this little fellow is in air with normal saturations and a normal heart rate and a normal temperature. So great.

Q. Do you say it was good that he hadn't had -- I don't mean good for him, but was it clinically acceptable that he hadn't had fluids for at least 4 hours and maybe longer by the time --

A. It's not good. It's not good.

Q. Is it acceptable?

A. Well, it happens. This happens in neonatal units. This is the way of the world. And I think I discussed this this morning. Nobody would want a baby to go without fluids for 4 hours. Did it make a difference in his case? As I discussed this morning, no. Why do I say that? Easy: if he was experiencing fluid loss, fluid loss, then, as we know from patients who are admitted

with fluid loss, the heart rate goes up. His heart rate didn't go up.

So it's unfortunate, but it is not something that -- it wouldn't be -- my word. We are all going to get COVID in a minute!

Where are we? I'm getting distracted here.

Q. Let me help you. What I would like you to help us with is this, Dr Evans: is there a possibility that it is there's a problem for him not to received the fluids he was meant to have received for a period of -- and the blood sugar for a period of 4 hours? Is that a potential problem? That's what we need to know.

A. His blood sugar-- the most recent blood sugar they took was 5.5, which is great, which is fine. That's fine.

Q. That was about 6 hours before the collapse, wasn't it?

A. Yes.

Q. Yes.

A. A blood sugar -- sorry.

Q. Just to assist you, Dr Evans --

A. Excuse me. I'm being distracted by loads of people coughing. Just a minute.

So he lost 4 hours worth of fluid, which I think is -- he was on 4.15ml an hour. So he missed out on a theoretical 16ml of -- of fluid -- now -- of 10% dextrose. And 16ml of 10% dextrose contains 1.6 grams of glucose and 1.6 grams of glucose contains 6 calories.

So a baby who has lost out on 6 calories of calories

is not going to drop a glucose value from 5.5 to a level where he crashes.

This baby did not have a little twitch or anything like that. He -- you know, he crashed to the extent he died.

Q. Going without --

A. You know, so -- sorry. Let me finish this bit.

So therefore it's unfortunate that he did not receive IV fluids for 4 hours. He did receive some oral fluid, by the way, 1 or 2ml, which is better than nothing.

Q. That's no substitute for failing to get the IV fluids, is it?

A. No, no, no, no, no, it's unfortunate, but in this particular case it did not make a clinical difference, and that's the important point I need to -- that's the important point I need to express -- to impress.

Q. Going without fluid for the 4 hours is capable of causing dehydration; do you agree or disagree?

A. Of course it does.

Q. And also going without the glucose that he was meant to receive for 4 hours is capable of leading to or triggering hypoglycaemia, isn't it?

A. Yes.

Q. In a child which we no know now tachypnoeic, which is breathing too fast?

A. Yes.

Q. But you don't see any of that as being a potential problem? Is that your evidence?

A. It's not so much that it -- I don't see it as a potential problem. From the records I have seen, it did not become -- it was not a potential problem.

Q. We don't know that, do we, Dr Evans?

A. Yes, we do actually. Yes, we do. This baby was in air, his saturations were 99%, his heart rate was nice and steady at 130/140, and his temperature was fine.

So we have got loads of markers here of a stable baby and I heard Dr Harkness say he was absolutely devastated by the baby collapsing because -- and Dr Jayaram the same -- this was a baby who was stable prior to his collapse.

Their words, not mine. Their words, not mine. But I'm just looking at these records and, yes, the heart -- the respiratory rate is tachypnoeic, yes.

Q. I'm going to avoid repeating question I ask to say where we disagree. That would be clear from the questions I'm asking and I'm going to move on so that we can get through the evidence.

Do you accept there is a potential risk of arrhythmia from the position of the long line? In other words, is there a potential risk that it could have been sited too close to the heart and created some sort of problem?

A. Not in this case, no.

Q. Do you see that there's any obvious link in the relationship in time between long line insertion and then fluid running through the long line and then collapse?

A. No. I'm not sure that question what you mean. There's no -- I mean, long lines are routinely used. They don't -- fluids running through a long line does not cause a baby to collapse.

Q. Do you recognise or do you accept, sorry, there's any risk involved in leaving a long line in place without fluid running through it for up to 2 hours?

A. No, there would be fluid in it.

Q. Running through it, I asked.

A. Not running through it. Right. If -- if there was -- right.

Q. Can I ask the question and then you can by all means expand upon it if you need to, Dr Evans. But what I asked was: is there any risk caused by leaving a long line in place without fluid running through it?

A. There's a risk of the long line clotting.

Q. Tamponade. You have explained that's where fluid gets into the gap between the heart tissue and the external sac of the heart, the pericardium?

A. Correct.

Q. When you made the report that you have been looking at and you were dealing with the question of tamponade -- and you deal with this at paragraph 36 of that report,

page 752 -- what you say, Dr Evans, is that:

"Cardiac tamponade is a complication of long lines. It typically occurs in a baby where the line has been in place for sometime, probably 24 hours or more. This would not occur within minutes of insertion of a long line."

Just to be quite clear, did you think it had only been in place for minutes when you said that?

A. Well, I'm not quite sure, but it wouldn't -- it didn't look within a couple of hours anyway.

Q. It could occur -- you say it couldn't occur within a couple of hours? Couldn't?

A. No. Let's forget about tamponade. If there was tamponade there, it would be present on post-mortem.

Q. I just wanted to see why you say minutes at that present (sic).

Infection. Infection. Do you accept there are potential --

MR JUSTICE GOSS: I just want to get a note there.

(Pause)

Thank you, carry on.

MR MYERS: Sorry, my Lord.

MR JUSTICE GOSS: No, it's fine.

MR MYERS: Do you accept that there are potential signs of infection or developing infection from what we can see in the observations and the blood gas and the picture presented by [Baby A]?

A. No.

Q. You don't regard high respiration as a possible indicator of it?

A. Well, again, two things: it's an isolated sign, and secondly, there was no evidence of infection on post-mortem.

Q. It's entirely possible, in a fast-developing infection in a small child, for it to develop and leave little by way of pathological signs? It is, isn't it?

A. This is -- this is simply wrong. Okay? This is simply wrong. What you're suggesting is that a baby would have an infection that was so spectacularly rapid that the baby would die, you know, despite having normal heart rate and all these other normal things, and where a pathologist found no evidence of infection on post-mortem. I mean, that's ridiculous.

Q. Okay. Can I just ask you to confirm this. In terms of blood sugar -- can I ask you to confirm this: at times of blood sugar -- in terms of blood sugar at the time of the collapse, are you able to assist us with what the reading was at that point?

A. No. Perhaps you can remind me, but I --

Q. Well, we've seen there's a chart which has the blood sugar readings until we get to 2.15 that afternoon.

A. Yes.

Q. After that point [Baby A] received no fluid and no more blood sugar, did he?

A. We've been through that.

Q. Yes. I'm sorry to delay you, Dr Evans, but I wonder if you can help me with this. After that time he received no fluid and no blood sugar, did he?

A. He received no fluid for 4 hours.

Q. And no blood sugar?

A. No, he didn't have a blood sugar (overspeaking) --

Q. And we don't know what his blood sugar reading is at the time of his collapse is, do we --

A. No.

Q. -- because no one has got it?

So can you discount in those circumstances a deterioration linked to hypoglycaemia?

A. Yes, I can.

Q. Just so we can be clear, why do you say that?

A. Because hypoglycaemia is pretty common in small babies, and it -- you know, they can be a bit jittery, they may have little fits. They don't just stop breathing on you -- well, because they don't.

But if they did, you know, they would respond pretty promptly to resuscitation. You know, so it's -- it's -- yes. So, you know, babies -- yes. So -- so there we are.

So hypoglycaemia is not -- is not a factor in causing this little baby's death.

Q. Just so it's quite clear where we are, although you've dealt with this, the suggestion I make to you, Dr Evans,

is from the available signs there it, he was not stable and he was not in a good condition at the time that he collapsed. You disagree with that?

A. I do. I heard the practising doctor say yesterday -- earlier they all used the word stable. Dr Jayaram did, Dr Harkness did. I'm not sure about the others. But yes, they said he was stable.

Looking at his markers here, apart from the tachypnoea, we have markers of a stable baby who, but for having an air embolus, would have survived.

Q. That is what he the practising doctors have said. Do you accept everything they say?

A. Well, that's their opinion --

Q. Did you apply an independent mind to what they say?

A. I have been pretty independently minded all my life.

Q. I just wonder, you said about people not spreading news about the mistakes we make. Are you looking at this as critically at the people who have given care as you are at other elements?

A. Yes, I have actually. I've -- yes -- oh, yes.

Q. Right.

A. I mean, oh, yes, I'm pretty independently minded.

Q. Can I ask one other thing about signs or indications we have with [Baby A], just before I move on, and if it's something you can or you can't deal with, please say, Dr Evans.

A finding in the post-mortem which you're familiar

with, Dr Shukla. I don't mean you have it immediately to your fingertips. Do you want to remind yourself from the statement? It's a finding of congestion and haemorrhage at the time of the post-mortem.

A. Say that again? Have you got his --

Q. It's page 724 in the statements.

A. Is this one of the J numbers?

Q. It's an I number.

A. I don't think I've got that. I have seen the report but I haven't (inaudible) last night. Tell me what you want me to answer and I'll see -- I mean, on the whole, if it's a pathology report, I'm more than happy to defer to the pathologist, okay.

Q. I don't expect to raise something on the hoof with you like that, Dr Evans. I don't mean that to be rude to you. If it's not something which you're turning your mind to, we can deal with it in due course if we need to. I'll deal with it that way, rather than ask you to form opinions as we go along.

A. If it's a pathology report, I would defer to a pathologist, and I know there is a pathologist in this trial.

Q. There is.

I would like to turn to some issues relating to air embolism.

I have asked you to assist us with what you regard as the features of air embolism generally. Could you

help us -- and the jury in particular -- with exactly what features you base your diagnosis of air embolism on in the case of [Baby A]?

A. He was a stable baby whose only marker that was a little bit outside the normal range was his increased respiratory rate. Everything else was great. It couldn't be better: in air, high sats, etc. We've gone through this.

He suddenly crashes. What on earth is going on here? We've since heard about the discolouration. But before I knew about that, I thought if you -- if this baby has collapsed as promptly as that, and even more significantly, more significantly resuscitation was unsuccessful, that is an air embolus. That is an air embolus, in my opinion, and that was my opinion before I knew about the X-rays and the discolouration.

The fact -- we've heard about the discolouration since. That's what the medic said. I'm not in a position to challenge them, I wasn't there. That's what they have said. They have said it all week, and we have also heard Dr Arthur's scholarly opinion last Friday, which --

Q. So --

A. Sorry -- which, in my opinion, reinforces my own clinical acumen regarding the cause of death in this baby.

Q. All right. So the fact you say he was stable, I have

asked you about that. Sudden crash, resuscitation unsuccessful. In fact, whatever point it is you turned your mind to it, you regarded discolouration as significant in his case, don't you?

A. Well, the discolouration, if we -- right (overspeaking).

Q. Do you regard it as significant, Dr Evans?

A. Sorry?

Q. Do you regard it as significant in his case?

A. Well, if -- if -- it's not my -- it's not my role as a witness to get engaged in what people call factual disputes. Those are matters for the court.

If members of the jury and others accept what Dr Jayaram and others say about the pattern of discolouration, you know, the pattern of discolouration and flitting movements and the redness and the pinkness as well as everything else. If -- if that evidence is accepted, that is what you get in air embolus.

Q. And you base that upon what you've read, the description in the report by Lee and Tanswell, don't you?

A. Yes.

Q. Right. So if I can summarise what you say there -- I don't mean to do any disservice to it, but you are saying if what Dr Jayaram is right and if it matches what you see in that report, then that could be supportive of air embolus?

A. It adds to the clinical diagnosis, yes.

Q. And the other matter you have referred to is air in the

abdominal vessels?

A. Yes.

Q. In terms of -- I just want to ask you some questions actually about collapse and speed of collapse, Dr Evans, just going through the factors you have identified.

My Lord, I won't finish this afternoon, and I don't know whether your Lordship would wish us to have a break at any point. If I just press on, I'm quite content to do so.

MR JUSTICE GOSS: Not unless anyone wants a break.

No, press on, please.

MR MYERS: Collapse in neonates can be very rapid, can't it, Dr Evans?

A. It can be.

Q. Your view is that administration of an air embolus could cause collapse within a minute or two?

A. Quickly, yes.

Q. Quickly.

Do you agree that speed of collapse does not prove the fact of an air embolism, could it, because collapse could be fast for any number of reasons?

A. A collapse of this speed in a baby in a neonatal unit with full monitoring, nursing care, is pretty unusual these days really. Pretty unusual in the last -- yes, it's -- there are usually warning signs. You know, babies just don't go from normal heart rate and sats of 99 to stopping breathing. It's --

Q. And you don't regard the respirations or anything to do with the blood gas as a warning sign?

A. I know you keep going on about respiration. I respect that because it's all you've got to go on that's outside the normal range. That's fine. I have no problem with it. I have explained to everybody its significance. In other words you're aware of it, you know, it's there, but given all the other factors which were not there, ie they are normal, you know, and this baby is in a neonatal unit. He is in -- let's be blunt about this: he is in the safest place on the planet. A neonatal unit in the UK is as good as it gets. You know, we are -- neonatal practice in my lifetime has -- in the UK has -- it's fantastic. It's come on in leaps and bound. It's as good as any -- I'm not being partisan or anything like that. It is really good, I think anyway.

So he's in the safest place on the planet.

Q. I'm not going to repeat what we say are the relevant factors. The jury has heard that. I'm going to move on to the next topic on this issue.

Actually, before I do I want a clear answer to this, if you could help us: there are many conditions that can cause a rapid collapse in neonates, aren't there?

A. Air embolus, suffocation.

Q. Are you speaking with an open mind, Dr Evans, to this jury?

A. I'll give you a list: blocked tubes --

Q. We heard the first two that came to mind.

A. These other cases -- I could give you -- Dr Jayaram gave you a list of the four Ts and the whatever yesterday.

Yes, there are a number of causes, but what we do as clinicians, we exclude those causes. We exclude those causes. And what's important is, when you are dealing with a baby or a patient who has deteriorated, you make sure that you exclude those causes that -- where prompt intervention makes a difference and you exclude those causes where prompt intervention -- where prompt treatment makes a difference.

So therefore in other cases in this -- in this series we will hear about blocked tubes. I won't go there now, but none of this is relevant to this particular baby because he did not have a tube in his lungs.

So therefore a pneumothorax, all those sorts of things, there's lots of them, but none of them are relevant to our particular case. That's it.

We have gone on and on and on and we're back where we started: we have ruled these out, or the clinicians have ruled these out.

I have been able to scrutinise the clinical notes. So yes, I have ruled them out. Yes.

Q. Discolouration -- (overspeaking) -- we're going to hear about discolouration, not just in this case, but in a number of them, aren't we, Dr Evans?

A. Yes, we are.

Q. It's something that was referred to the jury at the outset of the case. You heard the prosecution opening, didn't you?

A. Yes, I did.

Q. Mottling of skin or discolouration of skin is, for a variety of reasons, common in neonates, isn't it?

A. It is.

Q. And it can be non-specific, can't it?

A. It is non-specific.

Q. It can be a sign of illness?

A. Yes.

Q. It can be due to underlying conditions in the circulation?

A. Yes.

Q. It can be linked to infection, can't it?

A. Yes.

Q. It can be linked to blood pressure issues, can't it?

A. Yes.

Q. They may be secondary to other things that are happening in the baby?

A. Yes.

Q. Do you agree that you cannot confirm an air embolus from changes in skin colour?

A. Correct. In isolation, no.

Q. And would you agree it would be flawed to treat discolouration as diagnostic of air embolism?

A. Discolouration of skin is a generic term. It's a catch-all term. It simply means that the colour of the baby's skin is different to what you would expect it to be. So therefore when you're talking about discolouration, it could be mottled, as you say. It could be blue. It could be white. It could be red. It could have spots. You could have -- you know, purple. So therefore discolouration is a generic term. It's a general term simply noting that there is something present on the skin that the doctor has noticed.

So therefore you can't look at discolouration and say, oh, it is due to a specific condition. You can't go down there, so let's not go down there because it doesn't get us anywhere.

Q. Right. Now, insofar as the description that we heard about from that paper is concerned, I would just --

A. Pardon?

Q. Insofar as the description from the paper that we have heard about is concerned, I would just like to look a little bit more about that. So I'm going to ask Mr Murphy to put page J2496 up on the screen, please, and that's the page from this paper.

A. I've got my own copy of this paper, so I'll rely on that.

(Pause)

Q. If we could just enlarge perhaps the top half of the paper so we can see -- and the table as well, please.

A. So we are on page 508, yes?

Q. Yes, of that paper, yes. Page 508 from the journal.

Just so the jury have a little context, because this features in reports you have written and others, this is a study -- confirm this for us, if you can, Dr Evans -- a study in 1989. That's when it was written?

A. Mm-hm.

Q. Drawing together descriptions from other events that had happened. The authors had drawn together a number of events to analyse?

A. No, they've drawn together a number of others cases.

Q. A number of case studies. It's a case study, isn't it?

A. No, it is more than a case study, actually. If you look at cases from everywhere else, it's meta-analysis.

Q. They are looking at what has happened overall.

Now, help us with this: it's based on an analysis of -- I think it's 50 cases, isn't it?

A. Fifty cases.

Q. Fifty cases?

A. Three of them were theirs, I think. I can't remember.

Q. They looked to see -- and just so we can put this in context -- it says:

"What phenomena, what items, are associated with infants who had definitely had pulmonary vascular air embolism?"

If we look at that table, we can enlarge the table to start with, we can see that, as a percentage of those

50, what sorts of features were associated with vascular air embolisms. So I wonder if we can enlarge the table at the top left.

A. Yes, I've got this.

Q. There we go.

We are not going to go through all of these. I'm going straight to the item that we are interested in here, and that is that looking across the 50 cases, we have been hearing about discolouration and air embolus, in those 50 cases it's only in fact 11% of them -- can you see it says "cutaneous signs"? You know that means skin signs.

A. Yes.

Q. In 11% do cutaneous signs feature.

A. Yes.

Q. So that's approximately five or so out of the 50 that would have skin colour?

A. Five of the babies.

Q. Yes, five of them.

First of all, there isn't a necessary link between air embolism and skin discolouration, is there?

A. Well, you can have air embolism without skin changes.

Q. And in fact the vast majorities of those fall into that category, don't they?

A. Yes. But I reached my diagnosis of air embolism without knowing about the skin -- skin signs. So, you know...

Q. You have talked about it quite a lot in your reports

afterwards, haven't you, Dr Evans?

A. Well, I did a -- there were so many cases here where I suspected an air embolus was a significant contributory factor, that instead of -- that I prepared a report, which I think is dated in 2019, where I reviewed as many items of literature as I could find. It's not that I reviewed them all in 2019, you know. Some of them -- I knew about some of them. So I collected them I put them all together in an 11-page report.

Q. Right.

A. And as with virtually every clinical presentation, you do not get every feature in every case.

Q. Now --

A. So -- so, you know, so you get 11%, that's fine. And I -- that's fine. I'm aware of that.

Q. So, given the part played by discolouration in the way this is dealt with, let's just look on from this. 11% of the cases it features. We then come to the description that we have heard. So can we scroll down to the section below that we have looked at before, please, in particular the highlighted section.

The section that deals with what's called cutaneous signs in that table is a section that's been outlined largely in terms of description. The section that's outlined there, isn't it, is a the description of them?

A. Mm-hm.

Q. And of the five or so cases where there was any discolouration, it says that:

"Blanching and migrating areas of cutaneous pallor were noted in several cases and..."

And then, the feature we've been looking at here:

"In one of our own cases we noted bright pink vessels against a generally cyanosed cutaneous background."

Correct, Dr Evans?

A. Yes, yes.

Q. So first of all, the links, such as it is to discolouration and air embolus is based principally upon this study, isn't it? It's based upon five out of about 50 cases in this study; yes?

A. Yes.

Q. Of those five cases, only one of them involves bright pink vessels against a generally cyanosed cutaneous background --

A. That was in their case, that's right.

Q. You say if we are to make any use of that at all, the next step is to assess the accuracy of descriptions of discolouration against that, isn't it?

A. It is.

Q. Thank you. I have dealt with that.

Thank you, Mr Murphy.

In your reports you have taken the view that failure to respond to resuscitation, a resuscitation that was

prompt and consistent, is supportive of air embolus?

A. It is.

Q. Indeed I think you have said earlier when I was asking you about the features of air embolus that it's one of the matters that you regard as having a diagnostic value?

A. Yes.

Q. And the -- your own experience, of course, sadly, in the case you have told us about, resuscitation didn't work?

A. In this case, no.

Q. In Swansea, in your own personal experience?

A. The operative thing, no, that was awful. No.

Q. Now, just to be clear, what you say about resuscitation is diagnostic to some extent. Failure of resuscitation is not in itself diagnostic of air embolus, is it, because there are many things which might lead to a failure of resuscitation? Let me make that easier if that's complicated, Dr Evans. The mere fact that resuscitation, not that there's anything mere about it, but the fact that resuscitation hasn't worked does not enable any clinician to say that must be the consequence of an air embolus?

A. There was no evidence of any other clinical condition in this baby and we can spend all day and all week talking about what Dr Jayaram saw or didn't see and his colleagues. And we can spend all week discussing the presence of air in the great vessels. But you put the

air in the great vessels and the discolouration and the unexpected collapse and the failure of resuscitation, and put all those four factors together and you have a diagnosis of air embolus.

Q. Well --

A. Okay.

MR JUSTICE GOSS: That's not the question. The question is this, and I'll phrase it as I understand the question to be because it was perhaps the use of one word that made it slightly more difficult, and it was put "in itself", but I'll pose the question in a different way.

Failure of resuscitation is not of itself -- in other words looked at in isolation, of itself -- is not diagnostic of air embolus. That's the question. So you are just looking at one particular feature of this case, and saying that of itself is not diagnostic of air embolus?

A. That's correct.

MR JUSTICE GOSS: Exactly. That's what I thought.

MR MYERS: I apologise if it wasn't clear, my Lord.

MR JUSTICE GOSS: No, I know -- yes. But you understand that it's --

MR MYERS: I'm grateful for the clarification. I'm grateful, my Lord.

MR JUSTICE GOSS: In other words, if you look at each of these features, what is being suggested is, looked at individually, of itself, none of them by itself is

diagnostic of air embolus. I think that's the point you are making?

MR MYERS: It is. We are getting there. Thank you, my Lord.

MR JUSTICE GOSS: You say you don't just look at one, you look at all of them?

A. That's what we do.

MR MYERS: And we say, even looking all of them, it doesn't inevitably follow. There's a dispute about that --

MR JUSTICE GOSS: Exactly. But we are taking it in stages, breaking it down.

MR MYERS: Thank you, but I am not going to go cover the ground we have covered. I am grateful, my Lord, thank you.

Let me deal with the final matter you described then, which is air in vessels. We have heard this from Dr Arthurs.

You accept there are a number of reasons why there may be air in abdominal vessels?

A. I do. This is a matter for Dr Arthurs, by the way, but yes, I do.

Q. In which case I don't need to repeat them now because we have been over them with Dr Arthurs.

I want to pause there before we move to the end of this section of what I'm asking you is to deal with where air embolus can occur. We have been looking at what lies behind the factors you have identified and

looking at [Baby A]'s position.

I just want to ask you some questions about where air embolus does arise, coming out of what you said in your evidence to us this morning.

Without doubt, so far as we know, the most common cause of air embolus is actually in the course of medical treatment, isn't it?

A. Yes, you have to have an IV line in.

Q. Yes. And it is the most common cause, isn't it, for a documented air embolus?

A. There is no such thing as a common cause of air embolus. It's a very -- in babies it's a very, very rare and unusual condition, so let's not try and pretend that we're talking about something that's common here.

Q. I'm not trying to pretend anything.

The most frequent cause when it's encountered, Dr Evans, is what arises from treatment, isn't it?

A. Yes.

Q. What's called an iatrogenic cause, isn't it?

A. Yes.

Q. And of that, the use of venous catheters or long lines creates a risk, doesn't it?

A. Yes.

Q. And just so that we can follow why that is, if the end of a catheter or a long line is open to the atmosphere whilst a baby, or indeed anyone, is breathing, that can create a negative pressure that means air can be drawn

into it. That's correct, isn't it?

A. No.

Q. Pardon?

A. (Witness shakes head). I have heard of this and I have had problems of trying to work out what is meant by any of this. So let me try and answer this.

If you put a needle in an arm, in a vein, blood comes out. It is not that air comes in, blood comes out. We have all had blood tests: stick a needle in, blood comes out.

Anybody who has had a catheter inserted, a cannula inserted, until you make the connection, blood comes out. Air doesn't go in.

A very simple reason for that: the pressure in the vein is higher -- slightly higher than the pressure outside. The pressure inside is higher than the outside.

And not that you see it in babies because the veins are so small, but, you know, blood will come -- track back up -- up the cannula. It doesn't go the other way. It doesn't go the other way. I mean, come on.

Q. If respiration is taking place and a baby or an adult breathes in, as that takes place, that is capable of drawing air into a line, isn't it? You disagree?

A. Yes.

Q. All right. So we can understand, can you tell us how it is then that a long line or a UVC can create a risk?

A. I think there are rare conditions where you've got patients on goodness knows what -- you know, complicated treatments which would get in the way of intrathoracic pressure. I wouldn't within to go any further on that. It's not something that would happen in a neonatal unit with baby who is breathing on his own. Breathing spontaneously. In other words, this is not a baby who is on -- you know, sophisticated respiratory support.

So -- so let's dismiss that as a hypothesis. I can't -- I will not accept. That's the first thing.

Q. You disagree about that, Dr Evans, then?

A. That's -- you know. You're welcome to get somebody else to explain it to you. But I can't. I -- you know, life is simple.

Let's keep it simple. If you've got a cannula in a vein and you disconnect it, to put a new -- whatever the reason, the blood will ooze out. Air doesn't go back in, blood comes out. Simple.

Q. Do you agree that you might have been influenced by the allegation itself rather than the facts in the conclusions that you're drawing?

A. No, I was not influenced by the allegations because when I dealt with these cases there were no allegations. It's as simple as that.

Q. Do you think it might --

A. Just a minute. Just a minute.

In 14 of the 17 cases that are, you know, part of

this trial, I had completed my preliminary reports -- I accept they are preliminary reports -- and that our case is not -- not these, but there are other cases where I have changed my mind, etc, added, you know, and so on. Let's not go there. We can discuss that in the next few weeks.

But in 14 of the 17 cases I had reached my conclusions by the -- formed an opinion where I think I could -- by the end of November 2017. And again, and I think the members of the jury needs to know this, I was not aware of any nursing name or medical name that -- who was suspected of being involved in any way, and I know exactly when I heard about the name Lucy Letby for the first time. The BBC published it in early July 2018.

And I have been very straight in every report I have published -- I have written since July 2018. I have stated: I'm making this report recognising it's part of Operation Hummingbird and a suspect has been named by the press, that sort of thing.

So all -- all the cases -- sorry, on 14 of the 17 cases I had formed the opinion that you are hearing now well, well before any suspects were named, and I'm not claiming to be clever in any way, and the first person to come up with the idea, with the diagnosis, I should say, not the idea, with the diagnosis of air embolus in this -- in these twins was me.

We've heard Dr Bohin this morning agreed with me. You heard Dr Bohin saying that another consultant neonatologist who sadly became seriously unwell and has died, his -- his reports -- he did a peer review of my reports. He agreed with me. He agreed with me.

And since then I have had to, you know, look quite hard to get published papers to -- that are relevant here because it is such a rare condition.

Q. Can I just be clear then. Just answer this directly if you're able to, Dr Evans.

Do you accept there is a possibility that in this case the allegation itself that you were asked to look at has influenced you to look for possible mechanisms of harm because of the allegations rather than just the facts?

A. No, no.

Q. You disagree with that?

A. No, it's not -- no, no. I'm looking --

Q. That is all I want to know.

A. Hold on. I'll answer that for you. What I need to do is look at mechanism, nothing to do with harm. We have already discussed that it could occur accidentally. I'm not satisfied that this could occur accidentally given what I have seen about the way, you know, we connect all these bits of tubing together.

So if it doesn't -- if it doesn't occur accidentally, then it occurs as -- with intent. And

I think I have used the word "intent" once or twice in my report.

Q. Just looking at that report in 2017, the first one that you wrote, just at the end of it, paragraph 38, you suggest that one thing that might have happened here is that the person has received a noxious substance such as potassium chloride. There's no basis for that whatsoever, is there? But you suggested it.

A. Back to the principle of differential diagnosis, I have been asked by the police what on earth has happened with this baby? So therefore I -- I gave them these ideas. But I have already said that I have dismissed all of -- I have dismissed that, and so that's it.

Q. What do you mean giving ideas? Do you mean testing things out just to see if it works? (Overspeaking) by giving ideas, Dr Evans?

A. No, no, differential diagnosis is part of clinical practice.

Q. What do you mean "giving ideas" though?

A. Differential diagnosis is a better way of expressing myself.

Q. There is no basis to suggest potassium chloride had been used, was there?

A. None at all, as far as I know. That is why we have spent the last few hours talking about air embolus, which is what I think did occur --

Q. You suggested both things in that first report. You

suggested air embolus and you also had a run at potassium chloride, didn't you?

A. Of course I did, because you have to look -- you have to explore all potential causes.

Now, it's -- Mr Myers has spent a lot of time, could it have been other conditions, and I have said, no, and I have explained why. Fine. We are off to potassium chloride. I don't think potassium chloride was a factor here.

Q. I'm not suggesting it is. I am pointing out that it was something that you were ready to go with until it wasn't viable?

A. I wasn't ready to go with it. I was presenting the police with a differential diagnosis. This was a screening report. All the reports I have prepared in 2017 were screening reports. I have been able to add to a number of them. I have changed my mind on a couple of them. And so on.

So, as far as these twins are concerned, air embolus is what caused [Baby A]'s death and [Baby B]'s collapse.

Q. I'm going to turn to [Baby B], if I may, Dr Evans.

Of the two of the twins, [Baby B] was the more poorly from birth, wasn't she?

A. She was.

Q. And from birth she had serious problems with breathing, didn't she?

A. I wouldn't call them serious -- just a minute, I want to

open up my file, please.

I have only got a small laptop.

(Pause)

Are you referring to my -- which statement?

Q. At this point I'm just asking: from the evidence we have all been looking at this week, from what we've seen --

A. I've got two reports here, 6 November 2017 and 31 May 2018. Which one do you want? Are you referring to --

Q. Shall we put up page 1266 from the clinical notes. That's what I'm looking at when I say about problems with breathing early on.

A. Yes, she needed quite a bit of resuscitation.

Q. She did, didn't she? No chest wall movement initially, was there?

A. Oh, she required good resuscitation. Very impressed with what treatment she had. Yes, she did.

Q. Just a minute, Mr Murphy.

A. 1266. I'd rather look at my own file.

Q. You may not need to go through it because I have asked you about having difficulties with breathing and you have agreed, but just looking at what we can see on page 1266, which is at the back of slide 1, ladies and gentlemen, if anyone is following it on the iPads, for [Baby B], of course, to move across.

(Pause)

A. I think I mentioned earlier that I reviewed [Baby B]'s

notes before I reviewed [Baby A]'s reports. That's simply because she was the first twin. Okay? That's the only reason for that. So anyway, yes. Here we are.

Q. All right. We can see, right at the beginning, looking down at the bottom of this page, we have got:

"Five inflation breaths need, no chest movement."

Can you see the bottom part of the page? Just highlight that.

A. "Airway repositioned", that bit?

Q. "Blue and floppy, poor tone"?

A. Yes.

Q. "Inflation breaths, no chest movement, no response in heart rate."

A. Yes.

Q. She was given support and they did get her breathing, but can we move forwards, please, to 1271. I'm not sure that that is on the iPads, ladies and gentlemen. It might not be.

MR JUSTICE GOSS: No, it's not.

MR MYERS: Well, it's the clinical notes. We will see what they are in a minute. They deal with the chest X-ray at 10 o'clock on 7 June. Here we are.

Again we've got with [Baby B] an RDS type picture. Can you see that on the X-ray picture, Dr Evans, at 10 o'clock on 7 June?

A. Yes, I have seen that.

Q. Just to remind everyone, we have seen an RDS type

pictures where [Baby A] was concerned as well, hadn't we.

A. Yes.

Q. And RDS, respiratory distress syndrome, happens because in a premature baby the lungs have not yet developed to the extent they can live easily in the outside environment?

A. Right. This is now -- yes. This is the X-ray done at -- 8.30 she was born?

MR JUSTICE GOSS: Three and a half hours after birth.

A. Yes. So this is -- so this is the X-ray done at 90 minutes of age.

MR MYERS: I was just asking: RDS, that comes out of being premature, doesn't it?

A. Yes, it does.

Q. And the lungs don't have the sufficient flexibility inside them to work as they should do?

A. That's correct.

Q. And that's why we give them surfactant?

A. That's correct.

Q. A baby with breathing issues, like [Baby B], is prone to desaturate; do you agree?

A. Yes.

Q. And in fact she does have desaturations on her history even after the event we're dealing with, doesn't she?

A. Yes, she does.

Q. So putting things in context, this is the position when she was born. We know the event we're focusing on is in

the early hours of 10 June.

A. Yes.

Q. To something which is new for us to look at, but you make reference of it, Dr Evans, is 19 June, just thinking in terms of time, this thread of time, so some weeks after the deterioration we're looking at --

A. Are you talking about my report now?

Q. If you give me one moment I'll take you to it.

(Pause)

Whilst we are going there, could we put on the screen, please, J1408. Thank you.

Just looking at paragraph 20. Thank you, Mr Johnson. Paragraph 20 of your report dated 31 May.

A. 1408. So the nursing record? Okay.

Q. And if we just enlarge these. I need to get my eye in. It's a little difficult to read that.

Okay?

So as it happens, 19 June, 12.46:

"Written from care given at 12 o'clock. Handover taken. Equipment and alarm limits checked and satisfactory. [Baby B] nursed on Optiflow 3-litres in air. Masimo and apnoea monitors in situ. Observations satisfactory."

A. Hang on, 19 June?

Q. Yes, paragraph 20 of your report, Dr Evans, dated 31 May 2017.

A. She was born on 7 June.

Q. No, I said -- let me be clear.

We looked at the situation when she was born?

A. Yes.

Q. I'm just turning to the situation not long before she was discharged from hospital.

A. Oh, right, fine.

Q. So a week or two after the event we are looking at. I'm sorry if this wasn't clear.

A. So this is 19 June?

Q. As it happens, we can see, looking at this, it describes a couple of fleeting bradycardias or desaturations. I'm not putting them on the same scale as what we're dealing with on the 9th and 10th, but there are recorded some issues with respiration at that point; that's correct, isn't it?

A. Well, that's what it says.

Q. And if we move to the following day, page 1413.

A. 1413, yes.

Q. Could we just enlarge, it please.

A. 20 June?

Q. So this is now 20 June at 3.55.

A. Yes.

Q. "[Baby B] settled. Around 21.30, 22.00 and 22.30 the apnoea alarm went on and desaturated to around 70 to 80% on each occasion and heart rate dropped."

So a little bit more marked, but three desaturations on that occasion; yes?

A. Mm-hm.

Q. And this isn't extraordinary with a neonate, is it, can desaturate like this?

A. Yes.

Q. And then a note for several days after her discharge from hospital, could we put up J1335. It will be in the notes which you have had, Dr Evans, although I don't know if this features in any of the reports you did.

A. 1335?

Q. Yes, 1335. And if we just look at what this is, it's a paediatric assessment -- if we open up the top of the form, please, Mr Murphy --

A. 1335.

Q. -- relating to 14 July. It looks like it's early in the morning, for [Baby B]. Emergency department at the Countess of Chester. Can we just move down, please, under "paediatric assessment". We might need to go to the next page.

If we can just go over the page.

Just pause here to see what leads up to what we're going to look at. Can we just enlarge the paediatric assessment, please, Mr Murphy?

So this is at -- that day, early hours of the morning, 02.50. Dr Caroline Prior. Just go down over the page, please, to 1336. Just the top part maybe and then we will come down to the description.

Just details relating to [Baby B].

A. Mm-hm.

Q. Weight at this point 3 pounds and 11 ounces. And then we just go down, please, to the bottom part:

"Present complaint and systems. One month and 7 days. Discharged from the NNU 3 days ago on..."

Is that Nutriprem 2?

A. Nutriprem is a premature baby milk.

Q. "Gave lactose and then fed this evening."

And this must be the report, isn't it?

"Vomited during the feed. Looked mucousy."

And then something and then:

"Seemed to struggle in her breathing for a few seconds afterwards. Often mottled. No new colour change. Well otherwise today."

A. Yes.

Q. Then it goes on. So she had been brought in because of some breathing problems and because she exhibited some sort of mottling there?

A. Yes.

Q. No one is suggesting that mottling is associated with an air embolus or anything like that, but it's an example of mottling; yes?

A. Yes, yes.

Q. Okay.

Just so we can see there's more formal records as we follow on. I don't want any mystery to it. Let's go over the page, please, if we could.

I'm not going to go through all of these, but we have in effect further checklists:

"Examination. By the time of the examination, pink, well perfused, mottled as [something; I'm not sure what that says] for her."

"Mottled as normal for her."

MR JUSTICE GOSS: N for normal, I think.

MR MYERS: "Settled and alert, witnessed feedings, one posset but tolerated well."

Thank you.

Just stepping back from that. We have finished with that document, thank you, Mr Murphy.

Just turning now to what you say about [Baby B], Dr Evans, in her case there's some breathing issues associated with her health; would you agree, some respiratory issues?

A. Well, all I have -- well, you've shown me this.

Q. And before then, when she'd been born, going into the unit.

A. Nothing compared to the -- what we should call the index event. Nothing -- nothing comparable. Nothing at all comparable.

Q. No, that's right. The index event, as you put it, is far more marked. I'm not going to dispute that with you.

A. Far more marked. You know, she needed resuscitating.

Q. She did. She did.

A. It doesn't get any more serious than that.

Q. Well, let's look at that then. Let's look through what you say about --

A. Where are we?

Q. -- what happened in her case. I'm looking at your report, Dr Evans, one moment, paragraph 26.

A. Just a minute. 26. The one post-mortem?

Q. For [Baby B].

A. Just a minute.

Q. 6 November.

A. Just a minute. I've got the wrong one here.

Q. Let me just summarise to you, to assist, Dr Evans. Your opinion where [Baby B] is concerned is that this could be a collapse due to air embolus?

A. Yes, that's my opinion.

Q. That's that. You also, looking at your first report, the 6 November 2017, paragraph 26 --

A. Sorry, hang on. Right. Let's go through this one step at a time. Which report are you on about now?

Q. It's actually looking at the report you made on 6 November 2017.

A. Thank you.

Q. Paragraph 26.

A. Hang on.

Q. I'm looking at the suggestions.

A. I have closed it. So 6 November? Right. Just a minute. I had closed it down by mistake.

Q. Well, I remind you. It's simple. You suggest smothering.

A. Yes.

Q. So I'm just going through the suggestions you make. We have got air embolus?

A. Yes.

Q. We've got smothering?

A. Yes.

Q. You also, as we move forward, suggest in the next report, the 31 May 2018, that maybe somebody had removed the prongs on purpose, don't you?

A. Yes, I have.

Q. Right. So you have gone with three possibilities now there. We've got somebody who has possibly introduced an air embolus and/or smothered her and/or removed the prongs on purpose?

A. That's my differential diagnosis.

Q. Yes. Can I ask again, is any of that you being influenced by the allegation to look for something that really fits with that rather than just the facts?

A. Right.

Q. That's what I'm asking.

A. [Baby B] -- the first of the cases I dealt with was [Baby G]. We will come to her later.

So [Baby B] was the second of the 17 cases. She was the second case I reviewed. And -- I'm not going to go on any more about air embolus except -- just a minute --

except -- I'll just make sure -- except my -- the last line of my first report, the one of 6 November 2017, and I quote me, paragraph 28:

"I am also of the view that she could have received a bolus of air intravenously. This would have caused the very sudden deterioration in her heart rate and the colour change described graphically."

So I was -- in my opinion I was on the ball from the beginning with her in relation to my concerns about air embolus.

This would have caused a very sudden deterioration in her heart rate and the colour change described graphically and that had nothing to do with Dr Arthurs' report because her X-rays were normal. It was nothing to do with [Baby A] because I did her report before I did [Baby A]'s, and in my opinion it's been reinforced particularly by what Dr Lambie said yesterday when she was talking about, you know, these colour changes moving every 10 seconds. I didn't know anything about that.

So therefore that adds -- that adds to my -- to what I think is my -- I hope this doesn't sound arrogant -- adds to any clinical acumen.

Q. Do you still say there was a removal of the prongs around about midnight?

A. I don't know about that. It is something we should bear in mind.

Q. What is your basis for it?

A. Well, I'll tell you. There are a couple of photographs I've seen of [Baby B]. They are not very -- they're snaps, you know. But the photographs have been shown, you know, in -- to see if we could help with the colour change and they are not good enough.

But what they do show -- I've not seen this originally. What they do show is the way that the staff at Chester fix the prongs in CPAP -- cases of CPAP. There's more than one way of fixing these prongs, and the way they do it is really very good. You know, it's very good. They have got a special bonnet and the baby is on her back and, you know, the prongs are obviously over her face and mouth. And I saw this -- I saw this photograph, you know, earlier in the week when we were discussing it. I thought, mm, unusual this.

You see, the trouble is, if you ask me, can babies -- could they be displaced accidentally, the answer is yes. But I -- all I can do is to say I have concerns and wonder whether they were -- whether these prongs were removed deliberately, okay. I'm not taking it any further than that, and it crossed my mind.

Q. Just to confirm, you heard the evidence of [Nurse A] yesterday who described the arrangement you're talking about and said it wasn't unusual for them to dislodge?

A. Yes, I would accept that. I would accept that. That's why I haven't gone to town on it.

Q. Do you still stand by the suggestion this could be smothering?

A. No, because if it was smothering, once you unsmother somebody and resuscitate them, they pick up very, very quickly.

Q. Now, when it comes to air embolus, one of the features you make reference to in your report of 31 May 2018 is discolouration of the abdomen, isn't it?

A. In --

Q. Paragraph 26 of your report of 31 May 2018.

A. Let me get my -- let me get my -- that report out. 31 May 2018.

My paragraph 26?

Q. Yes.

A. Yes.

Q. Now, we've seen -- I don't want to go back over the paper, but we have seen the description in that paper about the bright pink vessels on the cutaneous background around the body.

If we just go to remind ourselves of the description given in the case of [Baby B], which is at S233 in our iPads, we looked at it this morning. That's slide 233 or page 1282 if anyone is going to the J numbers.

Slide 233. Thank you. Go into that.

(Pause)

We can go and see the descriptions. We've got -- there we can see the one which is seen by Rachel Lambie,

the purple blotching over the body. Purple blotching.

A. That's not Dr Lambie. That's [Dr B].

Q. No, [Dr B] writing down what Dr Lambie had told her. That's what that is, Dr Evans.

A. Yes.

Q. That's Dr Lambie's account to [Dr B]. Purple blotching on the body.

Then if we go down a little further we can see what [Dr B] said, which was purple blotching on the right mid abdomen and the right hand; yes?

A. Yes.

Q. Okay. So there you have the description given.

That doesn't -- that doesn't match what we have read in that paper on air embolus, have we, the characteristic bright pink vessels against a cyanose background, does it?

A. She's writing down what -- she discussed this this morning.

Q. Yes. I'm just getting your opinion on this so we can see how strong it is when you're linking it to the discolouration we have read about on this article.

A. No, no, I was talking about what Dr Lambie said in evidence yesterday, and her evidence -- she was very good, anyway, I thought. You know, she did it very well. And what she described, wow, you know, that was very convincing for me. And she was there. I wasn't. We weren't there. She was there, you know. And she

went through the resuscitation, you know, really impressively. So I was really impressed with Dr Lambie.

Q. Is that your assessment of her as a witness, Dr Evans?

A. Yes.

MR JUSTICE GOSS: Sorry, I'm not quite sure -- was that -- are you saying you were very impressed by her as a witness or as a clinician?

A. No, as a clinician.

MR JUSTICE GOSS: That's what I thought. In other words, she did a very good job at the time.

A. Yes.

MR MYERS: Well, we certainly don't dispute that with Dr Lambie.

We have had the description. I'm not going to keep reading it out. But if we're trying to see whether or not discolouration, which you identify, matches the one case that's picked out in the article by Lee and Tanswell, it's not the same, is it?

A. We're going round --

Q. Do you agree it's not the same, Dr Evans? That's all I'm asking.

A. No. What [Dr B] has written down there is not the same as the Lee and Tanswell description. It's not the same.

Q. Okay. There are no diagnostic tests we have to show that [Baby B] has any kind of air embolus, is there, or are there?

A. No, there aren't. It's a clinical diagnosis.

Q. You've put quite some weight on the inability to resuscitate as being indicative of air embolus, haven't you?

A. Yes, I have.

Q. And that's a key aspect of your opinion in the case of [Baby A], isn't it?

A. It is. If you look at the Lee and Tanswell report, the mortality rate with air embolus is very, very high.

Q. That's right. There's only about four cases out of 50 where it didn't result in a mortality?

A. Four out of 53 or something.

Q. You've relied upon that in the case of [Baby A] to make your diagnosis, haven't you?

A. No, I --

Q. The inability to resuscitate?

A. Yes, I have.

Q. Yes?

A. You know, we've gone through this.

Q. And your research, as you say, has indicated that invariably collapse from air embolus is fatal?

A. Sorry?

Q. Your research has indicated that invariably collapse from air embolus is fatal?

A. Let's avoid the word "invariably".

Q. Well, I'm looking across it. We can go to that on another occasion. I won't enlarge right now.

[Baby B] responded well to medical support, didn't she?

A. Yes, she did actually.

Q. And she made a swift and a good recovery?

A. Yes.

Q. That is inconsistent with what you have identified as a key diagnostic feature with [Baby A], isn't it?

A. No, it is not.

Q. And it contradicts your air embolus theory, doesn't it, Dr Evans?

A. No, no, it does not.

Q. Okay.

A. We've heard -- you know, we cannot do studies where we inject air into babies. We probably would not get ethical approval these days for injecting airs into rabbits, pigs or dogs. I don't know about that, by the way. So we -- anyway, we cannot do studies where we inject air into babies and find out what happens.

The little that there is in the literature says that the bigger the volume of air, the worse the -- the greater the danger. The faster the volume of air is given, the greater the danger. And therefore if [Baby B] had a smaller amount of air injected into her circulation, and if part of this air was, you know, within -- you know, it didn't all go in at the same time, then it helped save her life, plus the fantastic care she got off Dr Lambie and others.

So therefore let's not use the word "invariable". It's not a word that clinicians are very comfortable with.

Q. In fact, to be fair, when I asked you about the features of air embolus in your list of secondary features you didn't say "invariable". You said resuscitation is unsuccessful.

A. That's why they die.

Q. Yes. But the fact that resuscitation was successful in the case of [Baby B] and there was a very quick recovery is utterly inconsistent with an air embolus, isn't it?

A. That is incorrect. There are a couple of other cases where there are striking features consistent with air embolism where astonishingly the baby survived. We will discuss them in the next few weeks. Amazed they did survive, but that's a reflection -- I think that's indication of the quality of resuscitation in this unit, by the way.

But yes. So you can't say one minute -- you know, anyway, so that is it.

Q. Can't say one minute -- what were you going to say, Dr Evans?

A. Simply -- [Baby B] had symptoms and features consistent with an air embolism. Because she was on a unit where the staff knew how to resuscitate babies, she had the best chance and therefore recovered, which is great. But her original collapse in the first place is entirely

consistent with air embolism, and I reached that conclusion despite the fact that [Baby B] and [Baby A] were the first two babies I dealt with where the concept of air embolism and -- was an issue, was relevant.

Q. There's not actually any diagnostic feature where [Baby B] is concerned that can show this is an air embolism, is there?

A. She collapsed unexpectedly. Resuscitation took far more than you would expect. She had these astonishing skin descriptions. As we heard from Dr Lambie yesterday, that adds to the clinical diagnosis she has an air embolus, and I'm more than happy to hear anyone who says different from a medical perspective. No disrespect to Mr Myers. You know, he's defending a lady. But if anybody wants to turn up with another alternative diagnosis, that's fine. But that is my opinion and I'm comfortable with it.

Q. I wanted to suggest the highest you could get to with this, if you were to go with that, is that it's unascertained. There's no sufficient basis for embolus, Dr Evans.

A. I disagree with you.

MR MYERS: Perhaps time to stop, my Lord. We have finished with those questions for Dr Evans.

MR JUSTICE GOSS: Thank you very much. I owe you an apology. I interrupted at one point and said that one of the documents you were looking at, which was the

medical note of [Baby B] on 19 June, were not on the pad. They are. They are in the additional documents. I was looking on the sequence of events list and there are two lists. I don't know whether you have been looking at these and going to documents through this way. If you did, and you went into additional documents.

So just for the benefit of the jury if they've been making notes of the numbers as you have been giving them, J1408 and the J1413 and the other documents to which you referred are all on the pad. So they're there.

So I'm sorry I was precipitous in my response in saying it wasn't there because I was only looking in the SOE, not the additional one.

MR MYERS: That's very kind, my Lord. No apology required. There are a lot of documents. I'm grateful to Mr Murphy for getting them on to the system. It's a lot to keep track of.

MR JUSTICE GOSS: Right. Now, do you want to --

MR JOHNSON: I'm happy to deal with it now and then Dr Evans has finished. I'll only be about five minutes.

MR JUSTICE GOSS: Let's just do that then. Sorry. I just wanted to apologise to Mr Myers.

Re-examination by MR JOHNSON

MR JOHNSON: The notes of [Dr B] that are on the screen at the moment, Dr Evans, if you just look, it was suggested that what [Dr B] had noticed was inconsistent with the

article. But the only part that was read to you was "on my arrival purple blotching" or "blotchiness", whatever that says, halfway down.

A. Yes.

Q. But in the next line it says "right mid abdomen and right hand pink and active". Do you see that? [Dr B] interpreted her own handwriting for us this morning. That "pink and active" wasn't read to you. Do you see that?

A. Yes, yes.

Q. Is that consistent or inconsistent with the Lee and Tanswell?

A. It's a good point actually.

MR JUSTICE GOSS: Well, the point is that's the point. It's not for the witness to comment on it, realistically. It is there.

A. Thank you, my Lord.

MR JOHNSON: All right. Thank you.

Arrhythmia was dealt with in passing. You dismissed it as -- so we're back to [Baby A].

A. All right, yes, yes.

Q. Arrhythmia from the long line was floated as a possibility?

A. Yes.

Q. Why do you dismiss that as a possibility?

A. I dismiss that because there was no arrhythmia. I mean, the baby was on monitoring. You don't just get a beep

beep beep, you know, giving a recording of 140 or whatever per minute. You get these QRS complexes going on regularly. So, you know, there was a normal heartbeat.

Well, an arrhythmia is an irregular heartbeat. So you can't have an arrhythmia if you've got a baby with normal heart rhythm. So there was no arrhythmia.

Q. Thank you. Finally, can we go back to page 1413, which, as your Lordship has just told us, was in the additional material.

Again, part was pointed out to you and part was not, I think, and I just want to deal with the part that was not.

(Pause)

A. 1413?

Q. So -- yes, sorry. It was the desaturations that were being pointed out to you. Can you see:

"[Baby B] has been settled through shift. Nursed in cot. Around 9.30 pm, 10 and 10.30 apnoea alarm went off and desaturated to around 70 to 80% each occasion."

You said that was different.

But if we look in the next line, how was [Baby B] -- how did [Baby B] recover? What treatment did she need from those desaturations?

A. As far as I can tell she recovered with -- she recovered on her own really. If you go to line 4 -- line 3, if you go:

"Heart rate dropped to 75-80, no stimulation needed. Recovered herself very quickly. Back up to 100%."

I assume that's 100% saturation.

Q. Yes.

A. Yes:

"Very quickly back up to 100% with saturations and heart rate back up to 130-150."

Q. Yes.

A. So it's a bit frightening, but she self-corrected and these little babies do these things. But these -- you know, totally different to our index event, as I call it.

MR JOHNSON: Thank you very much, Dr Evans. Does your Lordship have any questions?

MR JUSTICE GOSS: No, I don't. Thank you very much.

Well, that completes your evidence at this stage. But as you've indicated, you will be back. Right, thank you very much. Remember, please, not to talk to anyone about this case or anything to do with it. Thank you very much.

A. Thank you, my Lord.

MR JUSTICE GOSS: Thank you. Members of the jury, 10.30 tomorrow morning. Thank you very much.

(Pause)

(In the absence of the jury)

MR JUSTICE GOSS: You will remember, Mr Johnson, we have to finish slightly earlier tomorrow afternoon. So there

will be no opportunity to go beyond -- no later than 3.45. So if you just bear that in mind. Thank you very much. So that everyone knows it. Thank you very much indeed.

(4.26 pm)

... [Omitted] ...