(2.00 pm)

(In the presence of the jury)

DR DEWI EVANS (recalled)

Examination-in-chief by MR JOHNSON

MR JOHNSON: I recall Dr Dewi Evans, please.

Dr Evans, would you identify yourself for the sake of the recording, please?

A. Dr Dewi Evans.

Q. Thank you. Dr Evans, you have provided a number -- four, I believe, separate reports in the case of [Baby D]; is that correct?

A. I have.

Q. Thank you. If we could just list them for the record, please. Is the first is dated 7 November 2017?

A. Yes.

Q. Was that what you have referred previously to as your screening report?

A. Correct.

Q. Was your second report dated 31 May 2018?

A. Yes.

Q. Was your third report, dealing with some issues that were raised with you, 15 October 2021?

A. Correct.

Q. Your final report, what was the date of that, please?

A. 21 October 2021.

Q. Thank you. Does that simply deal with pagination in the medical records?
A. Yes. Sorry, there were a couple of other minor reports, confirming various things --
Q. Yes.
A. -- little admin things, yes.
Q. Thank you. As before, Dr Evans, I'll concentrate on your report of 31 May 2018.
Have you been present, albeit over the link in the court next door, throughout the evidence concerning the life and the death of [Baby D]?
A. Yes, I have, apart from late Friday afternoon last week.
Q. I'd like to deal with the material that you were sent first of all, if I may, please. That is set out in your report at paragraph 3, I believe. Did you receive the medical records from the Countess of Chester Hospital primarily?
A. Yes, I did.
Q. Did you also receive material from Alder Hey Children's Hospital in Liverpool?
A. Yes, I did.
Q. And did that material from Alder Hey primarily relate to the post-mortem examination of [Baby D]?
A. Yes.
Q. Did you also receive some medical photographs and some

X-rays from the Countess of Chester?
A. X-rays, yes.
Q. I think one of the issues you raised in your report is that as at that date, in other words over 4 years ago now, you hadn't seen the gynaecological records relating to [Mother of Baby D].
A. No.
Q. But have you now seen those?
A. Yes.
Q. Thank you very much. Just to put this into the sequence then, I hope there'll be no problem with me just briefly setting out the chronology, taking it up at paragraph 6 of your report.
Do you list in chronological sequence various events during [Baby D]'s life?
A. Yes, I do.
Q. Starting with her birth at 4.01 on Saturday, 20 June?
A. That is correct, yes.
Q. You record her gestational age at 37 plus 1?
A. Yes.
Q. Her birth weight at 3,130 grams?
A. Yes.
Q. You have now seen the Apgar scores, which were referred to in evidence; is that right?
A. Correct, yes.

Q. Do you record, at your paragraph 8, [Baby D]'s original -- or initial, I should say -- oxygen saturation level at a low 48%?
A. Yes.
Q. I think that was at 19.30 hours on 20 June.
A. Yes.
Q. That's tile 8. I'm not asking us to look at it now, but if anyone wants to note it down.
You record [Baby D]'s blood gases at tile 12?
A. Yes.
Q. The fact that she, [Baby D], was treated with intravenous penicillin and gentamicin?
A. Correct.
Q. That information recorded at tiles 13, 14, 20, 21 and 22 of the sequence?
A. Yes.
Q. Together with a bolus of 0.9% sodium chloride?
A. Yes.
Q. And do you record also her saturations, blood gas results, which we have seen at tile 23, at about the time she was started on CPAP, ie 8 pm that evening?
A. Yes, 100%, yes.
Q. Did you then turn your mind to Dr Brunton's examination of [Baby D] at 21.45 hours on 20 June?
A. I did.

Q. And that information is at tile 34.
Did you note at your paragraph 11 that, although [Baby D] was showing signs of improvement, the medical staff decided to intubate her?
A. Yes.
Q. And did you record the fact that at 23.00 hours, I think it's tile 51 or tile 34 or tile 35, [Baby D] was given Curosurf?
A. Yes.
Q. Did you move on, on 21 June, to record at 1.50 the results of the blood gases which are recorded at tile 69?
A. Yes.
Q. Which is also J2218. And did you conclude that [Baby D] was stable on pressures -- on ventilatory pressures of 16 over 5 --
A. Yes.
Q. -- in 30% oxygen, with a respiratory rate of 40?
A. That's correct, yes.
Q. The next event in the chronology, as you recorded it, was the fact that [Baby D] had the ET tube removed at 9 am on 21 June?
A. Correct.
Q. And then your paragraph 13. Did you record that at 2 pm on 21 June, the two lines were inserted through her

umbilicus?
A. Yes.
Q. One was removed, the other remained in place and was withdrawn; is that right?
A. Correct.
Q. We know from the evidence of Dr Brunton, I think, that the line that he thought was an arterial catheter was in fact a venous catheter?
A. Yes.
Q. I think that's Dr Rylance, I beg your pardon. I think that's tile 133.
Did you record at your paragraph 14 that, in an entry timed at 19.00 hours on 21 June, [Baby D] had been:
"... in air all day, saturating well, no desaturations"?
A. Yes.
Q. That, I think, is at least partially referred to in Dr Rylance's notes?
A. Yes.
Q. Did you next record the fact that immediately post extubation, so this is going back to the morning, [Baby D]'s blood gases had been "not good"?
A. Correct.
Q. And it was that fact that had led to her being put on to CPAP?

A. Yes.
Q. Did you record next the blood gas results at 18.44?
A. Yes.
Q. Then your paragraph 15, the fact that [Baby D] had passed urine for the first time?
A. Yes.
Q. So moving on to the night shift and your paragraph 16, this is in Dr Brunton's notes at tile 174, did you record the fact that Dr Brunton had recorded that at 21.10 hours Dr Brunton had recorded various readings for sodium, which was high, bicarbonate --
A. Yes, sodium was low.
Q. I beg your pardon.
A. And "potassium H", that's hydrolised, not high, by the way. A minor point.
Q. Not at all. Was it noted at that stage that [Baby D] had saturations of 100%?
A. Yes.
Q. That there was no increased work of breathing or signs of respiratory distress syndrome?
A. Correct.
Q. So that's the lead-up to the events that happened at about 1.30 in the early hours of the morning of 22 June; is that right?
A. Yes.

Q. Is that a fair summary of the facts as you set them out in your report?
A. Yes.
Q. Thank you. Did you turn your attention next to Dr Brunton's notes made at 01.40 hours?
A. Yes.
Q. Which is the jury's tile 214. I'm looking at your paragraph 17 now, please, Dr Evans. So far as you were concerned, and so far as the notes of Dr Brunton were concerned, and taking into account the evidence he has given, what did you feel were the relevant features of [Baby D]'s desaturation at that time?
A. Well, I think the first point to say is that it would have been very, very surprising because up until then she was very, very stable. She was responding to the treatment that she had received from the age of about 4 hours, when she was admitted to the neonatal unit. And just before this, she was having oxygen saturations of 100%, you can't do better than that, she was not requiring additional oxygen, her only support was CPAP, which simply gives the air at a slightly higher pressure to keep the lungs open. And clinically, there was no increased work of breathing. In other words, there was no evidence that she was suffering any respiratory problem. In other words, she was a very stable baby.

So for a baby who was over 3 kilos, that's nearly 7 pounds, suddenly changing so rapidly is something that is incredibly unusual for anyone used to dealing with babies on a neonatal unit.

Q. Thank you. You record the fact that the nursing notes record:

"Extremely mottled +++ and tracking lesions, dark brown/black, across the trunk."

Did you find that to be of significance in this context?

A. It's very significant and it's also again extraordinarily unusual. This is not something that happens out of the blue in one's experience of dealing with babies, particularly this comment regarding tracking lesions, suggesting they move around, and also the discolouration being described as dark brown/black across her trunk. In other words, across her chest and abdomen. And again, she was needing 60% oxygen, so she'd gone from not requiring any oxygen at all -- 21% oxygen, air -- to 60%. So that is pretty unusual.

Q. All right. You noted next the information that's at tile 218, which is Dr Newby's note made at 2 am and the fact, as she has told them to us this morning, about these areas of discolouration on [Baby D]'s abdomen and also the information that's recorded at tile 224,

referring to the cefotaxime.

A. That's another antibiotic, cefotaxime.

Q. The next entry to which you refer in your report, which is at paragraph 18, is blood gas readings taken from [Baby D], which are also set out in the tiles 219 and 222.

A. Yes.

Q. The fact that [Baby D] was clinically much improved, that the areas of discolouration had completely disappeared.

A. Yes.

Q. The next entry, so I'm going to your paragraph 20 now, please, Dr Evans, refers to a further note made by Dr Brunton, which the jury can find, if they want it, at tile 236, timed at 3.15 on the morning of 22 June, where noted:

"Called urgently to paediatric ward as [Baby D] had further episode of being very upset and crying and desaturated to 80% in 100% oxygen."

A. Yes.

Q. "Skin discolouration again became more prominent but not as obvious as previously."

And then the fact that [Baby D] appeared distressed on CPAP with two plus marks and continuing:

"Clinically appears very well. She is in air. There is no increased work of breathing. Abdominal palpation. Notes skin discolouration (slight) over the

right side of the abdomen."

And the plan at that stage was to take [Baby D] off CPAP and to give her a fluid bolus and check the gas, her blood gases again, in a further 1 hour.

A. Yes.

Q. We come then to the fatal event, which was noted up by Dr Brunton at tile 253 at 04.35 hours.

A. Yes.

Q. This was a record of what Dr Brunton had seen when he'd been called to the neonatal unit at 03.55; is that right?

A. Yes.

Q. The relevant notes, if anyone wants to make a note, is J2226. You set out in your report the timings and events that are there set out in Dr Brunton's notes; is that correct?

A. That's correct, yes.

Q. I'm not going to run through those because we've been through them more than once already and we all have a written record of them in the sequence of events.

Now I want to move on, please, Dr Evans, to your paragraph 23. If we could just put up tile 220, please. If we go to the document behind, thank you very much.

If we can just see it all in one go if possible. Thank you very much.

At your paragraph 23, Dr Evans, did you review the information that is contained in this particular document that we can see on the screen?

A. I did.

Q. And did you start, in effect, with a verbal description of what can be seen from 19.00 hours on 21 June?

A. Yes. I can't read it from here, but that's 19.00 at the beginning, yes.

Q. All right. Well, by reference to your report, please, and we can go to the chart and point these things out one by one if we need to, do we start with [Baby D]'s heart rate at the top of --

A. Yes.

Q. -- the chart?

A. Yes.

Q. And how did you -- how would you describe what we can see on that heart record, please?

A. Right. That is a normal heart rate record. The values vary all within the normal limits. There is one spike, ie increase in heart rate, just before the end of the mark, which then falls. So therefore a normal heart rate, apart from that one increased spike, which is around -- between 1 and 2 am. So therefore that's a normal heart rate apart from that one blip.

Q. What about the respiratory rate, the respirations?

A. Same again. All the respiratory markers are within the normal range, they're all 40 to 60, and you get an increase to 60 around the same time as the increased heart rate. So you've got two values of 60 and then you have the drop. So therefore normal respiratory pattern up until about 1 in the morning.
Q. And the temperature, any significance to any of those readings?
A. Normal temperature readings.
Q. Thank you. Further down the chart, if we could just scroll down, please.
A. I think I'll open up my own because I can see it a bit better.
Q. Can we see [Baby D]'s blood pressure recorded there under BP?
A. (Pause). Right, I'll check my own because I can't read that on there.

There's a blood pressure value of -- two blood pressure values. The first is 69/45 with a mean pressure of 53.

Q. Yes.
A. And the next one is 66/34, with a mean pressure of 45.
Q. Yes.
A. And the last one is 68/39, with a mean blood pressure of 48. All those values are perfectly acceptable for

a baby of [Baby D]'s size and age. So normal in other words.

Q. Yes.

A. And the other bits down the bottom, slightly above the value of BP, you can see O2 on the far left. There's a value O2. If you look at the values towards the right, there are three values of 21. There's 21, 21 and 21. That means 21% oxygen, of air, and underneath the line O2 you can see SaO2, that's what that reads, not very clear, it's oxygen saturation. There are three values: one is 100, one is 94, and the last one is 99. So that relates to oxygen saturation and values of 94, 99 and 100. Perfectly normal, indicating good respiratory results.

Q. Yes. All right.

A. So a very stable baby, in other words.

Q. So [Baby D] in air?

A. Yes.

Q. No supplemental or additional oxygen and recording blood saturations which, as you have told us, are perfectly acceptable?

A. Yes.

Q. Thank you. Did you move on to consider the findings at the post-mortem?

A. I did.

Q. Do you defer to the pathologist, Dr Marnerides, so far as the post-mortem is concerned?
A. I do.
Q. Did you consider the issue of the failure to give [Mother of Baby D] any antibiotics in the light of her premature membrane rupture?
A. I did. I did -- I'm not sure. Yes. Yes, I did. Yes. I -- yes.
Q. And I think to be fair, you also took into account the witness statement of [Mother of Baby D], which was supplied to you by the police, setting out the chronology of her treatment?
A. Yes.
Q. That is your paragraphs 30 and 31.
A. Yes, I did.
Q. You recorded, I think at your paragraph 31, that [Baby D] had been born 60 hours after her mother's membranes had ruptured.
A. Yes.
Q. Did you flag up under your observations a need to clarify the hospital's policy regarding giving antibiotics to mothers in [Mother of Baby D]'s position following the early rupture of membranes?
A. Yes, I did.
Q. Thank you.

Did you consider -- I'm going to your paragraph 33 now, please, Dr Evans. Did you consider the Apgar scores at 5 and 10 minutes that had been recorded for [Baby D]?

A. Yes, I did. They were 8 and 9, which is -- both of which are satisfactory, yes.

Q. Did you also then -- I'm going to your paragraph 34 -- did you also then look to seek to explain why it was that [Baby D] had been in a poor condition following her birth?

A. Yes, I did. I thought that her condition was consistent with early onset pneumonia.

Q. And what features of [Baby D]'s condition caused you to reach that conclusion?

A. Well, she was -- the Apgar scores were satisfactory, so that's not too bad. But she was grunting and cyanosed soon after she was born and her respiratory rate was increased, so all of these are markers of some kind of respiratory problem.

Q. Yes.

A. And the commonest respiratory problem in any baby of 37 weeks' gestation is infection, pneumonia. To add to that, her bilirubin was 92, which is raised, and although babies commonly get jaundice, if the bilirubin is abnormally high initially in the first 24 hours, it's

not normal and in cases of infection the red blood cells haemolyse, they burst, and that causes the jaundice. So a raised bilirubin is a non-specific marker of infection in a situation of this nature. And on top of that, we've got grunting, which is again a well-recognised clinical indicator of something abnormal and worrying respiratory-wise. And of course she was cyanosed, you know, her colour was blue, was not normal.

Q. Yes.

A. So all of this, very straightforward, all of these added up to early onset pneumonia.

Q. Thank you. Did you take the view that once she had been admitted to the neonatal unit, [Baby D]'s management had been acceptable or not?

A. Yes. Once she got there -- she was about 4 hours of age when she got there and I thought her management was entirely consistent with what I'd expect of a modern neonatal unit.

Q. Thank you.

A. She received antibiotics and she received respiratory support and intravenous fluids.

Q. Was the decision to remove the ET tube from [Baby D] at about 9 o'clock on the morning of the 21st a reasonable one in all the circumstances?

A. It was, because she was getting better. She was making

what I consider a very satisfactory improvement -- and in fact a far more rapid improvement than I would expect given the condition she was in when she arrived at the unit. But all the respiratory markers, monitoring, that were carried out were great and therefore she was taken off endotracheal intubation, yes.

Q. Thank you. Having removed the ET tube and the blood gas results that were then reported, was it a reasonable decision to put [Baby D] on to CPAP to support her breathing?

A. Yes, it was. Although she was satisfactory when full ventilation was removed, her condition did not settle completely and therefore standard management -- she still needs a little bit of support, CPAP is that form of support, so she was put on CPAP and she stabilised very, very promptly on what is, by any standards, very minimal respiratory support. So that was great.

And over the day, as we've heard, her condition stabilised and, you know, she remained very well.

Q. Yes. Looking at things in the round and taking into account the evidence that appears in the records, and indeed that you have heard, what view did you come to so far as [Baby D]'s condition immediately prior to her collapse?

A. Can I just put one bit there to get the chronology

right --

Q. Please.

A. -- if that's okay?

Q. Yes.

A. She was stable on CPAP and the medical staff, in the evening prior to her collapse, took her off CPAP. This didn't work, so they put her back on CPAP. That is perfectly standard management, especially in a baby who by this time was not needing additional oxygen. She was a big baby, over 3 kg. Some babies don't like CPAP very much, you know, it's quite intrusive, can be -- having something over your face. So they tried her off CPAP. Her oxygen saturations dropped so they put her back on CPAP and her condition reverted to normal more or less straightaway and stayed perfectly normal in air, oxygen saturations normal, until the early hours of the following morning.

Q. So what conclusion did you come to so far as her condition in the time immediately before her collapse some time after 01.00 hours on the 22nd?

A. Just prior to that, if I'd seen her I would be very, very confident that she'd be very well the following morning and we would be looking to either maintaining her on CPAP, because she's still only, you know, a couple of days of age, or trying her off CPAP again to

see if she can now breathe without CPAP.

So her condition could not have been better and her condition clinically was entirely consistent with a baby recovering from early onset pneumonia -- not recovered from pneumonia, recovering from pneumonia. Nobody, I think, recovers from pneumonia in such a short time. So this -- you know, she was really doing exceptionally well and clinically very satisfactory.

Q. How would you describe [Baby D]'s response to the treatment that she had received?

A. When now?

Q. In the time immediately before her collapse.

A. Oh, extremely satisfactory. You know, her improvement was far quicker than I would have expected, to be frank. It was remarkable that her oxygen values -- oxygen saturations, you know, 100% or 99% without the need for any supplemental oxygen at all. Now, that is an indicator of a baby whose lungs are functioning satisfactorily.

Q. Thank you.

A. So very good.

Q. So you having told us that there is clear evidence that her lungs were operating satisfactorily --

A. Yes.

Q. -- can we look at the three collapses at about 01.30,

03.00 and 03.45 hours on the morning of 22 June, please.
A. Yes.
Q. We have heard evidence as to the nature of [Baby D]'s response following the first collapse. Is that typical in these circumstances?
A. It isn't, actually. It's very unusual because her deterioration was very rapid. Her oxygen fell, her heart rate fell. It was very rapid, which usually is an indicator of some kind of serious pathology, you know, but if it is an indicator of serious pathology, then resuscitation will work, but this is followed by the need for far more in the way of clinical support. In other words, she would need additional oxygen, she would not have recovered so promptly.

But within a very short period of time, she was back, not requiring oxygen, and well. So this is an incredibly unusual response for a baby who's 37 weeks' gestation.
Q. So what you're saying is the speed of her response and the nature of her response is inconsistent with the gravity of the collapse being part of the pneumonia that no doubt she had?
A. It's inconsistent with the pneumonia or any other one of the -- inconsistent with what we call septicaemia or sepsis, in other words a generalised infection. If she

had a generalised infection, sepsis, she would not have made this very prompt recovery within a very short period of time.

Q. Yes. Looking at your paragraph 39, Dr Evans, did you remark on the abdominal discolouration which had been reported by the treating medical staff?

A. Yes. The word I used was "intrigued". This was something that I found very unusual again. It was intriguing, both with regard to its appearance, and I think we've heard from the local people, local staff looking after her, their descriptions of all of this, noting tracking, bruises.

The other thing, which is even more remarkable, is that it disappeared. It disappeared within 35 minutes according to my report.

So these abnormalities, they could not be bruises.

Q. I think some of the treating doctors have referred to this, but why can't they be bruises?

A. Bruising is due to damage to blood vessels under the skin, whether you get kicked in the shins playing football or whatever. If you get damage to tissues underneath the skin, the blood vessels are traumatised, they break. Blood leaks out of the tissues and then comes close to the surface, where the bruise appears. If that happens, as is the experience of all of us,

I suspect, the bruising will last several days. So bruising will not disappear within a matter of an hour or two or less. So therefore this could not be bruises.

The other thing it could not be is what I think Dr Newby this morning described as purpura. Purpura, again, are blood spots. Same principle: tiny blood spots under the skin, which you get in any number of conditions. I think one of the people mentioned meningococcal septicaemia.

If you get purpura, if you get these little blood spots under the skin, they just don't disappear, they'll be there for days, and if they are due to some serious underlying condition, they don't just not disappear, but you get an increase in the number of purpuric spots. So you get a spreading of purpura and this is associated with continued deterioration in your baby, in your patient.

Therefore the fact of all of this discolouration disappeared in a short time, not bruises, not purpura.

Q. Okay. In coming to your final conclusion, which we will come to in a moment, did you note the report of the post-mortem X-ray that had been taken of [Baby D]'s body?

A. Yes, I did. Yes, I did.

Q. Did you ask for some assistance from a pathologist in terms of interpreting air which was found within [Baby D]'s

body following her death?
A. Yes, I did.
Q. All right. We can leave that for them.
Can we turn to your opinion, finally, please, Dr Evans, so your paragraph 43. Dealing with the issue of pneumonia, first of all, so far as you could tell, was this a pneumonia that affected both lungs or one lung?
A. Well, the post-mortem says right-sided pneumonia, so just the right lung.
Q. Yes. In your experience, what conclusion did you draw as to when [Baby D] had developed pneumonia?
A. I think she had developed it before her birth and that would be the result of the prolonged ruptured membranes. So this was an antepartum pneumonia.
Q. Antepartum, is that Latin for before birth?
A. Yes, before birth.
Q. Lawyers aren't allowed to use Latin anymore. I don't think doctors are prevented.
So far as that was concerned, if [Baby D]'s pneumonia had been sufficient to cause her death, what would you have expected the pattern of her decline towards death to have been? How would that have presented?
A. Sure. If a baby's born with a severe pneumonia, usually affecting both sides, but not necessarily, where

treatment fails to save her, what you find is that increasing amount of clinical input does not lead to an improvement. I'll explain all of this.

Q. Yes.

A. When she first presented, she was an unwell baby and required ventilatory support. She was on ventilation, she wasn't on just this CPAP. If her pneumonia had progressed, the clinical team would never have managed to get her off ventilatory support and they probably would have found that as the hours went by, she would have required more and more oxygen, in other words a greater concentration of oxygen probably. She'd have required ventilation with increased pressures, in other words it would have taken greater pressure to keep the lungs open. They would have had difficulties keeping her oxygen saturations at a satisfactory level.

This is what you get in babies who have a severe or a fulminant pneumonia. In [Baby D]'s case, none of this happened. She got better. And as I've said earlier, she improved far, far more rapidly than I would have expected. I would have expected her to improve over 2 or 3 days, say, but she in fact improved over 24 hours -- or less than that, less than that, because she was placed on ventilatory support around 8 pm, I think, 9 pm.

Q. Intubated 9 pm, extubated 9 am.
A. And extubated 9 am. So over that night her improvement was such that she did not need what I would call full ventilatory support anymore, which is great. On top of that, her oxygen requirements had fallen, you know, didn't need any, and so all of the prognostic factors, all of the predictions for [Baby D] at this time were she was recovering from pneumonia -- not recovered, not fully recovered, but recovering from pneumonia and it would be therefore a matter of, and I use these words advisedly, a little bit of trial and error as to when the medical team would get her away from CPAP to get her breathing on her own.
Q. Yes.
A. So by 9 am -- at 10 am she was put back on CPAP and was stable on CPAP. So by any account, she was recovering satisfactorily from her pneumonia and essentially she was out of danger.
Q. Do you exclude pneumonia as being the cause of [Baby D]'s death?
A. No, no, the pneumonia did not -- was not responsible in any way for [Baby D]'s death. Pneumonia is probably the condition that clinicians like myself have dealt with more commonly than any other condition, you know, any other condition, really. And in a situation like this,

you know, pneumonia with the correct treatment is curable. You just treat it, antibiotics, oxygen, breathing support if necessary, so standard pneumonia treatment. That's what we do. That's why she was in the neonatal unit.

Q. Did you reach a conclusion as to what had caused or what was consistent with being the cause of [Baby D]'s death?

A. Yes, I did. As we know, as with when I've given evidence before, initially all I had to go on were the clinical records and I formed the view this is an extraordinarily unusual collapse, unexpected collapse. This is something that is consistent with her having sustained intravenous air. In other words, she'd received an injection of air, of gas, through a vein into her circulation, causing what we call an air embolus.

As I've discussed earlier, air embolus is incredibly rare, but this is what -- this, I concluded, was the only explanation that -- the only cause that could explain [Baby D]'s collapse and death.

MR JOHNSON: Thank you. Those are all the questions I have for you. Thank you, Dr Evans. Would you wait there for some further questions?

Cross-examination by MR MYERS

MR MYERS: Dr Evans, you haven't been asked, so I'll ask you, what are the features that make air embolism the only explanation?

A. Right, well, let me go through them. The first is that her collapse -- this was a collapse of a baby who was stable and who had an intravenous line in place and where the collapse was unexpected and the changes were rapid and very, very striking. In other words -- the drop in oxygen saturation being the main one. So that was my first stage in reaching this diagnosis of air embolus.

The second stage was the presence of this discolouration, which is unique in two ways. The first is that it was a pattern of discolouration that experienced neonatal nurses had never seen before and experienced medical people, one of whom is now a neonatologist in Glasgow, had never seen before and had never seen since. So we've got this extraordinarily unusual pattern of discolouration.

The second aspect of the discolouration was that it came and it went. It came and it went. Again, this is something that you do not find as a result of sepsis or other disorders. So that was my second step.

My third stage in reaching this diagnosis was that resuscitation was unsuccessful. This is the fourth of

our 17 cases and I think we'll find in future cases that babies did deteriorate as a result of the usual complications that one gets in babies, infection mainly, and resuscitation carried out by experienced medical staff works. You don't need -- they just get better. So therefore the third step in getting to my diagnosis was the fact that she failed to respond to pretty -- well, pretty thorough efforts at resuscitation.

My fourth stage, which again I defer to the radiology and pathology opinion on, is the presentation of air in the great vessels. The local report said air in the aorta -- so the great vessels could be the aorta or the vena cava. So again we've got air in a great vessel, which is an incredibly unusual phenomenon, as our radiology colleagues will tell us. So that was stage 4.

The fifth stage is that none of the other issues that affected [Baby D] were relevant. You can't explain this on the presence of a pneumonia affecting one lung.

Her sodium was a little bit on the low side, you know, that wouldn't explain her collapse or discolouration or anything else. So therefore, putting -- so we have four stages followed by the fifth and I think have excluded everything else.

So in my opinion, in [Baby D]'s case, we had a full

house of clinical characteristics entirely consistent with her having sustained an air embolus, ie air injected into her circulation.

Q. Right, thank you. We'll come back to that shortly.

I want to go through next what we have in terms of her condition, leading up to the events in the morning of 22 June, Dr Evans --

MR JUSTICE GOSS: I think we might just have our mid-afternoon break at the moment.

MR MYERS: Yes, of course.

MR JUSTICE GOSS: I'm sorry to interrupt you, Mr Myers. I was going to have to interrupt you at some stage. I think this is a good time to have it. We'll just have our 10-minute break now. Thank you very much.

(2.53 pm)

(A short break)

(3.03 pm)

MR JUSTICE GOSS: Mr Myers.

MR MYERS: My Lord.

Dr Evans, you agree, don't you, that as we first encounter [Baby D] after her birth, her condition is entirely consistent with early onset pneumonia?

A. I do.

Q. That's based in part because she was grunting and cyanosed, isn't it?

A. Yes.
Q. Her respiratory rate was increased?
A. Yes.
Q. Her bilirubin was 92. And in fact, it's not just that, is it? Her presentation in the hours that followed indicated the presence of a significant infection, didn't it?
A. Yes.
Q. You'd said that it's quite common to encounter pneumonia and the presentation was straightforward. But she was actually quite poorly, certainly from about 12 minutes onwards, wasn't she, when we see her collapse?
A. She was an unwell baby, yes.
Q. Yes. She was in a state of very poor health before she went to the neonatal unit, wasn't she?
A. Yes.
Q. We know that her mother, [Mother of Baby D], hadn't been given antibiotics, contrary in fact to the guidelines of the hospital. You have seen that now, that's right, isn't it?
A. Yes, that is correct, I heard the evidence, yes.
Q. And also in [Baby D]'s case antibiotics weren't given until 4 hours after birth.
A. That is correct.
Q. And that is a delay that falls below the acceptable

standard in her circumstances, doesn't it?
A. It does.
Q. Now, your evidence is that by the time of the events that commence about 30 hours after birth, maybe a little bit later than that, she was in a state you would say of near complete recovery; is that correct?
A. She was recovering, she had not recovered, which is the natural history of pneumonia.
Q. Yes. In your report that you wrote, and the one that you were taken to, the second of the reports, it's dated 31 May 2018, paragraph 44, you say that there was a window of near complete recovery. There's a difference, isn't there, between recovering and recovery; would you agree?
A. "Near complete recovery", quite happy to use that, or use the word recovering. I think this is semantics. Perfectly happy to run with either observation.
Q. I'm going to suggest to you, the fact is [Baby D] was not anywhere near to a complete recovery, was she?
A. She was recovering.
Q. Right. If she's recovering, that means she still has the potential to become quite unwell, doesn't it?
A. She's in a neonatal unit, the best place for her on the planet. If she was becoming unwell as a result of infection, she would have had -- she was on full

monitoring, she had nurses all round her, she had doctors round the corner, as it were, and we -- and we recognise, doctors and nurses on neonatal units, we recognise clinical characteristics that would indicate she is not as well as she was or she's getting worse. She showed none of those just prior to 1.30 in the morning.

Q. What I asked was if she is recovering, as opposed to being in a state of recovery. If she's recovering that means she still has the potential to deteriorate and become quite unwell, doesn't she?

A. The potential is there, which is why she was on the neonatal unit, yes.

Q. Now, it is a fact, isn't it, that however we describe the assistance she got, she was never able to breathe for any period of time beyond an hour or so without assistance from some sort of breathing support?

A. She was breathing on her own. CPAP does not assist you, does not fill your lungs up and down or in and out, as it were. It is a measure simply to assist keeping the breathing tubes open between breaths. So therefore she was actually breathing of her own accord, but she needed this CPAP method as well. That is it.

Q. A child in good health will not need to be ventilated, do you agree?

A. She was recovering from pneumonia.
Q. Let's go through what the treatment was. A child who is in good health will not need ventilation, will she?
A. A child in good health would not need to be on a neonatal unit.
Q. So you agree with me then? She's not in good health?
A. She was not in good health when she arrived on the neonatal unit. She was recovering in a remarkably short time afterwards.
Q. You just said a child in good health would not need to be on a neonatal unit and [Baby D] was on a neonatal unit, wasn't she?
A. She had pneumonia.
Q. Because she's not in good health.
A. She has pneumonia.
Q. That means she's not in good health, doesn't it? You're a doctor, that why I'm asking you. You're an expert.
A. She had an infective illness that is within the remit of any neonatal unit to treat, so yes.
Q. You told the jury that, as we go through that day, all the respiratory markers were great. That's the language you put it in. Is that your evidence?
A. They were satisfactory.
Q. Your words were.
"All the respiratory markers were great."

A. Okay, fine.
Q. You heard the evidence of Elizabeth Newby this morning, didn't you, Dr Evans?
A. Yes.
Q. You know that once [Baby D] was taken off the ventilator, her blood gas readings began to deteriorate before she was put on to CPAP, didn't they?
A. Yes, and my comment regarding her respiratory markers was related to her being put on CPAP.
Q. Right. Let's look at the whole picture. Her blood gas deteriorated when she came off the ventilator, didn't it?
A. It did.
Q. Dr Newby was concerned that she seemed quiet and she didn't like her tone, it was stiff. She considered she may be suffering from sepsis in all the circumstances. You heard that, didn't you?
A. I did.
Q. Then we found that, because the blood gas readings deteriorated round about 10.14, because of that, [Baby D] was then put on to CPAP.
A. That's fine.
Q. Yes. So that indicates, doesn't it, that CPAP is necessary to give her some sort of support that she is at a disadvantage for if she doesn't have it, surely?

A. That's why it's used.
Q. Right. So it is necessary to support or assist her breathing, whichever words you prefer?
A. Yes. Let's call it assist.
Q. All right. It's necessary to assist her breathing, isn't it?
A. Yes.
Q. We heard that still later, at about 12.10, the blood gas readings were still unsatisfactory at that point and Dr Newby considered some form of acidosis was responsible for that.
A. Can you point me to that reading, please?
Q. We can put it up if you like.
A. Yes.
Q. We'll put up, please, Mr Murphy, in one moment -- it's slide 112. Pop behind there. We'll enlarge, if we could, the central part of the chart which shows the readings for 10.14 and 12.10.
A. Just a minute, I want to look at my own record because it's clearer for me. Give me the time again.
Q. 10.14 and 12.10.
A. Right. Let's have a look. Right. 10.14. 10.14, this is just -- it notes, "To start CPAP". So this was just before she started CPAP.
Q. Yes.

A. Therefore the CO2 is raised at 9, 9.02, and a bit later it's 9.97, so those values prove that it was appropriate to put her on CPAP.

Q. What I was asking you, Dr Evans, is by the time we get to 12.10, and we can see it here, in accordance with the evidence of Dr Newby and what we see on this table, the blood gas levels were still unsatisfactory even though she was on CPAP. You see that?

A. Yes, well, she was put on CPAP and then 2 hours later the CO2 is down to 5.18, which is spot on. This is what we do, okay? If we have a child with pneumonia who cannot cope without CPAP, you put them on CPAP. Standard, routine clinical practice.

Q. Just looking at your assertion that all the respiratory markers were great, which is what you said to the jury that's what we're looking at --

A. No, no. Nitpicking, I'm afraid. The issue is the respiratory rate during this time was satisfactory or great or whatever you wish to call it. So if you want to look at selected bits of information I am more than happy to comment on selected bits of information. But I think that what I would add to this, I've listened to every doctor who has given evidence, local doctor who's given evidence, and every one of them has said that when you're assessing a baby, you are looking at all the

markers. In other words, the well-being, heart rate, respiratory rate, blood tests. You are looking at all the criteria available to you. What you can't do, what you cannot do is what is happening today, is looking at one or two things which are out of sync in this situation, as we're hearing, where a little baby came off ventilation, could not cope without CPAP, so she was put on CPAP. Standard medical care. Okay?

Q. We --

A. Standard medical care.

Q. We know she had pneumonia, don't we?

A. We do.

Q. That's part of the clinical picture, isn't it?

A. Sorry?

Q. That's part of the clinical picture, isn't it?

A. What now?

Q. That she had pneumonia?

A. Yes, we know. I know.

Q. We know her condition the day before. I have just covered that and that's part of the picture to bear in mind, isn't it?

A. Yes.

Q. We know that throughout the course of this morning, the morning we're looking at, if she didn't get respiratory support she deteriorated into acidosis. We know that

don't we?

A. Tell me about the acidosis. Which --

Q. We know that she deteriorated, don't we?

A. Which figure are you pointing out?

Q. Don't you want to answer that question? We have had the evidence, Dr Evans, and we know she deteriorated, don't we?

A. She did not stabilise when taken off ventilation so she required CPAP. That's fine.

Q. The whole picture is of a little girl who has respiratory problems, isn't it?

A. Yes.

Q. Right. We know that, as we go on into the afternoon, her lactate levels were found to be higher round about 1 pm?

A. Um... Well, we discussed lactate. 1 pm, hang on, just a minute. Well... Just a minute, 1 pm... We've got a pattern here. Let me read them out. There's a 2.3. One of the medical people said that their lactate values were under 2.5, so we've got a 3.4 and a 4.5. These are values that are raised. This is what you get. This is what happened because she was -- one of them was prior to starting on CPAP. And by 2 pm, it's down to 1.8. So you know, again, we're looking at trends. So if one is looking at things in isolation, this is in -- this

indicates that people don't understand how medicine works. I mean, I'm not trying to be rude to Mr Myers, but this is what happens.

We've got lactate a little bit high, CO2 is a little bit high, let's put her on CPAP. Two hours later, her CO2 is 5.18 and her lactate is 1.8. Great. And she's back in air. She's even -- which is great.

That's what clinical practice is about. It's not about picking on one or two markers that don't assist in the overall context of how one assesses a baby --

Q. I'm not going to --

A. -- or any patient for that matter.

Q. I'm not going to repeat the questions or the points that I make. I've made the point already that the full picture is of a little girl who's unwell with pneumonia. You agreed with that, Dr Evans. I am not going to go back through that.

A. She's unwell and she's --

Q. Let me move on (overspeaking) picture.

A. -- recovering from pneumonia with the aid of CPAP. Great.

Q. In fact, when she was taken off CPAP, as we get into the evening, she deteriorated, didn't she?

A. She did.

Q. That goes to show that she has a problem with

respiration, doesn't it?
A. No, it goes to show she needs treatment with CPAP.
Q. If someone needs treatment with CPAP because they desaturate without it, that is a problem with respiration, isn't it, Dr Evans?
A. It's a problem that requires treatment with CPAP. And if you are looking at a baby of 37 weeks' gestation, who is over 3 kg and on CPAP, is in air with saturations in the high 90s, it's worth trying them off CPAP. It's worth -- listen now, listen. It's worth trying them off CPAP and if the oxygen saturation drops, you put them back on CPAP. I suspect that is something that happens most days of the week in every neonatal unit in the country.
Q. (Overspeaking).
A. So she's really, really stable.
Q. You don't want to accept the possibility of problems with respiration because that would be something that may undermine your alternative proposal that this is air embolus; that's what this is about, isn't it, Dr Evans?
A. No. I told you why I think she's got an air embolus. She died of an air embolus.
Q. When she was taken off CPAP we've seen she desaturated to somewhere in the 80s.
A. Yes.

Q. Would you have just left her off CPAP in that situation?
A. No, I'd have put her back --
Q. Why not?
A. I would have put her back on CPAP.
Q. Why? Why?
A. Because she needs it.
Q. Right. Why does she need it?
A. Because babies who are recovering from pneumonia, from time to time, will need CPAP. It's a standard clinical treatment. It's what you do. You respond to how the patient responds to your treatment. Okay? It is standard clinical medicine that I think most people would find very straightforward to understand -- appreciate.
Q. It's not a great respiratory marker if she desaturates to 80 when taken off CPAP, is it?
A. She was taken off CPAP --
MR JUSTICE GOSS: Answer the question yes or no. Just ask the question again.
MR MYERS: It is not a great respiratory marker that she desaturates to 80 when taken off CPAP, is it?
A. Well, it simply means she needs CPAP, that's all.
Q. That's your answer, is it, Dr Evans?
A. Yes, simple as that.
Q. You've told the jury how [Baby D] was very stable as we go

through the evening until her collapse.
A. Mm.
Q. And you said no evidence of a respiratory problem. That's your evidence?
A. In air, oxygen saturations normal, heart rate normal, respiratory rate normal. Those are the four criteria, clinical criteria, that I would look to, and all of them were, prior to her collapse, within the normal range.
Q. In fact, you said:
"Prior to her collapse, she could not have been better."
A. She was stable.
Q. You said she was doing exceptionally well.
A. She was doing exceptionally well.
Q. And do you agree -- is that your evidence, she could not have been better?
A. She was recovering from pneumonia. For a baby of 30 hours, I think, of age, given those clinical markers, she was doing remarkably well.
Q. Can we just move -- you said actually to the jury she could not have been better. Is your evidence seriously on her condition that she could not have been better?
A. Given that she had pneumonia and she was recovering from pneumonia, what I said was that is -- she was recovering even better than I expected, actually. I think I said

a few minutes ago that I would have expected her to recover over a period of a couple of days, but the fact that she had made this recovery, you know, made this recovery within 24 hours of admission to the neonatal unit --

Q. Can we scroll down the page? We've seen, and we've looked at it with other practitioners, that there is -- the readings at 23.52 and 01.14 both show increasing acidosis in terms of the pH for a start. Do you agree?

A. 7.26, bit low. Nothing much to worry about.

Q. So those other practitioners, so we can be quite clear about this, the doctors and nurses who have come here and agree that shows an acidic pH, are they right or are they wrong in your professional expert opinion?

A. It is a mild acidosis but, as every medic says, you look at the overall picture. If you scroll across that page she's on CPAP of 5 centimetres in air, therefore she has satisfactory oxygenation. It's a venous sample, which is not as good as an arterial sample, we heard that this morning. And so a pH of 7.26, you know, is slightly low, but nothing to worry about in isolation.

Q. When you produced the report that you were taken through in part a little while ago, you go through the various blood gas readings. You didn't refer, as it happens, to either of these two readings when you said that she was

doing well. You may not recall it, but I can tell you, it didn't feature in your report.

A. Okay, if I didn't, I didn't.

Q. When you went through your evidence to the jury a short while ago you went through various blood gas readings on the way to this point but you didn't mention these two readings that occur before the first event, did you?

A. That's the whole point of my being here, to cover anything that's not been included in the report and that's not been included in evidence-in-chief. So if you want to raise these issues, I will answer them.

Q. You identified readings that showed an improvement during the afternoon, didn't you?

A. Yes.

Q. You have made no reference in questioning so far or in your report to the readings that we see at 23.52 and 01.14, have you?

A. And your point is?

Q. It would be helpful if you just answer the question. You haven't made any reference to them, have you?

A. I haven't been asked about them.

Q. You haven't volunteered that, have you?

A. I haven't been asked about them.

Q. They're not in your report?

A. I haven't been asked. If you want me to ask about them

I will answer them respectfully.
Q. Is it deliberate not to include readings that show a deterioration in the period before the first event?
A. First of all, these readings in isolation, you cannot look at readings in isolation, as one keeps saying. If you want to ask me about those readings, I will answer them.
Q. All right. Can -- those two readings, do they demonstrate she could not have been better?
A. She's in air, on 5 centimetres of CPAP, her pH is over 7.25, her CO2 on a venous sample is 6 point something, 6.5 I think, that's not too bad, I would settle for that. In a venous sample that's okay. And her base deficit is 5.6, I'm not going to get worried about that.
Q. 8.9 is bad, isn't it?
A. And then it is 8.9, she is still in air, she's still on CPAP. And looking at... Looking at one little reading that is out of sync with everything else, this is not how clinical practice works.
Q. Maybe she was just not very well, Dr Evans.
A. She was stable, she was recovering from pneumonia, she was in air with oxygen saturations of 100%. For a baby who had antepartum pneumonia, ie pneumonia before birth, to be at this stage of progress within this pretty short time, actually, that is something I would be completely

satisfied with and, as I did volunteer earlier, I'd expect her to continue improving and she'd probably need to be on antibiotics for 7 to 10 days, maybe, depending on her progress. But you'd carry on with a course of antibiotics and then getting her off CPAP that evening didn't work, no problem with that, you put her back on CPAP. That's how it is, that's how it works. So the following day, if she'd not been the victim of an air embolus, that is my opinion, she would be nice and stable and the medics would have had another go at trying her off CPAP. That's where we are. This is the holistic approach that I take when assessing babies who have conditions like this.

Q. Do you agree that at paragraph 36 of the report that you were taken to, you say:

"Immediately preceding her terminal collapse all the clinical markers were normal"?

A. Clinical markers mean: heart rate, normal; respiratory rate, normal; oxygen saturation, normal; oxygen requirement, 21%, that's normal.

Q. Do you agree that what we're looking at for 23.52 and 01.14 are not normal? Are they normal or are they not normal?

A. They are not concerning.

Q. Are they normal or not normal?

A. 6.56, that's normal. Base deficit, 5.6, that's acceptable, within normal limits. 8.9, slightly raised. The other pH, 7.2 -- the other CO2 is under 6.56. I think that says 6.43, that's okay. Yeah, CPAP. In air again. Yeah. Stable.

Q. Do you agree she was unable -- we have been over this actually, but she was breathing with CPAP, wasn't she?

A. She was.

Q. She deteriorated without CPAP, didn't she?

A. Twelve hours earlier she did -- no, not 12 --

Q. No, not 12. 7.15 pm.

A. Let's work that out. Anyway, several hours earlier.

Q. Her sodium levels were low?

A. Slightly low.

Q. Platelets --

A. Not a concern.

Q. Not a concern to you.

A. No, no, not a clinical concern. A sodium of 126, which went up to 129, does not explain what happened to her and that which led to her death.

Q. And what you're doing, doctor, is deliberately seeking to exclude factors which go to show she may actually have been unwell. That's what you're doing, isn't it?

A. She was stable. None of the issues that we've talked about, things like a base excess of 8.9 or whatever,

none of this explains what happened to [Baby D] during the early hours of Sunday morning, 22 June. None of this is relevant, either in isolation or combined.

What does explain it is air embolus, and I've given everyone the five stages -- you don't need all five stages, but I've given you the five stages that [Baby D] experienced, entirely consistent with air embolus. The first four --

Q. You've (overspeaking). I would just like you to answer the questions, Dr Evans, we don't need the list again. You've given it to us and I'm going to go through it with you. May I proceed with the questions so we can deal with the actual issues I'd like to ask you about? Is that all right?

There are three different events, aren't there, that take place going into the early hours of that morning?

A. Yes.

Q. 1.30, 3 am, 3.45?

A. Yes.

Q. Those are the timings we have from the nursing notes.

We'll return to discolouration shortly, but in terms of breathing, on those occasions they were nothing more than, we don't underestimate them, desaturations, were they?

A. No, those desaturations were significant.

Q. To around the 70s?
A. Yes.
Q. We have had desaturations when taken off CPAP to just a little bit above that earlier in the day, hadn't we?
A. There's an explanation for that. Okay? There's an explanation for that. The explanation was she was tried off CPAP, put back on, tick, clinical management, that's the way it's done.
Q. It's not uncommon to have desaturations like [Baby D] had at 1.30 and 3 in the morning, is it?
A. It's pretty uncommon for her condition to be such that it required crash calling and the efforts that were made to get her round on the first and second occasions.
Q. Efforts to get her round? What efforts on the second occasion? Tell us about them, please.
A. Okay. Let me go through it in that case. Just a minute. I'll check on the... I'll check this through the clinical...

(Pause)

Q. There are no resuscitative efforts on the second occasion, are there, Dr Evans?
A. Just a minute.

(Pause)

Q. We can go to the notes.
A. No, no, I've got the notes on my -- I've got my own copy

here, so I'd rather go through that, okay?

Q. To assist the jury, so we can have a look --

A. I'm on J2222. The next one is 2223.

Q. Can we start with slide 218, please, Mr Murphy?

A. Here we are. I'll give you the number now, just a minute. J2225. Okay?

Q. We've got on the screen now the actual notes, Dr Evans, so perhaps we could look at those because they're the original material we are dealing with.

A. "Called urgently to paeds ward as [Baby D] had further episode of being very upset and crying and desaturated to 80% in 100% oxygen."

Right. Now, it's not that she desaturates to 80%, which is significant. But she desaturates to 80% whilst being in 100% oxygen. You can't -- that's pretty serious, right? That's pretty serious. Then it follows:

"Skin discolouration again became more prominent but not as [reads sotto voce] previously. Appears distressed on CPAP."

Then the next line:

"Now in air. No increased work of breathing."

So therefore, this was a very, very concerning issue, okay? It's a very, very concerning issue. Any baby who was in air and is now saturating to 80% only,

and requiring 100% oxygen to do it, and then soon after that, wow, she's back in air. So therefore there was a significant event round about that time. Okay?

Q. You were talking about the efforts, in effect, to resuscitate her. I was asking you to help us with where we see them on the first two events. So let's focus on the question because you talked about the importance of resuscitation and its failure as part of identifying air embolus.

A. It is.

Q. You told the jury about the efforts brought to stabilise her on these first two occasions. We have the notes at 01.40 for Dr Brunton. We're looking through them. We can see them, it starts from:

"Called urgently to review baby. Nurses noted that became extremely mottled. Also noted to have tracking lesions (dark brown/black) across trunk."

Nothing so far about resuscitation, is there? Is there, Dr Evans?

A. This was a serious collapse, okay?

Q. I'm asking you to help us with the question of resuscitation because you've referred to that, so let's carry on. Can you see anything there about resuscitating her as a result of this desaturation?

A. No.

Q. Right. Let's carry on:

"60% in oxygen."

That's on examination.

She's on CPAP. There's slight subcostal recession.

We've got HS -- is that heart sounds?

A. Where are we now?

Q. What's that, please?

A. Right. "HS 1 and 2", heart sounds 1 and 2, "normal".

"Plus 0" means normal.

Q. No resuscitation taking place whatsoever, is there?

A. Well, she recovered.

Q. She did. So when you were suggesting there were efforts taken to bring her round from this, there are no efforts taken to bring her back that are resuscitative, are there?

A. She recovered of her own accord.

Q. So one of the key factors that you identify for air embolus, when I asked you at the start of this, was the failure to resuscitate, resuscitation is unsuccessful.

A. Yes, she died.

Q. At this incident, Dr Evans, she did not die, did she?

A. She died a couple of hours later.

Q. We're looking at three events here.

A. Yes.

Q. At this first one, 01.40, there is desaturation and she

makes a full recovery. You agree?
A. Yes.
Q. We have heard a lot of witnesses telling us about it who were there. Yes?
A. A lot of witnesses?
Q. Telling us about it who dealt with it. And they described the recovery she made?
A. Yes, I know.
Q. You've heard that?
A. Yes, I know.
Q. You've also heard that there was no resuscitation required at all.
A. No, no, she required resuscitation. She required resuscitation at her third and final and terminal collapse.
Q. Yes. We're dealing --
A. So that is -- listen -- that is what I was talking about, okay? There were two previous very concerning deteriorations from which she recovered.
Q. Yes.
A. And then -- and then -- well, then on the third occasion, she crashed and resuscitation was unsuccessful. And to repeat what I said earlier, this is quite remarkable in a baby given the situation she was just before that.

Q. I began this section by reminding us there were three separate incidents, I gave the times, you agreed with that.
A. Three separate incidents.
Q. I suggested to you that the first two were followed by good recoveries. You made reference to the efforts taken to bring her back. We're dealing with that and there are no resuscitative efforts on event number 1, are there?
A. No.
Q. And that, first of all, means that it's not right for to you suggest there were efforts to bring her back then. There weren't, were there?
A. I didn't say that. What I said was that one of the features characteristics of air embolus is the failure of resuscitation. And you know, we've already -- so... and resuscitation failed --
Q. And there's no failure of resuscitation --
A. -- on her third -- let's look at the whole picture --
Q. Well --
A. -- on her third deterioration.
Q. We are looking at it, Dr Evans, and there is no failure of resuscitation on that first event, is there?
A. I think we just said that.
Q. Right. Second event, 2 am, the one where you

specifically refer to the efforts -- sorry --

A. No, no.

Q. -- 3 am, the one where you refer to the efforts to bring her back.

A. Let's -- no, no, let's not put words in my mouth. I'm quite capable of speaking for myself.

Q. Okay.

A. The second effort:

"Called urgently to paeds ward as [Baby D] had further episodes of being very upset and crying and desaturated to 80% in 100% oxygen."

From which she -- and then she recovered. But this was --

Q. Well --

A. Just a minute. This is a serious event, all right? It's a serious event. Then on the third event, she died.

Q. I'm grateful for Mr Maher for assisting me with the record we have of the evidence as it unfolds. Because I would quite like to be clear about the way this questioning went, Dr Evans. People may recall it, they may not, but we have the note. I said to you:

"Question: It's not uncommon to have desaturations like [Baby D] had at 1.30 and 3 in the morning, is it?"

And you said:

"Answer: It's pretty uncommon for her condition to be such that it required crash calling and the efforts that were made to get her round on the first and second occasion."

That was your evidence.

A. That was my opinion. She had two crash calls. That's serious, okay?

Q. You know and have spent time with these papers and have written four or five reports on this child, haven't you?

A. I have.

Q. There is no evidence and she did not require efforts to bring her round on the first and second occasions, is there?

A. She recovered of her own volition on the first and second occasions.

Q. So when you said to the jury minutes ago, in answer to my question that it wasn't uncommon to have desaturations like these two, when you said it required crash calling and the efforts that were made to get her round on the first and second occasions, there were no efforts, were there?

A. That is incorrect. That is incorrect. You are completely confusing everybody, I think, because -- because on the second occasion, let's read it again:

"Called urgently to paeds ward as [Baby D] had further

episodes of being upset and crying and desaturated to 80% in 100% oxygen."

In other words, the nursing staff, or the medical staff, the nursing staff had put her in 100% oxygen. That is one of the stages of resuscitation, Mr Myers. You need to know this.

Q. And there is no crash call on the second occasion, is there?

A. For goodness sake -- hang on:

"Called urgently to paeds ward..."

You can interpret it any way you like:

"Called urgently to paeds ward at 3 o'clock in the morning."

For goodness sake, that is -- it's good care, it's good care, but that's what happened. So again, making, you know, just playing at semantics doesn't get us anywhere, I am afraid. She was put in 100% oxygen. That is what you do to start the steps at resuscitation. If she doesn't need bagging and Neopuffs and all of that, great. She was put in 100% oxygen to get her round and they did. Great.

Q. And there is no requirement to resuscitate on the second occasion, was there?

A. That was the second. That was the second occasion and she was put in 100% oxygen. That is one part of

resuscitation, okay?

Q. And she recovered perfectly well, in fact, didn't she?

A. Because of the resuscitation efforts that were carried out.

Q. Your evidence has been that one of the marking features of an air embolus is the failure of resuscitation.

A. Correct.

Q. And for the second time, and the second desaturation we have, there is not a failure of whatever support was given, is there?

A. It depends on how much air went in, first of all, and it depends on the rate at which the air went in.

Q. So you're changing --

A. No, I'm not changing. Just listen now, just listen, okay? Therefore, the greater the volume of air that goes in, the greater the danger of death. The greater the speed at which the volume of air goes in, the greater the risk of death. And therefore -- and whilst air embolus is fatal in most cases, it's not fatal in all cases. What determines fatality probably -- probably -- because we know -- because we make so much -- we make such efforts to avoid air embolus, that it is very difficult to get -- I'm pleased to say it's very difficult to get research papers on it.

So therefore, on the second occasion, here we are,

she's really unwell, you know, she's crying, desaturations to 80% in 100% oxygen, but the resuscitation was successful without bagging. In other words, if we go back to our first cases, this is what happened with [Baby B]. [Baby B] didn't die, she recovered.

[Baby D] recovered on the second occasion thanks to the 100% oxygen and -- and -- um... She... the volume of air was insufficient to kill her.

Q. You said --

A. That's the gist of it on the second occasion.

Q. What you said in your report, the one which you rely upon and the prosecution took you to, at paragraph 42 was this:

"In my opinion, [Baby D]'s demise may be the result of tampering with her care during the early hours of 22 June. I believe one needs to seriously consider that [Baby D] may have been given some intravenous air causing an air embolus. A small volume would cause a precipitous deterioration in a baby's condition and lead to efforts at resuscitation failing."

A. That's correct.

Q. You also said it may explain the abdominal discolouration.

A. Yes.

Q. In fact, on the two occasions that we're looking at so far, efforts at resuscitation did not fail, did they?
A. It depends on the volume of air.
Q. You say:
"A small volume would cause a precipitous deterioration."
That's what you said in your report.
A. Yes. We can argue about how small is small because we don't know. We can't put a -- we cannot put a volume on and say any baby who receives so many millilitres per kilo will lead to death in all cases. I mean, that information is simply not available because air can only get into a circulation for two reasons. Either: some sort of horrible accident or as a result of a deliberate act.
Now, I am unaware of any -- you know, because of all the equipment and the care nurses and doctors take to avoid air getting in accidentally, people who give air intentionally are unlikely to write it up in the notes, are they? So you know...
Q. In fact both of the desaturations that we have looked at, the one at 1.30 and the one at 3 o'clock, could be regarded in fact as warning signs that [Baby D] was not well, couldn't they?
A. No, that is clinically unacceptable. She -- I can't

think of any, you know, of the conditions that make babies unwell leading to a presentation of this nature other than -- it just doesn't happen.

Q. And you vary what you say about air embolus because I would suggest to you --

A. I do not vary what I say about air embolus. I have explained to you exactly what I've said about air embolus, recognising how limited our information is because of the care we take to avoid the condition occurring.

Q. You vary what you say, I'm suggesting, because you're influenced by the allegation rather than the actual underlying facts, Dr Evans.

A. My information is based on evidence, the evidence that I presented in my papers and then -- and perhaps I could go back to my... I think I said to everybody at the beginning that when I did my reports, I did about 30 reports in November 2017, you know, so they were screening reports, so sorry if I've left one or two things out.

But if I go back to my... Where are we here? If I go back to my original paper, I need to read this because I think I was -- just a minute.

(Pause)

Right. In my initial report I say, I quote:

"In my opinion, [Baby D]'s demise may be the result of tampering with [Baby D]'s care during the early hours of 22 June. I believe one needs to seriously consider that [Baby D] may have been given some intravenous air, causing an air embolus."

Right?

"A small volume would cause a precipitous deterioration in a baby's condition and lead to efforts at resuscitation failing. It may explain the abdominal discolouration."

Now, that report was dated 7 November 2017, so 5 years to this. I was reliant at that time on the clinical notes only. I had no information regarding the pathology opinion, which we'll hear in future. I had no information regarding Owen Arthurs' opinion about aortic vein -- aortic gas. I had no information about Lucy Letby. None of this was known to me. No one had said, oi, there are babies dying of air embolus in Chester. I knew none of this.

I was investigating a baby with a blank sheet of paper, which I think is the term I used, from de novo, from the beginning.

That is the conclusion I formed 5 years ago to this week and, since then, I have heard from the local medical people, I have heard from the local nursing

people, and we've heard from the other witnesses and they'll give their evidence so I'm not going to quote them.

So in this particular case I am entirely satisfied with my opinion regarding the cause of [Baby D]'s demise. Okay?

Q. And you have said at the outset of your evidence today, when I asked the features of air embolus in this case, you made reference to resuscitation being unsuccessful.

A. I did.

Q. Yes. And when we look at what happened, to make it quite clear, there are two occasions when [Baby D] deteriorated and there was not death, there was not unsuccessful resuscitation.

A. It depends on the volume of air given and it depends on the rate at which that volume of air is given. A baby like [Baby D] would be on various lines. If the air -- some of the air was not (inaudible) into her circulation immediately, in other words it was at the end of a line, you need to consider that she was on about 5ml -- I can't remember, but anyway, so many millilitres an hour, so a fraction of a millilitre per minute. And if that air, some of that air, was in the catheter, in the catheter, you know, injected into the catheter 10r but hadn't got into the circulation, that air would then

infuse into her circulation over longer than -- would not be instant is what I mean, would not be instantaneous. Therefore that would explain the discolouration. It would explain her desaturations and it would also explain why giving 100% oxygen -- you can't give more than 100% oxygen by the way -- led to her recovery, if only for a short time.

Then next time, as I keep saying, the air that she suffered infused into her circulation was sufficient to kill her. That is it. Okay? That is my medical opinion, Mr Myers. Right?

Q. It was a very bad idea for her to be taken off CPAP, wasn't it, when she had just desaturated twice in the 2 hours beforehand; do you agree?

A. All right, we're back to that now, right. What time is this?

Q. I'm not meaning to delay you, Dr Evans, I'm not trying to be rude, so please be courteous to me with the questions I ask.

A. What time was the CPAP?

Q. It was a bad idea that she was taken off it after the second desaturation, wasn't it?

MR JUSTICE GOSS: I think "a bad idea" is a bit imprecise. It was clinically inappropriate; is that what you mean?

MR MYERS: I prefer that, yes, thank you, my Lord.

It was clinically inappropriate to take her off CPAP after the second desaturation, wasn't it, Dr Evans?

A. I don't know is the answer to that. I don't know is the answer to that because, you know, the medics thought that she was not tolerating CPAP very well and big babies quite often do not tolerate CPAP very well. So they took her off CPAP. They'd taken her off CPAP the night before, put her back on, she was fine, so therefore if her final -- so therefore CPAP had nothing to do with her final deterioration because if her breathing had become a bit irregular then resuscitation would have worked. Okay? That's what I'm trying to say. Sorry, you were confusing me with this -- you know, the final event with the getting her off CPAP the night before. Sorry about that.

Q. Before I ask you --

A. No, no, right. Sorry. I'd just caught up with what you're trying to say. Because I thought you were back on the night before. Apologies for that. Right, let's start again.

She took her off CPAP. Was it a bad idea? I don't know. Did it make a difference? The answer is no, because if her deterioration was simply due to lack of CPAP then putting her back on CPAP or -- she'd have responded very easily to resuscitation. She didn't.

She didn't, okay? She didn't. And anyway, lack of CPAP does not explain air in the aorta on post-mortem.

Q. I'll turn to the third event in a moment and deal with that. Before I do, do you agree that it is entirely possible that she could have died from infection?

A. No.

Q. Could have done?

A. No, no, no, no, no.

Q. That is consistent with the various adverse clinical signs we see during her life and continuing respiratory problems?

A. Correct. She could have died from infection aged 4 hours, but she didn't, and she responded superbly over the next 24 hours or so.

Q. You --

A. She responded very satisfactorily over the next -- you know, during 21 June.

Q. To make it plain, on behalf of the defendant, I don't accept that, but I'm not going to go through the points that we have dealt with on that already?

A. She responded to treatment for pneumonia. What more do you want?

Q. When the pathology was done at the post-mortem -- and you have seen the report of Dr McPartland, haven't you?

A. I have.

Q. That examination disclosed acute pneumonia, not in just the right lung, Dr Evans, it disclosed acute pneumonia in the lungs.
A. I am going to leave the pathology to Dr Marnerides.
Q. Yes. Well --
A. I am deferring the interpretation of the pathology to Dr Marnerides. That is what clinicians do with regard to autopsy findings, so I am not commenting on that at all.
Q. Well, you can confirm the presence of acute pneumonia in the lungs, can't you, from the pathological findings, from the post-mortem?
A. Well, if you -- where else do you get acute pneumonia except in the lungs?
Q. Well, you said "the lung" earlier. I'm just being quite accurate. It says "the lungs".
A. I have explained I am deferring to Dr Marnerides' opinion on the autopsy; okay?
Q. And you have -- you were ready to point out where it was when you were asked questions a little earlier by the prosecution, weren't you?
A. I was simply covering it. Let's leave the pathology to Dr Marnerides.
Q. I'm only doing what the prosecution did and asking you to confirm some aspects of what you were asked.

A. There was one quote I said where I quoted the fact that there was pneumonia in the right lung. That is it. I am not commenting on the autopsy findings in the lung. That is a matter for the pathologist.
Q. Are you able to confirm there was acute pneumonia in the lungs?
A. Leave it to the pathologists, please.
Q. And that it was indicative of acute lung injury?
A. Can we leave the autopsy findings to the pathologists, please?
Q. So [Baby D] was born with pneumonia, wasn't she?
A. She was.
Q. She was very ill with pneumonia, wasn't she?
A. She was unwell with pneumonia, yes.
Q. She continued to exhibit respiratory difficulties at points throughout the remainder of her sadly short life?
A. She did.
Q. And sadly, she died with pneumonia, didn't she?
A. She had pneumonia when she died, yes, that's what the pathology said.
Q. And that is quite capable of being a cause of death in her case, isn't it?
A. Not in her case, no. Not in her case, no.
Q. Now with the third --
A. I have dealt with lots of cases of pneumonia, no.

Q. With the third event, you have emphasised, one of the first things you identified to the jury, first of all, that her collapse is unexpected. In fact, the third event followed two other collapses that had taken place, didn't it?

A. From which she made a very quick -- astonishing recovery.

Q. You have told us about the steps that had to be taken to get her to that state of recovery, haven't you?

A. She required 100% oxygen on the second time and then she was -- I and quote, she was then...

"Clinically appears well and now in air, no increased work of breathing."

So therefore that is not what you find in a baby who's collapsed because of pneumonia. That's not what you find in babies who have collapsed because of pneumonia or sepsis where, you know, soon after the urgent call, they're in air, no increased work of breathing.

Q. Did you hear Dr Newby explain that after the second deterioration, her view was that [Baby D] was in fact on the verge of being put on to a ventilator? There was a low threshold to intervene if there were deteriorations from a respiratory point of view?

A. Yes, I heard that.

Q. That's not an indication of a baby with whom the treating consultant regards is in some excellent condition, is it?
A. But she wasn't put on ventilation, was she?
Q. She had been told --
A. She wasn't put on ventilation. That's the whole point. If her condition was unstable, Dr Newby would have put her on ventilation. She was not put on ventilation, ie she'd made this astonishing recovery. Okay? That is it. Let's not try and confuse the issue.
Q. She had been there and she had found that her condition was such, didn't she, that if there was any further deterioration she would need to be put on a ventilator; do you agree?
A. A different point altogether and I agree with that.
Q. Yes, she did.
A. Different point altogether.
Q. Then we come to her being taken off CPAP, don't we?
A. Yes.
Q. Which is in fact travelling in completely the opposite direction from that, isn't it?
A. How do you mean?
Q. That withdrew support that she'd received up to that point, didn't it?
A. The fact that she was taken off CPAP would indicate to

me that the clinicians were satisfied that her condition was stable, that's the first point, because you're not going to reduce the amount of respiratory assistance if you take somebody off CPAP. So that's the first point.

The second point was that, apart from these skin discolourations which was recorded on this chart, she was in air, no increased work of breathing, let's try her off CPAP. That's okay. Gas in 1 hour, yes, okay. That is what we do, that is what happens.

Q. Do you agree that up to that point there had been nothing to indicate that she would do better off CPAP in the sense of the clinical markers and her respiratory condition?

A. I don't know that. I don't know that. I've already explained that trying her off CPAP the previous evening was not -- you know, was a perfectly okay thing to do. It didn't work so they put her back on CPAP. So that's fine. She's now upset. I don't think she was -- I think it's due to CPAP, let's try her off CPAP. Not a problem because she, (1), is in a neonatal unit, safest place on the planet. She's on full monitoring. So if she doesn't cope without CPAP, they might find a drop in -- her breathing might increase or her heart rate might increase or her oxygen requirement might go up a bit or her oxygen saturation might drop to the low

90s. You know, I am just saying these are the sort of things that any experienced nurse would look for. So therefore let's try her.

What would not happen -- what would not happen -- let me be absolutely clear about this: what would not happen in a baby of 37 weeks, who is recovering from pneumonia, you take her off CPAP, she wouldn't suddenly crash and where resuscitation, including adrenaline, et cetera, was unsuccessful. That does not -- that is not a clinical process that anybody dealing with babies of this nature see. Whereas if she received a bolus of air intravenously, then we're back to my diagnosis of air embolus, which is what happened in this case. Okay?

Q. And your evidence on that is that if she receives a bolus of air intravenously, one of the features that gets top billing in your list, Dr Evans, is the presence of discolouration. You have been very clear about that.

A. It's not top billing at all. I've explained to you the five steps, one of which is this discolouration.

Q. It was second, you said. First is the unexpected collapse. The second is discolouration.

A. That's the sequence of events, not the order of priority -- of significance.

Q. As it happens there's no evidence or suggestion of any discolouration at all with the third collapse that we're

looking at, is there?

A. She collapsed, you know.

Q. And that is inconsistent with your theory of air embolus, isn't it?

A. No, it is not. Okay? It is not. Babies collapse, they're doing their best to resuscitate her and they are sadly unsuccessful.

Q. There's no discolouration on that final occasion, was there?

A. As far as I know nothing was recorded anyway.

Q. And that is inconsistent with the way you've described the presentation of an air embolus, isn't it?

A. No, it is not, because what I said earlier was, I described the five criteria and I said you don't need all five to confirm a diagnosis of air embolus. So in [Baby D]'s case we had the collapse, failure of resuscitation -- sorry, and air in the aorta. That's for the radiologists to comment on. And the absence of, you know, anything else really. So yes. So yes, I'll stick with that, I'll stick with that.

Q. Your evidence on that in conclusion was:

"A small volume caused a precipitous deterioration [this is in the report] in the baby's condition and lead to efforts at resuscitation failing and it may explain abdominal discolouration."

A. Mm.
Q. Yes. On the two occasions when we have some abdominal discolouration, resuscitation doesn't fail, does it? Does it?
A. Well, you said earlier she didn't need resuscitation, so you're now admitting that she did have resuscitation, so which one is it, please?
Q. On the two occasions when she had discolouration --
A. Which one is it? Sorry, I am not picking on you, I just need clarification. You made an effort to tell me that she did not require resuscitation on the second event and I said to her (sic), yes, she did, she required 100% oxygen, and now you are trying to tell me she did require resuscitation, so which question are you asking me, please?
Q. Well, you understand the point, Dr Evans.
A. No, I do not, actually.
Q. Resuscitative measures that failed do not feature in events 1 and 2, do they? They do not feature.
A. Depends on the -- it depends on the volume of air given intravenously and the rate at which it was given.
Q. You agree --
A. And I think we'll discuss that in a later case as well, so yes.
Q. I just want to confirm, taking that sentence to conclude

this, you agree that resuscitative efforts did not fail on events 1 and 2, did they?

A. She only required resuscitation with oxygen and it was successful.

Q. And although you talk about the embolus may explain the abdominal discolouration, there is in fact no abdominal discolouration on event number 3, is there?

A. There is nothing recorded.

Q. You suggest they all missed it?

A. I have no idea, I wasn't there. But if I've got a baby under my care, who's got no chest wall movement, heart rate under 60, you know, I'm not going to start looking at whether she's got a discolouration of her abdomen. I'm going to go full pelt to try and save a baby's life, for goodness sake.

Q. Have you seen any evidence of discolouration on the third event?

A. I have just explained to you that I have not seen anything. I have no idea what the significance of that is, but -- yes, but this is not what -- yes, anyway.

MR MYERS: Thank you.

MR JOHNSON: Does your Lordship have any questions?

Questions from THE JUDGE

MR JUSTICE GOSS: Just this. We've had a lot of questioning

about what actually was observed in relation to the three incidents and I just want to go back to slide 2241, J2241, which are the notes written in retrospect by Caroline Oakley. On the right-hand side:

"01.30. Called to nursery by SN Percival-Ward and SN Letby. [Baby D] had desaturated to 70s. Required oral suction as was bubbly and lost colour."

And she said in evidence about the "bubbly", she couldn't say whether that had come from the nose or the mouth, but "bubbly" and required oral suction. Can I just ask Dr Evans whether that has any significance at all in relation to that first incident?

A. Right. I've seen this, my Lord. This is the 01.30 one, yes?

MR JUSTICE GOSS: Yes.

A. "Discolouration to skin observed", so that was on incident 1.

MR JUSTICE GOSS: Yes.

A. That's the first crash call, if I could call it a crash call.

MR JUSTICE GOSS: Yes, and then it goes on to say after the oral suction:

"Discolouration to skin observed. Trunk/legs/arms/chin. Dr Brunton called to review. Saturations 100% and O2 [oxygen] weaned to air."

A. Yes.
MR JUSTICE GOSS: Which indicates that she was given 100% oxygen.
A. Well, she was given oxygen, my Lord, yes, and then once she got better, you've chopped down, you've reduced the oxygen, so she was weaned to air. In other words, she required resuscitation, she did not require --
MR JUSTICE GOSS: Well, in the form -- not physical resuscitation?
A. No, no, no.
MR JUSTICE GOSS: But instead of just breathing -- having the assistance of CPAP in air, she was given 100% oxygen.
A. She was given oxygen, which is step number 1 in any resuscitation process, yes.
MR JUSTICE GOSS: Can you just help on the bubbly aspect?
A. I don't know.
MR JUSTICE GOSS: You don't know anything about that?
A. I can't explain that. I can't explain that, sorry.
MR JUSTICE GOSS: Right. Then further down:
"03.00. [Baby D] crying and desaturated again to 70s. Commenced on 100% O2 via CPAP and picked up well. Skin discoloured again but less than previously."
A. Yes.
MR JUSTICE GOSS: So again, 100% air.

A. 100% oxygen. Discolouration. She recovered without the need for Neopuff or...

MR JUSTICE GOSS: Right, thank you.

A. And then she settled, handling well.

MR JUSTICE GOSS: That's it, I have nothing else I want to ask. I just wanted to be clear about exactly what was done in relation to those two incidents.

A. So resuscitation was required on all three occasions.

MR JUSTICE GOSS: All right. Thank you. I don't have any other questions, thank you.

MR JOHNSON: Thank you, my Lord.

MR JUSTICE GOSS: Thank you, Dr Evans. That completes your evidence at this stage. Thank you very much.

That completes today's hearing. We'll break off there.

Ladies and gentlemen, 10.30 tomorrow. I was told by counsel that tomorrow and Friday are unlikely to be full days. I was told they are unlikely to be longer than half days, but it won't be possible -- because Professor Owen Arthurs from Great Ormond Street, his next availability, we've been told several times, is not until Friday, so we can't bring him forward to Thursday. So we are going to finish earlier tomorrow; it won't be a full day. I will say to you, you can expect to be free by lunchtime, but I can't guarantee it. I'll look

to counsel.

MR JOHNSON: I'll take the blame.

MR JUSTICE GOSS: All right. So you will probably not -- you will not be required after 1 o'clock tomorrow and certainly Friday will be an early day with Professor Arthurs. The reason is that will then be the end of the evidence relating to [Baby D] and we'll be moving on Monday to the next mother who will be giving evidence.

(4.13 pm)

(The court adjourned until 10.30 am on Thursday, 10 November 2022)