(The short adjournment)

(2.00 pm)

MR JOHNSON: Dr Marnerides, can we turn to the case of [Baby D], please?

A. Yes.

Q. Starting with the agreed facts, as we have done before, we see that [Baby D] was born on 20 June. We have heard evidence that she died at 04.25 on 22 June.

So far as the factual summary is concerned, which the jury have of Dr McPartland's evidence, it is all in fairly straightforward language. If we go to where the heading "Lungs" appears at the bottom of the page. It says:

"There is a patchy acute pneumonia most prominent within one of the right lung samples with some hyaline membranes present, indicating diffuse alveolar danger."

Could you put that into more straightforward language for us, please?

A. Yes. So patchy means that the inflammation one observes, so the neutrophils that one sees are not in all the alveoli, so the air spaces of the lungs or all the air tubes, the airways that you can see on histology. But they have patchy distribution. So some have it, some do not have it. That's what patchy inflammation means. Patchy (inaudible).

Q. Yes.

A. "Most prominent within the right lung samples."

Typically one would take one sample from each lobe of the right lung, so three samples in total from the right lung, two samples from the left lung. She says she could see these being more prominent. So patchy, but more alveoli and airways being involved in the samples from the right lung.

Hyaline membranes. So I need to explain a little bit how infection and the response to that infection, which is the inflammation, causes damage to the lung and reduces the exchange of oxygen, because that's ultimately where the pathology lies: we cannot exchange oxygen because of the inflammation.

One is the physical presence of the neutrophils

there, they block the exchange. Two is, if you remember I discussed those cells that form the lining of the alveoli, the air spaces --

Q. I think we have got a picture, actually, which might just help. It was produced by Dr Kinsey. Do any of those help?

A. Yes, it may help. So as we look at this sketch, right side, left side, right lung has three lobes, left lung has two lobes. The distal aspect that we see on histology -- imagine a section like this, flat surface, a section through those spaces that you see there, these are called the alveoli.

In these alveoli you see the neutrophils, which is the acute patchy pneumonia. Acute means not all the alveoli that one sees on the section are packed with those neutrophils, some are, some are not.

The inner lining of the -- the inside of the spaces, the alveoli, is lined by cells. Two types of cells, pneumocytes, type 1 and type 2, and some other cells there, not going to the details.

When there is injury to those cells and these cells die, plus some blood that is there, we see inside these something that is very pink and it forms -- it's like covering the inside of those spaces. Okay? It's like covering that. So the inside of these alveoli. That pink material, when it's well formed, and we see that here on those surfaces, on the inner surface of the alveolus, it's called a hyaline membrane.

So when you see those, this is evidence that not only there has been response to something, the infection in this instance, for example, but there has been some damage to the alveoli.

Q. Thank you. I think otherwise, unless anyone particularly wants me to deal with any of the remainder of that section of the agreed facts, I will turn to your reports. I believe that everything else is straightforward.

So turning to your reports on [Baby D], please, Dr Marnerides, was your first report dated 22 January 2019?

A. Correct.

Q. Your second, 20 October 2021?

A. Correct.

Q. Your third, 22 October 2021?

A. Yes.

Q. And your third, 3 September 2022?

A. Yes.

Q. Thank you. I'll deal first, as before, with the material that you received, so going back to the first report, please, 22 January 2019.
Did that material include a witness statement from Dr Evans, dated 31 May 2018?

A. Correct.

Q. A binder of medical records running to 446 pages?

A. Correct.

Q. Lots of photographs from [Baby D]'s post-mortem, 32 in one bundle and three in another?

A. Correct.

Q. A further PDF document, which included 111 pages of paperwork from the pathologist?

A. Correct.

Q. The coroner's record consisting of 157 pages?

A. Correct.

Q. And then some additional medical photographs from the Countess of Chester and 42 histology slides from the post-mortem undertaken by Dr McPartland?

A. Correct.

Q. Thank you. Just to give us the chronology for [Baby D], please, if Mr Murphy would help by putting the sequence on the screen. As I said earlier, [Baby D] was born on 20 June 2015.

Go to tile 7 and just click on it, please. We see she was born as an emergency C-section following premature rupture of the membranes and a failed induction of labour. She weighed 3.13 kilograms. She had satisfactory Apgar scores. She required rescue breaths at 12 minutes of age. She was taken to the neonatal unit.

Tile 8, please. At 19.30 her oxygen saturations were 48% and her respiratory effort was poor, so she was put in an incubator and given Neopuff assistance.

Tile 14. She received antibiotics at 20.00 hours. She was intubated slightly later, tile 35, please, by Dr Brunton, who we may remember is the Scottish registrar at the time, who now works in Glasgow. That's at 21.45.

The following morning, on the 21st at 01.50 hours, she was stable on CPAP and seen by Dr Brunton, which is tile 69. The ET tube was removed, at tiles 105 and 107, at 09.00 hours the following morning, 21 June, and she was put on to CPAP at 10.30 that morning.

I think so far as your paragraph 12 is concerned, you have reviewed the medical records, which we have at tile 158, please.

A. May I...? I have not reviewed the medical records.

Q. Sorry.

A. I have extracted the information from the medical records and I state it in my reports because that's the job of the clinicians, to assess the medical records.

Q. Yes.

A. So I strictly followed my instructions, did a pathology review. So this, I extracted it from the report by Dr Evans that I received --

Q. Yes, thank you.

A. -- so I didn't go through the medical records.

Q. No, of course not.

At 21.10, you record the fact that [Baby D] had saturations, this is tile 174, of 100% on CPAP, without increased work of breathing or any signs of respiratory distress.

At your paragraph 14 you note that -- and it's our tile 214 -- at 01.40 hours on the 22nd, Dr Brunton was called urgently to review [Baby D] and the nurses noted she had become extremely mottled and that there were tracking lesions, which were dark brown or black, going across her trunk, albeit there was no increased work of breathing or signs of respiratory distress.

Following on from that, other medical practitioners at the scene, so tile 218, for example Dr Newby, noted that whilst [Baby D] was saturating well on CPAP in air, there was a prolonged capillary refill time of 4 seconds in her feet, 3 seconds in her fingers, with two "bruised areas on her abdomen like evolving purpura", which at that stage it was thought was secondary to sepsis.

At 02.35 on the 22nd, tile 222, Dr Brunton recorded that [Baby D] was clinically much improved and that the areas of discolouration had completely disappeared.

At your paragraph 17, 03.15, Dr Brunton was again called to review [Baby D] -- this is tile 236 -- as she was very upset and crying and desaturated to 80% in 100% oxygen and the skin discolouration became more prominent but was not as obvious as it had been previously.

Tile 253. At 03.55 hours, on the 22nd, Dr Brunton noted that [Baby D] was struggling to saturate. By tile 273, at 04.21 hours that morning, resuscitation was deemed futile, CPR was stopped, and at tile 276 [Baby D] was pronounced dead.

So that is the factual sequence as set out in your report; is that correct?

A. That's correct.

Q. Thank you. Before we get to your conclusions I'd just like to deal with further material that you have received along the way. This is set out in your report of 20 October 2021.

Did you receive a full copy of [Baby D]'s medical records, RM/8, and statements made by Professor Arthurs on 19 May 2020?

A. Yes.

Q. Dr Bohin, 3 December 2020. A couple of statements from Dr Evans, albeit one was one you'd seen before, but the other was 7/11/17. And a witness statement made by Nurse Caroline Oakley. Is that right?

A. Yes.

Q. I'm going back to paragraph 20 now, please, of your initial report of 22 January. Were you sent the post-mortem skeletal survey, so the full body X-rays that had been carried out at post-mortem?

A. I'm referring to the report?

Q. Yes.

A. Yes.

Q. And did you set out what had been found in that report?

A. Yes.

Q. Thank you. We have dealt with Dr McPartland's report insofar as it's relevant in the context of the written material that the jury have under paragraph 22 of the agreed facts. You set out in summary form Dr Evans' report that you had been sent at that stage; is that correct?

A. Yes.

Q. Do you then, at your paragraph 24, deal with the post-mortem radiology?

A. Findings.

Q. Yes.

A. Yes.

Q. In this context what did you believe was significant of the post-mortem radiology?

A. I felt that it could be significant, the presence of air in the aorta. That's what I felt was the significant part here.

Q. I think you now know that the evidence that was given by Professor Arthurs was that he couldn't differentiate between air in the aorta and air in the inferior vena cava.

A. Yes.

Q. Does that make a difference at all so far as you are concerned?

A. As far as I am concerned, there is evidence that there is air in an intra-abdominal vessel, a large intra-abdominal vessel.

Q. All right. I think one of the other features that was picked out on the radiograph was a small amount of intravascular air around the tip of the catheter; is that right?

A. Yes, that's correct.

Q. This is a question I asked you in the context of a different case, but one of the explanations for air being in the great vessels potentially is decomposition --

A. Yes.

Q. -- is that right? And so far as [Baby D]'s case was concerned, from what you saw in terms of the photographs taken at the time, was there any overt evidence of decomposition?

A. No. Let me expand a little bit on this.

Q. Could you keep your voice up a little?

A. No, there was no evidence of decomposition being of pertinence here. I note that [Baby D] died on the 22nd, early hours in the morning. The post-mortem was done the following day. It's not enough time for such -- for gaseous production to start.

Q. Let's deal with the timings then because I don't think we actually have this -- we don't have the second time in evidence. The first time is the time of death, which we have established was 04.25 on 22 June.

A. Yes.

Q. The time at which Dr McPartland's examination began was at 11.15 on 23 June; is that right?

A. Yes.

Q. Okay.

A. That's in the folder you --

Q. Yes.

A. So next day is not enough time for post-mortem decomposition to evolve yet so you get gaseous production. From the examination of the photographs, there is no evidence of decomposition being there, and from the histology, there is no such evidence. So I think, again, attributing to decomposition the presence of intravascular air is highly unlikely. I think it's -- I would confidently exclude this as a possibility in this case.

Q. Understanding as you now do that the radiology can't distinguish between the aorta and the inferior vena cava, is there any further assistance you can give us as to the presentation of the gas in whichever of those vessels it was?

A. I'm not a radiology expert, I will defer to the opinion of the experts in radiology in regards of how easy it is to identify which vessels it was. From the pathology point of view, the important thing is that there was air visible radiologically in the vessel.

Q. Now, in the context of the suggestion that [Baby D] died as a result of an air embolism, was there any evidence you could identify from the perspective of your specialty which either supported or refuted that suggestion?

A. No. I couldn't see findings like the air bubbles that I discussed in a previous case. I couldn't see this.

Q. Moving to your opinion, please, Dr Marnerides. This is the paragraph that follows your numbered paragraph 25. What opinion or what conclusion did you draw as to whether or not there was any natural disease in [Baby D] which caused her death?

A. So the natural disease that was present was the pneumonia with the acute lung injury. As I explained in the previous case, one can die from pneumonia, one can die with pneumonia. To make the assessment whether one died from pneumonia, you need the course of events being assessed by the clinicians and see whether this was a baby that was unwell, dying from their pneumonia or whether the pneumonia was something that they die with instead of dying from.

Q. Yes.

A. From the clinical assessment I had, my understanding was that this baby did not die from the pneumonia, the clinical assessment was that the baby died with pneumonia.

Q. What about the fact that you were unable to find overt evidence of air embolism?

A. I cannot, on the basis of not identifying air bubbles on histology, from the pathology point of view, say that I can refute the clinical suggestion of this being the likely explanation for the cause of death. I cannot prove it and we know that this is the nature of this beast. We know that post-mortem identifying air either using methods that cannot be used in mortuaries with respirometers is not reliable. If you see air bubbles on histology, that is something in keeping. If you don't see them, you can't say that's not the case. So you need the clinical information and the clinical assessment.

Q. Yes. So what conclusions did you draw so far as the cause of --

A. The conclusion is that the infection that was there, which appears to be a congenital infection, so explicable on the basis of the premature rupture of the membranes, would not sufficiently explain the death. And in my opinion, it does not explain the death because I have taken into account the clinical assessment. There is no other natural disease that has been brought to the attention of this case by the clinical review that could explain death. There is no other morphologically evident natural disease from the post-mortem examination. So my view is that this baby died with the pneumonia in terms of natural diseases rather than dying from the pneumonia.

So in terms of unnatural causes, my findings -- the findings of the post-mortem examination, my findings from the review of the histology cannot positively confirm it, but cannot refute it either. The findings that can confirm it are the findings of the radiology and the findings -- and the assessment by the clinicians

and that's how I came to the conclusion in relation to the cause of death here.

Q. Yes. What was that conclusion?

A. I think the likely explanation of this baby dying is air embolism.

Q. And is that by the same means?

A. By the same means, yes: injection of air into a vascular access line.

Q. But that is based on your assessment of the clinical and radiological evidence rather than --

A. It's based on the co-assessment of the clinical radiological views with the findings of the post-mortem and my findings.

Q. In other words, no other evidence of disease which could account for this premature death?

A. I couldn't identify it.

Q. Thank you. Can we move to the case of [Baby E],