Q. As before, I'd like to deal -- starting at the beginning, just deal with your instructions. So going back to your original report of 23 January 2019, please. You were instructed by or approached by Cheshire Police in November 2017; is that right?

A. That's correct.

Q. You were asked to examine the evidence relating to the death of [Baby C] and provide a statement addressing his cause of death; is that right?

A. That's correct.

Q. Initially, you were sent Dr Evans' report of 31 May 2018?

A. That's correct.

Q. Also the medical records; is that right?

A. Yes.

Q. Your item 4, digital photographs that had been taken at the post-mortem examination?

A. That's correct.

Q. A skeletal survey radiology report, which you have previously described to us, I believe; is that right?

A. Yes.

Q. The pathology paperwork, which in this case extended to 160 pages?

A. That's correct.

Q. Coroner's records consisting of 37 pages?

A. That's correct.

Q. And in this case, 27 histology slides from the post-mortem examination of [Baby C]?

A. That's correct.

Q. So far as those slides are concerned, are they broadly speaking the same type of material that you had received in the case of [Baby A]?

A. Yes, it's histology slides.

Q. Thank you. Just dealing with other material that you have received before coming to your final view, Dr Marnerides, and turning to your statement of 20 October 2021, did that further material consist of an updated version of [Baby C]'s medical record?

A. Yes.

Q. Professor Arthurs' report of 19 May 2020?

A. Yes.

Q. Dr Bohin's report of 12 December 2020?

A. That's correct.

Q. And four reports from Dr Evans: November 2017, May 2018, March 2019 and October 2020?

A. Yes.

Q. Together with a witness statement provided by Dr Katherine Davis, who was one of the treating physicians at Chester, and indeed Dr Kokai's witness statement concerning his examination of [Baby C]?

A. I can't see.

Q. Over the page, I think.

A. I don't have the other page.

Q. You haven't got the second page?

A. If it's been submitted to court, then that's --

Q. Yes. Well, it bears your signature.

A. Yes.

Q. Okay. Your initial examination or your initial view, I should say, was expressed in your report of 23 January 2019?

A. That's correct.

Q. It may be that you will be asked about this, but did you conclude at that stage that [Baby C] had died of natural causes in effect?

A. Yes, that was my initial conclusion back then. The reasons were there was no clinical indication in the materials I had received. That was my understanding, that there may have been natural causes. There was evidence of a reasonably plausible cause of death from the post-mortem examination. And on that basis, my assessment was that it was natural causes.

Q. However, on receipt of the further information that we have just outlined, did your view change?

A. Not at that stage.

Q. No, but in your report of, I think, 4 September 2022?

A. Yes. So the materials you referred to earlier were -- the statement was 28 October 2021.

Q. You are correct.

A. So at that stage I still was of the same view.

Q. You are quite right. You set out in your report of 4 September a full list of material that by that stage you were taking into account; is that right?

A. Yes.

Q. Much of that information is what you had had earlier, but what had changed?

A. So what had changed then is that I had the benefit of the experts' meeting which took place, so experts from the prosecution and experts from the defence that were present in that meeting. I had the benefit of more written statements of the clinical assessment. I was invited to revisit my view in light of these new statements, re-review the histology, and see whether I still had the same view or not.

Q. Yes.

A. As I explained earlier, that's what pathologists do. We interpret a snapshot on the basis of the information that we have. This is part of the process.

Q. Looking at page 8 of 16 of your report of 20 October, please, Dr Marnerides, did you mention specifically Dr Bohin's statement of 12 December, which you hadn't had when you produced a statement in January 2021, and Dr Bohin's statement of 15 October 2021, together with a further statement made by Dr Evans?

A. That's correct.

Q. When you were reviewing the case, or re-reviewing the case might be a more accurate way of putting it, did you take into account the following features? I'm looking at your paragraphs 2(a) through to (d). Can you tell the jury, please, what were the factors that you were taking into account?

A. So as I said earlier, on the histology examination there was evidence of acute pneumonia with acute lung injury on the histology from [Baby C]. So one can die from pneumonia but one can also die with pneumonia, so meaning not from pneumonia, but pneumonia was a bystander there, that's not the cause of death.

The information I had led me to the conclusion that it's reasonably plausible that the baby died from pneumonia. Having received further clinical information indicating to me that, yes, the clinical assessment is that [Baby C] had pneumonia but clinically he was stable, he was responding to treatment and was giving no indication that collapse was imminent. So that's the clinical assessment.

A baby with pneumonia responding to treatment, this is the expertise of the neonatologist, the descriptions we pathologists receive from neonatologists, babies dying from pneumonia is a deterioration of a baby which is progressive and not responding to the treatment. This is not the presentation that I was informed at this stage that was the case in the case of [Baby C].

So the clinical assessment was: stable, responding to treatment, suddenly collapsed, not consistent from the clinical point of view that the baby could have died from his pneumonia, which changes completely what I needed to take into account in terms of what that histologically evident pneumonia and acute lung injury meant.

And there was an assessment of what the massive gastric dilatation that was observed -- so ballooning, basically, of the stomach -- meant. So all these were taken into account, and having considered the reports by the radiologists, both from the defence and the prosecution, who agreed that there is the infection, the pneumonia, yes, we know that, but there is also massive gaseous dilatation of the stomach and the small bowel, so this part that I'm showing on the screen (indicating) -- do you see the screen?

This part was dilated like a balloon and all these loops were dilated. That's what the radiologists concluded. So lots of air in that.

Having heard the discussions at the meeting, having considered the potential explanations about how such a dilatation could have been caused, I reached my -- I revisited the cause of death I proposed and reached the conclusion I reached and it's noted in my report.

Q. Yes. So taking that information into account, did you go back -- I'm looking at your paragraph 6 -- to the digital photographs taken at the post-mortem examination?

A. Yes.

Q. What did the photographs or a photograph show?

A. The photographs showed a distended stomach -- so this part (indicating) dilated, distended -- and distended bowel loops. These loops were in this region (indicating), in the left part in that photograph. And to a little extent were crossing the midline. So mostly distributed here (indicating) on the left-hand side of the abdomen.

Q. Was the colour that you could see of the bowel in the photographs of significance in this context?

A. Well, there was no dark red/black discolouration to suggest necrotising enterocolitis.

Q. Yes.

A. So on that basis, and from what I could see on the histology -- necrotising enterocolitis on histology is the bread and butter of a paediatric pathologist.

Q. Did you exclude NEC in this case?

A. Yes, I did exclude NEC. So one of the potential causes for this dilatation, I think, had been certainly excluded.

Q. Yes.

A. My understanding is that none of the experts regarded NEC as a possibility here. They also -- they agreed. So if we go back to the photograph and the description by Dr Kokai that we read earlier about what was actually crossing and what was distended or not, on the photographs you can't really say whether it's a small bowel or large bowel, so I need to take a different approach on understanding -- on whether I could confirm the description was accurate or the view of the radiologists that were saying it's the small bowel that is dilated, not the large bowel crossing and so on, was correct. So that was the exercise I had to undertake.

Q. So you were looking at it as working out whether it was the small bowel dilated or whether it's the large bowel dilated?

A. Yes.

Q. And did you work through both possibilities --

A. Yes.

Q. -- and see where either possibility or both possibilities led you?

A. Yes.

Q. All right. So let's deal with the possibilities one by one as they might lead to different interpretations. What was the first possibility that you considered?

A. The first possibility that I considered was: are these dilated bowel loops small bowel loops? That would be in keeping because of the anatomy that I explained with the stomach being dilated.

Q. Okay. I'm sorry to stop you, but just so I can keep up with you. The small bowel is directly connected to the stomach?

A. Yes.

Q. And so that eventuality fits with the stomach being dilated on the basis that the air passes from the stomach immediately into the small bowel? Am I with you so far?

A. That's correct.

Q. So that's what you were looking to either confirm or refute; is that right?

A. Yes.

Q. You understood, and the jury has heard from Professor Arthurs, that his view was that it was the small bowel that we could see dilated in the radiographs?

A. Yes.

Q. So bearing that in mind as well, what did you then move on to --

A. I said, okay, let's examine this possibility being the truth. What are the potential explanations for that? So one is deliberate exogenous administration of air via the tube. That's one explanation.

Q. Yes.

A. The other explanation is necrotising enterocolitis. There was no evidence from the photographs, from the clinical history, from the histology.

Q. And you have excluded it?

A. And I have excluded it. The other explanation is what had been proposed during the meeting as the CPAP belly.

Q. Yes.

A. So because the baby was on CPAP, that's why the bowels were dilated. I will revisit this possibility in a while. And there were other anatomical explanations like stenosis or atresia of the bowel that are congenital abnormalities that would have explained that. And there is no evidence either from the post-mortem from the photographs or from the radiology that there was such a stenosis or atresia. Atresia means a complete block of the lumen.

Q. So the tube is blocked?

A. The tube is blocked. And it continues like a tube but there's no connection between them. Stenosis means that it's narrower compared to what it should have been.

Q. So like an hourglass?

A. Sorry?

Q. Like an hourglass?

A. Yes, but that has a typical presentation on radiology and, again, paediatric pathologists are trained to look for them. From what I can see on the photographs I couldn't see anything suggesting. Dr Kokai said there was nothing of that form when he physically looked at the bowel.

Q. Okay. So that's --

A. That's possibility 1. And we parked the CPAP --

Q. Yes.

A. -- in possibility 1.

Q. So leave the CPAP to one side?

A. Yes. Possibility 2, the distended bowel segments represent sigmoid, so large bowel, and descending colon. So this part of the colon (indicating). Why did I say -- examine it in that form? Because of the description that we discussed earlier from Dr Kokai, that that part looked to him as if it was crossing the midline.

Q. Yes, all right.

A. Okay?

Q. So this is -- is this in -- sorry to stop you again, but is this -- and to be contrasted to the -- possibility number 1 was small bowel distended, this is possibility number 2, large bowel distended?

A. Yes.

Q. So the distended colon; yes?

A. Yes. And it's on the left side that I see it on the photographs. That's where I see the distended bowel loops. So I was thinking, could this distension correlate to that description?

Q. Yes.

A. And again, I had to make a logical approach of what that meant. So you need to understand a mechanism, how air would be in the proximal aspect of a canal, so in the entry of a tunnel; that's the stomach. There is no dispute there's air in there. It's seen on photographs, it's seen at post-mortem examination, it's seen on radiology. And the proximal part of the small bowel, the duodenum, again there is no dispute on that.

Then there is no air in between and there is air on the distal part. That's what I had to explain, should this have been the case.

Q. Yes.

A. So I had to break that down, bearing in mind that would have been a very unusual distribution of air in a bowel to make logical sense. So what would explain this biphasic, if I call it this way, distribution of air in a bowel? It could be an infection that had a localised effect in the two areas, or disseminated infection, sepsis, that, for a weird and wonderful reason that I cannot explain, presented itself this way. There is no evidence of infection on histology, there's no evidence of infection, of sepsis on histology, and the clinical presentation was what I explained.

So I had to consider: what about that pneumonia? Would that pneumonia direct your thought that there is a systematic infection going on that could present like that? So should that have been the case, one would expect some other findings. A body's response to a systematic infection rather than a localised infection would be either a systemic inflammatory response or a response with molecules that are in the blood called chemokines. Okay? So the part with chemokines and interleukins and all those molecules I cannot assess on post-mortem but the clinical indication that the baby was stable and responding to treatment makes this unlikely. So that's one mechanism part.

The other mechanism, the morphologically evident systemic inflammatory response to an infection I know is there in the body. What would pathologists look for? They would look for histological evidence of such a response in the liver. I'm more than happy to go into the details of those findings if you want me.

Q. Were they there?

A. They were not there.

Q. That may do.

A. So considering those possibilities, liver histology, bone marrow histology, spleen histology, capillaries of the other organs, was there any systemic inflammatory -- there was nothing there to suggest that this baby had a systemic response to the localised infection. So that possibility to explain the air presence in the bowel -- again, I had no findings to suggest it. I think I can reasonably exclude it.

Then we go to other finding, other conditions, like volvulus, twisting of the small bowel or twisting of the large bowel. I have explained previously why this cannot be a volvulus because the colour is normal, there is no twisting, there is nothing on histology.

The other possibility is a condition called Hirschsprung's disease, which is a condition where the nerves, small cells in the wall of the bowel, are absent, and it's typically the large bowel, so the distal part, the part of potential interest here. I looked under the microscope. The cells were there, so we cannot suggest Hirschsprung's disease in this.

So having considered all this, I came to the conclusion that most likely the description about the descending and sigmoid was imprecise and what we were looking at were dilated stomach and bowel.

Q. Which would be in keeping with the radiology?

A. Which would be in keeping with the radiology. And having excluded, as far as I could, all the proposed conditions, we have not discussed CPAP yet, barely.

Q. No, we haven't discussed post-mortem gas either.

A. Yes. Having not yet discussed CPAP and post-mortem decomposition, the distribution of air would be in keeping with injection of air through the tube.

Q. Okay.

A. So CPAP --

Q. Can we deal with decomposition first? I'm sorry to divert you, but it may be more straightforward. I'm looking at your paragraph 8(b)(vi).

A. Yes.

Q. Can you exclude post-mortem decomposition as the source of the gas that was found?

A. Um... Highly, highly unlikely. The description of the bowel is that of a normal bowel. That's how it looks in post-mortem. There were no microscopic findings to suggest that decomposition was of any significance there. But most importantly, on the sampled segments of the bowel that I looked at, on histology, the mucosa, the inner surface of the bowel, not the outer surface, that's the first thing that will go into decomposition, looked normal. So yes, I think I can confidently exclude it instead of just saying highly unlikely, yes.

Q. All right. Having excluded all other possibilities, what about CPAP?

A. So CPAP -- and I need to express myself with caution here because I'm not the expert on how CPAP actually works in babies. My understanding is it's used in millions of babies and it's a safe procedure in neonatal care units.

My understanding is that the clinicians felt that it is unlikely that CPAP would explain this dilatation. My experience as a pathologist dealing with neonates and dealing with neonatal care unit doctors discussing cases -- in my experience, from reading the literature and textbooks, and going back to the cases to see, I've never come across a description or a suggestion of CPAP belly accounting for arrest of a baby, nor have I been asked by any of my colleagues at St Thomas', "Could this be a possibility?" So I think it's fairly, highly unlikely that CPAP belly would explain this distribution of air.

Q. So as opposed to the possibility that somebody put air down the nasogastric tube and caused what was found -- I'm looking now at your (xi) -- were you left with what you regarded as a theoretical possible alternative?

A. Yes.

Q. What was that theoretical possible alternative to somebody putting air down the NGT?

A. That we had either a volvulus on two -- on the small bowel and the large bowel, that result -- that's why we didn't get the necrosis to see it, but the air remained trapped there.

Q. So something trapping the air, which resolved and left the trapped air there, despite the fact it wasn't there to trap it?

A. Yes. That's a very theoretical possibility. I have never come across such a description. I have never seen it. I cannot think of a reasonably plausible mechanism, but I consider it as a theoretical possibility.

Q. All right. Theoretical possibilities apart, what was your opinion as to why it was that [Baby C] died when he did?

A. On the basis of what I have explained and the information, I think that the explanation for the sudden collapse in a background of his pneumonia was the excessive injection or infusion of air into the tube.

Q. Into the nasogastric tube?

A. Yes.

MR JOHNSON: My Lord, that may be a convenient point.

MR JUSTICE GOSS: Yes. That completes [Baby C]?