

23 March 2023

Baby P

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Housekeeping

Thursday, 23 March 2023

(10.30 am)

(In the absence of the jury)

MR JOHNSON: The document you have there, my Lord, will be dealt with with Dr Bohin in due course, but by agreement we want to present it in this way because we believe it is the most easy way to follow the reasoning behind the calculation and the conclusion.

MR JUSTICE GOSS: Thank you. So with the red typescript?

MR JOHNSON: Correct.

MR JUSTICE GOSS: Good, thank you very much.

(In the presence of the jury)

DR DEWI EVANS (continued)

Cross-examination by MR MYERS

MR MYERS: Dr Evans, I'd like to start with just what you told us about CPR yesterday --

EVANS: Yes.

MYERS: -- and the additional material you provided us with. We dealt with this when you gave evidence on 15 March and the issue with which you were dealing was whether or not chest compressions on a neonate could lead to damage to the liver. That's what you were talking about?

EVANS: Yes.

MYERS: The questioning, if we pick it up at page 110 for those who wish to follow it in the transcripts we have, I said to you:

"Question: You told the jury that chest compressions don't get near to the liver. That's what you have said to them."

And you said:

"Answer: They do not."

And we move on to this -- and this is where you picked it up yesterday, Dr Evans. I asked you:

"Question: What I asked you was that chest compressions on a baby are performed in the area over, just below the sternum, around the sternum or above and very close to where the liver is."

That's what I asked you. And you said:

"Answer: No, it's over the top of the sternum."

And you told me I was pointing to the wrong direction and you said where it was, you said, "The liver is down here".

Then we came to this, I put to you:

"Question: It's entirely possible for there to be some injury to the liver from vigorous chest compressions in a baby, isn't it?"

You said:

"Answer: I think that's very unlikely."

And you moved on to talk about the collapse.

That's what lay behind the questioning, the risk of harm to livers from vigorous chest compressions and you've provided us with the guidelines from the newborn life support material, haven't you?

EVANS: Yes.

MYERS: We saw them yesterday. I wonder if we can put the page up that we looked at and where it says "Where should I press?" These are the formal guidelines.

(Pause)

I can read them if there's a problem getting to the page.

(Pause)

This is the guidelines, thank you. If we go over the page to the section "Where should I press?" The guidelines say:

"Compress the sternum over its lower third. If you press too high on the sternum the heart is not compressed."

And it says:

"If you press too low, you risk damaging the liver. Place your thumbs or fingers on the sternum just below an imaginary line joining the nipples."

These guidelines identify the risk of damage to a liver in the course of chest compressions, the risk of it, don't they?

EVANS: Yes.

MYERS: And it's a significant enough risk that they actually state clearly where to put the fingers to avoid that happening, don't they?

EVANS: Yes.

MYERS: But the fact is that the liver is close enough to the area that is compressed that it is possible for injury to be done to it in the course of compressions, isn't it?

EVANS: Not if it's done properly, no.

MYERS: It is entirely possible for there to be injury to the liver from vigorous chest compressions, in fact, isn't it, Dr Evans?

EVANS: Where does it say that?

MYERS: No, I'm suggesting that to you now we have seen all of this.

EVANS: I've never seen it. Never reported it. If you have professional people who are experienced in doing chest compressions, you will not damage the liver.

MYERS: You agree it's something that the guidelines find it necessary to direct people to avoid by specific instruction?

EVANS: Well, obviously that's what guidelines are for.

MYERS: And so do you agree with this: the liver's position is such that there is a risk of damage in the course of CPR?

EVANS: Not if it's done properly.

MYERS: I wonder if we could --

EVANS: Sorry, I think it would help -- if one had one of the chest X-rays up, I could show you -- I think that will help the members of the jury, actually.

MYERS: Let's do that. If we put up then, please --

EVANS: Any one of the chest X-rays, really.

MYERS: T400, please, which is the chest X-ray from 8.09.

EVANS: Right. The sternum is situated -- the breastbone is situated around sort of between the thoracic level 2 and thoracic level 6. If you look at these, these are the spine -- those are the -- make up the spinal column.

And the sternum is positioned over and around T2, which is this one (indicating) or this one (indicating), down to 6, okay? 1, 2, 3, 4, 5, 6.

There's a bit of rotation in this X-ray, but for illustrative purposes it'll do. Therefore, that's the heart (indicating), that's the heart. The sternum is in the midline, it's right in the middle, the breastbone. What I said was if you put your -- in a baby of about 2 kilograms, the sternum measures about 4 centimetres, so slightly longer than my adult thumb.

So if you put your top of your thumb at T2, the bottom of your thumb, the joint, will be at T6 or thereabouts, and it's the ball of one's thumb, I mentioned this yesterday, I think it's worth showing, it's the ball of one's thumb, that bit (indicating), that caused -- does the compression on the chest. We did that yesterday.

So therefore, your compressions are occurring around here (indicating). The liver is way over to the right, your liver is this mass here (indicating), a big organ.

It's underneath the ribcage -- it's in the abdomen but it's underneath the ribcage. You can see the bottom ribs here. So the lower edge of the liver is underneath the ribcage.

So first of all, the liver -- most of the liver is way over to the right. In addition to that, it's lower down than the sternum. So if you are an experienced CPR neonatal doctor or nurse, you're carrying out your compressions here (indicating).

Right? In this area here (indicating). The liver is way to the right and further down.

So therefore, as I said with [Baby O], this is why I have never seen damage to the liver as a result of CPR in a baby -- I think Dr Bohin said the same thing -- because if it's done properly, you will not damage the liver. The guidelines there clearly emphasise the importance of placing your thumb or finger in the right place. So I think this is quite useful to illustrate my -- what I said yesterday and last week.

MYERS: The liver crosses the midline in fact, doesn't it?

EVANS: Yes.

MYERS: It's not just on the right?

EVANS: Yes, it does.

MYERS: You've described how it should be done, you tell us, and we have looked at this image here and we have seen the guidelines that warn about if you press too low you risk damaging the liver. I would like us next, given what you have said, to look at a video prepared by the prosecution on neonatal life support. It just gives a demonstration of CPR in progress. It's at RC621, it's one of the videos that was prepared, and it's just the section that goes from 5 minutes to 5:39. The video covers things like giving the Neopuff and bagging and so on. If we just look at this, bearing in mind what I've identified, I suggest to you, about the risk of damaging the liver with vigorous CPR. Can we play this, please?

(Video played to the court)

We can pause there. Thank you.

It's entirely possible, from looking at that, Dr Evans, that in the course of vigorous chest compressions over several minutes the liver can sustain damage?

EVANS: I've never seen it.

MYERS: Right. Well, we've got the demonstration, we have got the guidelines and we've got what you say.

MR JUSTICE GOSS: I think just for the avoidance of doubt, because that was a two-thumb resuscitation, the doll that was being used there, what weight would that be in a baby?

EVANS: I don't know, my Lord. Again, it's a doll and when you press on the chest of a baby, I don't think your thumbs will go that far down. It's for demo purposes.

MR MYERS: Yes. The whole point is, that's the illustration provided of chest compressions, isn't it?

EVANS: It's a doll.

MYERS: But in fact what you said about your thumbs wouldn't go too far down, that shows how easy it is, in fact, for someone to press too hard and do damage to what lies underneath, doesn't it?

EVANS: I've said my point. I have never seen it and if you do it properly -- that's a two-fingered compression, yes.

I have never seen it and if it's done by experienced professional people you're not -- chest compressions will not damage the liver. That is my opinion.

MYERS: They're both members of staff from the Countess of Chester, we understand.

EVANS: I know that, yes.

MYERS: Let's move then to [Baby P] and evidence relating to him, please.

We know that there was a collapse round about 9.40 to 9.50, round about that time on 24 June. That's a fact, a set fact. We're in agreement with that, aren't we?

EVANS: Yes.

MYERS: We know that despite interventions there followed, amongst other things, a series of collapses and overall a worsening of condition during the day --

EVANS: Correct.

MYERS: -- which sadly led to [Baby P]'s death later that day.

EVANS: Yes.

MYERS: What I would like to do first is just to look at some aspects of the response to that first collapse and look at what you're able to say about the collapse itself.

So we can be quite clear, the response itself first and then the collapse.

You have seen in the X-ray, in fact the one we've just looked at, that there is a right-sided pneumothorax identified in that X-ray timed at 11.57?

EVANS: Yes.

MYERS: It's your view, isn't it, that it is reasonable to consider that the pneumothorax that we see was a consequence of the resuscitation procedure?

EVANS: That is the most likely sequence, yes.

MYERS: And again, just so it's clear, that's something that you identified in your report, the second report, 2 June 2018, and your report in March 2019?

EVANS: Yes.

MYERS: Your opinion is that or you suspected that that pneumothorax increased significantly between 11.57 and 12.40?

EVANS: That's a possibility, yes.

MYERS: What you say in the report, the main one that we've looked at, your report of 2 June 2018, is that you suspect it increased significantly between 11.57 and 12.40. And then in your third report, actually, on 24 March 2019, you go as far as to say it's likely that it increased significantly.

EVANS: Yes.

MYERS: All right. And you say, in that third report on 24 March 2019, that the deterioration at 12.28 reflects how it is likely to have increased significantly between 11.57 and 12.40?

EVANS: It's a possibility.

MYERS: Right. In the three reports that you've provided us, the first on 21 November 2017, the second in 2018 and the third in 2019, you formed the view that the pneumothorax could have contributed to a failure in resuscitation even after the lung had been re-inflated?

EVANS: That was my feeling at the time. I couldn't think of any other reason why resuscitation was not successful.

MYERS: Your view in all three of those reports was that death was the result of complications from that pneumothorax?

That was your view in all three reports, wasn't it?

EVANS: Yes.

MYERS: Because despite re-inflation, probably that compromised [Baby P]'s circulation and prevented adequate re-oxygenation?

EVANS: Yes. That is something that does happen in a situation involving babies with pneumothorax, yes.

MYERS: I've simply gone through what's in the reports and that's what I wanted to ask you about that aspect of what you'd said, Dr Evans.

I would like to turn from that to the question of the cause of the collapse in the first place and how far we can get with that. Yesterday, when you gave evidence, you began this passage by saying you were at a loss to explain how he came to collapse. That was the starting point; do you agree with that?

EVANS: Yes.

MYERS: On the basis, first of all, that you don't identify any medical cause?

EVANS: Are we talking about the final collapse or all the collapses?

MYERS: We're talking about how the collapses began.

EVANS: The 9.40 collapse, yes.

MYERS: So we can be quite clear, I've gone through the resuscitation procedure and what you said about that in your reports. Now we are looking at that initial collapse at 9.40 and what the cause is. And your evidence is you were at a loss to explain how that collapse came about. That's the starting point, isn't it?

EVANS: Yes.

MYERS: You don't identify any medical reason for it, as in a clinical reason, a medical cause; is that correct?

EVANS: I am not sure in which report, but I comment on infusion of air into the stomach, into the abdomen, at some stage. I'm not sure which one. And I use the term "splinting of the diaphragm" in one of my reports.

MYERS: I'm going to come to that. I'm being quite particular.

What you said yesterday, and I'm simply acknowledging this, you don't identify any natural explanation for death. Let me put it that way.

EVANS: Oh none, no.

MYERS: Right. What you have focused on is, first of all, gas in the abdomen in that radiograph at 20.09?

EVANS: Yes.

MYERS: And you said yesterday you wonder whether that was natural or not.

EVANS: Correct.

MYERS: That is something that you considered through your reports. I'm not disagreeing with that, that's something you considered, isn't it?

EVANS: I thought there was a lot of gas in the -- my reports state -- I can't remember the exact term...

MYERS: You say:

"[You were] suspicious of a large volume of air noted in the stomach and intestines on the X-ray."

EVANS: Yes.

MYERS: And you say that in all three of those reports.

EVANS: I thought there was an awful lot of air in the intestines on that X-ray, yes.

MYERS: You suggest the air could have splinted the diaphragm?

EVANS: Right. I said that, and sorry if it doesn't read properly, but the splinting of the diaphragm is a matter that I -- if it's not clear let's make it absolutely clear -- is a matter that I think should -- is a matter that I think occurred on the following morning, on 24 June.

MYERS: Well, let's have a look then at exactly what you said.

I'm looking, first of all, in your second report, Dr Evans, the main one we looked at of 2 June 2018.

Your paragraph 30.

EVANS: Yes.

MYERS: It's at page 3835 of the statements. Are you there, Dr Evans? What you say is this:

"I remain suspicious of the large volume of air noted in the stomach and intestines found on X-ray."

And let's be clear, you're talking about the 20.09 X-ray:

"It may be the sequence of events was this: the excess air in the stomach and intestines splinted the diaphragm."

Then you go on to say:

"This would have compromised [Baby P]'s breathing, leading to his collapse."

You're quite clear there that the splinting of the diaphragm is the excess air in the stomach, aren't you, when you wrote that report?

EVANS: I did, yes.

MYERS: And then when you went on to write the third report on 24 March 2019, could you turn, please, to your paragraph 30 in that report? Sorry, paragraph 14 in that report.

EVANS: Yes.

MYERS: What you say there is:

"I remain suspicious of the large volume of air noted in the stomach and intestines found on X-ray. It may be the sequence of events was this: the excess air in the stomach and intestines splinted the diaphragm. This would have compromised [Baby P]'s breathing leading to his collapse."

That's what you say, isn't it?

EVANS: Yes.

MYERS: You also then go on to say, in fact, in your second and your third reports, that it is necessary to scrutinise nursing care during the night shift of the 23rd and into 24 June. You're clear about that?

EVANS: Absolutely, yes.

MYERS: So you're suggesting that air in the stomach and intestines at 20.09 on the 23rd was sufficient and is an

explanation to cause splinting of the diaphragm that led to a collapse at about 9.40 the following morning, aren't you?

EVANS: That was the option at the time, yes, that was the option at the time. I don't think that's now correct.

I think it's more likely that there was excess air in the X-ray of the 20.09 of the night before. I think that destabilised the baby. I think that's why he was unable to take his feeds properly. But given what we now know and what we've heard from the local people who saw him and who gave evidence over the last few days, I think there was an additional amount of air given to this baby during the morning of 24 June and that this additional air is what splinted the diaphragm and caused the collapse.

So I think that there were two events. There were two events. So I think there was excess air given before the 20.09 X-ray, if I could put it that way.

Then I think that destabilised the baby, but I think he had even more air given into his stomach on the morning of the 24th. That, I think, is a more accurate way of explaining the sequence of events.

MYERS: Well, first of all, Dr Evans, what you said in all three reports, in fact, about a suspiciously large volume of air in the stomach the night before, you were very clear about, weren't you?

EVANS: Yes, yes.

MYERS: Secondly, we'll look at this, on the notes that doesn't make any sense at all, actually, does it, what you were saying, on the notes you've had throughout? The clinical notes.

EVANS: I've had a whinge or two about the quality of the notes I got but anyway let's forget about that. I mean, that's my problem. We're going back to 2017. This is one of the last cases I did. I think it's worth noting that in each of these cases I make a statement saying that it's prepared on the understanding I will prepare a supplementary report in the event of a need to respond to any questions arising from this report or where I receive additional information. I have said that in each of my reports.

An awful lot of the information that we now know is information that's come out in this trial, so therefore I think it is unrealistic to expect anybody to form a view that is absolutely correct in each of these cases, I wish I could, but the most recent of these reports is 2019. That's 4 years ago. The first one is 6 years ago. The second one was 5 years ago. The third

one is 4 years ago. We're now in March 2023. And all of these -- so therefore we have far -- sorry, I have a far better understanding of the clinical sequence of events in this particular case.

So therefore, the sequence, there was excess air given to this baby preceding 20.09. Okay? I think that was concerning. It was sufficient for me to express concern. I was more concerned about the night shift issues regarding the failure to take milk, et cetera.

He had a bradycardia as well. So therefore, that was the real concerning point from my point of view.

And then we go to 9.40, where he collapsed. But I don't think he would have collapsed but for his having an additional injection of air into his stomach during the morning of 24 June. That is my opinion.

MYERS: What you have done, Dr Evans, is, having been very clear as to when you say the air first accumulated in your three reports, you've simply now shunted it along the line to a point near to, as it happens, when Ms Letby was on duty after the 8 o'clock handover in the morning.

That's actually what you have done, isn't it?

EVANS: It isn't actually, because if I was trying to put Ms Letby in the frame I would have started my concerning issues not on the night shift where the milk was aspirated, but I'd have started my concern on the day shift of the previous day when I understand she was on a call.

I didn't do that, so I can't be accused of putting anybody in the frame because my initial concerns related to people on the night shift of 23/24th. Then the collapse occurred on the day shift. Now, anybody who was -- any nurse or doctor who was on the night shift on 23/24 June would not be on the day shift. And any doctor or nurse who was on the day shift of 24 June would not have been on the night shift. Therefore in looking at my report, I was identifying -- sorry, I was expressing concerns about the care that [Baby P] had received on the night shift and on the day shift.

Looking back on it, I think that the air in his stomach at 20.09 was significant and not the result of anything natural. He was not on CPAP, he was not on Optiflow, so therefore I think he had -- what I have said is there's excess air at 20.09. What I did not say was, "I think somebody's squirted lots of air into his stomach before that". I didn't say that, but looking back on

it, I think this is -- this was the start of his destabilisation.

MYERS: What, the 20.09 air in the abdomen?

EVANS: Yes, I think so. I didn't say that in my report, I stuck with the night staff. But looking back on it, I think that the destabilisation had occurred before that.

MYERS: First of all in your reports, let's see if this is right, you said clearly three times the air at 20.09 splinted the diaphragm, didn't you?

EVANS: I did, but I think the air destabilised him. I think he had an extra dollop of air in the morning of the 24th. I have said that now three times and that's my opinion.

MYERS: So you're saying extra dollop of air, in other words you're saying that the air in the abdomen at 20.09 still has a part to play the following morning, some 13 hours later?

EVANS: I don't think so. It might have, it might have, but it would not have led to the baby's collapse. I think if the baby -- for the baby to have collapsed he must have had additional air just before 9.40 am. Because you know, we've dealt with this in similar cases in this trial where there's been a volume of air injected into the stomach; case number 7, [Baby G] was the most striking evidence. So we've seen this before.

In this particular case, the sequence now for me, clinically, is straightforward: he had air injected into his stomach, which showed up on the X-ray of 20.09, that compromised his feeding, they stopped his feeding correctly, but then he had an extra infusion of air into his stomach because -- and that led to the collapse at 9.40.

That is the clinical sequence of events having listened to the evidence of nursing and medical staff in this particular case over the past few days.

MYERS: Right. Let's have --

EVANS: That is the sequence, okay?

MYERS: I'm going to look at the evidence relating to that, but I make it plain, Dr Evans, I suggest to you what you're doing again is coming up with ideas and theories to try to support the allegation rather than work just within the facts that we have.

EVANS: That is incorrect because if I did that, I would have put more emphasis on air being injected into his stomach prior to 20.09 if I was trying to fit the evidence. So that is incorrect.

MYERS: That's exactly what you've done. You've tried to say that it happened then, you've listened to this in the trial, and you have now invented an extra dollop before 9.40.

EVANS: I have not invented anything. I have said that there was an additional infusion of air into the stomach of this little baby some time before 9.40 am on 24 June.

That is what I am now satisfied, from a clinical perspective, is what happened.

MYERS: Your starting point remains 20.09 the night before, doesn't it?

EVANS: No, my starting point starts prior to 20.09 because the X-ray was done at 20.09, there was a lot of air in it by that time, so the air didn't get there at 20.08, you know, it must have been there for, you know, maybe hours, I don't know.

MYERS: You don't know? Is that just a guess then?

EVANS: It's not a guess, it's a clinical assessment.

MYERS: Let's deal from 20.09 then, hearing what you have said.

We're familiar with that X-ray and Dr Arthurs gave evidence about that. Moderate dilatation, not a large volume of air, in fact, is where we get with Dr Arthurs' evidence there.

EVANS: I think he said he was excessive, actually. I listened to his evidence and he said it was excessive. I haven't got a print of his evidence, but I think he said it was excessive.

MYERS: We'll do this step by step. It's page 71 of the transcript for 16 March since you take issue with what I've suggested. I suggested to Dr Arthurs it was within the normal limits of what could be considered mild dilatation -- it's line 22 on page 71 -- and he said:

"Answer: I would go a bit further, I'd probably call it moderate dilation."

Not excessive, Dr Evans, moderate. That's the first thing. That's his evidence.

He identified it was not a usual pattern, it wasn't normal to see so much air going down, that was unusual.

But in terms of the quantity, first of all, he never described this as excessive. Are you ready to accept that?

EVANS: I haven't got a script in front of me, so you know...

MYERS: At 20.09, notwithstanding whatever you've said, there's certainly no suggestion of any baby collapsing or suffering from excessive air, is there?

EVANS: No evidence of a baby collapsing. The fact he was unable to tolerate his milk from the evening of the 23rd would suggest that there was something amiss with him.

MYERS: You've identified that X-ray at 20.09. Let's have a look at the blood gas record if we can. That's at tile 178, please. We'll go behind that. We can see there at 20.27, so 18 minutes or thereabouts after the X-ray, there are decent blood gas readings, aren't there?

EVANS: Where are we now?

MYERS: Sorry, 23 June 2016, 20.27.

EVANS: Oh right, yes. These are normal gases, yes.

MYERS: They're normal gas readings?

EVANS: Yes.

MYERS: Nothing there to indicate any issue with any excessive amount of air that has been put in at 20.09, is there?

Is there, Dr Evans? It's a simple question.

EVANS: No, no, the gases are normal.

MYERS: All right. Because you're saying to us there's a problem with air that goes in at that time, so I'm just seeing what the clinical evidence shows. This is material you've had all along, isn't it?

EVANS: No, no -- right. If a baby has had more air than you'd expect, it's unusual or whatever, then it doesn't necessarily follow that a volume of air will lead to a baby crashing. In other words, it might -- I think the amount of air compromised his ability to tolerate milk, but that doesn't necessarily follow that it would be so compromising as to interfere with his breathing.

So as I've said on a number of occasions, I think that splinting of the diaphragm occurred on the following morning and would not have occurred but for the fact he had an additional volume of air.

If I did not make that clear in my reports of 6 years ago, 5 years ago and 4 years ago, I am making it clear now.

MYERS: Tile 22, please, Mr Murphy, for the observations, just to see what this air -- any effect of this air that you're saying was in at 20.09. If we can just go behind that, please.

If we look at the top of it we can see "24 June" and we can see that where Sophie Ellis, as we're going to see, put in the entries from 20.00 through to 06.00 and indeed we pick up at 09 with the new member of staff afterwards.

Can you see 20.00 to 06.00 across the top of that chart?

EVANS: Yes, yes.

MYERS: If we scroll down, please, through the readings, we're familiar with the chart, we've got it. No indication and nothing to support the suggestion that there is excessive air in the stomach that is in any way compromising that baby overnight, is there?

EVANS: That is incorrect. There's no evidence that it compromised his breathing. Okay? There's more to a baby than a pair of lungs, he's got a stomach and intestines as well, and I think it compromised his feeding.

MYERS: We'll come to that shortly. Not compromised his heart rate?

EVANS: I've said that: it didn't compromise his heart rate or his respiratory rate and his saturations are normal, so it did not compromise his breathing. But I think it contributed to his difficulties with feeding.

MYERS: If air is getting anywhere close to splinting a diaphragm, there's going to be some impact on breathing, isn't there?

EVANS: I think the splinting of the diaphragm occurred the following morning.

MYERS: But you are saying this air is there all night and an extra dollop is given the following morning?

EVANS: Correct.

MYERS: Well, so far, there's no indication there of any problem; do you agree?

EVANS: Sorry?

MYERS: No indication so far of any problem?

EVANS: No, I don't agree: there were feeding problems.

MYERS: I'm going to come to that now, Dr Evans. Let's look at tile 24, please. We can see here again -- we're familiar with these entries by Nurse Ellis -- first of all at 20.00, 14ml of milk were aspirated. That's right, isn't it?

EVANS: Yes.

MYERS: No air as it happens?

EVANS: Well, nothing recorded.

MYERS: Well, if an extremely large amount of air came out, for instance, that would be recorded, wouldn't it?

EVANS: 14ml of milk aspirated -- at 8 pm?

MYERS: Yes.

EVANS: That's a lot of milk, actually.

MYERS: In fact, that's a time before the X-ray, isn't it?

EVANS: Yes.

MYERS: Yes. And that's Nurse Ellis looking after him at that time, isn't it?

EVANS: Yes, yes.

MYERS: We know that's combined with another 15ml and put back into the baby.

EVANS: Yes.

MYERS: Back into [Baby P], isn't it?

EVANS: Yes.

MYERS: And at 22.00 it seems no significant aspirate is taken, is there?

EVANS: It doesn't say.

MYERS: No, not even with the air that you say would be present, there's none there --so far as aspirates, no air found in an aspirate at that time that we have evidence of, is there?

EVANS: If the air is in the intestine you're not going to aspirate any air from the stomach. Okay? If you look at the X-ray carried out at 20.09, and I'm not a radiologist, the air is in the intestines, it's not in the stomach --

MYERS: I'll stop you there, Dr Evans, because I specifically asked Professor Arthurs about that because I pointed out that the stomach looked a bit greyer and he explained, "That does have air too", and he said not to be misled by the way it appeared on that, you may recall.

EVANS: Sorry, what did he say about the air in the stomach?

MYERS: That there is air there and the fact that it is greyer on the X-ray doesn't mean there isn't air there. This is air in the stomach and in the intestines, Dr Evans.

EVANS: Yes, I know. But we've seen in other cases where the stomach is very large because of air.

MYERS: If we carry on to 24.00, a total of 20ml is now aspirated, isn't it?

EVANS: Yes.

MYERS: And as it happens at that time there's no record of any air, is there?

EVANS: Not as far as I know, no.

MYERS: We've listened to the evidence, as you have. The first time there's any suggestion of abdominal distension from the nursing staff was actually from Kate Percival-Calderbank, who said the abdomen appeared to be distended when she was called round about 4 o'clock. Do you remember that?

EVANS: At 4 o'clock in the morning?

MYERS: Yes.

EVANS: Yes.

MYERS: Do you recall that evidence?

EVANS: Yes, I do, yes.

MYERS: No suggestion of any distension before that point?

EVANS: As far as I recall. I would have to check, but that seems correct, yes.

MYERS: Let's look at tile 237, carrying on into the morning.

We'll have a look at that, please. At that time we see 25ml of air is aspirated.

EVANS: Yes, I know.

MYERS: No record of any aspiration like that before this point, is there?

EVANS: No record of any aspiration of air before this point.

MYERS: And what the picture -- the picture that emerges is that there's certainly something in [Baby P]'s condition overnight where we can see there haven't been feeds suggested and air has been produced; that's right, isn't it?

EVANS: Yes.

MYERS: None of that air is identified, as it happens, in any aspirate before that point, is it?

EVANS: Right. Well, no.

MYERS: And no suggestion of abdominal distension before this point from the evidence that we've had?

EVANS: Correct.

MYERS: Right. Later on, if we carry on, there's 5ml of air aspirated at 07.00 hours.

EVANS: Yes.

MYERS: You agree with that?

EVANS: Yes.

MYERS: So whatever's going on, and whatever the condition is, to suggest that the air at 20.09 is excessive and has been there as a potential problem all night is fanciful, Dr Evans, isn't it?

EVANS: No, it is not fanciful. We've discussed the X-ray and everybody says there's a lot of air in the intestine.

Again, if it's in the intestine you are not going to aspirate it from a nasogastric tube, you can only aspirate air if it's in the stomach. So that's the first point.

The second point is that I think that whatever was shown on the X-ray at 20.09 is a marker and an explanation for why he was not tolerating his feeds.

Okay? But, and it's an important one, it did not -- as you've said, it did not compromise his breathing because if we look at his neonatal chart for the rest of the night, he remained in air and was breathing normally.

So his breathing was normal and I suspect that that is because the oral feeds had stopped, therefore he was not receiving any oral feeds, and the fact that he was getting -- sorry, that they only got 5ml air out at 7 am means that I think he was stabilising by that time, actually (overspeaking) --

MYERS: Yes, and all of that's apparent from these clinical records, isn't it?

EVANS: Well, I think that was the sequence of events.

MYERS: All of that is apparent from these clinical records, isn't it, Dr Evans?

EVANS: Yes, yes.

MYERS: So in other words, there was never any sensible basis for you, in three reports, to suggest that splinting of the diaphragm at 20.09 led to a collapse 13 hours later?

There was never any proper basis for that, was there?

EVANS: I've already said that the splinting of the diaphragm occurred as a result of air given on the morning of 24 June.

MYERS: And you began this with one theory that you raised, trying to attach a splinting of the diaphragm to 20.09.

That's where you began this, wasn't it?

EVANS: No, I began it by trying to find the first point at which this baby was not perfectly well. And the first sign of this baby being not perfectly well was the aspiration of milk. There was also a self-limiting bradycardia and a self-limiting desaturation some time during the night in isolation, not a concern. But I thought that was concerning in addition to the failure of the little one to tolerate milk. So therefore, that's what I put together then.

But I think the sequence of events that occurred during the day of 24 June was indicative of additional issues and the additional amount of air. That was not clear in my report 4 years ago, it's clear to me now.

MYERS: It's not just not clear, there was no suggestion of it in any of your three reports, was there?

EVANS: We've discussed this.

MYERS: Yes, but there was no suggestion, was there?

EVANS: It's not clear in my report but it's clear now.

MYERS: And what you have done is to invent an extra dollop of air, I think is the expression you used, to try and take your theory over the line?

EVANS: No, I have not invented any dollops. What we know is that this baby collapsed at 9.40. And it was a massive collapse which took four injections of adrenaline and Neopuff and so on and so on. So therefore it was a massive collapse and from the record of the other little babies, you know, who had injections of air into the stomach, who collapsed, this baby experienced a massive collapse at 9.40 and it's quite astonishing that he needed such vigorous resuscitation to get him back to normal. That is the result of what happened during the day shift of 24 June. That is the sequence of events. That is the sequence of events. As I said, I've done this reports years ago and the idea that I could get it all perfectly right from simply looking at notes is a little bit unrealistic as far as I'm concerned, especially as I was not able to talk to any of the local nurses or local staff. I had to rely on the notes completely and you're never going to get it -- I was never going to get everything 100% correct.

MYERS: Dr Evans, so no one misunderstands, nothing relating to the clinical circumstances and the records that lie behind what you're saying now has changed, nothing, has it?

EVANS: I've given you my opinion.

MYERS: Nothing has changed, has it?

EVANS: I've given you my opinion.

MR MYERS: No further questions.

MR JOHNSON: Does your Lordship have any questions.

MR JUSTICE GOSS: I don't, thank you. Dr Evans, that completes your evidence at this stage. Please hold yourself in readiness, I anticipate, for one final time.

MR JOHNSON: Dr Bohin, please.

DR SANDIE BOHIN (recalled)

Examination-in-chief by MR JOHNSON

MR JOHNSON: Welcome back, Dr Bohin. For the sake of the recording, would you identify yourself, please?

BOHIN: Dr Sandie Bohin.

JOHNSON: Thank you. Dr Bohin, in the case of [Baby P] you have completed, I think, five reports in total; is that right?

BOHIN: Yes, one was regarding pagination only.

JOHNSON: Yes. And the fifth of those five was last night when you set out in writing for us the way in which adrenaline has been calculated in this case?

BOHIN: That's correct.

JOHNSON: And we will come to that towards the ends of your evidence, if we may. So what I would like to do is to start with the material that you were sent originally and the particular facts that you set out in your report. I think your very first report was dated 12 May 2020, albeit, just to avoid confusion, for those who have the electronic copy at page 3864, it has been misdated 22 May 2020.

BOHIN: That's correct.

JOHNSON: So the correct date is 12 May?

BOHIN: That's correct.

JOHNSON: You were asked, weren't you, by Cheshire Police to look at the case of [Baby P] and also to take into account or to critique or peer-review the material that was provided to you from Dr Evans; is that right?

BOHIN: That's correct.

JOHNSON: Thank you. So far as the material that you were given is concerned specifically, did that include the medical records of [Baby P], which comprised 197 pages at that point?

BOHIN: Yes.

JOHNSON: Did you also receive two reports from Dr Evans, his first of 21 November 2017, and his second, 2 June 2018?

BOHIN: Yes.

JOHNSON: Did you receive a report written by Professor Arthurs in January 2020?

BOHIN: Yes.

JOHNSON: And also a report written by Dr Marnerides, a pathologist, from whom the jury will be hearing next week?

BOHIN: Yes.

JOHNSON: Thank you. You set out the chronology, which isn't in dispute. Summarising it very quickly, the fact that [Baby P] was born in good condition on 21 June. He continued in good condition, having been given some breathing support via CPAP and then Optiflow, but all that breathing support was discontinued a good 36 to 38 hours before that X-ray that we've heard so much about at 20.09 hours on 24 June?

BOHIN: Yes, that's correct.

JOHNSON: Thank you. You set out the blood gases and the fact that there were good results for a considerable period of time; is that right?

BOHIN: That's correct.

JOHNSON: The fact that his observations were entirely satisfactory?

BOHIN: Yes.

JOHNSON: And that by the morning ward round of 23 June, he was in air, not requiring any respiratory support at all?

BOHIN: That's correct.

JOHNSON: And for anyone who wants to make a note of that, that's tile 64.

I'm now going to your paragraph 3.12. You take up the chronology at 18.00 hours with the review of Dr Gibbs that he told us about yesterday in the immediate aftermath of the death of [Baby O].

BOHIN: That's correct.

JOHNSON: You reproduced at least part of -- I think the note was actually Dr Cooke's note, but Dr Gibbs' examination -- the description of [Baby P]'s abdomen?

BOHIN: Yes.

JOHNSON: The fact that the abdominal X-ray was taken at 20.09, that's tile 173, about which we've just been hearing in cross-examination of Dr Evans?

BOHIN: Yes, that's correct.

JOHNSON: And which Professor Arthurs described as unusual in a baby of this age and gestation?

BOHIN: Yes.

JOHNSON: You then turned to the feeding chart for [Baby P], is that right, setting out what he was being given and how often it was being given to him?

BOHIN: Yes.

JOHNSON: You recounted the fact of the self-limiting bradycardia shortly after the night staff had come on duty at 8 pm?

BOHIN: Yes.

JOHNSON: The fact that at that time, or noted at that time at least, 14ml of partly digested milk was aspirated, replaced, and he was fed again?

BOHIN: Yes.

JOHNSON: That his feed at 10 pm was tolerated, but then at midnight 20ml of partly digested milk was aspirated, which was discarded, and then feeds were stopped, as we have now heard, at the order of Dr Mayberry?

BOHIN: That's correct.

JOHNSON: You then set out the aspiration conducted by Kathryn Percival-Calderbank at 04.00 hours, which yielded 25ml of air?

BOHIN: That's correct.

JOHNSON: And the further 5ml of air aspirated by Sophie Ellis at about 7 am?

BOHIN: That's correct.

JOHNSON: Did you next refer to the note made by Lucy Letby at tile 263? Can we just look at that, please? We can deal with this rather than the original. We see:

"NG tube on free drainage."

Just remind us, if you would, doctor, of the intention of having an NG tube on free drainage, please.

BOHIN: Free drainage means that the end of the nasogastric tube, the little stopper, is opened, so that any air that's within the stomach can naturally escape up the tube and decompress the tummy.

JOHNSON: So any build-up of air will be evacuated; is that right?

BOHIN: Yes.

JOHNSON: We see that Sophie Ellis at that time -- sorry, that's Lucy Letby's note. I beg your pardon. We see she records:

"Trace amount in tube. Abdomen full. Loops visible. Soft to touch."

BOHIN: Yes.

JOHNSON: If we go back to 249 to remind ourselves of what Sophie Ellis had noted, please, about an hour and a half earlier:

"Abdo has been soft and non-distended. 25ml of air aspirated by SNP Kate Ward. NGT placed on free drainage."

So on the face of it, a change between that note made at 06.39 and Lucy Letby's note made at the beginning of the shift?

BOHIN: Yes. At 06.39 the abdomen was soft and she makes the comment that that was not distended but that has changed by the time the day staff came on.

JOHNSON: And in the meantime the NG tube has been on free drainage, the intention of which is to drain air; is that right?

BOHIN: Yes.

JOHNSON: At 3.21, you recorded the fact that [Baby P] was reviewed by medical staff, which we know in this case was --

BOHIN: Dr Ukoh.

JOHNSON: That's at tile 289. There were no problems then, but shortly thereafter he had an apnoea, a bradycardia and a desaturation.

BOHIN: That's correct.

JOHNSON: As a matter of fact you also observe the fact that Dr Ukoh noted that there was no respiratory distress and the abdomen was "moderately distended/bloated but remained soft".

BOHIN: Yes.

JOHNSON: If we go to -- you refer to Lucy Letby's note in this context, so if we could go to that, please, which is tile 286. It's your paragraph 3.23. There we see that Lucy Letby noted that:

"Registrar Ukoh arrived to carry out ward round. [Baby P] had an apnoea, brady, desat with mottled appearance, requiring facial oxygen and Neopuff for approximately 1 minute. Abdomen becoming distended."

BOHIN: Yes.

JOHNSON: There was, of course, no mention in Dr Ukoh's notes of [Baby P] at that stage having an apnoea, bradycardia and desaturation, was there?

BOHIN: He doesn't appear to have been aware of the fact that [Baby P] had been Neopuffed for a minute just prior to the ward round.

JOHNSON: Yes. In that context, if that had happened, who would have told the registrar that that had happened?

BOHIN: The nurse looking after the baby.

JOHNSON: Thank you. Can we go next to tiles -- just put the tiles up, please. It's 293, Mr Murphy. I don't think we need to -- I'm just trying to present the chronology in a clear way rather than going to the material behind it.

This is the desaturation, it's tile 293, it's [Dr B]'s note of the desaturation at 09.50.

BOHIN: Yes.

JOHNSON: Whether it's 9.40 or 9.50, I think we'll all remember [Dr A] telling us that he was paged or bleeped at about 9.40 and told to come.

BOHIN: Yes.

JOHNSON: Not an urgent call, he arrived at 9.50, and both Drs Ukoh and [Dr B] were already there.

BOHIN: Yes.

JOHNSON: So this was the occasion on which [Baby P] became bradycardic and desaturated; is that right?

BOHIN: Yes. His heart rate was around 80 and saturations 60%.

JOHNSON: That is your paragraph 3.26 and that was the note, and the evidence indeed, of [Dr A]?

BOHIN: That's correct.

JOHNSON: Do you record at your 3.27 that at 09.55, [Baby P] was intubated by [Dr A], with a size 3 tube, and put on to a ventilator?

BOHIN: Yes.

JOHNSON: There was then an issue over venous access because the cannula fell out and bilateral intraosseous, or IO, lines were inserted into each leg; is that right?

BOHIN: That's correct.

JOHNSON: We then have your record of the fact that adrenaline boluses were given at 9.55, 10.02 and 10.08?

BOHIN: Yes.

JOHNSON: Together with other associated resuscitation drugs?

BOHIN: Yes.

JOHNSON: You refer to the blood gases and a particularly poor blood gas at 10.06 in the immediate aftermath of that resuscitation.

BOHIN: Yes.

JOHNSON: Indeed, whilst the resuscitation was ongoing, because it's before the final dose of adrenaline.

BOHIN: Yes.

JOHNSON: You record that at 11.00 hours, [Baby P]'s heart rate was back to the normal range, being at 149 a minute, he was 100%

saturated with a mean blood pressure of 52, all of which are entirely normal findings?

BOHIN: That's correct.

JOHNSON: So do we have there a fairly serious collapse requiring the use of adrenaline, followed by a speedy recovery?

BOHIN: Oh yes, yes.

JOHNSON: Is that normal?

BOHIN: No. No, no, that's very abnormal to have a collapse with no prior indication that anything was wrong and to require that much adrenaline and then to recover fairly swiftly.

JOHNSON: Moving on with the chronology then, please, Dr Bohin, to your paragraph 3.33. At 11.30 was there a yet further deterioration, requiring CPR and the associated drugs?

BOHIN: Yes.

JOHNSON: On this occasion was [Baby P] paralysed with pancuronium?

BOHIN: He was. He'd also been given a stat dose of morphine at 11.10 and the only reason I point that out is that it's not a correct practice to give paralysing agents for children who have not been given sedation. So he had been given morphine at 11.10 and then was given pancuronium at 11.32.

JOHNSON: Yes. Do you next note, and we will return to this issue slightly later, at your paragraph 3.34, the adrenaline infusion that was written up as having been commenced at 11.30?

BOHIN: Yes. That's actually -- I do write that in my paragraph 3.34. That's actually a mistake. That is on the drug chart as being prescribed at 11.30, but from the resuscitation details we can see that actually it wasn't started until some time later.

JOHNSON: Right. That, of course, we also heard and is recorded as having been increased at 12.47?

BOHIN: Yes, the dose was doubled at 12.47.

JOHNSON: Meanwhile, your paragraph 3.35, tile 400, please, Mr Murphy, was a radiograph taken at 11.57?

BOHIN: Yes.

JOHNSON: There we see, amongst other things noted by Dr Wright, a distended abdomen; is that right?

BOHIN: Ah, that's the indication for undertaking the X-ray. So the ordering paediatrician has written "distended abdomen".

JOHNSON: Okay. So that's the context of --

BOHIN: Yes.

JOHNSON: That's the reason, if you like, for getting the report.

What Dr Wright has written, she has concentrated initially on what she describes as "a moderately large right pneumothorax"?

BOHIN: Yes.

JOHNSON: About which we've heard evidence of from various medical practitioners, including Professor Arthurs?

BOHIN: Yes.

JOHNSON: Reference to the ET tube with its tip at T1?

BOHIN: Yes.

JOHNSON: Which could safely be advanced at a further 10 to 12 millimetres?

BOHIN: Yes, it's a little high.

MR JUSTICE GOSS: Was that the one that Professor Arthurs commented on and said he thought it was all right?

BOHIN: Yes.

MR JUSTICE GOSS: He didn't think it needed to be advanced.

BOHIN: No, and to be honest in a baby that's unstable, you would not want to be -- and a baby that was paralysed, you wouldn't want to be messing about with an endotracheal tube unless you were very sure that it was in the wrong place, you would just leave well alone.

MR JOHNSON: Yes. Well, just so that we don't lose sight of the chronology, when did this report come back?

BOHIN: Well, it's quite difficult actually to ascertain from the notes and I have written in my report that the results were not back until 12.30. I think I base that on the fact that it appeared that nobody looked at the X-ray until 12.30. So in

theory the X-ray may have been on the system somewhere, but I don't think anybody looked at it until 12.30.

JOHNSON: All right. You record next the ventilator settings.

[Baby P]'s heart rate at 153 per minute.

BOHIN: Yes.

JOHNSON: Is that within the normal range?

BOHIN: Yes, that's upper limit of the normal range, 153, but it's still within the normal range.

JOHNSON: Was his blood pressure normal as well at that time?

BOHIN: Yes.

JOHNSON: Were the gases or in particular the gas at 12.28, was that reasonably encouraging in the context of everything that had gone before?

BOHIN: It wasn't a normal gas but it was certainly much, much better than the previous gas. And on this gas at 12.28 the pH is normal. The CO₂ is low, but I think that is a result of the amount of ventilation he was on, but he still has a metabolic acidosis. His base excess is minus 15.4, whereas previously it had been minus 15.8.

So the base excess is the same. So it's not normal but it's certainly much better than it had been earlier on.

JOHNSON: Yes. Was there then a further desaturation at 12.28, which I have previously referred to as the tea room desaturation?

BOHIN: Yes.

JOHNSON: The one that happened when [Dr B] and [Dr A] were in the tea room, according to the evidence of [Dr B].

BOHIN: Yes.

JOHNSON: That required [Baby P] being re-intubated and further CPR, including the administration of adrenaline?

BOHIN: That's correct.

JOHNSON: I haven't forgotten about the adrenaline infusion.

We'll come back to that. But did further treatment follow, including the administration of inotropes?

BOHIN: Yes, dobutamine was started just after 1 o'clock.

JOHNSON: And then blood gases were being taken periodically, showing what you have described as a profound metabolic acidosis?

BOHIN: Yes, the subsequent gases showed a profound metabolic acidosis with a large base excess and also a high lactate.

JOHNSON: And in language that I can understand, what does that mean?

BOHIN: It's pretty awful, to be honest. It shows a deteriorating picture because by this stage, we've had several cardiorespiratory collapses that have required large doses of adrenaline. The return of spontaneous circulation has occurred reasonably swiftly, although with each event things seem to take slightly longer and require more in terms of resuscitation drugs and fluids.

You know, they've set up a bicarbonate infusion, which is quite an unusual thing to do, they've given dopamine as an inotrope to help the heart. But despite all of that, we have still got an ongoing metabolic acidosis.

So they don't know what caused this, but they've not entirely got on top of the problem either.

JOHNSON: Did you say dopamine or --

BOHIN: That's interesting actually. At 13.10 dobutamine was started, but in [Dr B]'s evidence and on the fluid chart, dopamine, which is yet another inotrope, was started early on but there's no prescription for that drug in the notes.

JOHNSON: All right. What is the point of dobutamine and dopamine in the context of a child presenting as [Baby P] was?

BOHIN: These are drugs used to help the heart. Those two drugs work in slightly different ways but the end result -- the reason you give them is to try to help the heart pump better to improve the baby's blood pressure and to improve tissue perfusion so that oxygen that's being given by the ventilator can be distributed to the tissues. So after cardiorespiratory arrest, the heart usually doesn't pump that well and so these drugs increase the pumping of the heart to distribute blood and therefore oxygen around the body.

JOHNSON: Following the administration of those drugs, were [Baby P]'s saturations restored to optimal levels?

BOHIN: Yes. His saturations were 100%, you can't get any better than that. He was still on the ventilator but he was only in a very small amount of oxygen by then, so he was only in 25-30% oxygen, so a very small amount.

JOHNSON: Do we have, again, a situation in which there's been a profound respiratory collapse, but followed by an apparently successful resuscitation?

BOHIN: Yes, and by then moderate ventilator settings.

JOHNSON: We then know that there is a watershed time, in a sense, of about 3 pm when Dr Rackham appeared. That was a time at about which the final chest drain was inserted, the pigtail chest drain, which in a sense, I suppose, is the third chest drain, the first being the thoracocentesis needle, the second a different type of drain, and this, the third, in the same place; is that right?

BOHIN: Again, it's not clear from the notes but what we do know is that there was a thoracocentesis, there appears to be a chest drain on this second untimed X-ray that we've seen, and finally a formal pigtail drain inserted by [Dr A] at around 15.00.

JOHNSON: Yes. Just to keep the chronology, the second drain to which you have just referred is the timings taken from [Dr A]'s notes as 12.30?

BOHIN: That's correct.

JOHNSON: I'm looking at your paragraph 3.47. Did [Baby P] enter his final and fatal cardiorespiratory arrest at about 15.40?

BOHIN: Yes.

JOHNSON: Was he given further doses of adrenaline, atropine, phenobarbitone, bicarbonate and other fluids?

BOHIN: Yes.

JOHNSON: And despite full and prolonged efforts, were those efforts or was that treatment unsuccessful?

BOHIN: Yes, it was.

JOHNSON: You then move on to give us your opinion, but before we do that, I'd like to deal with the issue that arose overtly

yesterday with Dr Rackham, and it was the amount of adrenaline that was being given to [Baby P].

My Lord, hopefully to assist the jury following what may have been a slightly complicated explanation, we've got a further document for them with an outline explanation written, which Dr Bohin will supplement, which is done with the agreement and cooperation of my learned friend.

MR JUSTICE GOSS: Yes, thank you.

Well, you'll remember Dr Rackham saying he couldn't do the mathematics mentally in relation to this and it was going to be looked at. It has been looked at and there is essentially, as I understand it, a consensus in relation to this.

MR MYERS: Yes. I'll deal with the way it's put in a moment, but yes. In fact, if it doesn't steal the prosecution's thunder, the mathematics are correct, lest that bit pass us by so (overspeaking) relieved to hear that. But we take it from there and we'll go through it in the evidence now.

MR JUSTICE GOSS: If I may say this, it's entirely for you, but don't be too worried when you look at the writing in red and how the figures are calculated. The point is, it's the consequences of the figures that are important.

I hope I'm not speaking out of turn, but there's no issue in relation to that?

MR JOHNSON: No.

Let's deal with this prescription chart. In due course, ladies and gentlemen, we'll ask you to put this behind divider 21, but it may be that for now it's best kept as a separate document.

Dr Bohin, in the bottom half of the page is there a copy of the prescription chart, which has been taken from the hospital notes?

BOHIN: Yes.

JOHNSON: We can see that it appears to have been splattered with some sort of liquid.

BOHIN: Yes.

JOHNSON: That's as it was received. In the bottom right-hand corner has been superimposed a red J number, 23919.

BOHIN: Yes.

JOHNSON: So wasn't on the original, that's a prosecution artefact, if you like. It's just the page number in the papers of the case as a whole.

BOHIN: Yes.

JOHNSON: I'm just going to ask you to talk us just through what we see, without any explanation first of all, what we can actually see on the green prescription form first of all.

BOHIN: Okay. In the top left-hand corner are the identifying features that this is a neonatal variable infusion prescription chart and it's got [Baby P]'s name, date of birth and unit number on it. Moving across that top line, it has [Baby P]'s weight of just over 2 kilograms. So for the purposes of drug calculations 2 kilograms would be used.

JOHNSON: Yes.

BOHIN: Below that, it says "adrenaline", and then underneath "double". And if we need to speak about that we can do.

But adrenaline is a drug that is another inotrope drug. It can be given in other circumstances but for the purposes of this, I understand from listening to [Dr B], that they were using it as an additional drug to try and help pump the heart.

So the drug is adrenaline. The drug quantity written up is 3 milligrams. That would be a very small volume of drug and so that needs to be diluted in a compatible fluid. In this case, that dilutant is sodium chloride or normal saline.

Moving across, the final volume is 50ml. So whatever 3 milligrams of adrenaline comes to, that is added -- that will be a very small amount -- that is added to sodium chloride, so that the total volume is 50ml.

Moving across, the route is intravenous. Moving across again, the starting rate, ie the amount that you give per hour is 2ml per hour. It's then signed by -- I think it's Jessica Burke, who was the SHO, and dated the 24th.

But if we go back across the page to where it says "adrenaline double", below the drug quantity of 3 milligrams it says in a very small box there:

"The final concentration of infusion."

And that says:

"50 micrograms per millilitre."

So that's the --

MR JUSTICE GOSS: Does it say 60?

BOHIN: Sorry, 60 micrograms per millilitre. So that's the final concentration of drug after you've added 3 milligrams of adrenaline to 50ml of normal saline.

MR JOHNSON: Right. Let's just halt there and go to the --

BOHIN: Yes, it's quite complicated.

JOHNSON: Let's go to the red text at the top. The 3 milligrams of adrenaline, which is red figure 1, so we have superimposed a red number 1 --

BOHIN: Yes.

JOHNSON: -- in that box that says 3 milligrams of adrenaline.

BOHIN: Yes.

JOHNSON: Because the drug is to the left, adrenaline. That is equal to 3,000 micrograms, there being 1,000 micrograms in 1 milligram?

BOHIN: Yes, that's correct.

JOHNSON: So in order to do the arithmetic, you need to reduce it to or increase it to micrograms, is that right, or alter it?

BOHIN: Yes. It makes it easier, I think, for the jury to understand. Although it looks complicated it does it make it easier.

JOHNSON: All right. So although the form itself says 3 milligrams were put into 50 millilitres, that's 3,000 micrograms --

BOHIN: Yes.

JOHNSON: -- put into 50ml of saline?

BOHIN: Yes.

JOHNSON: Which is figure 2, 50ml?

BOHIN: Yes.

JOHNSON: That equals 60 micrograms of adrenaline per millilitre of solution?

BOHIN: Yes, that's correct.

JOHNSON: And just to remind us of how that's worked out, that's the 3,000 milligrams of adrenaline divided by 50?

BOHIN: That's correct. And that's number 4, red number 4 on your sheet.

JOHNSON: Exactly, yes. Then we come to what you pointed out as -- well, we haven't got yet to figure 3. If we're looking at the administration prescription, we have two separate orders, in effect, from Dr Burke.

BOHIN: Yes.

JOHNSON: The first timed at 11.30 on the 24th?

BOHIN: Yes, that's correct.

JOHNSON: The rate of administration, 2ml per hour?

BOHIN: That's correct.

JOHNSON: Of this solution that is 60 --

BOHIN: Micrograms per millilitre.

JOHNSON: So that's figure 3; is that right?

BOHIN: Yes.

JOHNSON: So going back to the red text at the top, the third paragraph, the solution was then run at 2ml per hour, giving an overall administration rate of 120 micrograms per hour; is that right?

BOHIN: Yes. So the fluids were running at 2ml an hour but that doesn't actually tell you how much drug the baby was getting per hour. So by doing a simple calculation you can see that 2ml an hour, because 1ml is 60 micrograms, 2ml an hour would be 120 micrograms per hour of adrenaline.

JOHNSON: Thank you. We then have to work out how much that is for a particular person; is that right?

BOHIN: Yes. Neonatal drugs, unlike adult drugs, are not standard there's not a standard dose for everybody. So in paediatrics and neonates, drugs are always recorded as per kilogram of body

weight. So for any dose of drug you want to give, you need to work out what that means per kilogram of body weight.

JOHNSON: Is that where we get, in effect, the fourth paragraph of red text, which is because [Baby P] weighed 2 kilograms, he was receiving 60 micrograms per kilogram per hour?

BOHIN: Yes. He was having 2ml per hour, which we've just said was 120 micrograms, but he weighed 2 kilograms. So if you wanted to find out how much that drug was per kilogram, you divide it by his weight, which would give you 60.

JOHNSON: Yes. So far, so good. What was the intended dose?

BOHIN: Well, unfortunately, it gets a bit more complicated than that. As well as giving drugs per kilogram per hour, some drugs are by convention noted as per kilogram per minute. So up until now, we have got to 60 micrograms per kilogram per hour, but this particular drug is prescribed and the notation -- the traditional notation is per minute, so we need to convert micrograms per kilogram per hour into micrograms per kilogram per minute.

JOHNSON: Is this where the intended result is departed from because it's at this point of the calculation that a mistake was made?

BOHIN: Yes.

JOHNSON: So let's deal with that, please.

BOHIN: Well, in order to get from 60 micrograms per kilogram per hour to micrograms per kilogram per minute, given that there are 60 minutes in an hour, you divide 60 by 60 and the answer is 1 microgram per kilogram per minute.

But what is written at item 5 is 0.5 micrograms per kilogram per minute. So that is the error.

JOHNSON: So the intention of the prescriber, if the intention is accurately represented by the dose, which is at figure 5 on the green form, was to give 0.5 micrograms per kilogram per minute; is that right?

BOHIN: That's what this prescriber has written that he or she would like the starting dose to be, 0.5 micrograms per kilogram per minute.

JOHNSON: But the result, the actual result of administering this particular fluid at the rate it was administered, was precisely double what the avowed intention was?

BOHIN: Yes.

JOHNSON: Right. So far, so good. We've reviewed, as we've gone through, the administration of various inotropes, which are designed, you have told us, to increase the heart rate?

BOHIN: Yes.

JOHNSON: And increase -- there's another word, which was used yesterday by at least one medical practitioner, was it contractility?

BOHIN: Yes, that just means a squeeze of the heart.

JOHNSON: The power of the squeeze?

BOHIN: Yes.

JOHNSON: And designed also to increase blood pressure?

BOHIN: Yes.

JOHNSON: And that is one of the consequences of dobutamine?

BOHIN: Yes, that's why you give all of the inotropes.

JOHNSON: It's also a consequence of giving adrenaline, or it may be?

BOHIN: That's what you're hoping for, yes.

JOHNSON: Yes. In the context of our everyday lives, we're all wittingly or unwittingly familiar with the administration of adrenaline, aren't we, generally speaking?

BOHIN: Yes.

JOHNSON: Maybe more in the witness box than in his Lordship's chair sometimes?

BOHIN: Yes.

JOHNSON: What is adrenaline?

BOHIN: Adrenaline is a naturally occurring hormone produced by a gland that sits just above the kidneys. It's produced at times of stress, hence your indication about it may be high if you're in the witness box. It's produced at times when you have a fight-or-flight response. So in stressful situations the body automatically makes you ready for some impending attack or to

deal with something stressful. So at that time everyone will be familiar with their heart pounding in their chest and that is the response of adrenaline.

JOHNSON: So we all have experience of it to that degree at least.

Now, what effect did this apparent overdose of adrenaline have in this case?

BOHIN: I don't think it had any -- well, it didn't have any adverse effect in that it was -- the infusion was started after [Baby P] had had at least two of his collapses and already had a metabolic acidosis by then, as we've already established. Looking at what happened after the adrenaline was started, albeit at double the dose that was intended by this prescriber, his blood pressure -- it didn't really have any effect on his blood pressure, his blood pressure didn't go up. That is a potential consequence, that you'll get a sudden rise in blood pressure, which in premature babies can be a problem.

This didn't happen.

It can also cause the heart rate to go up very briskly; that also didn't happen. And it can also cause lactic acidosis. But of course, [Baby P] already had a lactic acidosis. So it's difficult -- it's impossible for me to estimate what contribution this dose of adrenaline made to the lactic acidosis, but it certainly didn't effect his blood pressure or his heart rate adversely.

JOHNSON: They were trying to raise it and it didn't have that effect in the end, did it?

BOHIN: No, and by this time he was on three inotropes, which in premature neonates is extremely, extremely unusual.

JOHNSON: Going back to the position immediately following [Baby P]'s premature death then, please, Dr Bohin. What conclusions did you draw from all the evidence as we have summarised it to be?

BOHIN: Firstly, I was concerned about the initial abdominal X-ray taken and the amount of gas within that X-ray because that X-ray was taken as almost a precautionary measure by Dr Gibbs at a time when there was no actual clinical concern about [Baby P]'s abdomen. Yet we can see on the X-ray that the abdomen is full of gas. Dr Arthurs described it as moderately full of gas, but there's gas that goes from the stomach and there's abdominal distension right the way through the bowel to the rectum.

JOHNSON: That's tile 173. So that's the 20.09 --

BOHIN: That's the 20.09 X-ray.

JOHNSON: -- X-ray on 23 June?

BOHIN: The night before.

JOHNSON: I'm sorry, could you take up where I so rudely interrupted?

BOHIN: That X-ray was abnormal and then -- I felt that X-ray was abnormal and showed an excess amount of gas which at the time wasn't causing any particular problem but, of course, over the course of the night subsequent to that gas, [Baby P] started to become intolerant of feeds and was subsequently put nil by mouth and over the course of the night the abdominal distension, which was noted by Kate Percival-Calderbank, reduced and his abdomen was said to be normal by Sophie Ellis and then, shortly afterwards, his abdomen was said to be distended and loopy when the morning staff came on and then he had a collapse, which is difficult to explain.

JOHNSON: Yes.

BOHIN: That was the first kind of concern I had, was about the abdominal distension and the X-ray. Going on from that, he obviously had a number of subsequent collapses, the cause of which were difficult to explain. But in looking at the cause I was looking around the pneumothorax and whether that should have been drained sooner because it was noted on the X-ray after a time when [Baby P] had collapsed and, in my opinion, the X-ray probably should have been done sooner after the first collapse because we had no cause for that initial collapse. So I would have done that X-ray probably sooner.

Whether the pneumothorax would have been present then or not, no one knows. But having seen the X-ray and heard the clinicians who have given evidence speak, it's clear that once they had seen the X-ray with the pneumothorax, they initially chose not to immediately drain it because they felt it wasn't of clinical concern and that is generally the right course of action. But of course, with [Baby P] we did have ongoing clinical concerns because by this time he'd had a collapse at 9.50, he was then on a ventilator, so that was very different from the baby first thing in the morning. And a baby on a ventilator is unstable and you don't know if the snapshot that was taken when the X-ray was done showing a pneumothorax not under tension has changed in some way to become a pneumothorax that is under tension and requires drainage.

So there is an issue about whether attention should have been paid to that pneumothorax sooner in my opinion.

JOHNSON: We heard Professor Arthurs give us his view as to the origin of the pneumothorax, the reasons why it manifested itself, and he favoured the point of view that it was the consequence of the ventilation.

BOHIN: I think -- you know, pneumothoraces can occur spontaneously in babies. They can occur in babies who have got lung disease. He didn't have any lung disease, so we can discount that. Babies who are resuscitated can develop a pneumothorax as part of their resuscitation, so that has to be taken into account.

But also, babies who are put on a ventilator can also develop pneumothoraces; that's not uncommon at all. And in fact, in [Baby P]'s case, for a baby with no underlying lung disease his ventilatory pressures, so the amount of pressure pushed into his lungs with each breath, was quite high for a baby with no underlying lung disease and so that may well have caused -- I'm not being critical of the team in Chester at all, it's just a consequence of being on a ventilator.

JOHNSON: All right. Did you come to any conclusions as to the reasons why [Baby P] collapsed in the first place?

BOHIN: Well, yes. Prior to collapse that morning, [Baby P] developed abdominal distension. That was noted by Lucy Letby, the nurse looking after him. That had been a new feature. I think it was at that point that the abdominal distension splinted his diaphragm and adversely affected his breathing, causing his collapse.

I think the air in his abdomen the night before was abnormal and my conclusion then was that that air -- I could find no reason for that amount of air to be in his abdomen and I felt that that air had been introduced via the nasogastric tube and was not naturally occurring air.

JOHNSON: In the context of reaching that conclusion, had you taken into account the fact that this was a child who was being fed enteral -- being given milk down the NGT?

BOHIN: Yes.

JOHNSON: And had been apparently sailing through?

BOHIN: Well, he'd been tolerating his milk up until the events of the night of the 23rd. There had been no problem, nor had there been an issue with abdominal distension.

So there was -- this was something that was striking and out of the ordinary.

JOHNSON: And do you also take into account in reaching that conclusion the fact that all the blood tests, albeit they hadn't been reported on at this stage, because as we know they have to be incubated in the lab, ultimately showed that he didn't have any sort of infection?

BOHIN: Yes, as we've heard throughout the trial, one of the first things you think of when a baby starts to become unwell, showing subtle signs of not tolerating feed and desaturations, is: has this baby got an infection? So an infection screen was carried out. There was no evidence of infection at all.

JOHNSON: So did you come to the conclusion that in reality there was only one plausible explanation for why it was [Baby P] had collapsed?

BOHIN: My conclusion was that air had been injected into his nasogastric tube at some point or points and it led to splinting of his diaphragm, which subsequently caused his initial collapse.

What I can't explain is why he went on to have further collapses. I can't think of any naturally occurring phenomenon that would have led to those further collapses.

MR JOHNSON: Thank you very much.

My Lord, that may be a good moment for the break.

MR JUSTICE GOSS: Yes. We'll have our break, slightly later than normal. A 10-minute break, please, ladies and gentlemen, and Dr Bohin. Thank you.

(12.07 pm)

(A short break)

(12.19 pm)

(In the absence of the jury)

MR JOHNSON: There's one issue I forgot to raise, which I've discussed, and I'm going to deal with, with your Lordship's leave, thank you.

(In the presence of the jury)

MR JOHNSON: My Lord, there's just one issue I forgot to raise with Dr Bohin. I'm sorry.

Dr Bohin, going back to the green form, if we can, from the jury's point of view, we now know that whichever of these two prescriptions one looks at, the dose, as expressed by the doctor, was in fact doubled for the reasons that you have already explained.

BOHIN: Yes.

JOHNSON: So at its highest, taking the right-hand prescription, which is written up at 12.47, the 1 microgram per kilogram per minute would become 2, is that right --

BOHIN: Yes.

JOHNSON: -- if my maths is in order? What is the effect of that and how does that fall within general guidelines is the issue I should have asked you.

BOHIN: That is quite difficult to answer because there are published guidelines in a book that all doctors use, which gives you the regular doses and the range of doses that can be given of any particular drug and it gives you side effects, et cetera.

In that particular book, which is the British National Formulary, for a neonate, the upper limit of what they consider to be the normal range is 1.5 micrograms per kilogram per minute. However, that book gives a guide and certainly in children's intensive care units, in paediatric intensive care units and in children's cardiac units where they look after neonates, doses much, much higher are used.

But of course, the higher the dose, the more likely you are to suffer more significant side effects of the drug. So most children's intensive care units, where they have guidance for giving these drugs, will give the upper limit of normal as being 1.5 micrograms per kilogram per minute and there will be an instruction to say it can be increased to a higher dose at the consultant's request.

So this in effect stops junior doctors from giving very high doses, so the doses can be exceeded only on a consultant's say-so. so there isn't a straightforward answer to your question, I'm afraid, because certainly I have worked in cardiac units where much, much higher doses have been given, but that would be in an extraordinary circumstance.

JOHNSON: You talk of side effects, what are the side effects?

BOHIN: The side effects are a rise in blood pressure, rise in heart rate or heart arrhythmias, and lactic acidosis are the main ones. As a consequence of very high doses, it can also contract your blood vessels, so make the perfusion of the skin worse, so the exact opposite of what you want the drug to do. And that's true of a number of inotropes that in low doses they work in one particular way -- and adrenaline in a low dose actually causes your skin to flush because it causes your blood vessels to dilate and get bigger, but in high doses it causes blood vessels to constrict and that can have the opposite effect that you want it to have in that it reduces oxygen to the tissues.

MR JOHNSON: Thank you very much.

Cross-examination by MR MYERS

MR MYERS: Dr Bohin, what I would like to do, if it's all right, is just to look at some aspects of the treatment of [Baby P] after that initial collapse and then come back to look at what you say about why that collapse took place.

BOHIN: Okay.

MYERS: I am doing it in that order, so we can all follow that.

So with regard to the care after that first collapse, and I'm assisted by the report that you prepared on 22 May 2020, it was and it remains your view, doesn't it, that the chest X-ray should have been taken sooner than it was, all other things being equal?

BOHIN: Yes.

MYERS: I'm looking at paragraph 4.15 of your first report. You make the point there, as you did in evidence, that given that it's said the cause of collapse was unknown, it's a matter of some urgency to get the X-ray?

BOHIN: Well, you're looking for the cause of the collapse, so in my routine workup of a baby with an unexplained collapse, a chest X-ray would be part of that.

MYERS: Just going through issues you raise in that report, the question of adrenaline I'm going to come back to that and a particular issue in a moment. But I made reference yesterday -- when the matter arose, I made reference to the fact that you had referred to it in your report and in fact at paragraphs 4.18 and 4.19 of that report, you specifically identify a potential issue with adrenaline, don't you? 4.18 and 4.19.

BOHIN: Yes.

MYERS: What you say there, I'm going to come back to it, is:

"An adrenaline infusion was commenced at 0.5 micrograms per kilogram per minute, and later increased to 1 microgram per kilogram per minute. This is a high starting dose. Usually adrenaline is started at 0.5 to 0.1 micrograms per kilogram per minute and gradually increased to prevent unwanted side effects [as read]."

BOHIN: Yes.

MYERS: Then you said this at paragraph 4.19:

"I am not clear why the adrenaline infusion was started at this point. I assume it was to improve cardiac function and, in turn, ensure that the blood pressure was maintained."

Then you go on to deal with:

"The issue with starting high-dose adrenaline is that it can raise the blood pressure excessively and can also cause blood vessels to constrict, which has an adverse effect on tissue perfusion."

BOHIN: Yes.

MYERS: So that's what you said in the report -- the May 2020 report?

BOHIN: Yes.

MYERS: I'm going to come back in more detail to what we're saying now, I'm just identifying that you identified that as a possible issue of concern.

BOHIN: Yes.

MYERS: At paragraph 4.20 you identify that in these circumstances with [Baby P], the ventilator settings were high pressure settings for a baby with no underlying lung disease. And that is your view now as you have said in evidence; is that correct?

BOHIN: Yes, because the oxygen requirement also was only 26%, so you wouldn't have needed pressures that high.

MYERS: I'm just actually looking for a moment ahead at your paragraph 4.41. Your opinion was that -- is it the pneumothorax

may have developed because of high ventilator pressures; is that correct?

BOHIN: I think it's, as I said earlier, impossible to say whether it was due to bagging and resuscitation, because I don't know what pressures they used during bagging, or from high ventilator pressures. One or the other.

MYERS: But you noted the pressures were high as it happens?

BOHIN: Yes.

MYERS: Just carrying on going through your assessment of this, I'm looking at your paragraph 4.22 next, Dr Bohin. You deal there with the action, the identification of a chest X-ray and the action taken. The easiest thing perhaps is if I just remind you of what you say in paragraphs 4.22 to 4.25. I'll just summarise, but enlarge it if you wish.

You identified that the chest X-ray is taken at 11.57 and, as you said in evidence, it appears -- for whatever reason, it doesn't appear to have been reviewed until 12.30; is that correct?

BOHIN: Well, as far as I could deduce from the notes, yes.

I think that's my estimate rather than anything written.

MYERS: Right. In any event, was it your view that there was a delay between having ordered the chest X-ray, its being taken and its being reviewed?

BOHIN: Yes.

MYERS: Is it your opinion that there is a high possibility that whatever the nature of the pneumothorax when it first arose, in due course it became what's called a tension pneumothorax? I'm looking at your paragraph 4.42.

BOHIN: That was something I had to consider because we knew that [Baby P] had a pneumothorax. When pneumothoraces are drained, babies usually recover fairly quickly. So I was looking a reason for why he had repeated cardiorespiratory collapse. So these were one of the things that I had to consider: had this become a tension pneumothorax in the meantime? But of course, once it was drained that wouldn't explain the further collapses.

MYERS: But in any event, was it your view that the pneumothorax may have contributed to a collapse prior to being discovered?

BOHIN: Yes.

MYERS: We know it was discovered round about, or it appears on the notes, round about 12.30, doesn't it?

BOHIN: Yes.

MYERS: So the collapse we are talking about where you're raising that is the collapse at 12.28, isn't it?

BOHIN: Yes, it may have contributed. I have no way of proving that either way but it may have contributed. I was looking for a reason for him to collapse and that's one of the things I would go through in my differential diagnosis.

MYERS: All right. We've heard that being described by the prosecution as the tea room incident. We would say that can be described or considered to be a pneumothorax incident potentially.

BOHIN: Among other things, yes. It's potentially, but also there are other things that need to be considered as well. It may not have been that. But potentially it could contribute to it. I don't think it caused it but it could have contributed to it.

MYERS: Did [Baby P] receive one or two chest drains? Can you help us with that?

BOHIN: Well, no --

MYERS: In fact, so everyone understands why I'm asking that question, I'm going to show you two of the radiographs that we have.

BOHIN: I'm not sure I can link it. I'm not sure I can link the X-rays to the narrative in the notes.

MYERS: Can I just show what it is so we know what I'm referring to? I'm going to ask to put up the radiograph from 12.30, which is at tile 434.

If we look at the commentary from Dr Wright, please.

If we bear in mind this has been established on the evidence to have been taken round about 12.30.

BOHIN: Yes.

MYERS: It says:

"ET tube and NG tube in satisfactory position. A right-sided chest drain is in situ with its projecting medially over the upper zone [as read]."

There's some other comments there. It refers also to the residual right pneumothorax. It says a right-sided chest drain. If we scroll up to look at the actual image, please, Mr Murphy, if we just hold that image in our heads, I'm going to go to the next radiograph with what that says, and then why I am asking this question will become apparent if it isn't already.

The next radiograph was taken at 15.36 and it's at tile 574. Could we look at that, please? Thank you.

In fact, straightaway as we look at this, the commentary which we have refers to:

"ET tube and NG tube in satisfactory position."

Then it says:

"Presumed right chest drain in situ."

When we look at that, we can definitely see what we now know is a pigtail drain in situ, can't we?

BOHIN: Yes.

MYERS: So I don't know if it's possible to put the two images next to one another, the image on tile 434 and the image on tile 574.

(Pause)

Thank you. So on the left, that's the image at 12.30, we believe, T434. On the right the image at 15.36, T574.

BOHIN: Yes.

MYERS: We've seen the commentary for the image on the left referred to a chest drain and the commentary for the image on the right refers to "presumed chest drain".

BOHIN: Yes.

MYERS: Plainly, on the right, the presumed chest drain is that pigtail drain?

BOHIN: Yes.

MYERS: Can you help us with whether there's one or two chest drains in situ? I'm just asking because of what we have on the radiographs.

BOHIN: Well, there's nothing in the notes to suggest that an additional chest drain was put in. The only evidence from [Dr A] was that he used a 24-gauge Jelco catheter, which is absolutely tiny. So it's the kind of -- not much wider than a hair. But you would possibly see it on there. I can't see any evidence of that Jelco on that screen and this really would be a matter for Dr Arthurs. I can't see that.

MYERS: Perhaps to simplify the matter, [Dr A] referred to a Jelco catheter. What we see on the right is a pigtail chest drain, isn't it?

BOHIN: Yes.

MYERS: That's not a Jelco catheter, is it?

BOHIN: No, no, no, but there is on the left radiograph something that to me looks like a drain, but because the mouse...

MYERS: Will it not work?

BOHIN: No.

MR JUSTICE GOSS: Perhaps it can't work when you put them side by side.

I don't want to put words in your mouth but is it the regular-shaped object running from the letter R down towards the centre of the body?

BOHIN: No, my Lord, I think it's something below that. I think the tubing where the letter R is, which is on -- that's also on the other radiograph. That's where Dr Arthurs would come in. I think that's a suction catheter which has been left on top of the chest. I think that is probably outside the body.

MR JUSTICE GOSS: So it's a freestanding object?

BOHIN: Yes. But I think on the left hand image, below the tube, next to the R, is also another tube, which goes right across the middle of the chest, but I'm afraid I can't show you.

MR MYERS: Very faint?

BOHIN: Yes. I think that that is the tube that Dr Wright is referring to in her report.

MYERS: All right.

BOHIN: That was my view. Dr Arthurs maybe should be asked about that rather than me.

MYERS: That can be confirmed if it assists because he's returning by video. I wanted to see if you could help with that because it was apparent, looking through that, it appears to be two different drains being used.

BOHIN: Yes.

MYERS: All right. Can we take those down, thank you, Mr Murphy.

In your paragraph 4.53, Dr Bohin, you do summarise a view, a critical view, of some aspects of the care of [Baby P], don't you?

BOHIN: Yes.

MYERS: What you put is:

"My impression of the care afforded to [Baby P] after the collapse on 24 June is that it was muddled. There were unacceptable delays in recognition and treatment of the pneumothorax, the ventilatory strategy used, and the use of a high-dose adrenaline infusion was unusual."

Before we come to the question of the collapse itself, that was your view when you came to look at the way that care had been implemented after that collapse had taken place?

BOHIN: Yes, and I think questions need to be asked of the clinicians involved as to why they used that ventilatory strategy and why they started the use of high-dose adrenaline. But I think [Dr B] certainly addressed -- Dr Rackham, rather, addressed the adrenaline along with [Dr B]. No one addressed the ventilatory strategy, but that certainly -- neither of those things caused him to collapse.

MYERS: They come afterwards, don't they?

BOHIN: Yes.

MYERS: All right. I'm going to deal with the question of adrenaline next, if I may, Dr Bohin. We've looked with you at what you said in your original report relating to adrenaline and about the nature of the dose.

BOHIN: Yes.

MYERS: As to the standard dose for a child receiving adrenaline, you've told us this morning from the relevant guide that the upper limit is 1.5 micrograms per kilogram per minute; that's right, is it?

BOHIN: From the British National Formulary for Children.

MYERS: When you made your statement in May 2020, and we've just looked at your paragraph 4.18, you observed there that:

"0.5 micrograms per kilogram per minute..."

Which is the first dose for [Baby P] --

BOHIN: 0.05.

MYERS: 0.05:

"... later increased to 1.0. [You say] This is a high starting dose. Usually adrenaline is started at 0.05 micrograms to 0.1 micrograms."

BOHIN: Yes.

MYERS: Whatever the upper limit may be, the usual starting dose for an infusion is 0.05 to 0.1, isn't it?

BOHIN: It depends what you're starting it for.

MYERS: Right.

BOHIN: And it depends on whether the child is on any other inotropes and what the clinical condition is of the child and what has gone on before. In this case -- well, in general, if babies are on low dose of a single inotrope and you want to add in adrenaline because the child is sick on an intensive care unit and you want to improve their blood pressure, it would be normal practice to start off at a low dose and titrate up until you have got an effective adrenaline.

I think the situation here, as we heard from Dr Rackham and the team, is that they decided not to go with a low starting dose because by then he was already on two inotropes and had had cardiac arrest. So they wanted to give a large dose to try and kick-start the heart with a view to titrate down if the dose of adrenaline was effective. But in fact it wasn't effective. So even at the high dose it wasn't effective.

MYERS: May I just ask this: where you said in your report that 0.05 to 0.1 micrograms is the usual starting dose, is that right, all other things being equal?

BOHIN: For a baby who's just being treated for low blood pressure as opposed to a baby who's has been collapsed.

The indications different and there are clear guidelines from transport teams and children's intensive care units that where there is a neonatal collapse with a lactate over 4, larger starting doses can be used regardless of what it says in the British National Formulary.

MYERS: We have a starting dose, don't we, of 1 microgram --

BOHIN: Yes.

MYERS: -- per kilogram?

BOHIN: Yes.

MYERS: So that be certainly 10 times that lower starting dose, wouldn't it?

BOHIN: The lower starting dose for just treating pure hypotension, yes.

MYERS: And as it happens we know double what the intended starting dose was on the day in any event?

BOHIN: Yes.

MYERS: There are unwanted side effects that can accompany doses of adrenaline that are high, aren't there?

BOHIN: Yes.

MYERS: And whatever the clinical reasons for making a decision to put in a higher dose, once you do that, it increases the likelihood of a side effect accompanying that, doesn't it?

BOHIN: Yes, which is why, as I said earlier, in most units if you wish to give high-dose adrenaline it's a consultant decision.

MYERS: Therefore there's sometimes a balance, isn't there, between going for a higher dose and weighing that against the potential problems that could occur if you have it?

BOHIN: Absolutely, yes.

MYERS: In terms of potential problems with adrenaline, I'd suggested three to Dr Rackham and I think you have dealt with them.

One is it can raise blood pressure and that might be the intended desire, but it can raise blood pressure?

BOHIN: Yes.

MYERS: The second one is it cause blood vessels to constrict?

BOHIN: Yes.

MYERS: And the third one, I suggested, was that it can create lactic acidosis?

BOHIN: Yes.

MYERS: And you agree that is a potential side effect of higher doses of adrenaline?

BOHIN: Yes, I've mentioned that to Mr Johnson this morning.

MYERS: It's that one I'm most interested in. Before we do, just on the subject of blood pressure, could I just ask us, if we look at the observation chart for [Baby P] at tile 22. You said there was no issue or no significant impact on blood pressure, as I understand it.

I am just looking at the readings for 11.00 and 13.00 on 24 June. We can see the last two columns, and if we scroll down, we'll come to a column which has "blood pressure" and "mean blood pressure". In fact, it's the readings at the bottom right.

BOHIN: Yes.

MYERS: It's a little difficult to see.

BOHIN: Yes.

MYERS: But on the left-hand column, we've got BP for blood pressure.

BOHIN: Yes.

MYERS: Below that, the word in capitals "mean".

BOHIN: Yes.

MYERS: Then we can see readings across on the right-hand side.

BOHIN: Yes.

MYERS: As it happens, 52, which is the mean blood pressure at 11.00, that's actually at the upper end of the desirable mean blood pressure for a neonate, isn't it, like [Baby P]?

BOHIN: It is, but he's already on a lot of inotropic support and, as we heard from [Dr B], one of things that Dr Rackham wanted excluded was pulmonary hypertension.

So if you want to exclude pulmonary hypertension, you make an attempt to keep the systemic blood pressure, which is what this is measuring, at the higher end of normal so that you don't develop pulmonary hypertension.

So this is -- the 52, I'd say, is normal for a baby of 2 kilograms, a mean. The next one either says 81 or 85.

MYERS: Yes.

BOHIN: And the subsequent ones, which are not on this chart, were back down into the 50s again.

MYERS: We're going to move along, actually. But at 13.00, which is certainly after the adrenaline infusion commences, it's up to 81, possibly, from this, isn't it, the mean?

BOHIN: Yes.

MYERS: And that is very high, isn't it, actually?

BOHIN: Well, it's high. I wouldn't say it's very high. It's high.

MYERS: It's well above the normal range for a baby, isn't it?

BOHIN: The other thing to say is that these blood pressures taken -- the best way of taking blood pressures in a neonate, the most accurate way, is to take a blood pressure from a special drip that goes into an artery, so that you measure the blood pressure directly.

Unfortunately, [Baby P] didn't have that, so he was having blood pressures taken in the way that we would all have blood pressures taken, which is a cuff on the arm or the leg in a baby. But of course this baby had had very poor perfusion and so (a) taking blood pressures with a cuff is not the best way of doing it, but it's the way we most often do it, apart from in very sick babies, but it's not the most reliable way, and it certainly is not that reliable in a baby that has had collapses.

So yes, we're looking at the trend, because that's the only available means we've got, but it's certainly not the best way of measuring blood pressure.

MYERS: However it's been measured, do you agree 81 is very high?

BOHIN: No, I'm saying 81 is high. I'm not saying it's very high.

MYERS: Just to see this through, over the page we're on tile 505. Go behind that, please, Mr Murphy.

If we look down at the bottom, we know where we're looking now, the bottom left. At that point the blood pressure has fallen to 48 -- and this is at 14.10 -- 43 or 48. 48 maybe.

BOHIN: Yes, when -- he's on the very high dose by then.

MYERS: That's at the higher end of normal, isn't it?

BOHIN: The very high dose is 2, yes.

MYERS: Yes. I'm just looking at the blood pressure so we follow it through. That's the higher end of normal, as it happens?

BOHIN: I'd accept that mean blood pressure for a baby, as I did for the first reading on the other chart. I would accept that as being normal.

MYERS: The issue I'm principally concerned with is the lactic acidosis potential but I wanted to deal with that because things had been said about the blood pressure so I wanted to look at that with you?

BOHIN: I think the blood pressure is normal other than one reading.

MYERS: Going to the lactic acidosis, we've been through the arithmetic, and just so we can be quite clear, the arithmetic, as we went through it with Dr Rackham yesterday, was correct, wasn't it?

BOHIN: Yes.

MYERS: So we know we are dealing with -- we've got the paper in front of us -- double the intended dose, both at the time of the first dose and then when it was increased at or around 12.47?

BOHIN: Yes.

MYERS: Right. If we put up the blood gas chart, please, which is at tile 178. I appreciate we have -- if we scroll down to where

we get to it as we look at this. It's really the lower half of the chart or the lower portion, please, Mr Murphy.

Plainly, there is certainly -- by 9.51 and 10.46, there is acidosis where [Baby P] is concerned, isn't there?

BOHIN: Yes, and actually there's one gas missing on this chart from 10.06.

MYERS: Yes. Just looking at those alone, there's acidosis in [Baby P]'s case, isn't there?

BOHIN: Yes.

MYERS: Thank you. If we move forwards, we've got readings at 12.03, which certainly on the chart don't include a lactic acid component, do they?

BOHIN: No.

MYERS: But by the time we get to 13.33, which is after the infusion has been running for a while, certainly the lactate reading is high, isn't it?

BOHIN: Yes.

MYERS: 18.5 is very high; do you agree?

BOHIN: Yes.

MYERS: You said frankly in the evidence that you gave that it's difficult to summarise the impact of the adrenaline on any question of lactic acidosis because there is a high lactate in any event. Have I summarised that correctly?

BOHIN: Well, it's difficult to quantify the contribution made by the adrenaline infusion in a child who's already got a high lactate and who's had several cardiac arrests, which in turn would cause a high lactate. So it's impossible to say the contribution that the adrenaline infusion made.

MYERS: But you agree, don't you, that lactic acidosis is one of the unwanted side effects of higher doses or potentially unwanted side effects of higher doses of adrenaline, isn't it?

BOHIN: It's a potential side effect of any dose of adrenaline.

MYERS: Right. And we agree, don't we, that on this occasion there is double the dose of adrenaline going in, whichever infusion we look at?

BOHIN: Yes.

MYERS: Which increases the likelihood of it creating a higher level of lactic acidosis, doesn't it?

BOHIN: It's a potential side effect. It doesn't mean that it is going to happen, it's a potential side effect.

But actually you have to take these blood gases in the context that these are taken after a child has had cardiac arrests, which will inevitably increase the lactate on their own, regardless of whether you've got adrenaline infusing. That's why I said it's impossible to establish the contribution that the adrenaline infusion is making to the blood lactate.

MYERS: Impossible to establish it but it is entirely possible it made it worse, isn't it?

BOHIN: It may have contributed but I don't know to what degree.

MYERS: Thank you for dealing with that, Dr Bohin.

I want to come back then to the question of cause of collapse and what you say about that. I'm looking at again the report, your principal report, on 22 May 2020.

Let's consider this alongside where we are now with the evidence you've given today.

When you wrote this report, I'm going to suggest you were linking very clearly the abdominal gas pattern in the X-ray at about 20.09 on 23 June with the collapse at about 9.40 on the morning of the 24th? Do you agree that is a link you were making at that time?

BOHIN: No, my report doesn't say that.

MYERS: Right. Well, let's see. But is that not a link you were making? We'll come to your report in a moment.

BOHIN: I was making the link with abdominal distension with the collapse at 9.40. The abdominal X-ray was abnormal.

I made the link with abdominal distension because it was noted by the nurse looking after him that morning and he had had episodes of being intolerant of feed overnight.

MYERS: At paragraph 4.48. You say this:

"Prior to his collapse, [Baby P] had a very abnormal gas pattern on his abdominal X-ray on 23 June."

And you describe it and you say it's not normal and was not associated with any gut pathology.

BOHIN: Yes.

MYERS: You say that?

BOHIN: Yes.

MYERS: Right. You deal with some other reasons for which there may be gas in the gut, but moving forwards to 4.52, you say:

"The only plausible explanation for the gas pattern seen in the abdominal X-ray is a result of gas being injected or administered into the stomach from an exogenous source."

And we're looking here via the NGT.

BOHIN: Yes.

MYERS: Then 4.54, you say:

"In conclusion, the abnormal gas pattern is the result of exogenous gas entered into the bowel."

You follow that with:

"The collapse is most likely to have occurred as a result of the gastric dilation splinting the diaphragm and adversely affecting breathing."

That's where you get to on the conclusion, isn't it?

BOHIN: Yes.

MYERS: And I'm suggesting, first of all, you're drawing a link from where you say from the exogenous gas injected into the bowel seen in the gas pattern and gastric dilation splinting the diaphragm. That's what you're doing in the report, isn't it?

BOHIN: No. There is an abnormal gas pattern and I think that exogenous air is responsible for that.

The next morning, [Baby P] collapses, but prior to that, he has been intolerant of feed and has developed, as a new finding, abdominal distension. Sophie Ellis said the abdominal distension has gone. That then recurs on the morning shortly before his collapse.

MYERS: So we can be clear what it says in the conclusion, the wording, I'm going to suggest, matters, you say:

"The abnormal gas pattern is the result of exogenous gas injected into the bowel."

BOHIN: Yes.

MYERS: And you then say:

"The collapse is most likely to have occurred as a result of the gastric dilation splinting the diaphragm."

BOHIN: Yes.

MYERS: When you say "the gastric dilation", that refers to the exogenous gas into the bowel, doesn't it?

BOHIN: No. It's poor wording on my part, so I'm sorry, I apologise.

MYERS: Nowhere in that report, I'm going to suggest, do you say that somebody, at some time shortly before or whatever time before 9.40 but after the shift before had finished, nowhere do you suggest there has been an additional injection of air, do you?

BOHIN: No.

MYERS: And the only air you're identifying is what we see on the X-ray at 20.09, isn't it?

BOHIN: There haven't been any other abdominal X-rays so there's nothing else to compare that to. If there'd been another abdominal X-ray taken that morning when the nursing staff noted abdominal distension, I'd have something to compare it to, but obviously there wasn't.

MYERS: Do you agree there's no indication in any of the observations on [Baby P], after that 20.09 X-ray, I'm talking about the heart, the respiratory, the temperature, that indicates an adverse effect caused by air in the gut?

BOHIN: No, he didn't have any evidence of that after that X-ray until he collapsed the next morning.

MYERS: And do you agree the only suggestion we have of abdominal distension, certainly being visible, is that given by Kate Percival-Calderbank at 4 o'clock in the morning?

BOHIN: She notes it, Sophie Ellis then says it goes away, and then Lucy Letby, shortly after her start of her shift, notes that the abdomen is distended and loopy.

MYERS: The first point I make to you as a suggestion, Dr Bohin, is at the time you produced the report you were focusing on splinting being caused by gas the night before; do you disagree with that?

BOHIN: I do disagree with that.

MYERS: Let's look at what we have in the morning then. You've identified in particular, and you've been taken to, what Nurse Letby says and I'd like to remind ourselves of that. It's on tile 263, please. Scrolling down, it's in the first section. There are the opening comments talking about care being given from 08.00. Then it's the last two lines:

"NG tube on free drainage. Trace amount in tube. Abdomen full. Loops visible, soft to touch."

BOHIN: Yes.

MYERS: And there's reference to abdomen distended when Dr Ukoh is there?

BOHIN: Yes.

MYERS: The fact that at that time "abdomen full, loops visible", an abdomen distending in that way or becoming full doesn't indicate in any way there's been air forced down the NGT, does it?

BOHIN: It can be. It's not diagnostic, but it doesn't exclude it.

MYERS: An abdomen becoming full with loops visible might happen quite naturally, mightn't it?

BOHIN: But no one else has noticed that and visible loops don't cause babies to collapse a short time later.

MYERS: In that case I would like us to look at the [Baby O] carousel, please, and could we please, if we do that, go to tile 89 on the [Baby O] carousel. I'm suggesting it could happen like that quite naturally. Can we go behind this tile?

This is a note that we've seen before. If you scroll down to that, please. It's the large note.

A note by Sophie Ellis who was looking after [Baby O] the night before she was looking after [Baby P]. We've heard that [Baby O] -- there were no particular concerns with [Baby O]'s health at this point when she took over. She sets out the various findings, his observations are stable, pink, warm and well perfused, Optiflow, it carries on, and then towards the end of that section we have:

"Abdo full but soft."

Do you see that?

BOHIN: Yes.

MYERS: And then if we scroll down --

BOHIN: She also says that he's got partly digested milk aspirates, so not entirely normal.

MYERS: If we carry on down. At 7.32, before handover to Lucy Letby by Sophie Ellis, we have:

"Abdo looks full, slightly loopy."

That's a description we've just looked at in the note with Nurse Letby, isn't it?

BOHIN: Yes.

MYERS: So that's at 7.32:

"Abdo full, slightly loopy."

In fact we know later that day, as it happens, [Baby O] collapsed. But I'm suggesting to you an abdomen full and slightly loopy, for whatever reason, is something that can occur in a baby quite naturally.

BOHIN: Yes, it may occur, but you can't look at it in isolation, you have to put it into the context of what else has happened. So actually, the loopy abdomen here is related to an intolerance of feed. The loopy abdomen in [Baby P] is associated with a lot of air being taken from the gut a few hours before but also a collapse very shortly after, whereas this collapse occurred many hours later. So I'm not sure the two things are the same.

You have to take the clinical findings into context with what you're seeing at the time.

MYERS: In fact, in the case of [Baby P] we've seen an intolerance of feed the night before when 14ml were aspirated and then 20ml were aspirated at midnight.

BOHIN: Yes.

MYERS: I am suggesting to you that the mere fact of an abdomen looking full and slightly loopy, the fact of that in the circumstances we're dealing with on the morning of the 24th does not go to support that air has been forced down an NGT.

BOHIN: It's very different from the finding that Sophie Ellis found shortly before handing over where she said everything was fine and then there appears to be a change where we've got a full and loopy abdomen and then a catastrophic collapse a short time later.

MYERS: We've looked at what we saw the night before with [Baby O] and everything being fine before that and I'm not going to go beyond that, but I am identifying where we have a similar finding, I suggest to you, in terms of description where [Baby O] is concerned.

We know also that Dr Ukoh examined [Baby P] about 9.35, didn't he, on this particular morning?

BOHIN: Yes.

MYERS: We're dealing with [Baby P] now, 24 June. That's at tile 289, the second page. We have the reported matters first and then on the next page we have what he found which includes:

"On examination: mildly pale, no recession, and abdomen moderately distended and bloated, skin slightly mottled."

Do you see that?

BOHIN: Yes, soft abdomen, yes.

MYERS: But certainly no indication at that point of a baby whose diaphragm has been splinted by excessive air, is there?

BOHIN: Not at that point, but 10 minutes later he has a cardiac arrest.

MYERS: Well, something happens, undoubtedly.

BOHIN: Because he's got a distended abdomen and there obviously becomes a tipping point where the baby will tolerate having abdominal distension for a certain amount of time, but then is

unable to tolerate it because the diaphragm becomes splinted by the gaseous distension and the baby decompensates.

MYERS: We have heard from Dr Ukoh. Nothing in his examination indicated, we are told, anything like the collapse that was going to follow -- was it?

BOHIN: No, it was completely unexpected and unexplained.

MYERS: And the abdomen is described simply as "distended moderately", isn't it?

BOHIN: Yes.

MYERS: Yes. There's no indication of an abdomen so full of air that it has splinted the diaphragm, is there?

BOHIN: Not when he examined him, but 10 minutes later this baby has a cardiac arrest and has a distended abdomen, so I've put the two things together and I think the most likely cause is that this baby has splinted his diaphragm and decompensated at that point.

MYERS: And do you disregard entirely the fact that feeds had not been properly digested the night before and that 25ml of air were aspirated at 4 in the morning with an abdomen that was distended?

BOHIN: Well, I can't -- I don't totally exclude that. I think the issue was he wasn't tolerating his feed. What has been an issue for me throughout the whole trial is the way that the nursing staff deal with the nasogastric tubes in these babies because there doesn't seem to be any set pattern and nurses seem to have different processes, so sometimes the whole amount of milk is aspirated and other times they say they just aspirate a little bit, enough to test the tube, to make sure the tube is in the right position, so there doesn't seem to be consistent practice. But regardless, 25ml of air was taken out of the gut by Kate Percival-Calderbank at 4 o'clock and that's an abnormal finding.

MYERS: Yes. The only other radiograph we have is 11.57, tile 400. If we just briefly look at that, please.

BOHIN: The X-ray with the pneumothorax?

MYERS: Yes, that's right.

It's the commentary which I wanted to go to. We see the image there, but if we scroll down to the commentary by Dr Wright. Just to confirm:

"The bowel gas pattern [it's about 4 or 5 lines down in the main body] is within normal limits."

Do you see that?

BOHIN: Yes.

MYERS: So certainly there's no -- in terms of any supporting evidence by way of a radiograph indicating any gaseous extension at the time you are talking about, there is none as it happens, is there?

BOHIN: This is at almost midday and he collapsed at 9.50.

MYERS: And you're advancing a theory about something in the absence, as it happens, of us being able to look at any radiograph alongside that; that's right, isn't it?

BOHIN: Yes.

MYERS: I suggest, Dr Bohin, that saying that air had been put into it, in whatever window you're describing, is something that you have come up with to support the allegation. You've heard me say that before and I'm suggesting to you that's what you have done at that point.

BOHIN: No, it's not.

MR MYERS: There's one final topic, my Lord. I can see it's 13.05. It will probably take about 6 or 7 minutes to deal with. I don't know whether there's other material for the prosecution to return to or not.

MR JUSTICE GOSS: I think we'll have the break in any event for lunch. It's about 1.07 now. Could you be ready to continue at 2.05? Just under the hour. Thank you very much.

(In the absence of the jury)

MR JUSTICE GOSS: Thank you, Dr Bohin, there's no need to remain. Could you be ready to resume at 2.05?

BOHIN: Of course.

(The witness withdrew)

MR JUSTICE GOSS: I just wanted to ascertain where we're going to go hereafter when Dr Bohin's evidence is concluded. I thought if I did that now, if we had the break now, it would be more appropriate.

MR JOHNSON: Yes. Whenever we finish -- well, the jury aren't here tomorrow. That's the first point, of course.

MR JUSTICE GOSS: There's nothing else today?

MR JOHNSON: No, there's nothing else for today. There's no summary agreed on this one, so there's not even that.

So as soon as we finish, we're proposing to begin the business with my learned friends of trying to sort out what we've called the first-instance pathologists to see whether they will be required to give evidence before Dr Marnerides.

MR JUSTICE GOSS: So in short, taking it shortly, the jury should be told they are not required tomorrow. If they are not required on Monday, when will they be notified?

MR JOHNSON: I'd say 4 o'clock tomorrow as a backstop.

Hopefully before then.

MR MYERS: Yes. I agree, that's certainly -- and inevitably with the latest point, but I anticipate we will have reached a conclusion before that point as to whether evidence will be called on Monday. I anticipate it might even be by lunchtime tomorrow and of course we will have had this evening to reflect on where we get to today.

MR JUSTICE GOSS: Of course, yes. I understand what the situation is, I'm just thinking of telling them as much as I can tell them so they're not unduly inconvenienced.

MR JOHNSON: If we're not calling any pathologists on Monday, we would invite your Lordship not to proceed to [Baby Q] before we start the pathology for obvious reasons because that would just split that hopelessly. What we would propose between us all to do on Monday -- a lot of work has already gone into the interviews.

MR JUSTICE GOSS: To do more work on the interviews?

MR JOHNSON: Exactly. You'll recall, I'm sure, I raised this before Christmas and work has been going on since then. The more time we get together to do that, the more condensed we hope that will become.

MR JUSTICE GOSS: Well, certainly I commend that because in my view the jury will not be assisted by a vast amount of material in relation to interviews. What we need is the material that is relevant to the issues in this case --

MR JOHNSON: Yes.

MR JUSTICE GOSS: -- and no repetition where there's a subsequent issue and the same ground is gone over and the same ground is essentially given. If they're different answers, obviously that's material, but if they're the same answers, we don't need that.

MR JOHNSON: No. One of the points that is understood between us is that the records will be exhibited and therefore if anything arises ex improviso it can be referred to.

MR JUSTICE GOSS: They can be referred to, indeed.

Thank you very much. Good. I'm sure that will -- with your combined experience on both sides, I'm sure you'll be able to address those issues.

The one final thing -- this document with which the jury has now been provided, I suggest it goes in its J number sequence, in other words after J23917, it being J23919.

MR JOHNSON: Yes, agreed.

MR JUSTICE GOSS: I'll suggest that.

MR JOHNSON: I had it on my list for my final act.

MR JUSTICE GOSS: I'll leave it to you.

MR JOHNSON: I'll forget now that I have said that.

MR JUSTICE GOSS: If you do, I'll try and remind you.

Thank you very much.

(1.11 pm)

(The short adjournment)

(2.05 pm)

(In the presence of the jury)

MR MYERS: Dr Bohin, there was one matter I wanted to deal with, but just before I do, can I clarify one matter about the adrenaline chart we have looked at, one issue in connection with it. We can all still see the chart; I know you've got your copy in front of you.

It's something you dealt with in the report you have prepared to deal with this and I'm going to ask you to just confirm one detail, which was referred to but I think we need to be clear about this.

Ladies and gentlemen, if you want to see it, you may recall it, but it was behind divider 21 of jury bundle 2, but in any event, I'm going to describe what it is. I think you'll be able to follow.

If you look at the chart, Dr Bohin, can you see where it says "adrenaline", underneath it has the word "double" in brackets?

BOHIN: Yes.

MYERS: It's something you dealt with in your report which you prepared for us, but just so there's no misunderstanding as to the relevance of that, or rather irrelevance for the point we are dealing with, what you explain is that in the case of [Baby P], despite the word "double"

appearing under the word adrenaline on the drug chart, that's an error:

"The infusion written up is standard and not a concentrated dose and it has nothing to do with the error in calculating the dose."

You say that at your paragraph 2.11.

BOHIN: Yes.

MYERS: I just wanted to deal with that so nobody thought when we're talking about double doses that's the answer.

It's not?

BOHIN: No, it's not, it's irrelevant.

MYERS: Thank you.

MR JUSTICE GOSS: Although in fact it is doubled -- coincidentally, but not intentionally.

MR MYERS: Yes. The error in concentration on the dose remains the same?

BOHIN: Yes.

MR JUSTICE GOSS: Exactly, yes.

MR MYERS: Thank you.

Actually, there is something I'd like you to go back to, Dr Bohin. In fact, there is a link with [Baby P], but it actually relates to [Baby G]. It'll become quite clear what I'm raising in fact when we get there.

You will recall, we'll all recall, a simple point, [Baby G] vomited after 2 o'clock in the morning on 7 September, the issue of the projectile vomit.

BOHIN: Yes.

MYERS: She had been in the care of [Nurse E], that's to remind us all what we are talking about, and there was a vomit some time after 2 o'clock, a projectile vomit.

I'm going to ask Mr Murphy just to put up, from the [Baby G] sequence 1 carousel, tile 75. It's the feeding chart. The point I'm going to is the question of milk and pH. I'm going to take time just to remind you of what we talked about, what pH levels would be with milk in the tummy.

Let me explain or rather remind you. At 2 o'clock [Nurse E] on this chart recorded having fed [Baby G] 45ml of milk via the NGT and it has got recorded a pH of 4. One of the issues we had to deal with, raised by the defence in particular, of course, was whether or not [Baby G]'s stomach was empty at the time of the 2 am feed. We can see you nodding. Let's just take a moment to cast our minds back --

BOHIN: No, no, I'm just acknowledging what you're saying, sorry.

MYERS: I'm not being critical when you said you're nodding, I was just checking you were with me.

BOHIN: I was acknowledging what you were saying.

MYERS: All right, thank you. Putting to one side whatever [Nurse E] said she did or she didn't do, the issue we were looking at, and we looked at it in some detail when you gave evidence, Dr Bohin, was whether or not that pH of 4 could indicate that -- there could still be a pH of 4 if the stomach was empty or if it could be a pH of 4 if there was still milk in the stomach. The suggestion I was making to you was that there could have been a quantity of milk in the stomach on top of which the 45ml were given and then the vomit happened after that. That's just to remind us all of what was being said.

BOHIN: Okay.

MYERS: You disputed that. Your view was that a pH of 4 is acidic and that would mean there wasn't milk in the tummy because the milk would buffer the pH.

BOHIN: Yes.

MYERS: I can actually remind you of what you said if it helps.

BOHIN: No, that sounds like the sort of thing I've said.

MYERS: I had suggested to you, this is on 13 December, that the pH value of 4 is acidic but still there could have been a large amount of undigested milk in the stomach, notwithstanding that, and you said:

"Milk is neutral, gastric contents are acid. A pH of 4 is very acidic. If there was undigested milk or milk in the stomach, that would buffer or neutralise the pH and you would expect the pH to be higher than that."

In other words, you were explaining why it was unlikely that there would have been any quantity of milk in the stomach with a pH of 4?

BOHIN: Yes.

MYERS: I just check we're all there with that point. You may remember it. It's on 13 December.

Now, that's what I wanted to go to with that. But I want to come back to [Baby P] with that in mind and take a look at the feeding chart that we've been looking at on tile 24, please.

If we go behind that. So you know exactly the point I'm seeking to make, and it's the same as we dealt with with [Baby G], I am suggesting, Dr Bohin, that it is possible for there to be a significant quantity of milk in the stomach and for there still to be an acidic pH.

That's the point. The only reason I went to [Baby G] was so we understand where this had arisen in this case.

I am looking at the bottom right-hand corner of this chart, we're familiar with it, and we see that feed at 20.00. We see that there is, on that occasion, 14ml of milk aspirated and the pH is 3. Do you see that?

BOHIN: Yes.

MYERS: That's more acidic than a pH of 4 in [Baby G]'s case, isn't it?

BOHIN: Yes.

MYERS: It was acidic like that, notwithstanding the fact there were 14ml of milk in the stomach. And if we go right to that at 20.00, there's then 20ml of milk with a pH of 3.

BOHIN: Yes.

MYERS: Of course, at this point [Baby P] is only 2 or 3 days old.

So he's receiving these feeds in that situation. But I just want to suggest to you, looking at that, that it is entirely possible to have an acidic pH like that and for there to be a quantity of milk still in the stomach.

BOHIN: Well, that's what we can see here. But my opinion still stands. I didn't take the pH, somebody else did, so I can only go by what's written down.

MYERS: All right. Certainly you agree that on face value, looking at these, there are significant quantities of milk and there still is an acid pH where the stomach is concerned?

BOHIN: Yes.

MYERS: All right. Just so I'm clear, are you saying you question perhaps what the level of the pH is, whether it's accurate?

BOHIN: No, I'm just saying at face value it looks like there's an acid pH.

MYERS: So it's entirely possible that in the case of [Baby G], there could be milk in the stomach and a pH of 4?

BOHIN: That was what I said in my evidence with [Baby G], but without going back to [Baby G]'s case, I can't now remember the details. We've done so many babies since then, you'd have to appraise me of the details of the clinical context surrounding that.

MYERS: Well, I suggest it was a very simple point. I simply put to you the proposition that a pH of 4 does not mean that there cannot be a significant volume of milk in the tummy. And you said milk would buffer the pH, didn't you?

BOHIN: I think milk would buffer the pH.

MYERS: It hasn't done here, has it?

BOHIN: No, it hasn't done here, but I still think milk would generally buffer the pH.

MR MYERS: I'm not going to ask you about that. That was the additional point I wanted to deal with. Thank you.

Re-examination by MR JOHNSON

MR JOHNSON: Just a couple of things, please, Dr Bohin.

Just in case we've lost our collective memories of what buffer means in that context, can you define it for us, please?

BOHIN: Buffer means a way of neutralising either acids or alkalis, trying to get back to what is a neutral solution.

JOHNSON: So in effect it's what you do with an acidotic baby by giving them --

BOHIN: Bicarbonate.

JOHNSON: -- bicarbonate of soda, yes. So that's the concept?

BOHIN: Yes.

JOHNSON: All right. Thank you.

You were being asked by reference to the blood pressures, and we can find these in our paper copies if people wouldn't mind looking. It's probably the easiest way. It's divider 21, page 23953. It's the observation charts, ladies and gentlemen.

You remember you were asked a series of questions relating to the level of [Baby P]'s blood pressure.

BOHIN: Yes.

JOHNSON: You were being -- it was being suggested to you that, certainly at 13.00 hours, the blood pressure was very high.

BOHIN: Yes.

JOHNSON: That was the suggestion. And one of the points you made in the context of a high blood pressure was that one of the issues that arose was the question of pulmonary hypertension.

BOHIN: Yes.

JOHNSON: I know we've heard about this before, but some of us may not remember the full details of what pulmonary hypertension

is first of all. So in a few sentences, could you just explain the concept of pulmonary hypertension?

BOHIN: Pulmonary hypertension, particularly in babies, is where there's an increased pressure of blood flow to the lungs, and it can affect the blood flow within the heart, it can affect oxygenation -- subsequent oxygenation and blood pressure. In newborn babies it's an attempt for them to try to revert to the condition that they were when they were inside their mum's tummy, but of course you don't want them to revert to that condition. And if they develop pulmonary hypertension there is difficulty in oxygenating those babies because of the high blood pressures in the lungs.

JOHNSON: Does it stop the oxygen going out in the arteries round the body in effect?

BOHIN: In a simplistic way of dealing with it, yes.

JOHNSON: Simple is better for me!

BOHIN: I think -- yes, without getting into detailed physiology, it means that that high pressure inhibits oxygenation so the babies have low saturations and ultimately a low heart rate and you have to put in quite -- it's a very difficult thing to treat, so you do your best to prevent it happening. And if it does develop, you have to put very specific strategies in place to try and treat it, to overcome it and reverse that action.

JOHNSON: In the context of a child who might have in their differential diagnosis pulmonary hypertension as a possibility, if a child may have pulmonary hypertension, would it actually be an advantage to treating them to have a high general blood pressure?

BOHIN: That is one of the treatments, that -- and I think Dr Rackham said yesterday as well that one of the things he was considering was pulmonary hypertension and if you think a child may be developing that, one of the ways of treating it is to make sure that the blood pressure in the body, as opposed to in the lungs, is higher than -- you would set it higher than you normally would using inotropes. There's a variety of inotropes you can use but actually adrenaline is in certain -- in the North-west Neonatal Unit Team, adrenaline is the drug -- is the inotrope of choice to try and prevent pulmonary hypertension because one of the side effects, potential side effects, is that actually it reduces the blood flow to the lungs paradoxically.

MR JOHNSON: Thank you. Does your Lordship have any questions?

MR JUSTICE GOSS: I don't, thank you very much, Dr Bohin, for giving evidence in relation to this child.

(The witness withdrew)

Housekeeping

MR JOHNSON: I think, ladies and gentlemen, judging by the fact you all reached for your files, you'd already put that away and that was the last thing in my list to remind you to do, but you are ahead of me.

MR JUSTICE GOSS: It doesn't matter where you put it, but it has to, obviously, be in section 21. I've actually put it in J number sequence, in other words after J23917.

MR JOHNSON: And before 23950.

MR JUSTICE GOSS: Yes. But it doesn't matter. Anywhere in there. It's obviously distinguishable because it's the green-coloured chart, so it is readily distinguishable.

MR JOHNSON: Thank you. My Lord, so far as [Baby P]'s case is concerned, it has not been possible to agree a very short summary of the interviews, so the jury will have to wait to hear the full interviews to hear what Lucy Letby said --

MR JUSTICE GOSS: Or the fuller interviews, not the entirety of the interviews. That's one thing that I am going to mention in a moment.

So far as the case of [Baby P] is concerned then, apart from --

MR JOHNSON: Dr Marnerides.

MR JUSTICE GOSS: -- and pathological evidence generally in whatever form, that is therefore the evidence in relation to [Baby P]?

MR JOHNSON: It is.

MR JUSTICE GOSS: So we would then move on to the last child, but as you have mentioned more than once this week, we have to have Dr Marnerides on Tuesday of next week. Before that can happen, the jury, the evidence relating to the post-mortem examinations has to be put before the jury as well.

MR JOHNSON: Yes.

MR JUSTICE GOSS: That is still, for good reason, work in progress?

MR JOHNSON: Yes.

MR JUSTICE GOSS: Because you know that in the cases of both [Baby O] and [Baby P] there were post-mortem examinations on the direction of the coroner. It is intended that that evidence is presented to you in as simple a way as possible and that is one reason why you are not going to be required tomorrow, as I told you yesterday. In a moment, you're going to be leaving this afternoon early as well. So the next occasion on which you may be required is Monday. I'm saying it in those terms because, as yet, it is not known whether you will actually be required on Monday or not. But I have been assured by counsel that by no later than 4 o'clock tomorrow afternoon you will know whether you are required on Monday or not. So you will get proper notice, you won't just get it at the very last minute.

You know what the procedure is. I don't know what arrangement you have with the jury officer, whether you ring them or they message you or whatever it is, you will know how it is that communication takes place with the jury officer and you will know no later than 4 o'clock tomorrow whether you are required on Monday.

If you are not required on Monday, you will definitely be required first thing Tuesday morning.

Then, and I'll be corrected if I'm wrong about this, we'll hear the evidence of Dr Marnerides.

MR JOHNSON: Yes.

MR JUSTICE GOSS: We'll then move on to [Baby Q]'s case.

MR JOHNSON: We will.

MR JUSTICE GOSS: Which will take?

MR JOHNSON: About 3 days.

MR JUSTICE GOSS: That will then complete the evidence of the events relating to each of the children in this case.

Then we move on to interviews?

MR JOHNSON: Interviews and searches.

MR JUSTICE GOSS: You obviously know some of what's coming in the searches already. So that's the plan for the next week or thereabouts. The following week is the week leading up to

Easter. It ends on Maundy Thursday, because Good Friday is a public holiday.

As far as the interviews are concerned, there is going to be ongoing work -- there has been a lot of work already, I am told, which I fully accept there will have been -- in relation to reducing the volume of that material. You've had summaries in most of the babies' cases of what was said when the defendant was questioned about these events. You will get fuller details of that and also filling in the gaps where there is no agreed summary. That will -- I assume we'll get on to that...

MR JOHNSON: Well --

MR JUSTICE GOSS: By the end of next week?

MR JOHNSON: The way we see it, Tuesday to Thursday will be Dr Marnerides next week. Thursday, Friday, Monday, Friday, Monday, Tuesday, will be [Baby Q]'s case. And we then have 2 days, probably, to do the rest, which we think is probably a push. If we can, we will. But we think it's a bit of a push.

MR JUSTICE GOSS: All right. If not at the end of -- by Easter the end of the prosecution evidence, very close to the end of the prosecution evidence?

If we are sitting on Monday, I can tell you this: the latest we will be sitting to, if we are sitting, will be 3 o'clock in the afternoon. So you can make arrangements if you want, knowing that you will not be here beyond 3 o'clock, if you're required at all, on Monday.

Sorry, it's the following Monday, isn't it? So Monday, don't make any arrangements for Monday after 3 o'clock. Sorry, that's a week on Monday, you can make arrangements for that. Next Monday, if required at all, you'll be notified tomorrow.

There's a Tuesday coming up when we're not sitting, isn't there?

MR MYERS: On the return from the Easter break.

MR JUSTICE GOSS: It's the first Tuesday after we return from the Easter break?

MR MYERS: The 18th, I'm told.

MR JUSTICE GOSS: What I'm going to do is, next week, write down a full list of precisely when we're not sitting.

MR JOHNSON: The dates the court previously gave us were the Monday, as your Lordship said, ending -- I think we were previously told 14.30. 17 April, not before noon.

18 April, not sitting. Those are the dates we have.

MR JUSTICE GOSS: Right. I'll put them in writing but we're going into after Easter then.

So please remember your responsibilities. You've got a longer break than normal coming up now. Remember your responsibilities. I in fact was in error when I said it was -- I think I said 1.2 million. It was £1.4 million in costs for that trial to be recommenced.

So please, the whole integrity of the jury system depends upon you, as I am confident you are obeying the instructions you have received from the very outset.

Thank you very much indeed.

(In the absence of the jury)

MR JUSTICE GOSS: As far as tomorrow is concerned, Mr Myers, I gather you would like the defendant to be produced.

MR MYERS: Yes, we'd be grateful for that. Amongst the various matters that will be dealt with ongoing will be the consideration of the interviews in tandem with other issues. One of the aspects of that we'd be grateful for would be, if there is an issue that does require resolution and we need to come before your Lordship, that we're able to do so. And we would ask, if it isn't inconvenient that your Lordship be available, if you were planning to be, and if that's something the court can accommodate and the matter be listed with that in mind. It's impossible to say at this point if we will need to call upon your Lordship for assistance and a ruling, but if we did, it would be the ideal time to do so, so long as that isn't inconvenient to your Lordship and the court can accommodate us.

MR JUSTICE GOSS: I'll deal with the first: it's not inconvenient.

MR MYERS: Thank you.

MR JUSTICE GOSS: I shall just work in a different location, namely here, than I was going to work. That's not a problem for me at all.

So far as the courtroom, I doubt whether there will be any difficulty with that. No? None at all.

MR MYERS: I'm grateful.

MR JUSTICE GOSS: The answer to your request is yes.

MR MYERS: I'm grateful, my Lord, thank you. One matter that we could deal with, if your Lordship were here, is the issue relating to Dr Marnerides and the PowerPoint presentation. It's a very brief issue.

MR JUSTICE GOSS: Yes, certainly.

MR MYERS: And perhaps that would be the time to deal with it if your Lordship is available and if my learned friend is ready to deal with that. It won't take a great deal of time.

MR JUSTICE GOSS: And if there is any other issue, then I'll deal with it, obviously, to assist.

Do you want to --

MR MYERS: We would be grateful, my Lord, yes.

MR JUSTICE GOSS: All right. Someone will come down to see the defendant before she's taken back. It'll be straightaway, it'll be the usual arrangement.

(2.34 pm)

(The court adjourned)