Monday, 12 December 2022

(10.28 am)

... [Omitted] ...

MR JOHNSON: Yes. Dr Bohin, please.

DR SANDIE BOHIN (recalled)

Examination-in-chief by MR JOHNSON

MR JOHNSON: Welcome back. Would you just identify yourself for the sake of the record, please?

A. Yes. I'm Dr Sandie Bohin.

Q. Thank you. Have you written several reports in the case of [Baby G]?

A. Yes.

Q. Just dealing with them, was your first report 28 March 2019?

A. Yes.

Q. Your second, 31 January 2022?

A. I've got a report of 15/10/21.

Q. Sorry, that's my mistake. Perhaps it's easier if you tell us the dates of your reports.

A. 15/10/21.

Q. Thank you.

A. 31/01/22.

Q. Yes.

A. 07/04/22.

Q. Yes.

A. 23/11/22.

Q. Thank you.

Can I start, please, with your report of 28 March 2019?

A. Yes.

Q. So far as your initial involvement was concerned, did it follow the pattern that was established in the other cases about which the jury have heard your evidence?

A. Yes, it did.

Q. So you were sent material relating to [Baby G], including her medical records, and also one or more of the reports that by that stage had been written by Dr Evans?

A. Yes, that's correct.

Q. Thank you. I think, you having set out the terms of engagement at paragraph 6 of the report or section 6, you set out the relevant chronology of [Baby G]'s life?

A. Yes, that's correct.

Q. Her birth on 31 May 2015?

A. That's correct.

Q. The fact that she was extubated on 6 July 2015 at 38 days of age?

A. That's correct.

Q. She was initially put on to BiPAP and then on to CPAP?

A. That's correct.

Q. She remained -- well, whilst at Arrowe Park, brain scans that were conducted of [Baby G] were normal?

A. Yes, they were.

Q. And there were many of those: 1 to 5 June, 12, 14, 19, 30 June, 10 and 31 July, and 3 August?

A. That's correct.

Q. And all those were reported by the radiologists as being normal?

A. Yes.

Q. With the one qualification of the mild ventricular dilation in the later scans?

A. That's correct.

Q. But your opinion, which I assume is subject to that of a radiologist, is that that's not significant but just required monitoring?

A. It is not significant as an isolated finding, but yes, would require monitoring, but any baby born at that gestation would have been on a programme of having quite a lot of ultrasound scans in any case to monitor that.

Q. Thank you. You then turn to the transfer of [Baby G] to the Countess of Chester on 13 August.

A. Yes.

Q. And then on to consider how she had behaved and presented herself at the Countess of Chester in the ensuing days?

A. Yes.

Q. So taking that up, please, at paragraph 6.7, did you record the fact that [Baby G] was receiving enteral feeds every 3 hours via bottle or NGT?

A. That's correct.

Q. That she was giving no cause for concern?

A. That's correct.

Q. That the observation charts for her between the 2nd and 6 September were unremarkable?

A. That's correct.

Q. Her temperature was stable, as was her heart rate and her respiratory rate?

A. That's right.

Q. She had at that stage no desaturations or apnoeas?

A. That's correct.

Q. And a blood gas taken on 5 September was normal?

A. That's correct.

Q. The feeding charts which the jury have in the paper bundles behind divider 7, which we've just been looking at with Dr Evans, showed that on the 5th and the 6th, [Baby G] was being fed every 3 hours? It should be divider 7, page 7012. It's the penultimate page. You've got the wrong one. I do it all the time. I've written "1" and "2" on the back of mine.

A. Yes.

Q. Are those the charts to which you referred in your report?

A. Yes, that's correct.

Q. Did you also record the fact that [Baby G] had no vomits and no significant aspirates from her NGT --

A. Yes, that's correct.

Q. -- in those 2 days?

A. That's correct.

Q. Did you also record the fact that, from the available

material, her bowels opened four times on the 5th and once on 6 September?

A. That's correct.

Q. And her weight was increasing?

A. Yes.

Q. Your paragraph 6.10, looking at the bottom of that page, 7012, did you record that at 23.00 hours on 6 September [Baby G] took a bottle of 45ml of expressed breast milk?

A. That's correct.

Q. Over the page on the chart at 7013, at 02.00 hours, she took a further 45ml of feed at 2 o'clock in the morning?

A. She was given a nasogastric tube feed at 2 o'clock in the morning, yes.

Q. Thank you. And that the NGT was recorded as having been aspirated prior to that feed?

A. With a pH of 4.

Q. Yes. Then you moved on to the large projectile vomit and further vomits plus plus recorded in the medical notes and in Lucy Letby's nursing note?

A. Yes, that's correct.

Q. You then set out the treatment that she received, that [Baby G] received, at the hands of Dr Ventress?

A. That's correct.

Q. The fact that 45ml of milk were aspirated from the NGT altogether with a large volume of air?

A. Yes, that's correct.

Q. And that various treatments were given to [Baby G] that

morning at various times following further desaturations?

A. That's correct.

Q. At your paragraph 6.18, did you record the fact that [Baby G] was then transferred to Arrowe Park on 8 September?

A. Yes.

Q. Your paragraph 6.19, that she returned to Chester on 16 September?

A. Yes.

Q. And that thereafter there were incidents which the jury have yet to hear about?

A. That's correct.

Q. Thank you. So far as the later incidents are concerned, I'm not going to ask you about those at all at this stage. I'm just going to concentrate on what happened in the early hours of 7 September.

Did you, in your opinion and observations of your report, conclude that [Baby G] was very vulnerable, born at the margins of viability?

A. Yes.

Q. And that she had a very stormy early neonatal course, which required a huge amount of neonatal intensive care?

A. Yes, that's correct.

Q. Having looked at the material from Chester in its entirety, which of course includes the material we've just referred to, what conclusions did you draw as to her state of health up to the point at which she

collapsed some time after 2 am on 7 September?

A. She was very stable at that time. She had -- her respiratory requirements had changed from CPAP to high flow and then to a very small amount of low-flow oxygen. She did have chronic lung disease, which meant that her lungs were abnormal, but she was managing well on a small amount of oxygen. Her respiratory rate was stable, her oxygen saturation was stable. She wasn't having any desaturations. So from the respiratory point of view, all was well. Her heart rate was stable, her temperature was stable.

On top of that she had gone from two-hourly feeds to three-hourly feeds over the course of the time at the Countess of Chester and was tolerating those. She'd started taking some bottles and therefore things were progressing really very well and as you'd expect them to be for a term baby.

Q. Thank you. I'm looking at your paragraph 7.3, but if the jury want to remind themselves of the observation charts that are at the beginning of divider 7. What conclusions did you draw from what you could see on the charts as to [Baby G]'s vital signs before the first of the collapses?

A. They were all completely normal.

Q. So far as the report of projectile vomiting is concerned and the photograph marked by and the description given by Ailsa Simpson is concerned, what conclusions or views

did you reach?

A. The whole episode was concerning for me. Ailsa Simpson said that they heard projectile vomiting so I'm not quite sure what they heard because when babies vomit it's usually silent, but maybe they heard the vomit hitting the floor. In my experience, even working on a neonatal surgical unit, I haven't seen babies of 2 kilograms projectile vomiting. So for me that was something that was quite extraordinary.

Q. Putting that into the context of the distance of the vomit, together with the fact that 45ml of milk was aspirated together with air plus plus, what conclusion did you reach?

A. Well, there must be a huge volume of milk coming from somewhere because the baby's generated a huge amount of force in order to projectile vomit. It wasn't only on the cot but over the side of what is quite a deep side to the cot that we were shown that she was being nursed in at the time. So a baby lying flat on their back has to vomit over the side of the cot, which gets to the floor and then over the side again to get on to the chair. And in order to move that distance, a considerable force has to be generated within the abdomen. We don't know the volume of that vomit. But it was clearly a lot if it's landed in three places and on top of that the nurses write, "Continued to vomit ++", whatever that means, and there's 45ml of milk

aspirated from the stomach. So altogether there must have been at some point much more than 45ml of milk within the stomach.

Q. Yes. In your view, is there a credible "innocent" explanation for there being more than 45ml of milk in [Baby G]'s stomach at the time that she vomited?

A. No, because I think her stomach was empty prior to that 2 o'clock feed because the pH was 4. If she'd had a lot of milk in her stomach (a) the nurse who aspirated it to test the pH would have noted that -- she may not have wanted to aspirate the whole lot, but she would have noted that there was milk in the stomach, and she hasn't noted that, but what she has noted is that the pH is 4. If there was milk in the stomach the pH would not have been 4, that's very acidic. The pH would have buffered -- the milk would have buffered the acid in the stomach so would have neutralised it to some extent and you wouldn't have got a pH of 4.

So there was additional milk. The additional milk that is vomited had to have come from somewhere. I think her stomach was empty and I think the only plausible explanation for me was that she was given an excessive amount of milk, and possibly air, down the nasogastric tube, which distended her stomach and caused her to then vomit in the way she did.

Q. In this context we have heard, and you have been listening in, watching in via the video facility, we've

heard about [Baby G]'s CRP level being normal just before the incident, getting to the margins of normality at 12, or whatever it was, a bit later, and then increasing to a figure of over 100 by the late evening of the same day.

A. Yes.

Q. In your view, is what happened to [Baby G] plausibly explained by an infection?

A. No. I think it's clear that [Baby G] had an infection, but I don't think the projectile vomit heralded the start of the infection. That isn't the way that infections present in neonates of this age and size. They usually provide the carers with subtle markers that all is not well and she showed none of those things. Starting with a huge projectile vomit and then continuing to deteriorate in the way she did is not the way that infection presents.

Q. Thank you. There are other issues that I want to ask you about. It may be that that's a --

MR JUSTICE GOSS: Unless it's something that can be dealt with in a few minutes.

MR JOHNSON: I can deal with the issue of taking on air.

MR JUSTICE GOSS: Yes, I think so. When you get to Arrowe Park Hospital and looking at those records, which we haven't looked at yet --

MR JOHNSON: Of course.

I'm moving on to your report, Dr Bohin, it's

a report that I don't have a date for, I'm afraid. I think it's probably your second report.

A. 15/10/21, where I'm asked questions?

Q. Yes, that's the one.

A. Yes.

Q. It's your paragraph 6 of that report. You were approached by the police and you were told that in her interview Lucy Letby had said that babies can take on a lot of -- I think this was in the context of the air that was drawn out after the vomit. "Aspirated", I should use that expression. "Air ++" aspirated after the vomit. Lucy Letby had been asked about this and had said that babies can take on a lot of air when vomiting and you were asked to express a view as to whether or not that was correct or not. Could you assist the jury with that issue, please?

A. That's not correct. What I have written is babies do not take in air when vomiting and I have written that I have no idea if there are literature reports on this. But there aren't. If you're vomiting, things are coming out, they're not going in.

MR JOHNSON: Tomorrow I'm going to ask you about your research of these medical notes from Arrowe Park, so perhaps I can leave that until then.

MR JUSTICE GOSS: Yes, certainly. Good.

Thank you very much, Dr Bohin. 10.30 tomorrow morning to continue.

A. Thank you very much.

(The witness withdrew)

MR JUSTICE GOSS: Right, ladies and gentlemen. 10.30 tomorrow morning then, please. I'll remind you, it's the start of another week, we haven't seen each other for a few days now. Please remember your responsibilities as jurors not to communicate with anyone in any way about anything to do with this case or conduct any research into anything or anyone to do with this case. Thank you very much. 10.30 tomorrow morning.

(In the absence of the jury)

MR JUSTICE GOSS: I've received a note. The defendant has gone now. I'll simply hand it to counsel for you to look at and we will address it tomorrow morning.

MR JOHNSON: I don't think there's an answer to that one. I think we have tried to get the answer.

MR JUSTICE GOSS: Well, perhaps -- I'll leave it to you as to what you want to do. As an issue it can be dealt with, even if a direct answer cannot be given, or a direct answer can be given but it may not be a mathematical answer. That's what I'm striving to say. But I'll leave it with you both.

MR JOHNSON: You'll see one of the questions we asked was: scaling it up to an adult, can you give us the corresponding amount? Which we thought was the most graphic way of getting an answer, in effect, to that and

that you can't.

MR MYERS: If the answer is that we can't then that is the answer, I suppose, and it's better than any attempt at guessing something that isn't clear.

MR JUSTICE GOSS: Yes, certainly one cannot do that. But I think the issue needs to be addressed even if the answer is not wholly satisfactory from the questioner's point of view. All right, good. Thank you very much. 10.30 tomorrow morning.

(4.21 pm)

(The court adjourned until 10.30 am
on Tuesday, 13 December 2022)

Tuesday, 13 December 2022

(10.30 am)

(In the presence of the jury)

DR SANDIE BOHIN (continued)

Examination-in-chief by MR JOHNSON (continued)

MR JUSTICE GOSS: It's still cool in here.

MR JOHNSON: Thank you, my Lord. Dr Bohin, welcome back. I forgot to ask about one thing yesterday before I move on to the issue of what happened in Arrowe Park before [Baby G] was transferred into the Countess of Chester for the first time. I just want to deal with this one issue first and show you a photograph that you have seen before and you were asked to comment on in the witness statement that you made on 7 April 2022.

It's in your comments/opinion section, which, if your print is the same as I have, is the bottom of page 2.

A. Yes.

Q. What would you say from your experience about this photograph?

A. Well, it shows that [Baby G] was nursed in that particular type of bed, a Kanbed, which has very high sides and what the photograph shows is that the position of the vomit would have meant that she would have had to have exerted a huge amount of force to have vomited -- from being on her back to have vomited over the side of the cot and on to the floor and also even further, several feet, on to the chair.

I just find that surprising, given that she was only 2 kilograms at that time, that she could generate enough force to make vomit travel that sort of distance. So you know, clearly that's what happened and that seems extraordinary to me.

Q. How many years' experience do you have of dealing with children of this sort of age?

A. My first neonatal job was in 1986, so over 30 years.

Q. Yes, 36 years. Have you ever encountered a situation in which a child that doesn't have the pyloric stenosis condition that we heard about yesterday has vomited like that?

A. No.

Q. Have you ever heard of a case in which a child who didn't have pyloric stenosis vomited to that extent?

A. No. I mean, you know, it's very common for babies to vomit and certainly in older children with gastroenteritis they vomit quite forcefully, as anyone who's had a child will know. But they are usually sitting up -- because they're older children, they're usually sitting up when they vomit, and they are much bigger than 2 kilograms, which is what -- [Baby G]'s weight was only 2 kilograms and I have never seen a baby of that size forcefully vomit or projectile vomit in that way to that extent.

Q. Yesterday at the close of business, the jury asked a question. I'll read it to you and ask whether you can answer it, please.

The question is this:

"What is the maximum amount of fluid a baby of [Baby G]'s size's stomach could hold? How much would cause the diaphragm to be compromised?"

This may be two questions, so shall I deal with each individually?

"What's the maximum amount of fluid a baby of [Baby G]'s size's stomach could hold?"

A. That's an excellent question and something that I've looked into myself. Unfortunately, there isn't a right answer. There's nothing much in the literature to enlighten us on that. People have looked at the volume

of a stomach in a term baby who was not being fed, so has never had anything in the stomach, and that is very small. And what happens over time in term babies is that as the feeds increase day on day, the stomach, which is muscular, stretches to be able to accommodate that. But there's no research that I could find that would allow me to inform the jury of the volume of a stomach.

What I know from my own experience, and being at post-mortems, the neonatal stomach in a 2-kilogram baby is very small, about the size of a plum, but it can actually extend a lot. And in a baby who's been fed over many weeks and months, as [Baby G] was, the stomach would actually have enlarged. So it's absolutely impossible to be precise and tell the jury the volume of a stomach in a baby who had been fed for many months.

Q. Yes. And the second part or the second question?

"How much would cause the diaphragm to be compromised?"

Is there an answer to that?

A. Again, that's impossible to say because for some babies with normal lungs, a distended tummy might press up on to their lungs only a small amount and wouldn't actually affect very much. But in [Baby G]'s case we know that her lungs were not normal because she had chronic lung disease and so most probably there wouldn't need to be much distension before her lungs were compromised. But

in terms of the volume in the stomach, I'm afraid I can't give an answer to that.

Q. Thank you very much.

MR JUSTICE GOSS: Sorry, could I just say that I should have mentioned to the jury that I received that note from one of you; I don't know whether you discussed it between yourselves. After we rose yesterday afternoon I handed it to counsel and it was going to be dealt with today. But you have heard the doctor's answer to it, that's as far as it can be taken, thank you, with this witness certainly. I don't know whether any other witnesses will be able to assist or not.

MR JOHNSON: Well, I doubt it, but...

MR JUSTICE GOSS: So do I, but...

MR JOHNSON: Dr Bohin, can I move on, please, to a witness statement that you made on -- not very long ago, actually, about 3 weeks ago, on 23 November 2022.

Is it right that you were asked to look at whether there was any clinical evidence that [Baby G] was intolerant of feeds at any point whilst she was an inpatient at either Arrowe Park Hospital or the Countess of Chester Hospital?

A. Yes.

Q. You were asked to comment on whether vomiting was a notable clinical feature whilst [Baby G] was an inpatient at either Arrowe Park or the Countess of Chester.

A. Yes.

Q. And thirdly, you were asked to look at the issue of whether there was any clinical evidence to support the diagnosis of gastro-oesophageal reflux in [Baby G].

A. Yes, that's correct.

Q. Did that cause you to go, in effect, back to the beginning, so far as [Baby G] was concerned, to the time of her birth at the end of May 2015?

A. Yes, it did. I needed to read very thoroughly the nursing and medical and observation charts for the whole of her feeding history.

Q. So taking things up at your paragraph 2.3 then, please, did you observe what we have established in evidence, namely that [Baby G] was born on 31 May 2015?

A. Yes.

Q. And that enteral feeds, so milk feeds, were cautiously commenced at half of 1 millilitre every 4 hours via a nasogastric tube on 15 June 2015?

A. Yes.

Q. Merely summarising the position, were those feeds tolerated and gradually increased?

A. Yes, they were.

Q. And full feeds of milk were reached by 22 June 2015?

A. Yes.

Q. And as always, are full feeds calculated on the basis of so much in millilitres per kilo per day?

A. Yes.

Q. And in [Baby G]'s case was that 150ml per kilo per day?

A. At that stage, yes.

Q. Yes. I know this wasn't the position, but if she had been still about half a kilo in weight, she would have received 75ml per kilo per day?

A. Yes.

Q. At that point?

A. Yes.

Q. Putting that into context, that would be roughly, in very rough terms, about just under 3 millilitres an hour over a 24-hour period --

A. Yes.

Q. -- give or take?

A. Yes.

Q. Was she actually fed initially hourly via the nasogastric tube?

A. Yes, she was fed hourly for a long time.

Q. Yes, and was there any vomiting or nasogastric aspirates, and if so, to what extent in Arrowe Park?

A. There was no vomiting and the nursing staff recorded the nasogastric aspirates as minimal, which I take to be less than a millilitre really.

Q. Because feeds, the breast milk, was tolerated, was some fortifier added from 26 June 2015?

A. Yes. I think it's probably around that time there was a plan to add fortifier a day or so before. Fortifier is usually added as half strength first of all and then if that's tolerated goes up to full strength. So the

notes aren't really clear about when she went to full strength fortifier, but it was around -- she was definitely receiving it on the 26th.

Q. Was there a hiatus in feeding breast milk because [Baby G] had to have this Broviac line inserted by the surgeons at Alder Hey Hospital in Liverpool on 26 June?

A. Yes. She'd had a pulmonary haemorrhage and required a Broviac line and the Broviac line is inserted under general anaesthetic and so feeds would have needed to be stopped, but they were reintroduced -- within the same day.

Q. Yes. So thereafter, can you take us through [Baby G]'s feeding history by reference to paragraph 2.6 of your report, please?

A. Yes. The feeds on 30 June were hourly feeds and they were running at 3ml every hour. The decision was made to increase that volume to 4ml every hour. When that happened, [Baby G] had a single large nasogastric aspirate. The volume wasn't recorded, it just says "large aspirate".

The medical team were informed, they decided not to stop the feeds, the feeds were continued, and thereafter were well tolerated to the extent that breast milk fortifier was reintroduced later on that day.

Would you like me to continue?

Q. Yes, please. So that's 30 June. Did you then move on to a change on 3 July?

A. Yes. Between 30th and the 3rd, [Baby G] continued to feed on hourly nasogastric feeds. On 3 July, the feeds were increased from 150ml per kilogram of body weight per day to 165ml per kilogram of body weight per day. This was because she hadn't been gaining weight that well and in light of that the volume given was increased in an attempt to get her to gain weight.

That increase was well tolerated and there was no vomiting or increased nasogastric aspirates. What the staff did note -- that [Baby G] had developed frequent desaturations, but these were self-correcting, which means that she very briefly desaturated but managed to get her saturations up without any help or intervention from nursing staff.

Q. Thank you.

A. There's a nursing entry that mentions introducing anti-reflux medication for the desaturations and that was the first mention of gastro-oesophageal reflux that I could find in the notes. And coincidentally, with these desaturations and the mention of anti-reflux medication, [Baby G] developed very thick secretions from her breathing, her endotracheal breathing tube, and these did subsequently grow a bug.

Q. Is that also on 3 July?

A. Yes. On 3 July there was also a ward round note, so as well as the nurses saying that there should be -- that the anti-reflux medication should be optimised, there's

a ward round note on that day, again saying that there was a plan to optimise management of reflux, but reflux had not been mentioned prior to that at all. But what they did was they elevated the cot a little bit. So the standard practice is to elevate the head end of the cot by about 30 degrees so that, just by pure physics and gravity, it's very difficult or more difficult to vomit if you're sitting up or you're elevated.

They also started a course of erythromycin, which is an antibiotic. It's not really clear why they started that. There are two possible reasons. One is that erythromycin can act as a prokinetic, so it can act as a way of advancing your stomach contents through the stomach, so that's one reason. But also in the notes it mentions covering for an organism called ureaplasma, which is a rare organism found in babies with chronic lung disease and erythromycin is also the treatment for that and the notes don't make it clear whether erythromycin was prescribed as a prokinetic to help the reflux or to help with ureaplasma.

They also decided to start a medication called Gaviscon which adults can use as well as babies. In babies it comes as a powder that you can add to the milk. It makes the milk slightly thicker if given in large doses, but in the kind of dose that they were giving to [Baby G] there would not have been any obvious noticeable difference.

But what Gaviscon does, when it's in the stomach, it kinds of forms a sort of raft over the top of the stomach contents and it makes it more difficult for you to vomit them.

Q. Yes. I think there's an image of that on the TV adverts for Gaviscon.

A. Possibly! It's not clear from the notes when Gaviscon was started and there's no reference to starting Gaviscon in the medical notes, but there is reference in the nursing notes and there is a prescription that I can find when Gaviscon was actually given.

Q. Thereafter, how did [Baby G] progress? I'm moving on to your paragraph 2.9.

A. Yes. [Baby G] improved. She was extubated on to BiPAP, so a kind of fancy form of CPAP really, on 7 July. She continued to tolerate feeds, which by this time were 5ml every hour.

On 12 July, the feeds were increased again to 180ml per kilogram per day. Previously they'd been 165ml per kilogram per day, so they were increased to 180 and then to 190ml per kilo per day on the 15th. So the volume she was receiving had increased because her weight gain was still sub-optimal and the team were trying to maximise her weight gain. But this change in feed volume was well tolerated, it wasn't associated with any vomiting or large aspirates.

Q. Thank you. Moving on to 31 July.

A. Yes. On 31st, [Baby G] had three desaturations which were not self-correcting and required a brief increase in her oxygen concentration. But thereafter, she recovered, she continued to have very fleeting self-correcting desaturations after feeds, which is very normal in neonates of this size.

She had a single large nasogastric aspirate of 10ml prior to the feed at 5 o'clock and that feed was subsequently omitted but then she was fed thereafter without any problems so there was just one single large aspirate of 10ml.

MR JUSTICE GOSS: That was still the 31st?

A. That was on the 31st, yes. She remained well and it is of note that on 1/8, she was given her immunisations and that -- you just would not give immunisations if a baby was unwell. So she must have been well and stable for the team to have considered giving her her immunisations on that day.

MR JOHNSON: Does that follow as a general principle that if the medics are actively considering giving immunisations to a child of this age then the view must be that the child is well?

A. Yes, because immunisations can upset babies and can just destabilise them, so you wouldn't consider giving immunisations unless a baby was absolutely stable.

Q. And we know that immunisations were being considered on the 6th and 7 September when [Baby G] had her incident

that we have been exploring for the last few days in evidence.

A. That's correct.

Q. So that would be a reflection of the view that had been taken medically of her before the desaturation?

A. Yes.

Q. Moving on to 3 August then, please.

A. Yes. On 3 August [Baby G] had an increase in her desaturations and also these were accompanied by bradycardias, so a slowing of her heart rate. In view of that, the medical team were cautious and did an infection screen and started her on antibiotics.

Feeds, however, were continued and she continued to tolerate feeds, which were still running at 190ml per kilogram per day. There was no vomiting and aspirates were minimal. So although it was the right thing to do to cover for infection, the feeds continued without a problem.

On 12 August, [Baby G] was well, was doing so well that the feeds were increased to two-hourly from hourly, and that change in -- so that means then that she was given double the amount but on alternate hours as opposed to hourly and that change was well tolerated.

Q. Yes. And what does the fact that the feeds were doubled but the incidence of the feeds were halved, so to speak, or doubled mean?

A. That means [Baby G] could tolerate that sort of doubling of

volume in her stomach and that her stomach could accommodate that.

Q. Yes. So following that increase of the quantity being given because the frequency was halved -- or doubled as well, I should say --

A. Yes.

Q. -- was [Baby G] then transferred from Arrowe Park on the Wirral to the Countess of Chester Hospital on 13 August?

A. Yes.

Q. So far as the discharge summary was concerned, first of all can you tell us what a discharge summary is and then tell us what it said so far as [Baby G] and her ability to tolerate feeds was concerned?

A. Yes. All neonatal units in the UK have a computerised neonatal discharge summary that is electronic, that is shared between neonatal units, so that information can be shared between the units and this was the case with [Baby G]. It's usually the job of the most junior person in the department to write the discharge summary. It's called Badger because that's the name of the man who developed the system. On the Badger summary it's usually the SHO who does that and clearly this person had their work cut out because [Baby G] had had a very difficult time when she was at Arrowe Park. She had a very long period of intensive care with lots of problems, so it would have been difficult. That first episode has probably got almost 2,000 pages of notes for

the SHO to have gone through.

What they tend to do for the GP and the hospital that the baby is being transferred to is write a list of the main problems that the baby's suffered during their stay, and then, system by system, go through it, so they would write a paragraph on the respiratory system and the problems that ensued, write a next list of problems with the heart, problems with feeding, problems with neurology, how many bloods transfusions you've had, how many infection screens you've had, all of those details are the -- the whole episode is kind of précised into one summary.

Finally, for the accepting hospital they would usually give the current status of the baby, the current weight, what the feeding regime is, the current problems that the receiving hospital need to be aware of, and a list of medication.

In [Baby G]'s summary there was no mention of the fact that she was on Gaviscon and no mention that gastro-oesophageal reflux was being seen as a potential problem for her.

Q. Did the Countess of Chester notes mention gastro-oesophageal reflux?

A. Yes. In their very first medical entry -- I think it was Dr Ventress -- she's written in their problem list that gastro-oesophageal reflux was a potential problem. So although it wasn't in the discharge letter, I would

imagine she had had a verbal correspondence with the people at Arrowe Park because that would be normal for you to have a verbal handover as well as having a very detailed discharge letter, but it's mentioned in their list.

Q. We haven't given the jury the feeding charts going back to 13 August, but you have reviewed them. What do they show so far as [Baby G]'s ability to tolerate two-hourly feeds between her transfer into Chester on 13 August and the events about which the jury have been hearing evidence, which occurred in the early hours of 7 September?

A. The feeding charts show that the feeds were well tolerated with no vomits, no large aspirates. The nursing notes mention the occasional self-correcting bradycardia, so a drop in heart rate, after feeds. They were noted but [Baby G] didn't become unwell or destabilised, and that is so common as to almost be a normal feature in neonates.

Q. On 24 August, so about 2 weeks before 7 September, was [Baby G] put onto three-hourly feeds, so upped from two-hourly to three-hourly feeds?

A. Yes.

Q. Did somebody by mistake give her 45ml of feed instead of 36ml?

A. Yes. The three-hourly amount was 36ml, which she had been tolerating, but in error at 8.45 she was given 45ml

by mistake. But despite this increase in volume, she tolerated that, there was no vomiting and it was well tolerated.

Q. So this is an increase of 9ml on a feed that should have been 36ml?

A. Yes.

MR JUSTICE GOSS: Sorry, just the date and time of that.

A. 8.45 on the 24th.

MR JOHNSON: 8.45 am?

A. Yes, 08.45 am.

Q. So it's an increase of exactly 25%, isn't it?

A. Yes.

Q. An accidental increase of 25% results in no problems for [Baby G]?

A. Correct.

Q. Thank you. Did those three-hourly feeds continue?

A. Yes, she went back to three-hourly feeds with the added Gaviscon.

Q. And were there any issues so far as aspirates or vomiting were concerned?

A. No vomiting and the aspirates were said to be minimal by the nursing staff.

Q. Did the issue of self-correcting desaturations continue?

A. Yes, they were noted during and after feeds.

Q. But did they cause a problem?

A. No.

Q. And so bringing us up to date so far as [Baby G]'s collapse

is concerned and going back to divider 7 in the bundle that the jury has, the number 2 bundle, going to the back of that bundle to find the feeding charts, it's the penultimate change, the one before the end, J7012. Did you look at those?

A. Yes.

Q. And what conclusions or observations did you make?

A. It's clear that, certainly by the 6th, [Baby G] was receiving alternate tube and -- nasogastric tube and bottle feeds. They were three-hourly feeds. They were tolerated. There was no vomiting, there's no mention of aspirates, and where the nasogastric tube has been tested for acidity, certainly on the 5th, the nurses just marked "positive for acid" without actually writing down a pH. But at 20.00 on the 6th, the nurse has written that there is a pH of 4, which is obviously acid, and that's before the nasogastric feed, but all those feeds are well tolerated.

Q. Yes. Is that acidic -- we know that's [Nurse E], she told us that was her signature. Is that pH value of 4, so an acidic value, consistent with there being a large amount of undigested milk in the stomach?

A. No, it's not. Milk is neutral and 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.

Q. So a neutral -- I'm sure the jury all know this, but a neutral substance, be it milk, be it water, added to an acidic substance reduces the level of acidity?

A. Yes. So a neutral pH is 7. Anything less than that is slightly acidic. I have reviewed the subsequent feeding charts from Arrowe Park and indeed the Countess of Chester and where there have been minimal aspirates or where there have been milky aspirates, the pH is usually around 5.5 or 5, but never gets as low as 4, where there are milky aspirates obtained.

Q. Yes. And thus, turning the page in the jury bundle to [Nurse E]'s entry at 02.00 hours on 7 September, what conclusions do you draw from your expertise as to whether or not [Baby G] had a large volume of undigested milk in her stomach when [Nurse E] put in 45ml?

A. In my opinion, the stomach was empty at that time because the pH is 4 and I wouldn't expect the pH to be that low if there was a large volume of undigested milk in the stomach.

Q. And thus, as a consequence of her having vomited in a projectile way, as we have heard described, and there then having been recovered or aspirated from her stomach the 45ml of feed, what conclusions do you draw as to what was in her stomach and what caused her to vomit?

A. She must have had an additional volume of milk in her stomach because there's no way that -- she had an empty stomach here at 02.00, she was then fed, and so she must

at some point after that feed have been given an excessive amount of milk in order for her to be able to projectile vomit a huge amount and have a 45ml residual within her stomach.

Q. Is there anything in the records to reasonably suggest that prior to this incident she was a child that was prone to vomiting?

A. No.

MR JOHNSON: Thank you, Dr Bohin. Would you wait there, please?

Cross-examination by MR MYERS

MR MYERS: I'm making a note of one thing before I commence, my Lord.

MR JUSTICE GOSS: Yes, certainly.

(Pause)

MR MYERS: Just before we turn to what you've just been dealing with, Dr Bohin, may I ask one general matter. It's just about the composition of air. I don't know if you can help us with this. The main constituents of air are nitrogen and oxygen, aren't they?

A. Yes.

Q. Can you help us with this? The proportion of nitrogen is about 78%, isn't it?

A. Yes.

Q. Yes: 21% oxygen, 78% nitrogen, approximately that, isn't it?

A. Yes.

Q. Thank you. We've just been through the statement which you prepared a few weeks ago dealing with the history of [Baby G] at Arrowe Park Hospital. To deal with that, you reviewed her notes, didn't you, Dr Bohin --

A. Yes.

Q. -- and various other records? With your assistance I'd like just to go to some of the notes to pick out some details if that's all right. You said that there were about 2,000 pages of notes.

A. No, no, there were 6,000 pages in the whole bundle.

Q. Right.

A. The 2,000 were my estimate of the first episode of care at Arrowe Park.

Q. With your assistance I'm going to go to about 20 of them, so getting off quite lightly. The rest are there if they're of relevance to anybody. But there are some particular aspects of how she presented that I would like to look at with you.

I'm going to ask Mr Murphy to assist with this. The first page I'm going to ask to put up is J4205. These aren't currently on the system but once we've seen them we can access them again.

I'm not expecting you to perform any kind of memory test of these things, and you'll see there are particular points I just want to identify. If we look down that page, we can see an entry on 2 June 2015 at 20.30. Do you see that?

A. Yes.

Q. Thank you, Mr Murphy.

A. Yes.

Q. It sets out what the gases were at 19.30. These are Arrowe Park records. It says below the gases:

"Saturating well: 92 to 94% at 19.30 in 50% oxygen."

Then below that it says:

"However, over next 4 minutes SaO2 declined to mid-80s [as read]."

So that means her oxygen saturation dropped to the mid-80s, doesn't it.

MR JUSTICE GOSS: I think it may be 45 mins. It looks to me like a 5 after the 4.

MR MYERS: Yes, that's probably right, yes. On mine it looked like 41, but yes, it's 45 of course. So it dropped to mid-80s?

A. Yes.

Q. That didn't lead to any lasting problem, we see that, and there's an intervention. I'm not suggesting it became more dramatic than that.

There is a pattern of desaturations with [Baby G] at Arrowe Park, isn't there?

A. Not in relation to feeds. From my memory, on 2/6 and looking at that entry [Baby G] was on a form of -- [Baby G] was clearly very seriously ill and unwell and was on a form of ventilation called oscillation, which is a kind of step up from conventional ventilation, which shows us

how unwell she was.

So the fact that she desaturated then, you cannot establish that that was down to her being fed, it was down to the fact that she was seriously ill, and I think she probably was also on nitric oxide at that time which is, yes, a further step forward. So this is someone who is as sick as you could possibly be.

Q. Just so it's clear, I'm not going through this to try to link this to feeding. So we can all follow, this is to look at how unwell [Baby G] was.

A. Yes, she was very unwell at that time.

MR JUSTICE GOSS: Sorry, what was that form of ventilation? You did say it.

A. Oscillation, high frequency oscillation.

MR JUSTICE GOSS: This is a step up from just an ordinary tube down to the bilateral airways?

A. You still have a tube, but it's a different machine, a different mechanism. It's used for the sickest and most vulnerable babies, as is inhaled nitric oxide, which she also received.

MR JUSTICE GOSS: Sorry, Mr Myers.

MR MYERS: Not at all, my Lord.

The next page I would like to go to, please, is page 4216, and we're moving forward to 4 June.

These are notes for 4 June and the entry I'm going to go to is for 23.45 on 4 June. Thank you.

23.45. It says:

"Written retrospectively."

These are, of course, clinical notes, and over the page we have the signature of the doctor who signed off, but it's just the starting part that I'm going to.

"Arrived on NNU at 22.30 for another ill baby but had to attend to [Baby G] first due to desaturation to 60s."

Is that "good chest"?

A. "Wobble."

Q. Does that mean movement in the chest?

A. Because of the oscillatory ventilation it makes the whole baby shake, so you need to -- if it's working effectively you need to look for chest wobble, so you need to look for movement in the baby.

Q. So:

"... desaturating down to 60s. Good chest wobble. Distended abdomen."

That's also recorded at that point. It then goes through.

A. It also says:

"No perforation on abdominal X-ray."

Q. Yes. No perforation of what, in the abdominal area?

A. Yes.

Q. Right. And then it goes through other findings and by all means take us to any that you wish to, but all I'm doing at this point is identifying certain issues that arise while she is at Arrowe Park of things that we see in the notes.

A. It tells you what the actual problem was and the cause of the desaturation there because the next line after the "no perforation on the abdominal X-ray" says that the chin was on the chest, and therefore if your chin is on your chest, you block your airway, and they put in a gauze roll under the neck to stop that happening again and then the problem resolved.

Q. Thank you. In fact, I'm just going to go to the top of the page if I could as well. That note that we've just looked at deals with the situation from 22.30. This is a note at 23.00, so just beforehand, and how [Baby G] presented at 22.15:

"Whilst I was with another baby for resus called to see [Baby G]. Sudden desaturation. In 100% oxygen, desaturation 70%."

It has various readings:

"Good wobble seen. Abdo looks distended."

So that would appear to be all part of the same incident, would you agree, Dr Bohin?

A. Um...

(Pause)

Q. Or if it isn't, please say.

A. Well, it's not clear. Somebody's written something at 23.00 about something that happened earlier, so yes, it's probably part of the same incident, yes. I think what it does illustrate, looking at those readings, the ventilatory readings there. You said there were

a number of -- there's a whole row of numbers. Looking at that, that tells me that she was on then a vast amount of ventilation and was also receiving nitric oxide at a very high level. That sort of ventilation with the nitric oxide is about as much ventilation as you could possibly give to a baby. So she was as sick as you could possibly be and therefore it would not be uncommon to have desaturations or bradycardias or whatever. If you're that sick, that's kind of normal for a baby in intensive care who is that unwell.

Q. Right, thank you.

MR JUSTICE GOSS: Maybe I'm misreading these because we haven't got the one below, but it seems to be a note written in retrospect --

A. Yes.

MR JUSTICE GOSS: -- at 23.00 hours saying:

"At 22.15, while I was with another baby for resus, called to see [Baby G]. Sudden desat in 100% oxygen, desat 70%."

And then various figures:

"Good wobble seen. Able (sic) to" --

A. "Abdo looks slightly distended."

MR JUSTICE GOSS: "Abdo looks slightly distended. Cold light showed no sign of pneumothorax."

Then there's a symbol, which I think means actions, is it, or something like that?

A. Yes.

MR JUSTICE GOSS: "(1) Increased MAP 12.7. (2) Abdominal X-ray and chest X-ray to rule out perforation. Dr Lee arrived at 22.30 to take over the care."

So that seems to be something that happened at 22.15, and then of course in the later note that we've just looked at the X-ray has been taken -- (overspeaking) and they've had the result and then you say that there's the issue with the chin.

A. Yes.

MR JUSTICE GOSS: So it's clearly linked in time and they are linked as a sequence. They appear to be two --

A. It does appear to be two, you are absolutely correct, because this mentions the chin on the chest, yes.

MR MYERS: Thank you. It's my fault for going back to front with that. I apologise. I'm grateful.

Let's move forwards to 6 June, please. That's page 4227. As is quite apparent from what I've dealt with already, Dr Bohin, we are moving forwards over very large numbers of medical notes. These are just examples. These are clinical notes by the doctor who's treating and we're just looking at the top half of the page, please, looking at some of the features we find.

It's an entry for 01.30. Not the easiest writing to decipher but that's not unique in this case. It says:

"Cannula..."

Is that "thought to be"?

A. "... thought to be leaking by nursing staff."

Q. Yes.

A. "Sodium bicarbonate infusions stopped."

Q. "Following gas and some..."?

A. "Handling."

Q. Handling.

A. "... saturations dropped..."

Q. "... to the low 60s."

It then -- let's read through this note. It's relatively short:

"If FOV MAP..."

Can you hep us with that, please?

A. HFOV is high frequency oscillation ventilation, which is the oscillation I spoke about:

"Mean airway pressure [is MAP] increased to 10.5 but no improvement in oxygenation."

I can't read the next thing and:

"Mean blood pressure dropped to 37 from 40."

MR JUSTICE GOSS: I think it's "noted".

A. Oh yes, "noted".

MR MYERS: MAP returned to 10?

A. "MAP returned to 10 and adrenaline increased to 2 micrograms per kilogram per minute."

So [Baby G] was on an adrenaline infusion for her blood pressure, which shows me -- that's not the first line medication for blood pressure so that shows me that her blood pressure was clearly a problem. Then it goes on to talk about the examination.

Q. It says:

"Oedematous, good wobble. Abdo soft but discoloured."

That's what it has recorded on this occasion, isn't it?

A. Soft but discoloured and she was paralysed as well so (inaudible) paralysis.

Q. Right. And Dr Rackham -- "Discussed with Dr Rackham on the phone"?

A. "Maximise inotropes to optimise perfusion."

So again increase the adrenaline or add another inotrope:

"Try brief suction of the endotracheal tube. Minimise handling. Not for re-cannulation at present."

Q. Thank you.

A. So she didn't tolerate any sort of handling and would immediately drop her saturations and her oxygenation, so they wanted to minimise that, but then there's the conundrum because she needed a new drip, so that means that you need a lot of handling.

Q. We see from that again a propensity for her oxygen saturation to drop, which it does on handling on this occasion, doesn't it?

A. It does in the early stages of her life, in the beginning, of June, yes. That's in the first week or so of her life when she was gravely ill.

Q. We'll carry on. Also we notice the abdomen is

discoloured.

A. The abdomen is discoloured there, but this is a baby who's only 500-odd grams and so would have no subcutaneous fat at all and therefore the abdomen in babies that are that small often looks discoloured because you can see the blood vessels in the skin and you can see the bowel and the bowel almost through the skin as the skin is almost translucent. That doesn't necessarily mean that there's pathology there, that's quite normal in a baby that's that tiny.

Q. Thank you. Can we move, please, next to page 4461, which is later the same day, and this is in the nursing notes. Which you are going to see, it has to be said, it might be thought by some, are an awful lot easier to read than the Countess of Chester nursing notes.

This is a nursing note at Arrowe Park Hospital. We can see it relates to [Baby G] and it has her date of birth. It has the name of the nurse on the right-hand side where it says "electronically signed by", or at least I take that to be the name of the nurse, and it has a date and time so we can see when the entry is made, and this is at 20.32 on 6 June. The last entry was at 1.30 that morning. We can see it relates to [Baby G] and it says in the body of the text:

"Head scan done this afternoon. Abdominal X-ray done as abdomen shiny and some distension and some colour change. Plan to commence on metronidazole.

Insulin recommenced this evening."

Then reference to other medication, but I just identify there:

"Abdominal X-ray done as abdomen shiny. Some distension and some colour change."

Was she -- did you recall whether at this point she was on any type of feed or is it all intravenous at this stage?

A. It was all intravenous. She didn't start her feeds until the inotropes, which are drugs to help your blood pressure, until they were stopped because if you feed a baby then in order to digest it you have to divert blood to the gut in order to help/aid with digestion and clearly they didn't want to do that while she was so gravely ill and on lots of drugs to help her blood pressure. And also in a baby that has problems with low blood pressure if you feed them you will increase their risk of developing necrotising enterocolitis, which is clearly what they were concerned about there because they did the X-ray and then they added in metronidazole to her antibiotic regimen, which would be normal practice, to be very, very cautious in a baby that was so gravely ill in case she was developing necrotising enterocolitis.

Q. So far as we know she didn't develop necrotising enterocolitis?

A. No, she didn't, but it was still the correct thing to

add in the metronidazole.

Q. Of course. So the distension would be due it a build-up of gas unrelated to the feeds; is that right?

A. Yes.

Q. And some clear change but, as you've explained, seeing colour change in the abdomen of a very small child is something you might expect to find?

A. Well, you would always find that in a baby of only 500-odd grams, yes.

Q. Next, please, the following day, 7 June 2015, page 4238. It's an entry we can see at the top half of the page so if we enlarge that part, please. 7 June 2015, 6.30 in the morning. It's the first part I'm interested in going to, but we have the rest of it to see:

"Attended to patient as desaturation to 60s. No bradycardia at 05.35. Over 15-minute period repeatedly dropping sats to mid-60s/70s. Improving with Neopuffing but then dropping again. Occurred after change in baby's position. Good AE bilaterally on auscultation."

In other words that's listening, is that, and AE is that air entry?

A. Yes.

Q. "Good chest wall movement. Cold light applied."

Is that to see if there's any damage or any pneumothorax?

A. It is to see if there's any pneumothorax.

Q. It says -- is that:

"Increased transillumination on the right side"?

A. Yes.

Q. "Oxygen gradually increased to 100% but sats sitting in low 80s. Rate goes back to 55 flow 50 [as read]."

A. "From 50."

Q. Sorry, my fault:

"... from 50. Called Dr Hughes who attended within 50 minutes. Urgent X-ray performed."

And the X-ray is then reviewed:

"No pneumothorax, no significant change previously."

A. Yes.

Q. Again, just identifying there, recognising this is only just after we're about a week old with [Baby G] now, but again a propensity to desaturate. She's very young, very unwell, but she is desaturating repeatedly at this point, isn't she?

A. Yes, I think the distinction needs to be made between the desaturations in a critically ill baby who is receiving this amount of intensive care to a baby that is several months old who is not receiving that amount of intensive care and the causes are different -- the causes of the desaturations are different.

Q. All right, thank you. We'll move forward a week then to 14 June. Page 4271, please.

These are notes on 14 June at 08.00. We can see a review setting out medication at the top of the page. If we scroll down the page it says:

"Sepsis."

Underlined?

A. That just is trying to state the position with -- for anybody else who reads the notes where we are in terms of sepsis because it's so common in babies who are this sick.

Q. All right. where I'd like to go to is down to where it says "on examination". So apologies, Mr Murphy, for coming out of that. But "on examination", just to see what is said there.

A. "Pale pink. Capillary refill time less than 2 seconds. AF [anterior fontanelle] soft. Some oedema [which is swelling] persists. Desaturated on handling to the 80s [which is completely normal in a baby which is this sick]. (inaudible) squeaky bilateral air entry. CDS. Both heart sounds present with no added sounds. GIT [gut]/abdo not examined as prone."

So that meant that she was being nursed on her tummy.

Q. All right. What I'm identifying there is that desaturations on handling continue but, as you identify, she's still very young and receiving a lot of support?

A. It would be normal for a baby that ill to desaturate whenever she was touched, which is actually why we have minimal handling of these babies. So they are only touched when absolutely necessary because of that very fact that they tend to desaturate.

Q. Thank you. Next, the same day -- that was at 08.00 and the next entry is for 23.38 that evening, and it's in the nursing notes at page 4510, please, Mr Murphy.

It's easy to enlarge the top part of that page. This is -- we see -- I'm going to straight to the time and the date first, 14 June, 23.38. We have the name of the nurse. Just underneath there we have the progress note. I'm going to go to that:

"[Baby G] is now 14 days old and stable, therefore incubator changed and came out for first cuddles. Tolerated cuddles well and settled back in incubator. Saturating well but last blood gas poor, therefore rate increased and suction..."

It says "suction 7 given", but it should be "suction given" maybe?

A. Yes.

Q. "Minimal secretions from ET: small, bloodstained."

Do you see that?

A. Yes.

Q. Nothing remarkable about ET tube being small and bloodstained in this situation, is there?

A. No. Because I would imagine she would have been having fairly regular suction of that ET tube in order to keep it patent.

Q. Yes, but it is entirely possible to get secretions, small, bloodstained, around the ET tube without there being any deliberate harm, isn't it?

A. Well, the nursing staff would have been causing trauma by putting the suction catheter through an ET tube, so if you get bloodstained secretions because you have been suctioning down the ET tube, that is a consequence of the nurses doing cares and ensuring that that tube is patent. That's very different to having bloodstained secretions where there's no ET tube present.

Q. So an ET tube in itself, if there's been suction taking place, could cause bloodstained secretions; is that right?

A. It can do depending on how aggressive, I guess, the nurse is being, but also what I don't know is at this time were things like her platelets normal because if her platelets were low -- on the previous note that you showed me her platelets were only 22, so if her platelets were low then any sort of intervention like that would cause bleeding.

Q. In fact she had a transfusion -- I don't know if we have page 4818 available, but she was given a transfusion at 13.55 that day.

A. Of platelets or blood?

Q. Of blood -- platelet transfusion. I wonder if it's possible to put up page 4818 so we can confirm this. It isn't on the list, Mr Murphy, but if it's possible. I don't have it here.

If we just look at the top. Can you see 14 June, the low entry?

A. Yes.

Q. "Platelets, 11ml."

A. Yes. So she had low platelets on that day and they treated her with a platelet transfusion. So prior to receiving those platelets, her platelets would have been low enough that any sort of intervention would have caused bleeding.

Q. Yes. Just to be clear, you didn't know whether there had been a transfusion or what her platelets were?

A. No.

Q. Taking that, first of all. At 1.55, so about 10 hours before this, 9.5 hours, she had been given a platelet transfusion, hadn't she?

A. Yes.

Q. Right. Thank you. That's done to assist with clotting, isn't it?

A. It is and it's often given because the baby's got an infection and the infection is consuming their platelets so the fact that she was given platelets then doesn't tell me what her platelet count was at the time the suction was carried out because it may well have dropped again.

Q. But you asked, so I was just establishing (overspeaking) done.

A. Yes, thank you very much.

Q. Let's move forward, please, then to 17 June, which is at page 4282. This is a note that goes over two pages.

The first page, let's have a look, and it's the bottom part of the page. Thank you:

"17/6/15. 12.30. Written in retrospect. ST4 Callaghan. Called into the room. Desat to 40s and previous episode of bradycardia. Desat improved slowly with Neopuff but sats still in 60s. ET tube removed. End blocked by old clot/secretion. Sats improved with bagging."

Perhaps we can just see what's over the page before I come back to that. I don't know if we're able to go to the page that follows. Thank you, Mr Murphy.

Continuing the note:

"Two attempts at intubation by ANNP Collins."

And it describes what happens on those two attempts and it is noted on the second one that the ET tube slipped before it was secured. Two attempts by the doctor making this entry. And Dr Callaghan describes how this was done:

"First attempt inserted. Pulled back to 6.5 centimetres at the lips as secured 6 at the lips this morning but tube dislodged."

Do you see that, Dr Bohin?

A. Yes.

Q. "Second attempt successful. 2.5 centimetres ET tube secured at 7 centimetres at the lips. 8 centimetres..."

What's that word, can you help with that, "8 centimetres at the"?

A. Clamp.

Q. "... clamp. Initially slightly quiet (inaudible) air entry on..."

Is that the left?

A. Left.

Q. "... left when connected to the ventilator, but ET had been pushed in and was 5 centimetres at lips and 9 centimetres at the clamp. ET pulled back to original position and re-secured at 8 centimetres at the clamp, 7 centimetres at the lips. Air entry improved. OFC 19.7..."

What does OFC mean there, could you help?

A. The head circumference.

Q. "... without hat on."

Then:

"Chest X-ray. Review tube positions with X-ray."

Dealing with what we have on that page first, at this stage [Baby G] is still a very small baby, isn't she?

A. Yes.

Q. Do you know from what's here whether there's any amount of sedation at the time she was being intubated or do you not know?

A. I can't remember, but I would imagine if she was -- this wasn't a fresh attempt at intubation, it was a re-intubation because of a blocked tube so I would imagine that she was on sedation at that stage, although I can't confirm that, but it would be unusual for her

not to be.

Q. Even in those circumstances, and small as she was, it appeared that the tube moved position even after it had first been put into her; is that correct?

A. With these attempts or the previous one? The previous tube was removed because she was desaturating and they removed the tube and there was a clot at the end of it, so she needed to be re-intubated, and it looks like the first doctor tried and was unsuccessful. The second doctor tried and the tube was dislodged. The second doctor tried again, was successful, but then subsequently the tube slipped in a bit further than it should have done and these tubes are, in this case, only 2.5 millimetres wide, and they go into the trachea and then they're secured at the lips and they're secured by a clamp, which should stop it moving backwards and forwards, because it would be easy to come out but if it goes in too it far it tends to go down into the right lung preferentially, just because of how the anatomy is. And if that happens, when you listen to the chest, rather than hearing air entry the same on both sides, you hear loud air entry on the right and reduced air entry on the left, which is what that doctor describes, because the tube had slipped down too far.

Once they pulled it back -- it had gone down to 5 centimetres at the lips, so once they pulled it back the air entry was equal again. So that would cause

a baby to destabilise because you're then only ventilating one lung.

Q. What we're looking at on that page shows one incidence where the tube it had dislodged and another when it had slipped in; is that right?

A. Yet.

Q. And that is something that can happen quite naturally without anyone making that take place, it can just happen with a little baby's on an intubator, can't it?

A. Well, not really, because this baby's likely to have been (a) sedated and on the previous air entry -- on the previous things we looked at the baby was actually paralysed, so I'm not sure on this occasion whether the baby's on sedation or paralysed, because if she were then there would be -- if people had secured the tube correctly with the clamp there would be no reason for the tube to move in because it should be fixed and firm as the baby's not moving about to dislodge it herself.

Q. But what we do see is, whatever's happened, there is movement of the tube in that baby even when sedated, isn't there?

A. It appears so, yes.

Q. All right.

MR JUSTICE GOSS: Just before we leave that, you said these tubes are 2.5 millimetres.

A. Wide.

MR JUSTICE GOSS: Wide:

"Second attempt, successful. 2.5 centimetres ET tube."

A. Ah.

MR JUSTICE GOSS: That puzzled me when I saw that.

A. That's a typo. They're millimetres.

MR JUSTICE GOSS: That's not a typing mistake, it's a writing mistake?

A. They're like a small straw. It's 2.5 millimetres.

MR JUSTICE GOSS: We have seen one in fact during the course of the trial. That was just a mistake by the author of the note?

A. Yes.

MR JUSTICE GOSS: It should say:

"2.5-millimetre ET tube secured at 7 centimetres at the lips and 8 centimetres at the clamp"?

A. That's correct. The length is in centimetres but the width of the tube is in millimetres.

MR JUSTICE GOSS: Exactly. It's an easy mistake to make when you're writing a note. There we are. Just so there is no confusion.

MR MYERS: That would be an enormous tube (overspeaking) --

MR JUSTICE GOSS: It just didn't make sense when that was being read and when I heard the doctor say 2.5 millimetres I realised that should be just highlighted in case anyone else had spotted it as well.

MR MYERS: Absolutely. That's what I wanted to ask about the tubes and movement of the tubes. Can we just go

back then to the beginning of the note and let me just return to that. So back to the page before, Mr Murphy, if you would, please.

Just that note that we have there. Again another instance of [Baby G] desaturating, correct, Dr Bohin?

A. Yes.

Q. When the ET tube was removed a clot and secretions on the end of the ET tube, isn't it, which is -- that's something you might expect to find on an ET tube once a baby has been intubated, isn't it?

A. It would be unusual to find clots. You quite often -- if the tubes have been in a long time, very often they get coated with just natural secretions from the lungs and because they're so small it doesn't take much to occlude the lumen with the secretions. But it would be unusual to have a tube blocked by a clot unless there was ongoing bleeding with -- as a consequence of low platelets or a clotting disorder or from a previous pulmonary haemorrhage. You wouldn't normally find blood in the trachea.

Q. But as it happens with [Baby G] on this occasion, the fact is, as recorded here, the end was blocked by an old clot, wasn't it?

A. Yes. That's what it says, yes.

Q. But her sats improved with bagging, so that's with the Neopuff and bagging?

A. Yes, because they'd taken the ET tube out so it had to

be with a Neopuff.

Q. Right. Will that be, from what you can see here, because air wasn't going through the ET tube because of the clot, so once it was taken out and she was given oxygen with the Neopuff and bagging, she did improve?

A. Yes. She desaturated because the ventilator was unable to push gas into her lungs because of the clot or secretions, a mixture of both, at the end of that tube. So if you're not ventilating then you will desaturate. So that's a very sudden thing. That's a very sudden event.

Q. Thank you. I'm going to move forward to 19 June now. Page 4536, please, Mr Murphy. It's a nursing note. Again, we're getting familiar with the format of the Arrowe Park notes. We can see the time and date on the right-hand side, 19 June 2015 at 19.46, and if we just go down to the progress part, please, and we can see that:

"Fairly stable day. Ventilation unchanged. Has had several desaturations without bradycardia requiring oxygen. Large oral secretions. Small to moderate ET secretions. Slight pink bloodstained secretions at last suction."

Do you see that?

A. Yes.

Q. "Gases good."

So just putting to one side the desaturations, the

slight pink bloodstained secretions at the last secretion, they could be caused because of ongoing suction; is that correct?

A. Yes.

Q. They could be caused because of possible the tubes irritating [Baby G]'s throat; do you agree?

A. No. I think it could be due to the suction -- the action of suction by a nurse. It maybe due to the fact that her platelets -- I don't know what the state of her platelets or her clotting was that that stage, but not the fact that the ET tube is just -- merely the fact that it's there, no.

Q. Is it possible for there to be slight pink bloodstained secretions from some source within oropharyngeal area or the trachea not necessarily caused by suction but just something that happens in the course of the baby being treated?

A. You can get it -- if you're in heart failure you can get pink-stained secretions, but she wasn't in heart failure, so --

Q. I wasn't suggesting that.

A. No, no, you asked if there were other causes and that's a natural cause where you can get pink-stained secretions.

Q. And if a baby has infection, can that cause bloodstained secretions?

A. Not in and of itself, no.

Q. All right. Anyway we have pink bloodstained secretions and you would put that down to suction, would you?

A. No, I'm saying suction can be a cause --

Q. Right.

A. -- but I don't know in her case whether that was the cause but it can be a cause.

Q. Thank you.

Next, please, 29 June, so about a month now into [Baby G]'s life, page 4314, Mr Murphy. It's the bottom half of that page. I might need your assistance here with interpreting some of this, Dr Bohin. An entry at 4.20 in the morning.

A. "Asked to review by staff nurse. Desaturation. Increased oxygen [something] 23 plus 6. Now day 30. The corrected gestation is therefore 28 weeks [that's 28/40]. Bradycardia to 65 beats per minute. Problems: prematurity (inaudible) RDS. On DART."

That's a regime of steroids for babies who are effectively stuck on a ventilator. It's a very prescribed dose of steroids given to babies to try and get them off the ventilator. It just shows you how sick she has been from a breathing point of view:

"Hypophosphataemia [so her was phosphate low]. Thrombocytopaenia [which means her platelets are low]. PDA..."

Which is a patent ductus arteriosus, which is an additional blood vessel that babies have when they're

inside their mum's womb, that usually would close in a few days after birth, but in premature babies quite often stays open.

Q. We see she's on the ventilator, is that?

A. Yes. She is on SIMV ventilation, so synchronised intermittent mandatory ventilation, so is not on the oscillator anymore. And it gives you the ventilatory pressures, which are moderate.

Q. Is this a more mild form of ventilation from the oscillatory ventilation?

A. It's standard. I would call that standard ventilation.

Q. "Saturations down to 50%."

A. "Down to 50%. Required oxygen increased to 80%."

She was in 60% oxygen before and in order to treat her desaturation she required the oxygen to go up to 80%.

Q. And then the examination?

A. For the examination, they've kind of drawn a schematic diagram of the thorax with the lung fields and it just says:

"Decreased air entry right base."

I don't know if that says -- yes:

"Squeaky auscultation on the left. Staff nurse suctioned. Fresh blood on suction tube. Looking pale. Heart sounds, number 1, number 2."

And she's got a loud murmur which would be consistent with the PDA, which is item number 5 on the

sheet:

"Chest X-ray requested. Contacted the specialist registrar. Will come to review. Pressure on ventilator increased to 18/5 from 18/4."

Q. So just looking at that, we have desaturation down to 50%, albeit on a less invasive form of ventilation at this time, don't we?

A. Yes.

Q. And she's about a month old. And also on this entry fresh blood identified when suctioned?

A. Yes.

Q. We can continue with what's said in the clinical notes at about this time, just following on from this, which is at page 4315. Following on from these notes. We can see ST4 Flanagan. It is this page and over the page:

"05.16. Bleeped at the time of event but busy on paediatric ward. History and events noted. Fresh blood in ET on suction. Significant desat prior to this requiring 50..."

Is that 50 --

A. "Requiring FiO2", so the fraction inspired oxygen content is 80%.

Q. "Chest X-ray..."

Is that "reviewed"?

"Hazy changes right mid and lower zones."

Then it says:

"Diagnosis: probable pulmonary haemorrhage."

A. Yes.

Q. "Attempt venous access and coag. Vitamin K. If cannot get another cannula, give oral. Keep PEEP at 6."

The bloods are sent off. Just go over the page, please --

A. And an ultrasound of the head.

Q. And it continues here at 5.50 on the daily review. I just want to go to where it says "problems" if we could:

"Prematurity. Probable pulmonary haemorrhage. Hypoglycaemia. PDA. Hypophosphataemia."

We had seen at the page before "diagnosis: probable pulmonary haemorrhage" and it says "probable pulmonary haemorrhage" here. That's, first of all, because we're dealing with fresh blood rather than something mixed in with a secretion, isn't it?

A. Yes. And it's in -- on the previous problem list, which is omitted from this list, it says thrombocytopaenia, which is low platelet count, which would predispose you to bleeding spontaneously.

Q. But just pausing there, yesterday Dr Evans said that pulmonary haemorrhage is a killer. And I took issue with that. Pulmonary haemorrhage is not necessarily a killer, is it?

A. In the majority of times it is, certainly in a baby this fragile, because with a pulmonary haemorrhage, rather than just having less than a millilitre of bloodstained

secretions or a small amount of bloodstained secretions, with a frank pulmonary haemorrhage you normally got lots and lots of fresh blood coming up the trachea, such that you cannot suck it out quick enough, and it's that that means that you cannot resuscitate these babies. So if this was a pulmonary haemorrhage, and I don't know that it was, in the face of low platelet count it was certainly very mild.

Q. Yes. It doesn't appear that anybody, as we can see from the notes, is reacting to it as if it's about a killer, does it?

A. No, but she's already seriously ill at this point.

Q. But it simply isn't right to say that a pulmonary haemorrhage is inevitably a killer, is it?

A. It's not inevitable but in a baby of this size and gestation, it --

Q. And we see --

MR JUSTICE GOSS: In a baby of this size and gestation?

A. It would usually be if it was a frank pulmonary haemorrhage.

MR MYERS: What we do have is an identified instance of [Baby G] bleeding --

A. Yes.

Q. -- not because of suction, but bleeding for whatever reason?

A. Yes.

Q. Next, I would like to go to page 4601, which takes us to

1 July. I just have a handful more entries to deal with. An entry in the nursing notes at 19.01 and the nurse notes the following:

"[Baby G] has had frequent episodes of desaturations all requiring stimulation and increased oxygen. All blood gases stable, repeat chest X-ray. Reported as significant evolving lung disease. Echo..."

Is that echocardiogram?

A. Yes.

Q. "... performed by consultant Oliver Rackham. Small PDA..."

Did you say that was patent ductus arteriosus?

A. Yes.

Q. "... noted. Desaturations diagnosed due to poor lungs. [Baby G] also appears in pain, therefore paracetamol and morphine increased."

And the glucose remains stable.

So at this stage now, into being about a month old, the desaturations with [Baby G] continue, don't they?

A. Yes.

Q. Next I'm going to go to page 4702, which is jumping forwards some way because it's 31 July 2015, so we are moving forwards almost a month. 5.59. [Baby G] is about 2 months old at this point now. The nurse enters on the entry at 5.59 in the morning:

"Three desaturations observed to 60% overnight. Not always requiring increased oxygen. Mostly come up self

or with adjustment of CPAP mask or giving a dummy. Desaturation, fleeting and occasional, after feed to mid-80s seen."

Sorry, I didn't read that very well:

"Abdomen looks full. Mum measured baby's tummy this AM and states her abdomen is 30 centimetres, usually 26 to 27 centimetres. OGT aspirate: 10ml of feed. 5 am feed omitted. Gas satisfactory. Eyes/mouth cleaned as needed. Nares..."

What is nares?

A. Nostrils.

Q. Sorry:

"[Nostrils] satisfactory."

All right. This is an entry a little under 2 weeks before the move to the Countess of Chester and we now know [Baby G] is 2 months old. So at this point [Baby G] is still or is marked as desaturating, isn't she?

A. Yes, I think I read that when I was speaking to Mr Johnson as she was having self-correcting desaturations and, over the course of a whole night shift, she appears to have had three over the course of a whole night shift and I also mention that the 10ml aspirate, but that was the only large aspirate during that time.

Q. Yes, all right. There was an aspirate and it appears that her stomach had distended after the feed, is that correct, because it says:

"Abdomen 30 centimetres, usually 26 to 27"?

A. With all respect to [Baby G]'s mum, this was measured by her mother, and I would -- it depends on where you measure the abdomen from, whether you measure at the same point each time. So I'm not sure if that's an accurate reflection. It may represent a distension.

Q. We have a coincidence of feeds still in the stomach, it seems, 10ml, and desaturation accompanying it, don't we?

A. Yes.

Q. And that meant that the next feed, or if it is the next feed, the 5 am feed, was omitted?

A. That feed was omitted and then the following feeds continued without problem.

Q. All right. Could we go next please to page 4748, which is the same day but a little later at 17.40.

The actual entry we're looking at, if we can scroll down, please, is at 31 July 15 at 17.40.

MR JUSTICE GOSS: Yes. That's highlighted, I think.

MR MYERS: Ah, thank you.

We know that [Baby G] was discharged from Arrowe Park Hospital on 13 August and went to the Countess of Chester then. But that wasn't the first time that attempts had been made for her to be transferred to the Countess of Chester, was it?

A. No.

Q. On this occasion here we have, 31 July 2015:

"[Baby G] transferred to transport incubator..."

Pausing there, that's a particular incubator designed to do what it says, assist in transporting a baby from one establishment to another?

A. That's correct, yes.

Q. So transferred to the transport incubator:

"CBG..."

Is that capillary blood gas taken?

A. Yes.

Q. And satisfactory:

"Handover given. [Baby G] then started to desaturate to 42% with associated bradycardia to 70s."

That's a significant drop in heart rate, isn't it?

A. Yes.

Q. "Neopuffing required. Decision made by consultants not to transfer to Chester. [Baby G] now back in incubator, parents aware."

So what happened there was [Baby G] was due to be transported and then, for whatever reason, there's a significant but profound desaturation to 42%, and her heart rate drops, and the decision was taken that it wasn't the right time to transfer her to Chester; is that correct?

A. That's correct but she must have recovered because they immunised her the next day, so she must have recovered from that.

Q. Yes.

A. Transporting babies from one hospital to another is

fraught with difficulty and babies do not travel well and sick babies do not travel well. So I think that was a wise decision. If the baby had desaturated in that way on transfer -- by the mere action of transferring from one incubator to another, the baby was unlikely to travel well that day, so that was the right decision, not to transfer her.

Q. Pausing there, we have seen already in the last entry that at about 6 o'clock in the morning on the same day there had been the three desaturations observed around about the time of the feed.

A. Well, she was having self-limiting desaturations with feeds all along. That's quite a normal occurrence. If they're self-limiting and babies correct themselves, that's not a problem.

The three desaturations happened over the course of the whole night, they weren't all altogether in one batch, they were over a long period.

Q. She displayed a tendency to desaturate, didn't she?

A. She had desaturations associated with feed, which is absolutely standard for a baby of that gestation and age.

Q. And then at 17.40 she had quite a profound desaturation --

A. Yes, she did.

Q. -- when she was due to be transported?

A. Yes.

Q. You say she was due to be immunised the next day and earlier in the questioning from the prosecution you used the fact -- it was described that a baby about to be immunised was a good sign of how fit and stable they are because they're going to receive their immunisations.

A. Yes.

Q. But on this occasion she was due to be immunised, but that still didn't mean that there weren't events that couldn't lead to a profound desaturation?

A. No, but desaturations would occur throughout the time she would spend on the neonatal unit. Neonates are prone to desaturate for all manner of things. This was a significant one, but she clearly must have recovered or they would not have immunised her the next day. So yes, she was still very young, she was still very vulnerable, she was prone to all sorts of complications of her prematurity, but at that stage they clearly felt she was well enough to immunise her, regardless of what had happened the day before, as she had recovered from that.

Q. Yes. But again, so we can be clear, when we began to go through these notes, Dr Bohin, you identified perfectly accurately the desaturations we looked at were linked to a time when she was very, very small and receiving a higher level of intensive care.

A. Yes, but I also said when babies are older the causes of desaturations are different and they are here.

Q. Throughout the whole of her history she demonstrates a propensity, a tendency to desaturate depending on the circumstances, doesn't she?

A. So would any baby, any premature baby.

Q. And this one is quite a profound one, isn't it?

A. Yes.

Q. And if we go next, please, to 4 August, so about a week before she was transferred, page 4393. It's a short entry, the bottom of that page.

Look at the bottom of the page, 4 August, 8 o'clock. Daily review by L Jones. We've got the various statistics at the top for age, day 66, it records the birth weight, the current weight, 1.19 kilograms.

30 grams -- is that the weight that's been put on?

A. An increase of 30 grams in a week.

Q. It sets out the problems: preterm -- CLD?

A. Chronic lung disease.

Q. On CPAP. Sub-optimal weight gain. And?

A. "Raised CRP." She had an infection at that point.

Q. "Ventilation: remains on CPAP."

And it sets out what the pressures have been:

"Blood gas is satisfactory."

And again it records here:

"Has been having frequent desats and bradys overnight. Down to 45%. Some apnoeas this morning requiring stimulation."

A. But she'd been screened for an infection the day before

because she'd become unwell the day before and was screened for an infection and started on antibiotics because of the increase in desaturations and bradycardias on the 3rd.

Q. We know that when, a little more than a week later, [Baby G] is transferred to the Countess of Chester Hospital we've heard how she was stable on CPAP at that point.

A. Yes.

Q. We can also see over the months that have led up to that she was prone to desaturate, sometimes profoundly, depending on the circumstances, wasn't she?

A. Yes, but on this occasion it was because she had an infection. But they continued the feeds, the feeds were continued. She still was -- continued to be enterally fed despite that.

Q. She was on this occasion. We have seen another occasion where they suspended the feed, didn't we, after the desaturation --

A. One feed, just one.

Q. But the fact is her desaturations are not linked purely to being a very small baby just born in a high level of intensive care, are they?

A. No. Early on in her life they were and, as I explained earlier, once you move out of that period where you're critically ill and receiving lots of intensive care, the causes of desaturations change slightly and it's very common for babies to desaturate after or in between

feeds. And as long as they're self-limiting, as long as the babies correct themselves and don't go on to require intervention, they're usually ignored because they are so common they're usually ignored. If they need intervention then infection needs to be considered, which is what happened on 3 August, the day before this entry.

MR MYERS: Thank you. Well, I'm going to move next to the events of 7 September, my Lord (overspeaking) --

MR JUSTICE GOSS: We'll have our break.

MR MYERS: I should say, thank you, Dr Bohin, for assisting with that.

MR JUSTICE GOSS: Thank you. Our usual ten-minute break then, please.

(11.59 am)

(A short break)

(12.09 pm)

MR MYERS: Dr Bohin, I'd like to go to the first report that you wrote, it's the one dated 28 March 2019, and go to paragraph 6.10, please.

A. Yes.

Q. I'm going to remind you what it says at paragraph 6.10 -- and you're dealing with the feed that we're looking at now on 7 September:

"On 6 September, [Baby G] took a bottle feed of 45ml at 23.00. On 7 September, she was given 45ml of milk by NGT at 02.00. She was asleep. The NGT was recorded as

being aspirated prior to this feed. This was (a) to check the NGT was in the correct place prior to giving the feed and (b) to check there was not a large amount of undigested milk remaining from the previous feed, which might indicate a developing problem."

That's what it says at paragraph 6.10, isn't it?

A. Yes.

Q. Then in your opinion and observations at paragraph 7.4, the same point really but what you say is this:

"The feeding chart shows [Baby G] was given a bottle feed at 23.00 on 6 September 2015. This was tolerated. Her next feed was due at 02.00 on 7 September 2015. She was asleep. The NGT was recorded as being checked prior to this feed. At this check no large residual volume of milk was found in the stomach, ie it was empty. 45ml of feed was given."

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

A. Yes.

Q. An assumption that you worked on at the time of your report was that the contents of [Baby G]'s stomach had been aspirated by the nurse, [Nurse E], who was about to give the feed at 2 o'clock? That was an assumption you worked on, wasn't it?

A. It was because that's what nurses normally do.

Q. Yes. We've heard [Nurse E] indicate that that isn't what she would have done for [Baby G] on this occasion. You have heard that evidence, haven't you?

A. Yes, I have.

Q. What you don't make any reference to in the report, but what you have told us about in your evidence yesterday and today, is that you say the stomach must have been empty because of the pH value.

A. Yes.

Q. That's something which you are telling us, I'm going to suggest, because you've heard the evidence of [Nurse E] and it's an alternative way of being able to say the stomach must be empty. That's what you've done, you have switched to the pH as a way of being able to say that.

A. That's not correct.

Q. When you gave your evidence yesterday, I just want to -- help us with this. You were asked a question and it was said that you had been listening to and watching the evidence via the video facility.

A. Yes.

Q. Just so we can understand the arrangement, you're obviously entitled as an expert in this case to see the evidence that witnesses give. You're entitled to do that, absolutely, there's no criticism of that. That's the process. And you do see the evidence in the case, don't you?

A. Yes.

Q. So for example, what the witnesses say, you see, albeit not in this courtroom but in another courtroom or from a

CVP location elsewhere?

A. Yes.

Q. It follows, for example, if Dr Evans gives evidence, you can hear the evidence that he gives, can't you?

A. Yes, I can hear everybody's evidence.

Q. And whenever you have come to be asked questions in cross-examination by me, you will have heard what Dr Evans' evidence was and the questions he was asked, won't you?

A. Yes.

Q. Yesterday I raised with Dr Evans that he had worked on the basis that [Nurse E] had aspirated the stomach contents when he wrote his reports. I put that to him. You will have seen those questions.

A. Yes.

Q. I'll leave his answers for now, but those were the questions. And I've just asked you that you worked on that assumption and you've accepted you did. And yesterday, Dr Evans said that he was working on the fact that the pH was acidic now as the basis for saying the stomach must have been empty. Did you hear me asking him about that?

A. Yes.

Q. And you're doing the same thing well, aren't you, you're working on the basis that the stomach was acidic as a basis for saying it was empty?

A. Yes.

Q. Can I ask, just so we understand, is that something you will have discussed with Dr Evans before giving this evidence?

A. No, it absolutely is not. I was asked to do a supplementary report regarding [Baby G]'s feeding, the final report from November of this year, and during that I reviewed all of [Baby G]'s feeding charts from the Countess of Chester, both admissions, and the Arrowe Park Hospital, both admissions. So actually I had gone through her feeding charts in great detail and could see what the pHs were and compared them from Arrowe Park to the Countess of Chester, where one group of nurses regularly aspirated and the other group didn't regularly aspirate. So no, this is not -- my opinion on this has not come as a result of a dialogue with Dr Evans.

Q. Dealing with the question of pH, the fact is that the stomach pH in terms of the acid in it, what would that be, the acid pH of the stomach? I'm going to suggest it's a lot lower than 4, isn't it?

A. Sorry, I'm not -- do you mean --

Q. The natural pH of an empty stomach, the acid in it, what would it be?

A. In a baby it can be anything between 3.5 and 5.

Q. Out of interest, in an adult does it go lower than that?

A. I have no idea.

Q. So 2 or 3, is that too low for a baby in any situation?

A. I don't ever recall seeing a nurse getting a pH of 2,

no. I don't have -- I have never worked in adult practice, so I have no idea about adults.

Q. As for the pH value, it is possible, isn't it, to get a pH like the one we see in this case and there still be milk contents in the stomach? That's possible, isn't it?

A. I don't think it is. I think the stomach was empty.

Q. Right. I'm going to suggest it depends a little bit, for instance, on exactly whereabouts the sample in the stomach has come from.

A. Yes, it does vary depending on where the tip of the nasogastric tube is, but we don't know where that is.

Q. No, we don't. But do you agree we can't discount the possibility there is milk in the stomach at the time this was aspirated?

A. Yes, I think we can.

Q. And I'm going to suggest if that was a basis for saying there was no milk, you would have said that before you say it in your evidence, Dr Bohin.

A. Well, I've said the normal practice is for nurses to aspirate the tube and so what I have written is that the tube was aspirated because that would be normal practice for any other nurse I've worked with. That clearly wasn't the practice at the Countess of Chester or not with [Nurse E] in any case.

Q. And so I am making it clear what I suggest to you, that in now turning to pH as being a basis for saying the

stomach was empty, that's something you've done because you realise you cannot support what you want to say off the back of what [Nurse E] says.

A. No, that's absolutely not the case.

Q. Do you agree, notwithstanding your most recent report, that in none of the reports you have provided do you say that the pH we have on the feeding chart shows the stomach was empty?

A. No, I haven't mentioned it in any of my other reports.

Q. Right. I'm going to ask you about infection next, please.

Do you agree, or disagree by all means, that CRP, the C-reactive protein reading, will peak between 24 and 48 hours after the infection commences?

A. I have no idea. It changes. But I don't think there is an absolute cut -- it increases, but I don't think there's an absolute cut-off. I don't think anybody knows.

Q. But isn't it a general understanding that there's a 24 to 48 hour (sic) to peak with CRP?

A. That's general understanding but I don't think that rule can be rigidly applied. You know, nothing suddenly happens at 48 hours to say you haven't got an infection or you haven got an infection.

Q. It may not be rigidly applied, I'm not going to dispute that with you, Dr Bohin, but the general rule is 24 to 48 hours?

A. Yes.

Q. In a given case it could be less or it could be more?

A. It could be.

Q. Thank you. We've seen the CRP readings for [Baby G] over the period from 7 September onwards. She is a baby who would be prone to infection, isn't she?

A. Yes.

Q. And it can't be said precisely when any infection has started from the CRP readings, can it?

A. No.

Q. The watery stool that was identified, and it's mentioned in Dr Ventress' notes, a watery stool is always going to be considered abnormal unless there's an explanation for why it isn't, isn't it?

A. No.

Q. Isn't it something that a doctor, for instance, would always want to take in a history from a patient as to whether the stools are loose or watery as an indication of whether there is any underlying problem?

A. I personally never ask if stools are watery. I ask if stools are loose. The consistency of the stool is important to note and whether there are any additional findings, like blood or mucus, but actually watery that's not something I ever ask.

Q. Well, a stool that's passed that is watery could be consistent with being unwell, couldn't it?

A. But it could also be normal.

Q. It could be, but I'm asking could it be consistent with being unwell?

A. It could be, but it could also be normal.

Q. In terms of an infection that [Baby G] had, it's possible that could have started after the time of the 2 o'clock milk feed?

A. Yes.

Q. It's possible that could have started before the 2 o'clock milk feed, isn't it?

A. Well, I think -- not if you're looking at your 48 -- the point you put to me before, where you'd suggested that the peak CRP was at 24 to 48 hours, because the peak CRP in this case was 50-odd hours after the event where [Baby G] had her major desaturation.

Q. Yes, it is, and it goes over a two-day period. But as you accept, it's not a precise figure, it could be more, it could be less?

A. Yes.

Q. And bearing in mind the period over which the CRP rises, it's possible, if it's due to an infection, that could have started before the feed, couldn't it? It's possible?

A. It's possible.

Q. You will suggest it started later?

A. Yes, I do.

Q. Right, okay.

The projectile vomiting that we see. I think you

agree that babies may vomit for many reasons, Dr Bohin.

A. Yes.

Q. Forceful vomiting, first of all, you would say, am I right about this, is not common in a neonate?

A. No, it's not.

Q. If a baby is given too much feed, for whatever reason, that could cause forceful vomiting, couldn't it?

A. Yes.

Q. If a baby was given too much feed, I'm going to suggest accidentally, that could cause forceful vomiting, couldn't it?

A. Yes.

Q. Just in general with regard to the Countess of Chester Hospital neonatal unit, when you've reviewed this case, I just don't mean this case but the case generally, did you find there are times when nurses didn't aspirate before feeding?

A. Yes (overspeaking) --

Q. That was a problem, wasn't it?

A. Yes.

MR JUSTICE GOSS: Frequently, she said, but you spoke over her.

MR MYERS: I'm sorry.

MR JUSTICE GOSS: I thought you'd want to know that.

MR MYERS: Thank you, my Lord. I apologise for my enthusiasm to move on.

A. It may have been that they -- if they did aspirate, they

didn't record it, but there are lots of omissions on the notes, yes.

Q. All right. With the question of gastro-oesophageal reflux, and I'm not going to take this beyond where we can get to on the evidence, I am just asking what you say about the evidence, that is something that can be common in preterm babies, isn't it?

A. Very common.

Q. Very common. Is it something which can develop over time even if it isn't present at birth?

A. Yes.

Q. And is it something that can cause forceful vomiting?

A. It tends not to cause forceful vomiting. It tends to cause vomiting but the type of vomiting really depends on the age and the size of the baby. So in much older children, older neonates who get it, they're more robust, so their vomiting might be forceful, but in small babies it tends to cause lots of problems with small spits and possets, small vomits as opposed to forceful vomits.

Q. Thank you. Certainly as we are going to find out and as the jury will hear, when we move forwards from 7 September and we move to the events from the 21st and onwards, whatever the reason, we begin to see a more marked history of vomiting, don't we?

A. Yes.

Q. Right. As it happens, from your own review, even when

[Baby G] was at Arrowe Park, gastro-oesophageal reflux was a consideration, wasn't it --

A. Yes.

Q. -- because you have seen that she was prescribed anti-reflux medication in early July 2015?

A. Yes.

Q. And although it isn't on the discharge summary from Arrowe Park, gastro-oesophageal reflux is noted as a clinical problem at the time of her admission to the Countess of Chester?

A. Yes, it was.

Q. Your view of 7 September is that whatever the position with gastro-oesophageal reflux, and correct me if I'm wrong, your view is that can't explain what happened?

A. That's my view, yes.

Q. Is it possible for gastro-oesophageal reflux to contribute to what's happened if there's any basis for finding it there?

A. No.

Q. But the 7 September can be due to overfeeding for whatever reason?

A. Yes.

Q. If [Baby G] suffers from an infection at that time, I'm going to suggest that is something that could contribute to a vomit if, for example, it interfered with her ability to digest a milk feed.

A. Infection does not present with projectile vomiting

in the way that was exhibited by [Baby G].

Q. I'm not suggesting on its own, Dr Bohin, it would do. But what I'm exploring is whether if there was an infection taking place that interferes with her digestion, and if she's overfed in those circumstances, that can make the reaction to it what we find here.

A. No, I'm sorry, I can't agree with that.

Q. So you discount infection?

A. Yes, at that stage. She had an infection later on, but at that stage, yes.

Q. Overfeeding, you accept, can be the cause of it?

A. Yes.

Q. And I'm going to suggest to you if she was given too much milk on top of milk that hadn't been digested, that could have caused the vomit that we find?

A. Sorry? Are you suggesting that if her stomach was full and she was given an excess of 45ml at that feed, so the combination of the whole lot?

Q. I'm not suggesting her stomach was full, but if there's already a quantity of undigested milk in her stomach, whatever that is, and she's given 45ml on top of that, that could cause this?

A. (overspeaking) no, I can't agree with that because I think her stomach was empty, so an excessive volume of milk in her stomach caused her to have that projectile vomit, but I do not agree that there was milk in her stomach at the time she was given that feed.

Q. I've dealt with where and how we come to dispute that with you, I'm not going to repeat that.

But if there is milk that goes in on top of other milk, as it happens, that could cause this if there was milk already present, couldn't it?

A. If there was, but that's very -- that's --

Q. You don't accept that there was?

A. No.

MR MYERS: Right. Thank you, Dr Bohin.

Re-examination by MR JOHNSON

MR JOHNSON: Just a few questions, please, Dr Bohin. It has been pointed out that you hear the evidence of all the witnesses, including Dr Evans. Are there any other doctors in the courtroom next door?

A. Yes, there are.

Q. Who are they?

A. Dr Hall.

Q. And who is Dr Hall?

A. He's the neonatal expert for the defence.

Q. Yes, thank you.

MR JUSTICE GOSS: Just so that there is absolutely no mystery about this, expert evidence, about which I shall give you a legal direction, comes from people who have specialist knowledge. They can only express any opinion when they hear all the evidence. They can read all the materials pre-trial, but then they hear the evidence as well. So it's absolutely standard practice for all

experts to be able to hear what you hear by way of the evidence. Then they can express their opinion on the evidence that you hear. All right?

So there's no mystery about this. So all the experts are hearing everything -- or any experts who may be going to give evidence are hearing everything and Dr Bohin, as you know, is coming back again and again and again to give evidence, so she hears it all the time. As you know, but the jury won't have known this, but I'll give you a direction about this.

Mr Myers made this perfectly plain.

MR MYERS: I didn't suggest there was anything wrong with that arrangement, I just wanted everybody to be aware of it.

MR JUSTICE GOSS: It's just that is the fact because that's how it goes. So Mr Johnson is now eliciting the fact that the defence expert is listening to all this, as any expert would.

MR JOHNSON: You were asked about acid being different in different parts of the stomach. I'd just like you to clarify that, please. You told us that so far as the standard term baby is concerned, the stomach is about the size of a plum, to give us the idea of the area that we're dealing with. Where does the NGT have to be to be able to aspirate any stomach contents? Whereabouts in the stomach?

A. Well, it needs to be in the body of the stomach. So the

stomach is -- it kind of lies at an angle and the nasogastric tube comes down the gullet and you would hope that the tip of it would be in the body of the stomach, so in the bottom of the sort of bowl, really.

Q. Yes. So if we think of the stomach as in effect a plum-shaped object --

A. Yes.

Q. -- on an angle?

A. Yes.

Q. So there is a part of the bottom of the plum that sits much lower than everywhere else. Can we apply common sense here, that the stomach acid would, under the force of gravity, if a baby is prone, would it be, in effect, at the back of the stomach --

A. Yes.

Q. -- in terms of whether the baby was standing up?

A. Yes.

Q. Okay. Which parts of the stomach have different concentrations of acid?

A. I'm not sure there's any research for neonates, actually. I think it's based on adults where there are certainly some areas have more acid-producing cells than others, but that isn't where the tip of the nasogastric tube would lie, because obviously those areas that produce more acid, that fluid then, by gravity, pools in the bottom of this bowl where you would hope the tip of the nasogastric tube is. If the nasogastric tube

isn't there, and it's midway where there is no fluid, you clearly can't aspirate any fluid.

Q. Right. So now you have given us that explanation if, as we know, [Nurse E] aspirated some liquid --

A. Yes.

Q. -- would that liquid necessarily, because of the physical characteristics of what we're talking about, have included milk if there was milk in there?

A. Yes.

Q. Yes.

A. And nurses would normally write that down. And in many other entries with [Baby G], of which obviously there are a huge number relating to feeds, nurses would write "clear aspirate" or "milky aspirate" or "undigested milk aspirate", and there's nothing, only pH 4. I think if milk was there, it would have been noted.

Q. Yes, and if there was a large quantity of undigested milk as has been suggested, what effect would that have had on the pH?

A. The pH of milk is neutral, so 7, so it would have neutralised or buffered whatever acid was in the contents of the stomach. So that would have raised the pH so that it would have been 5 or 5.5 or 6.

Q. You were asked about the peak of the C-reactive protein reading and if Mr Murphy can help us, please, I wonder whether he can show us J7291. You spoke of the peak having occurred much later at Arrowe Park?

A. Yes.

Q. Is this one of the sets of data for the blood tests?

A. Yes, it is.

Q. And can we see the C-reactive protein reading in that list of data?

A. Yes, it's 218, it's at the bottom.

Q. It actually says "C-reactive protein: 218". The time of that reading, please?

A. 07.23 on 8 September.

Q. On 9 September.

A. Sorry. I beg your pardon, on 9 September.

Q. Just to put that into context, [Baby G]'s projectile vomiting and collapse was at about 2.30 in the morning of 7 September. So if we go to 2.30 on the 9th, that's 48 hours. And this is another 5 hours, so about 53 hours after the collapse?

A. Yes.

Q. And the proposition that was being put to you on behalf of Lucy Letby was that it peaks at anything between 24 and 48 hours after the onset of the infection.

A. Yes.

Q. And having looked through the records, is this the peak so far as you could tell?

A. This is the peak. After that, it goes down quite sharply.

Q. If one applies the 24 to 48 hours theory as was being suggested to you on this, does that suggest the onset

was before or after the problems?

A. After.

Q. Yes. We know from the evidence that at about 6.15 on the morning of the 7th, 100ml of either air or liquid, or a combination, was aspirated from [Baby G]'s stomach.

A. That's correct, yes.

Q. Can that be accounted for by infection?

A. Not in my opinion, no.

Q. Well, you were also asked about a later, more marked history of vomiting, but I'll return to that when you give your evidence about the later incident concerning [Baby G]. So I've not forgotten about that, but I'll deal with it in that context rather than now.

Does your Lordship have any questions?

MR JUSTICE GOSS: I don't. Thank you very much.

Thank you, Dr Bohin. That completes your evidence at this stage. The usual conditions apply: do not discuss anything about -- anything to do with this with any other witnesses. Thank you very much.

(The witness withdrew)

Wednesday, 18 January 2023

(10.30 am)

... [Omitted] ...

MR JOHNSON: Dr Sandie Bohin, please.

DR SANDIE BOHIN (recalled)

Examination-in-chief by MR JOHNSON

MR JOHNSON: Dr Bohin, for the sake of the record would you give the jury your identity, please?

A. I'm Dr Sandie Bohin.

Q. Thank you. Dr Bohin, it's some time since you gave us some evidence about [Baby G]'s case and that was limited to the events of 7 September 2015.

A. Yes.

Q. What I would like to do now is to turn to the events of 21 September 2015. In this respect you have -- or in the case overall, so to speak, for [Baby G], you've written several reports; is that right?

A. That's correct.

Q. But in relation to the events of 21 September 2015, that was initially dealt with by you in your report of 28 March 2019?

A. That's correct.

Q. Thank you. You set out in that report the chronology relating to [Baby G]'s life up to and including the events of September 2015?

A. Yes, that's correct.

Q. You told us last time that following the events of 7 September, [Baby G] had been transferred back to Arrowe Park Hospital.

A. Yes, that's correct.

Q. She was then returned to Chester on 16 September; is that right?

A. That's correct.

Q. Having been transferred out on the 8th, I think?

A. That's correct.

Q. You then deal -- and I'm looking now at paragraph 6.20 onwards of your report -- with the events of 21 September 2015?

A. That's correct.

Q. When you looked at the records, what was the factual basis on which you then offered your opinion?

A. [Baby G] was feeding well and tolerating her feeds, and in fact the day before had been fed by bottle, apart from one feed when she was asleep, so was fed by nasogastric tube. On the 21st she was given a feed at 9 o'clock via nasogastric tube, because she was apparently asleep, and shortly after had two -- what were considered to be large projectile vomits, which caused her to stop breathing temporarily and for her to desaturate down to 30%. So she became clinically compromised by that.

In addition, 30ml of undigested milk were aspirated from the nasogastric tube after these large projectile vomits.

Q. Thank you. I think you refer in your report to the feed that [Baby G] had at 6 am, so in other words 3 hours prior to the 9 o'clock feed.

A. Yes, she was given a bottle at that time of 45ml of milk by bottle, which she took.

Q. So the records record that at 6 am on the 21st she had

a 45ml bottle?

A. That's correct.

Q. But at 9 o'clock Lucy Letby has recorded giving [Baby G] 40ml via a nasogastric tube?

A. That's correct.

Q. Then the jury has seen the records this morning in the nursing notes that at 10.15 [Baby G] had two projectile vomits, followed by a period of apnoea, with falling saturations.

A. That's correct.

Q. And also the fact that, following that event, 30ml of undigested milk had been aspirated from the nasogastric tube?

A. That's correct.

Q. What conclusions did you draw from those events in context?

A. Well, it just didn't add up to me. It is a case of simple arithmetic: if she'd been given 40ml of milk and 30ml were aspirated from the nasogastric tube subsequent to these two large projectile vomits, the two large projectile vomits, although we can't quantify them, were clearly more than a mouthful of milk, which would have been 5 or 10ml, so all of that would have added up to more than 40ml.

Q. So what conclusion did you drew?

A. My conclusion therefore was that the feed at 9 o'clock that was given via the nasogastric tube was in excess of

40ml.

Q. When you say at 9 o'clock, are you restricting it to that particular time or --

A. No. Obviously, that was when it was noted in the nursing record and on the feed chart that the feed had been given. But prior to the projectile vomit, milk in excess of 40ml had been given.

MR JOHNSON: Thank you. Would you wait there, please, Dr Bohin, for some further questions?

Cross-examination by MR MYERS

MR MYERS: Dr Bohin, you describe this as a process of simple arithmetic --

A. Yes.

Q. -- in terms of working out that she must have had more than 40ml at or after the 9 am feed.

A. Yes.

Q. Of course we don't know, do we, how much milk, if any, there was in her stomach from the 45ml feed she'd had at 6 am? We don't know that for sure, do we?

A. We don't know that for sure but what we do know is that she had been tolerating her feeds very well and there had been no episodes of vomiting, apart from very minor vomits, prior to that. So she had been tolerating her feeds, which means that her stomach is likely to have been empty prior to the 9 o'clock feed.

Q. But we don't know for sure how much --

A. No.

Q. And we don't know, in fact, the size of the vomits that she had, do we?

A. We don't but nurses are very good at describing whether vomiting are just a posset, which would just be a mouthful of vomit, which is completely normal and common in babies. Nurses will say a baby's had a small vomit, a moderate vomit or a large vomit. So yes, whilst you can't actually measure the number of millilitres, for a nurse to describe something as a large vomit, it's a significant amount of milk.

Q. I just asked that because it's been described by you and another witness as arithmetic, but we don't actually have the basic figures, do we?

A. No, we don't, just what would be normal practice for nurses when they're describing vomiting. They have no way of measuring it so they do describe it in terms of mild, moderate or large.

Q. Whatever lies behind this, whatever happened, in terms of scale and consequence this is very different from the event on 7 September, isn't it?

A. Well, not really, because on 7 September there were projectile vomits which, as I said in my evidence at that time, is extremely unusual for premature babies. So this baby had two large projectile vomits resulting in clinical compromise. So she dropped her saturations and became blue. So there's a lot of similarities with the event of earlier in September.

Q. To remind the members of the jury, though they may remember it actually, 7 September arises out of a -- follows a feed at about 2 o'clock in the morning, didn't it?

A. Yes.

Q. Then, the jury may remember, a little while later there was a series of significant desaturations that [Baby G] underwent, weren't there?

A. Yes.

Q. Dr Ventress gave evidence about how that went on until about 6.30 in the morning, didn't it?

A. Yes.

Q. And it was necessary for her to be ventilated, wasn't it?

A. Yes.

Q. And there was the business of the ET tube and it being replaced and the repeat collapses; that's correct, isn't it?

A. Yes, that's correct.

Q. And ultimately, [Baby G] had to be transferred to Arrowe Park Hospital, didn't she?

A. Yes.

Q. So when I'm suggesting that what happened on the 21st is not the same scale as what happened on the 7th, it really isn't the same scale, is it?

A. It's not the same scale but the events with the vomiting and the excess milk are strikingly similar. The

repercussions are not but the events are almost identical.

Q. Perhaps what you mean is the mechanism, the projectile vomiting, is identical?

A. Yes.

Q. That's what you're saying if you don't mind me putting it that way?

A. Yes.

Q. All right. As it happens, when we look at [Baby G] after her return from Arrowe Park Hospital, as we go into late September and October 2015, she did display a history of regular vomiting, didn't she?

A. Yes, she did. Vomiting became much more a feature in [Baby G] after around 3 October of that year. Prior to that, vomits were very small and intermittent, but vomiting became much more of a feature after 3 October.

Q. I'm going to describe that what we have on 21 -- or rather suggest that what we have on 21 September fits a pattern of vomiting that follows on from that going forwards.

A. No, I'm sorry, I don't agree with that because [Baby G] had two episodes of projectile vomiting on 21 September and she had projectile vomiting on 7 September. There were no other episodes recorded of projectile vomiting.

Q. In your report of 7 April 2022 at paragraph 2.28, you say this -- page 5716 of the statements, my Lord:

"From 3 October 2015 to 8 October 2015 [Baby G]

was recorded as having one to two vomits each day."

It's page 5 of 10 in your report.

A. I'm sorry, that page has not been photocopied. It's missing in this folder, so I'm sorry it's not here.

Q. I'll read the whole of that and we are going to look at some entries anyway. But what you say -- we have all got the papers -- is:

"From 3 October to 8 October [Baby G] is recorded as having one to two vomits each day. These varied from small to large and some were after cares, ie after a nappy change where the legs are lifted. Domperidone was added to the anti-flux regime on 17 October 2015 because of the vomiting."

So I just want to have a look at some examples of this with the jury. You've described a pattern between the 3rd and 8 October. Let's go to 8 October just to see the entry for that. It's at page 7452. These are additional references, ladies and gentlemen, so they should move across to the iPad eventually but they may not be there right now.

We're looking at the right-hand side in the box that Mr Murphy has enlarged. Thank you, Mr Murphy.

This is now 8 October and it's an entry at 19.15 by a nurse with the initials KS:

"[Baby G] has been very settled. Nursed in cot. Has had 5.5 hours off oxygen today but having clusters of desats, so put back on at 17.30 tonight. All

observations within limits. Feeds..."

Is that every 4 hours?

A. Yes.

Q. "... but has two large vomits. Could have been a little bit of overhandling with the first vomit so advised mum to put her straight back after her next feed to settle her but still vomited with the next feed. Also looking back on feeding history all vomits have started since going..."

A. "4 by 6".

Q. "... so how now been put back to three-hourly feeds. Has passed urine and bowels opened."

That's 8 October. I am not going to every time we see a vomit, I am just going to pick several examples.

I'm going to go next though to 9 October, please, at page 7453. In fact, we'll find that this goes from 7453 into 7454, but let's start at 7453.

It's an entry at 04.17 on 9 October. We'll see over the page that this appears to be by Ailsa Simpson, who has given evidence in the case, and it says:

"Care commenced at 19.45. All safety equipment, alarm, limits and fluids checked. [Baby G] remains nursed in 0.1 litres per minute of nasal prong oxygen. Maintaining sats above 90%. Few fleeting self-correcting desats noted, otherwise observations [and we go over the page, please, to 7454] stable. Temperature low at 36.4, therefore blanket added and is

now within normal range. Tolerating three-hourly feeds well of expressed breast milk with Gaviscon via own bottles. [Times 2] large digested milky vomits noted up to time of report."

We can see it's Ailsa Simpson dealing with it.

If we go to later the same day, please, still on 9 October, page 7456. Another entry by Melanie Taylor. We can see the initials "MT" for 9 October at the entry at 13.28. Halfway down:

"Feeds: three-hourly bottle feeds, expressed breast milk with Gaviscon. Fed at 09.30. Large vomit at 10.30 (digested thick milk)."

If we move on to a few more, but do you agree there's a pattern of large vomits with [Baby G] as we move forwards through October?

A. I think in my report, looking at the vomiting, I've made it clear that from 3 October vomiting became a feature with [Baby G] and she was treated for gastro-oesophageal reflux from that time. The difference is these were not projectile vomits and didn't cause her to be clinically compromised.

Q. All right. We go to page 7477, please. The entry almost at the bottom at 15 October 2015 by Ashleigh Hudson:

"19.20. Watery stool passed. Sample collected and sent to lab. One vomit at 19.00 hours following 17.30 hours feed. Projectile and quite large in size.

[Baby G] was uncomfortable prior to this and unsettled. Otherwise very well in herself."

Pausing there, that is another example of projectile vomiting, isn't it, Dr Bohin?

A. That's what the nurse has recorded, yes.

Q. Yes. You had said that there were no more. I appreciate it's one amongst all of them, but that's there, isn't it?

A. Well, I've reviewed all of her feeds, of which over that period of time there were many, many, many feeding charts to review. So if I missed a projectile vomit then I missed it.

Q. That's also associated with the passing of a watery stool as it happens, isn't it?

A. On that occasion, yes.

Q. Yes. All right. We'll move on, please, to page 7485. On the left-hand side we've got an entry by KB, Kate Bissell, 04.23 on 17 October.

If we look three or four lines into it, we can pick up:

"Observations within normal range."

That's about four lines down in the centre of that sentence:

"Continues on three-hourly feeds of EBM with fortifier via bottle. Has had one large vomit following her feed at 23.15 hours."

Do you see that, Dr Bohin?

A. Yes.

Q. That's repeated again in the entry below that. Then finally -- I'm not going to all of these by any means but for 23 October now, page 7509. At the bottom of that page -- sorry, Mr Murphy, page 7509. At the bottom of the page the nurse identified as CNB, 23 October 2015 at 04.30:

"Care taken over at approximately 20.00 hours, cot space checked, including emergency equipment. All satisfactory. [Baby G] remained self-ventilating in air until 22.00 when returned to nasal cannula oxygen, .01 litres. Therefore 17 hours off oxygen. Fed by dad at 21.30. [Baby G] had large vomit with wind following feed."

And just to conclude this, something else to bear in mind, Dr Bohin, but I repeat it because it's a while since we had the evidence, we had a statement read by [Baby G]'s father, who said this, talking about 7 September, it's at page 1795 of the statements, my Lord:

"I have seen [Baby G] projectile vomit on other occasions since this incident..."

He was talking about 7 September:

"... where she has covered the cot. I think on these occasions they were linking her projectile vomit to reflux."

A. With the greatest of respect to [Baby G]'s father, parents quite commonly will report their child projectile vomiting and that doesn't necessarily mean the same

thing as health professionals would mean by projectile vomiting, where vomit would go some distance. What parents commonly describe as projectile vomiting is what I would say is forceful vomiting but not projectile as in it goes a huge distance.

MR MYERS: Those are my questions. Thank you, Dr Bohin.

MR JOHNSON: Does your Lordship have any questions?

MR JUSTICE GOSS: I don't. Thank you very much. Thank you, Dr Bohin. That's it at this stage, thank you very much.

(The witness withdrew)