Wednesday, 20 March 2013

(10.15 am)

(Delay in proceedings)

(10.28 am)

THE CHAIRMAN: Good morning.

MR WOLFE: Our next witness is Dr Robert Scott-Jupp, please.

DR ROBERT SCOTT-JUPP (called)

Questions from MR WOLFE

THE CHAIRMAN: Thank you for coming back, doctor.

MR WOLFE: Good morning, doctor. Could I commence by confirming that you have so far provided three written reports to the inquiry, which are in the sequence 222-002, 222-004 and 222-005, and can I confirm that you would wish to adopt those reports as part of your evidence to this inquiry to be supplemented by your oral evidence today?

A. Yes, I confirm that.

Q. I know that there's one factual correction you wish to make in one of the statements, which we'll turn to in a moment. But could we have up on the screen your curriculum vitae, please? It's at 222-002-001. Within that middle paragraph you set out what you say your credentials are. You are a consultant general paediatrician in a small district general hospital in England. That remains the case. This was written in

2011.

A. That's correct.

Q. You qualified in 1990.

A. That is a typo. I qualified in 1980, I'm sorry. I thought that had been corrected.

Q. You took up your consultant post in 1992.

A. That's correct. That is correct.

Q. It would have been a fast-track system if you'd qualified in 1990 and achieved consultancy in 1992!

And you say:

"[Your] consultant post involves care of children presenting acutely with a wide variety of conditions and [you] have some experience of the conditions relating to this case [that is Raychel's case]."

A. Yes.

Q. Could I just unpack that a little with you? Presumably you've experience of appendicectomy patients being on the ward in your general hospital.

A. Yes. Because I work in a small district general hospital, we have only one children's ward, which takes both medical and surgical children, and therefore children who present with surgical conditions such as possible appendicitis are admitted to our ward and we, as paediatricians, to a greater or lesser extent, get involved with them as well as the general surgeons that

work in my hospital.

Q. So I hesitate to use the words "perfect match", but it's a similar situation to what appears to have pertained in Altnagelvin in 2001, where you had a district general hospital with one paediatric ward which attracted a mix of paediatric and surgical patients.

A. Yes. It's similar. Our unit is a little smaller, but not much, and we probably have slightly fewer patients on the ward than in Altnagelvin, but a very similar medical staffing set-up, yes.

Q. You in your reading and your preparing of reports would have seen to some extent the potential for paediatricians to become involved with surgical patients. That's what happened from time to time over the course of Raychel's care; is that something you have experience of?

A. Yes.

Q. And we'll explore as we go through your evidence the extent to which the surgical and paediatric disciplines interacted in Raychel's care.

As you say in the last sentence of your credentials section, you're familiar with the standards of practice which were applicable in 2001.

A. Yes.

Q. Can we move just to the small factual correction which

you would like me to deal with? It's at 222-004-002, 1(d). Within 1(d), doctor, you reflect that your interpretation of the prescription sheet -- which one finds at 020-021-040 -- and I think you thought that that was the struck-out or crossed-out prescription of Mr Makar. You now appreciate that that was the crossed out prescription of Dr Gund.

A. Yes.

Q. As we will see as we move through your evidence, he wrote a prescription for Hartmann's to be continued post-operatively and then struck that out.

A. Yes, that's now apparent from what the witnesses have told us, but it wasn't apparent from the medical records as they were.

Q. Yes. Moving on to the substance of your evidence, can I ask you some questions in relation to the decision-making at the Accident & Emergency department and then into the decisions to operate? You have said in your report, 222-004-002, that:

"Raychel's initial assessment and management in the Accident & Emergency department and the decision made to plan for an appendicectomy for her were, in [your] view, entirely straightforward and in keeping with best practice."

You say:

"The history and symptoms of appendicitis were typical, with a typical duration of a few hours and a history of localisation of pain moving from the whole abdomen to the right iliac fossa. It is well recognised that even when the appendix is not inflamed, these typical symptoms can occur and because of the danger of missing an acute appendicitis, routine practice would have been to arrange an appendicectomy."

And that is your view, doctor; isn't that correct?

A. Yes.

Q. Let me now put to you a few points that appear to be in contention. Dr Kelly was the doctor on duty in the Accident & Emergency department when Raychel was brought in by her parents. He observed that she was in pain and decided, at or about 8.20 pm, to administer IV Cyclimorph as an analgesic. And Mr Foster, who's the inquiry's surgical expert, has considered this approach and criticised the use of a powerful analgesic in these circumstances because of the potential to compromise the surgeon's ability to interpret findings on examination. Have you thought about that issue?

A. Yes, I have. This has been a controversial area for many years as to what extent, in both children and adults, when somebody presents to hospital with abdominal pain, one should give analgesia -- that is

pain relief -- because there was a view -- and there still is a view in some quarters -- that by giving powerful pain relief, the signs are masked. That is to say, it makes it more difficult when assessing the patient's abdomen to decide what the problem is. The assessment of an abdomen in an adult or a child is dependent on finding tenderness, areas of the abdomen which are particularly painful or more so than other areas. That's particularly true of appendicitis.

There is an argument that by giving powerful analgesics, the areas of tenderness are not so apparent and therefore it's more difficult to make a diagnosis. The counter-argument is that by giving powerful analgesics, the patient is obviously more comfortable and more relaxed and that if there really is a problem there, it will still be apparent even if there are analgesics on board. In other words, some people argue that it makes the diagnosis easier rather than more difficult.

That has changed over the years in that, when I was a student, we were taught that surgical patients should not be given analgesia until they've been assessed and a firm diagnosis has been made, but over the years that view has changed and I think most paediatric surgeons -- I can't really speak for adult surgeons, but most

paediatric surgeons -- would think that it is acceptable to give analgesia when the patient first presents to hospital. Firstly to relieve suffering, because that is what doctors are here to do, but secondly because it might actually facilitate diagnosis. Children are often very anxious and tense and when a child is anxious and tense it's difficult to examine their abdomen. Some analgesia is likely to make them more relaxed and it is then actually easier to assess them.

Q. Yes. The inquiry has the evidence of Dr Kelly, who, if you like, put up a spirited or aggressive defence of his approach, based primarily on the view that as a doctor, seeing a child in pain, it is his job primarily to take that discomfort and pain away from her. But can I ask you this -- and I should add to that Mr Makar's evidence, the surgeon, was that he doesn't accept that analgesia would have masked the peritoneal signs of appendicitis. And both those views, I think, you appear to have some sympathy or understanding of.

A. Yes, I would agree with both those views.

Q. Could I put two points to you? There would have been other analgesic options available to the A&E doctor; isn't that right?

A. That's correct, yes. I have to say, going straight for morphine, which is what Cyclimorph is, without using

less powerful analgesics, was ... Not unacceptable, but perhaps going a little bit further than was strictly necessary at the time because I don't believe Raychel had had other analgesics such as paracetamol or ibuprofen, which are commonly used in this situation beforehand and they could have been given. Or morphine could have been given by mouth rather than intravenously.

Q. The second point is this: in terms of the decision-making around which analgesic to give and in this case the decision to give IV Cyclimorph, is that something that would be better run past a senior colleague as opposed to the relatively junior and inexperienced Dr Devlin making that decision for himself?

A. Dr Kelly, I think. Yes, it will obviously depend on the experience of the doctor. In this case, it was the first-line A&E SHO, I think, who saw Raychel. He may have felt himself competent, he may have faced this situation before, I don't know. But generally, because of this difference of opinion amongst surgeons as to what extent it masks the signs, I would think most first-line doctors would want the surgeon, who might be the person doing the operation, to agree to giving the analgesic before doing so.

Q. And it would appear that Mr Makar wasn't consulted in relation to this; the analgesic was prescribed and administered before he attended.

Can I move on to a second point that has raised some controversy in, if you like, the preoperative stage, and that concerns the evidence of protein in the urine? That's an issue you have considered.

A. Yes.

Q. I think you have said at 222-004-003 that:

"Children of Raychel's age often complain of painful urination just because they feel unwell without it being indicative of a urinary infection. One or two of protein in the urine may be normal."

A. Yes.

Q. Then you say -- is it "leukocyte"? Is that how you pronounce it?

A. Leukocyte, yes. White cells, yes.

Q. "The leukocyte and nitrite tests were negative on both occasions, which virtually rules out a urinary infection. It would therefore be acceptable not to send an urine specimen to the lab."

A. Yes.

Q. Could I now put Mr Foster's perspective to you? He has said in his report that one sample -- at least one sample -- should have been sent for culture and

microscopy before deciding to operate. He goes on to say that the surgeon here ignored an abnormal urine result and that that, in his view, was bad practice, that this issue should have been further investigated before a decision was made to operate.

A. Yes.

Q. Is that a view you can understand?

A. I disagree with Mr Foster on that specific point. As I said in my report, there are several points here. First of all, to have a small amount of protein in the urine -- 1 plus, 2 plus -- is a very common incidental finding you see in children all the time when you test for it. Often when you test them again later, it has gone away. It comes and it goes. It is not -- absolutely not -- diagnostic of a urinary tract infection. In fact, when a child does have a urinary tract infection, frequently there is no protein in the urine, so it is a very, very poor test for that.

The urine test that appears to have been used in Raychel's case also contained two other much more specific tests for urinary tract infection, which is the leukocytes -- as you mentioned, that's an indicator of the number of white cells in the urine. When somebody has a urinary tract infection, white cells are excreted from the bladder and kidneys and appear in the urine;

they can easily be tested for. Nitrites are a type of chemical that are produced by bacteria when there are bacteria present in the urine and they produce a positive response as well. If both those things are negative, whatever the protein is, that is a very strong indicator that there is no urinary tract infection.

Q. Perhaps just to finally deal with this point, if we could just illustrate that by putting the tests up on the screen for you to comment on. 020-015-030. It's a poor copy, Mr Chairman and doctor, but what we can see on this one, this appears to be an urine sample taken just at or about the time she's brought to theatre. There was an earlier one. On this one we see "PRO" and that's 2 plus of protein in the urine.

A. Yes.

Q. I think you've said that's not an uncommon finding.

A. It's not an uncommon finding at all. If I were to find that in a child coming in for some other reason, I would simply repeat it a day or so later and the likelihood is it would have disappeared.

Q. And then you say there are a number of more specific tests for the presence of infection. And we see -- is that "NIT, negative"?

A. "Nitrites, negative."

Q. And then "LEU" at the bottom --

A. -- is leukocytes. I'm not sure what the thing beginning with B is because it's blurred on this. That may be bilirubin. I'm not sure.

THE CHAIRMAN: Your point is that in terms of the protein, that's a minimal or a negligible indicator of infection?

A. Yes.

THE CHAIRMAN: And the other two elements, the nitrites and the leukocytes, are in fact negative?

A. They're negative. They're very sensitive indicators and for almost every child with an urine infection at this age, either one of both of those will be positive.

THE CHAIRMAN: So that's actually pointing fairly strongly away from infection in your eyes?

A. Yes, and I believe there was a repeat test later which showed the same thing.

MR WOLFE: This is the later test. If we could please go back one page -- I think it's to page 30 of the sequence.

A. Sorry, that was the second test, yes.

Q. Maybe it's page 31 I need to go to.

THE CHAIRMAN: Page 31 is the first test and 30 is the second test. 020-016-031. If you can highlight the bottom left, please. Thank you.

MR WOLFE: Yes. I can't see a time on this, but it would appear to be the earlier one. And following the listing

which is consistent with the later test, we can see 1 plus of protein in urine and then we can just see the "T" sneaking out there. That's the "nitrite, negative" and then at the bottom the "leukocyte, negative".

A. Yes.

Q. And presumably these urine tests are run as an attempt to get a baseline or to identify whether there's any suspicion of infection in the urine?

A. Yes. It's routine for children coming into a children's ward with a wide variety of conditions -- certainly abdominal pain would be one of them, but a fever, many other things -- for one of these urine tests to be done. In some situations, if there is an abnormality on this, then the urine needs to be sent to the lab for confirmation because this is just a preliminary screening test. However it's a very sensitive test, which means that if it is negative, the likelihood of finding anything on the full lab test is extremely low.

Q. So if you were running these tests, if you saw an abnormal nitrate or an abnormal leukocyte, you'd be wanting to send it off --

A. Yes.

Q. -- to the lab for urinalysis and culture?

A. Yes, absolutely, although I should add that in this case, even if those tests had been abnormal -- and they

frequently are even when there is no urinary tract infection -- the laboratory result wouldn't have been available for a couple of days anyway, so it wouldn't have had any direct effect on management.

Q. Yes. Let me move then along to the decision on management. The decision of Mr Makar was to go to surgery, to perform an appendicectomy because in his view -- and we have seen it in his written witness statement and in his oral evidence -- he thought the factors were there to support an operation that night.

THE CHAIRMAN: I'm sorry, just on your last point, doctor, if these results don't come through then, what is the value of the second test or even the first test result? Are these tests really for reviewing after the event rather than --

A. The tests that we're seeing in the notes are available instantly. These are quick tests. With a sample of urine, a dipstick, a little plastic stick is dipped into the urine and then put into a device that reads it and provides this printout. That takes less than a minute, it's very quick. If there is an abnormality, then either the same specimen or another specimen is sent to the laboratory. The laboratory will look at the urine down a microscope and make a more accurate count of the whites cells and bacteria in there and subsequently see

if there any bacteria are growing on culture. That takes time.

THE CHAIRMAN: So you would only delay the treatment if there was something quite significantly abnormal on the dipstick test?

A. Yes. If the clinicians suspect a urinary tract infection, a decision has to be made then whether one starts antibiotic treatment straightaway on the basis of the dipstick test or whether one waits until the confirmatory laboratory test is back and that would depend on many factors, how bad the symptoms were and how confident one was of the diagnosis.

THE CHAIRMAN: Thank you.

MR WOLFE: The decision to operate, doctor. You've expressed the view that it was appropriate to operate.

A. Given the history and the examination findings described both by Dr Kelly and Mr Makar, it sound as if Raychel had fairly typical symptoms of appendicitis. Therefore the decision to undertake an appendicectomy was justified, yes.

Q. In your report -- I think I read it out at the start of this segment -- the symptoms were typical:

"... typical few hours' pain over the peri-umbilical region, then localising [you say] in the right iliac fossa."

And you say:

"It's well recognised that even when the appendix is not inflamed, these symptoms can occur. Because of the danger of missing --

A. Yes.

Q. -- the indicator would be to go to surgery."

A. Yes.

Q. Could I put Mr Foster's perspective to you? He said that the decision to operate was reached on tenuous grounds. He says that the symptoms were of short duration. Raychel had come home from school that afternoon with some pain, had eaten a meal, her mother encouraged her to go to the toilet. This is all happening around 4 o'clock/5 o'clock. Then a decision is made to bring her to the hospital. Mr Foster then says there are no signs of inflammation, there was normal temperature, normal pulse. Dr Haynes, who's an anaesthetist, has provided a report saying the wisdom of proceeding to surgery so rapidly has to be questioned since she wasn't febrile, her white cell count was not elevated, the pain had decreased. Observations at that time that we're aware of show that the pain was in the region of zero to 1, albeit that that was a reading taken after the Cyclimorph had been administered.

So taking all those factors together, each of those

experts have said that the decision to operate was reached in haste and was premature.

A. I think, in 2001, things were different to how they are now. There was a tendency to do more operations out of hours at night than is currently the policy. It would have been very common practice for a junior surgeon or middle-grade surgeon to assess a child who came in at that time of night to make a confident clinical diagnosis of appendicitis and decide to take them to theatre that night. There has been a change in policy in that for a number of reasons there is now -- people are more inclined to wait and see whether the symptoms resolve on their own without surgery rather than taking the child to theatre. So that has changed.

By what would have been fairly standard practice at the time, what Mr Makar undertook was not unusual and, I think, probably justified by the type of policy that was being adhered to at the time.

Q. Was erring on the side of caution and deciding to operate more particular to female patients than male?

A. The reason for your question, Mr Wolfe, I think is that if there is peritonitis and if an appendix ruptures and causes peritonitis there is, in theory, a threat to fertility in female patients. I actually don't think that's all that relevant because peritonitis is a fairly

unpleasant disease whatever gender you are and worth avoiding, so I don't think that's so relevant, actually. Has that answered your question?

Q. It has. And of course we have Mr Makar's evidence, which says that there were various factors to support a diagnosis of appendicitis and to move quickly that night.

You have mentioned peritonitis, but what was the risk, if any, of taking some time to review the patient perhaps after the Cyclimorph effects had worn off?

A. I think by today's standards, a child such as Raychel presenting with those sorts of symptoms would be more likely to have been left overnight and reassessed in the morning as to whether an appendicectomy was necessary. And there are a number of reasons for that, why these things have changed. However, when that happens, when a surgeon makes a decision not to operate in somebody where appendicitis is a possible diagnosis, they're taking a risk, and the risk is that the condition can develop very rapidly, the appendix can burst, and if the appendix bursts -- and it can be quite difficult in children to assess when that is about to happen. If the appendix bursts then you have a much more unwell child, you have peritonitis, which can cause a lot of complications as I've mentioned and can make the child

really quite unwell, require more extensive surgery and a much more prolonged hospital stay. There is a risk -- the risk is small -- but there is a risk of that happening if an appendix is not removed when it's inflamed.

Q. Okay. So the decision is made to operate. Questions have arisen before the inquiry about the process leading to that decision. And Mr Foster again has cited the findings of an NCEPOD report dating from 1989, "Who operates when?". And if I could just put the summary of those findings up on the screen, please? We have them at 223-002-054. Could we just focus on the last of those, the last bullet point:

"Consultant supervision of trainees needs to be kept under scrutiny. No trainee should undertake any anaesthetic or surgical operation on a child of any age without consultation with their consultants."

If you like, it's a recommendation that applies both to the operator and the anaesthetist. First of all, can I ask you -- you're obviously thinking about these matters from the paediatric medicine side of the house and, to the extent that you can assist us, no doubt you will. What was the status of NCEPOD recommendations in terms of how they affected practice by 2001?

A. I'm probably not best qualified to answer that in

respect of the surgical confidential inquiry, which was NCEPOD. If I just mention at the same time, there was, if you like, a paediatric equivalent into unexpected deaths in childhood and in maternity, which I was more involved with, which a great deal of attention was paid to. However, to answer your question, from talking to surgeons I think people did take some account of it, but much less then than they do now. I think its status and its ability to affect practice has changed over the years.

Q. You have said in your reports for the inquiry that it would have been common practice at the time for junior surgeons at the level of Mr Makar to operate unsupervised and, secondly, so far as the anaesthetist is concerned, Dr Gund, you have found that he appears to have been considered competent to administer a general anaesthetic to a child unsupervised and that this was usual practice at that time.

A. Yes.

Q. Obviously, these matters can be taken up with the surgical experts and anaesthetic expert which the inquiry's yet to hear from. But if I could ask you this: you say that, in practice, NCEPOD recommendations are more complied with now perhaps than they were.

A. Yes, and there are many other reports and policies,

including NICE guidelines, which weren't around at that time, which oblige clinicians to comply in a way that NCEPOD didn't. Everything was optional then.

THE CHAIRMAN: So it's not that NICE wasn't there at the time, whereas NCEPOD was there at the time? Why is there more adherence to what NCEPOD recommends --

A. I think because the entire National Health Service has become much more orientated towards best practice, towards clinical governance. I could just sum it up in one phrase: clinical governance, which was not widely practised in 2001 in the way that it is now.

THE CHAIRMAN: Thank you.

MR WOLFE: If I can put this perspective to you: to the extent that the senior clinicians at Altnagelvin were aware of NCEPOD -- and that appears, on the evidence, to be reasonably patchy -- but even if they were aware, presumably it was a matter for the operational discretion of the surgical hierarchy to work out whether any particular operator was competent for the task.

A. Yes.

Q. Of course, the operator, Mr Makar, has given evidence that he held a conversation or consulted with his registrar, Dr Zawislak.

Can I move to the issue of fluid management in Raychel's case because you've offered some comments in

your report in respect of that? With regards to preoperative fluids, we know that by applying any of the battery of formulae that are available for calculating rate and volume that Raychel, applying that strictly, should have been given 65 ml per hour; do you agree with that?

A. Yes.

Q. However, Mr Makar prescribed 80 ml per hour and he has explained that he gave this extra because of a number of factors, including the fact that Raychel had been fasting since at or about 5.30, because of a concern in relation to the ambient temperature of the ward, which might affect her in terms of dehydration, and thirdly, he thought that in any event the fluids that he was prescribing were likely to be of short duration. This was 10 o'clock at night and it was likely, in his mind, that she'd be going to theatre within a short period of time. Have you thought about the evidence that he has given?

A. Yes. I think there is some justification for him giving a little more than what would be the standard maintenance amount of fluid. This is done not infrequently. The business of going to theatre, having an operate, does lead to fluid losses, as I'm sure he explained.

I'd also just like to mention that the difference between 65 ml an hour and 80 ml an hour isn't that great. It's only 15 ml an hour, which is less than a tablespoon full or a few sips, if you look at it in those terms. So in fact the difference in volume is not that great. I think the point about this case isn't so much that it was that there was a difference between the 65 and 80; it was that it was continued for so long post-operatively. It's the total quantity given during the day rather than the hourly rate that I think was the problem here.

THE CHAIRMAN: So the 65 to 80 wouldn't matter so much or might not matter at all if the rate had been reduced post-operatively?

A. Yes. If the rate had been reduced post-operatively or if a different type of fluid had been given, that would be entirely irrelevant, I think.

MR WOLFE: Let me move neatly into that post-operative phase. Starting with the preoperative prescriber, he has given evidence that his prescription was intended -- and strictly intended -- for the preoperative phase. But of course, post-operatively the same fluid and the same rate was used, so Raychel receives Hartmann's solution intraoperatively and is reconnected post-operatively to the Solution No. 18 at a rate of

80 ml an hour, and it stays in place even to the point of post-seizure, when her fluids were changed at or about 5 am on 9 June.

THE CHAIRMAN: Can we just pause one moment, Mr Wolfe? I think this is clear, but I think we should have it because you're moving on to post-op fluids -- we should have it on the record. It's quite clear from your report, doctor, but just for the record, there is no criticism of the conduct of the surgery itself. It was a standard appendicectomy, which was perfectly well performed.

A. Yes. I'm not a surgeon, so I can't really comment on surgical technique, but as far as I can tell from the records, there was no problem with that.

MR WOLFE: Mr Chairman, that helpfully reminds me of just one point I wanted to raise with the doctor, arising out of that, if he can help us at all.

The surgical report, which is in the papers at 020-010-018, says that the operation was performed. It was an appendicectomy and the findings were a mildly-congested appendix and a faecolith, then the "peritoneal clean fluid reaction [sic]". What is the significance of the finding of a faecolith?

A. Again, I'm probably not best qualified to deal with this because that's something that surgeons deal with, but

that's a tiny amount of faecal material that has got lodged in the appendix, which can be entirely benign. It may not, I believe, cause any symptoms at all and is frequently an incidental finding when an appendix is removed.

Q. And the finding of a mildly-congested appendix, I think you have said in your report -- correct me if I'm wrong -- that with the benefit of that hindsight, an operation may not have been strictly necessary, but the finding of simply a mildly-congested appendix is only something you can find after the operation.

A. Yes. The diagnosis of whether the appendix was inflamed or not is based on the histology report. Surgeons will quite often make a sort of rapid diagnosis just from looking at the appendix as to whether they think it was inflamed or not. In my experience, this is quite often wrong and the histology frequently fails to confirm the surgeon's initial impression as to whether the appendix was inflamed or not. The surgeon will take the appendix out anyway because it's an unnecessary organ, so in fact what the surgeon's impression of whether it was inflamed or not is to some extent irrelevant in terms of what they do at the time.

Q. If this wasn't strictly speaking an appendicitis then, can you help us at all in terms of what the alternative

diagnosis for her symptoms might properly be?

A. This is extremely common. One of the commonest reasons for children of any age, but particularly this age, to be admitted to a children's ward anywhere in the country is abdominal pain. One of the commonest reasons for GPs to send children up for assessment is they present with abdominal pain and the GP is concerned they might have appendicitis or, much more rarely, some other acute surgical problem. The majority of children that come to hospital with abdominal pain, with suspected appendicitis, do not have appendicitis. The problem is that it's very difficult to make a firm clinical diagnosis or sufficiently confident clinical diagnosis to rule it out when they are first seen. And even after the second and third examination, it can still sometimes be difficult. To make it more difficult, the investigations -- as we have already heard in this inquiry -- often don't help. One will frequently do blood tests, urine tests, but often they are non-specific or completely normal and the normal tests do not rule out appendicitis.

This really hasn't changed in the last 30, 40 years. Appendicitis has always been a difficult clinical diagnosis, even with modern technology. So for that reason, many children with abdominal pain where there's

a possibility of appendicitis are referred to hospital and frequently admitted overnight in order to see whether they develop into a more classic signs of appendicitis where they might justify an appendicectomy. So to answer your question of what the alternative diagnoses are, many of these children don't really end up with a very firm diagnosis. We have a term that encompasses these, which is often referred to as non-specific abdominal pain or idiopathic abdominal pain of childhood, which isn't really a diagnosis; it is a non-diagnosis, in a way, that you haven't found anything else the matter.

There is another diagnosis that's sometimes used, which is mesenteric adenitis. That refers to inflamed lymph nodes within the abdomen, but not in the appendix, which can often coincide with appendicitis. It's sometimes possible to feel these or to find them on an ultrasound scan. It's benign, it doesn't require surgery, it's often caused by a virus infection and it gets better. So mesenteric adenitis is another diagnosis that's sometimes used. Much more rarely there are other more serious diagnoses, of which there's a long list, that can cause abdominal pain in children, most of which are of a medical rather than a surgical origin and require various investigations and treatment.

Q. Very well, thank you. That's very helpful.

Moving back to the post-op fluids, if we would. In your report, you have noted what you've described as an important point of confusion. If I could take a little time to define that and you can say whether you agree with me. It appears that Dr Gund, as we reflected earlier, had written a prescription that was struck out. He says it was struck out because he was told that, as anaesthetists, they shouldn't be writing for the post-operative phase, that this issue of post-operative fluids would be looked at on the ward and he assumes that a doctor would attend to Raychel. Whereas in fact what happened was that no prescription was issued, the nurses picked up the preoperative prescription and continued with the fluids as they were preoperatively. Is that the confusion you were thinking about?

A. Yes. Would it be possible just to bring up my report?

Q. Of course, I can do that for you. It's 222-004-005.

A. Could you just go back to the previous page, please?

THE CHAIRMAN: Or put the two pages together.

A. Yes.

MR WOLFE: The confusion point you can see at the top of 2(h). I'm going to come back and ask you a question about 2(f), but if you could just help us with the confusion point and why that was significant.

A. The confusion as to whose responsibility it is to prescribe the post-operative fluids?
Q. Yes.
A. This, I think, was not unique to this case or to Altnagelvin. I think this happens not infrequently in surgical children.
Q. Yes. You've said -- this is at 2(h) again -- that:
"In [your] experience, the post-op fluid regime prescribed by the anaesthetists [that's presumably intraoperatively] is continued for the initial few hours, perhaps 4 to 6 hours, until the bag runs out."
That's your broad experience; is that right?
A. Yes.
Q. And then:
"In [your] experience, the nurses would normally request one of the ward doctors to prescribe more fluids if necessary or take the decision that IV fluids were no longer necessary."
THE CHAIRMAN: When you say "ward doctors" there, is that surgical doctors or paediatricians or either?
A. That statement was intentionally vague because the ward doctor would depend on what the policy was on each individual ward. In many departments it would be the surgical doctors, in some it might be the paediatric doctors. By that stage, it would probably not be the

anaesthetists because they would mostly only be responsible for the immediate post-operative fluids.
THE CHAIRMAN: Thank you. So that depends on local arrangements?
A. Yes.
MR WOLFE: Could I reflect to you a perspective that has been put forward by a number of experts, including Mr Foster and Mr Orr, whose report I understand you haven't seen, but I can summarise the perspective? That is that in the post-operative phase, there is a requirement to consider the child's fluid needs because it's different, potentially different, from the preoperative phase. And the expectation is that you would reduce intravenous fluids post-operatively, primarily to take account of the increase in secretion of antidiuretic hormone, which is a feature of surgical patients.
A. Yes. In most cases what would have happened in the immediate post-operative period after an appendicectomy is that the child would have improved, would have started drinking and the drip rate, the intravenous infusion rate, would have been turned down as a result of the child's improvement. Whereas, as in this case, they didn't improve, there probably wouldn't have been sufficient awareness and insight into the need to

re-adjust the fluid rate given that the child was having no significant oral intake. And I would imagine that that was fairly prevalent at the time. There was less understanding then, as you will be well aware, of the issues with excessive fluid given post-operatively. I think in most hospitals for a child who was not taking in oral intake at the time, people would not have reduced the IV fluids just because of an awareness of increase in ADH secretion, reducing urine volume. They might have been adjusted on the basis of abnormal blood tests, which is what should have been done.
THE CHAIRMAN: Just before we get to that, there's a number of issues there, but one of them is: should the rate of fluid have been reduced after the operation anyway? Do I understand that you agree that it should have been reduced? 80 was to allow for losses during the operation.
A. It was, yes.
THE CHAIRMAN: So post operation, do you agree that it should have been reduced?
A. Well, it depends what you mean by "should have". Physiologically, it should have been because the requirement was less. In terms of local procedures and practice, there was nothing in place that would have reminded or prompted the doctors to take that action.

It wasn't standard practice in children at the time to automatically reduce fluids post-operatively unless there was some other indication.
MR WOLFE: Just pause there. So what you appear to be saying is that Mr Foster and Mr Orr are absolutely right: physiologically, the fluids should have been reduced post-operatively.
A. Yes.
Q. Preoperatively, the fluids are deliberately too high. Post-operatively, the theory is absolutely right: they should have been reduced.
A. Yes.
Q. But what you're saying is that the local knowledge in very many units in your experience just wasn't there to do that, so the practice was perhaps to continue at the preoperative rate?
A. Yes. That would have been standard practice in many units, I believe, at the time.
Q. The experience that you have reflected, of course, is that post-operatively, for 4 to 6 hours or until the bag runs out, the fluid that was used was the intraoperative fluid, which would in this case have been Hartmann's.
A. Yes.
Q. So it appears that the local regime in Altnagelvin in

the way it worked on the ground was, unless the anaesthetist wrote for the continuation of Hartmann's, they moved to Solution No. 18 at the preoperative rate. Can I ask you this: does that approach then jar with your experience, which is that the anaesthetist's fluid should continue?

A. Well, there's really two separate questions there. There's the type of fluid and there's the rate of fluid. To deal with the type of fluid, for traditional reasons -- and I'm not entirely sure why this is -- but Hartmann's is used frequently in theatres, but rarely used on the ward. Anaesthetists use it, paediatricians don't. We almost never use it for paediatric medical patients, and that just seems to have been custom and practice for many years.

Then there probably would have been no bags of Hartmann's actually available on the ward, I guess. The question is --

THE CHAIRMAN: There was one, but it was in case rather than the standard -- it certainly was not the standard.

A. It wouldn't have been and I doubt on my ward there would have been bags of Hartmann's available. One could have get them, of course, but it wasn't standard practice. The question is: should it have been changed from Solution No. 18 to a more isotonic solution? Well, this

is the entire crux of this inquiry, of course, and of course, again, the answer is, physiologically, yes, it should have been, but the standard practice at the time at Altnagelvin -- as with almost every other hospital in the UK, I believe -- was to use 0.18 per cent or Solution No. 18 as the standard fluid for children for reasons that I think you may have already heard about.

So what the staff did was standard practice. In terms of the rate of infusion, yes, I would agree that some attention maybe should have been given to reducing the rate of infusion because children need more when they're actually in surgery and in the very immediate post-operative period than they might do afterwards. But the difference between what she was given and what she would have been given in terms of hourly rate wasn't that great, and so any doctor or nurse looking at an infusion rate of 80 ml an hour, it wouldn't have appeared on the face of it to be very abnormal.

In other words, you would have had to have got a calculator out to work out whether it was wrong or not; it wouldn't have been instinctively wrong. If, say, she had been getting 120 or 150 ml an hour, somebody would have thought, "That seems an awful lot", but for 80 ml an hour, not really.

THE CHAIRMAN: Then the point that you mentioned in passing -- and we'll come on to later -- is that the bloods should have been checked?

A. Yes.

THE CHAIRMAN: Which didn't happen?

A. Yes.

THE CHAIRMAN: And that should have come about because of the vomiting or the prolonged vomiting --

A. Because of the prolonged vomiting, yes.

THE CHAIRMAN: -- which you're not really sure was actually post-operative vomiting at all? I think you suggest that there might have been other causes for the vomiting.

A. There could have been many other causes, yes.

MR WOLFE: You've said 80 ml an hour may not have looked terribly abnormal. Of course, if there had been an understanding of the physiological need to reduce maintenance by -- from what Mr Foster says -- something in the order of 20 per cent, bringing it down to 52 or 54, as compared to the 80 for maintenance, a difference of that degree should have appeared abnormal if there was an understanding of the physiology.

A. You're right, it should have done, but there was not anywhere, I think, a widespread understanding of that physiology.

Q. Could I ask you another question just about process and fluids post-operatively? It would appear on Dr Gund's account that his expectation was that the child would be, if you like, assessed or examined on the ward when she got out of recovery for the purposes of post-operative fluids going forward, and of course that didn't happen. There was the ward round, which we will come to in a moment, but in terms of Raychel being released from recovery at or about 2 am and going to the ward, it was 6 or perhaps 7 hours before her fluids were looked at again by a doctor.

A. Yes.

Q. Could you comment on that? Was that poor practice?

A. It was not ideal practice, but I can imagine that a very similar thing would have happened in many children going to theatre at night for an appendicectomy. It's unlikely that their IV fluids would have been reviewed by anyone in the middle of the night until the ward round in the morning. Certainly the concept of reducing fluids post-operatively because of more ADH being secreted wouldn't have occurred to anyone to have adjusted the fluids because of that in the first maybe six to eight hours post-operatively.

Q. Let me move then to the ward round briefly, please. You have commented in your report that the ward round

conducted by Mr Zafar, the surgical senior house officer, was not untypical of your experience of your surgical colleagues.

A. Yes.

Q. You say:

"Routine surgical ward rounds are usually rapid as most of the patients are straightforward and decisions are simple. As they usually occur at the same time each day, a timing in the notes is generally unnecessary."

You go on to say that there's often time pressure to see all the ward patients early in the morning because of a full day's operating list:

"Surgeons will often rely on a quick report from the nurses on the patients' condition without necessarily consulting all of the charts."

So that's your experience of a surgical ward round?

A. Yes. Surgical ward rounds are very different to medical ward rounds. In a medical ward round it is the main business of the day, that's what we do, and we spend longer going through the notes, seeing the patients, examining them, speaking to them, and so on. For the surgeon, it is just something that has to be fitted in around everything else they do because the great majority of post-operative surgical patients, particularly children, do very well, don't require that

much attention; they just get better, recover from their surgery and go home. So there are usually fewer decisions to be made and less to be done on a surgical ward round compared to a medical ward round.

Q. Could I ask you a number of specifics about this? Mr Zafar attended. His advice it appears, in the round, was Raychel should have sips of fluid orally, and then if she's tolerating that, then you can proceed to reduce intravenous fluids.

A. Yes.

Q. Is that typical advice?

A. Absolutely typical. That's exactly what you would expect a surgeon to say on the first day post-operative ward round for a child who had had a straightforward appendicectomy.

Q. Applying general medical practice, is that plan for fluids something that should have been recorded by him?

A. Yes, it would have been best practice to record something in the notes to that effect, yes.

THE CHAIRMAN: But I think, to be fair to him, the note would have been almost equally vague, wouldn't it?

A. Yes.

THE CHAIRMAN: It wouldn't say, "Reduce fluids by 11 am", or, "Reduce fluid by 50 per cent by midday". The plan was -- and was clearly understood by the sister who then

took it over with her nurses -- that during the course of the morning Raychel should start sipping and, as she sipped and absorbed those fluids orally, then the IV fluids could be reduced and eventually stopped.

A. Yes.

THE CHAIRMAN: That must happen hundreds of times for children after appendicectomies.

A. It's absolutely standard procedure for children after appendicectomies and the nurses would normally be given the discretion to reduce the IV fluids as they saw fit as the child tolerated oral fluids without necessarily a doctor being involved.

THE CHAIRMAN: So although one could say: well, it would have been better if he had written something formally, in reality that would not have guided the nurses any more than they were guided by what he said orally.

A. Yes, that's correct. I think an experienced paediatric nurse should be able to make her own judgment to the extent to which the IV fluids could be reduced.

MR WOLFE: You have commented specifically in your report in relation to the non-attendance of Mr Gilliland, the consultant under whose care Raychel was admitted. At 222-005-005 of one of your reports, you say:

"In my view, his non-attendance, by the standards of the time, was acceptable practice."

This was a child who had been admitted overnight under the care of a consultant and had intra-abdominal surgery. Was it satisfactory by the standards of the time that she would be seen by a senior house officer without a registrar, without a consultant?

A. Well, again, like many issues here, this is something that it's easy to criticise judging by today's standards, and certainly today I think all children would be at least discussed and the greater majority seen either by a consultant or a senior surgical trainee and I believe that most surgical departments that see both children and adults would prioritise the children over the adults if there were a lot of patients to see, given that the juniors may have had less experience with children than they have with adults. In this case it appears that the opposite happened and the consultants saw the adults and the more junior surgeons saw the child. But that would have been common practice at the time, yes.

Q. Could I touch on one point that you might help us with? You've reflected your experience on the difference between a paediatric medical ward round and the surgical. The paediatric ward round more intensive, it was the work of the day.

A. Yes.

Q. The inquiry's heard evidence that in Altnagelvin one of the staples of the day for a child being on intravenous fluids on the paediatric medical side was an electrolyte profile, whereas on the surgical side if a child was on intravenous fluids, electrolyte profiling would rarely, if ever, be done.
A. Do you mean in an adult on the surgical side?
Q. On children's surgery.
A. I see what you mean. So comparing a medical child of the same age on IV fluids as against a surgical child on IV fluids? Clearly, if a medical child comes in and requires IV fluids, they've got a condition that has required them to need that. Most commonly gastroenteritis, but many, many other things as well. And one would most often be doing bloods to monitor the progression of the underlying condition with which they came in as well as checking their electrolyte status as a consequence of them being on IV fluids. So one would have really two reasons. For a child that is a simple, straightforward surgical case, because the diagnosis has been made and the treatment has been already given, doing bloods in order to help with diagnosis is unnecessary, and therefore the only reason to do bloods is to monitor their hydration, their response to IV fluids. So it's not quite a fair comparison in that

there are other reasons for doing blood tests in medical children on drips than there are in surgical children.
Q. Yes. You do refer in your report to a practice -- I hesitate to call it a 24-hour rule, but a practice which seemed to be in play at the time that if a child on intravenous fluids is still on intravenous fluids after 24 hours or so, the practice ought to have been to conduct electrolyte profiling. Could I perhaps have that up on the screen, please? 222-004-019. It is your answer to question 2.2.
A. Yes. This was custom and practice and has been, I think, for many years, long before 2001, that after 24 hours there is a greater likelihood of there being an abnormality in the urea and electrolytes that requires some change in the IV fluid regime. But as I've said here, that is not a rigid threshold. There may be many reasons why you'd want to do it before 24 hours, and in particular if 24 hours happens to fall in the middle of the night when the child's sleeping, it's not very nice to wake them up just to do a blood test when it probably should have been done earlier in the evening rather than later.
Q. And of course, short of 24 hours, if a child is, for example, vomiting or has diarrhoea, or what have you, that might cause a conscientious practitioner to want to

investigate electrolytes?
A. Yes.
Q. And we'll look at whether the factors were in place in Raychel's case as we move through your evidence for conducting electrolytes.
Just moving along the chronology, Raychel, the evidence shows, suffered a vomit at 8 o'clock. It's unclear whether Mr Zafar was aware of that. She suffered a further, a large vomit at 10.30, and on her mother's account, vomited undigested food at midday, a vomit that has not been recorded in the fluid balance chart. The fluids have continued to run at 80 ml per hour and, at or about 12 o'clock, the nurses recognised that the bag is about to run out and that, given the presence of vomiting, she's going to need further IV fluids.
With that context, I want to ask you some questions about Dr Butler, who attended, and she was a senior house officer on the paediatric side, so I think this is the first paediatrician, if you like, that I'm going to ask you to comment on. In your report -- and if I could have it up on the screen, please, at 222-004-023 -- you have commented on the role played by Dr Butler; isn't that right?
A. Yes.

Q. And I think it's in answer --
THE CHAIRMAN: I think it's 009, 222-004-009.
A. Yes that's the one.
MR WOLFE: I must have had some rogue referencing. You say, doctor, that:
"It's a very common situation on any children's ward that a passing doctor will be asked by the nursing staff to write up routine prescriptions."
A. Yes.
Q. And indeed, that appears to be the picture that has emerged in this case. Dr Butler has had no previous dealings with Raychel's case and is passing through, perhaps dealing with other paediatric medical patients, and she's grabbed, if that's not too indelicate a phrase, by a nurse.
A. Yes.
Q. What in your experience would you expect of the trainee paediatrician in those circumstances when asked to renew the prescription or continue the prescription for intravenous fluids?
A. Well, I think this is very difficult. Can I just give you an impression of how the average children's ward functions in order to answer that question?
Q. Sure.
A. The majority of patients on any children's ward in

a hospital like this, where there's only one children's ward, will be medical. The paediatric staff will be there virtually the whole day. The nurses will know them as well. They'll know them personally, they'll know them by name. The surgical teams will be much less involved. There may be many different surgical teams -- because there's not just general surgeons, there's orthopaedic, ENT, et cetera, et cetera; there'll be many different surgical teams -- and the most accessible doctors to the nurses will always be the paediatric team at any level, whether from SHO right up to consultant.

Surgical doctors can sometimes be difficult to get hold off for very good reasons because they may be in theatre, but even if they're not in theatre, they will be tied up with adults in a different part of the hospital, which may be a long way away and they may be extremely busy dealing with very sick adults on the surgical side and the children's ward is often quite a long way down their list of priorities. Part of the reason the children's ward is a long way down the list of priorities is perhaps, to some extent, they rely on their paediatric colleagues to do these minor tasks, these little things, for them without them having to spend a lot of time going there just to simply write up a simply prescription or carry out some fairly minor

task. That is how children's wards tick over. I think they always have done and they continue to do to this day.

This then leads to difficult questions of responsibility and accountability, this sort of thing, not just for IV fluids but many other things as well: taking blood tests, resiting cannulas, prescribing analgesia, pain relief, prescribing antibiotics, and many other routine tasks that have to be done. Not making big decisions, but just doing the routine tasks that the junior doctors do all day and every day.

If one were to institute a universal rule that no prescription, procedure or anything could ever be done on a surgical patient except by a surgical doctor, that would be highly disruptive to the running of every children's ward in the hospital, and I think that's an important point.

So although in theory accountability should be hierarchical in that each patient is under a consultant and that consultant's team, in practice it doesn't work like that. So I think in this particular case, Dr Butler was entirely -- her behaviour was entirely excusable in doing what the nurses asked her to without going into a lot of detail on a patient she didn't know.

One could say, yes, she should have asked a few

questions, she could perhaps have glanced at the notes and she could maybe have briefly examined the patient and that would have been ideal best practice, but the everyday practicality is that that can't happen.

Q. So what you're balancing is practicalities with, if you like, theoretical good practice?

A. Yes.

THE CHAIRMAN: In essence, there wasn't anything which was so obviously wrong with Raychel at about midday that Dr Butler might have been expected to do more?

A. Well, that depends on what she was told by the nurses and I know this is something else that you have discussed in this inquiry. But if she was told by the nurses that it was all straightforward, straightforward post-appendicectomy, not yet drinking enough oral fluids to come off the drip, surgeons are busy, please could you just continue the fluids, there would have been an element of trust on Dr Butler's behalf that her colleagues who had written up the original infusions had got the numbers right. One wouldn't necessarily have expected her to get out a calculator and recalculate the amount. That, I think, is reasonable, although ideally one could argue she should have done, I think it is excusable that she didn't.

MR WOLFE: There's briefly a second point, and I think

you've captured Dr Haynes' criticism there that -- I'll move on to the second point in a minute, but just to have it on the record: Dr Haynes makes the point that it is his expectation that the majority of paediatric trainees, medical trainees, would get the calculator out and assess accurately the fluid prescription before writing it and if that had been done, he says, then the excess of rate might have been identified.

A. The majority -- I don't know. Some would, some wouldn't. It would depend on how busy they were, it would depend on to what extent they trusted their colleagues who had written up the original prescription.

Q. There is a second point which I said I would come on to. That is, by this stage, taking all of the evidence in the round, Raychel had vomited three times: two that are recorded, and one noted by the mother, which isn't recorded. So if those three vomits happened, is the basis for the question: if she had been told that, is that the kind of feature that ought to have triggered contact with the surgical team by the junior paediatrician?

A. Well, if she had been told that, it could have justified continuation of the IV fluids because the usual decision to make -- in fact more often, if one is asked as a paediatrician to write up fluids for a surgical

patient, usually the question one asks is: do they really need it? Are they drinking enough now to actually come off the drip? So had Dr Butler been told that, her decision might have been, "Oh well, that actually is a good reason to continue the IV fluids".

The other question of whether because Raychel by this stage was vomiting was sufficient for her to tell the nurses to contact the surgical team for that reason is really a different question. By midday, which was, what, about 12 hours post-op, it's arguable whether that was long enough after the operation to cause concern or not.

THE CHAIRMAN: If it's arguable, that means you're beginning to get into the timescale for bringing in the surgical team.

A. Yes.

MR WOLFE: We will, in a short while, move on to what can be said about whether and at what time Raychel's condition ought to have attracted concern, but just one further fluids point, if we can, before we move on. In your reports you've reflected upon the fact that you haven't been presented with any written document giving guidance on the prescription of IV fluids that might have been applicable at Altnagelvin at that time. And you say that that was not untypical of most NHS hospitals at the

time.

A. Yes.

Q. You then go on to deal with what Mr Gilliland says at page 17 of his second statement. I don't need it up on the screen, but what he says is that:

"An estimation of the amount of vomiting and replacement of that fluid with 0.9 per cent saline or Hartmann's would have been better management."

You examined that. If we could have up on the screen, please, 222-005-005. At the very bottom of the page, what you say is:

"However, neither an estimate of the volume of vomiting nor the use of high solute-containing fluids was common practice in the paediatric surgical unit at Altnagelvin at that time."

I think that's citing what Mr Gilliland says, just to put it in context.

A. Yes.

Q. You go on to say:

"The practice of replacing gastric losses millilitre for millilitre with normal saline rather than hypotonic solutions was well established long before 2001, at least in children. This is mentioned in standard textbooks used widely at the time."

Then you cite those textbooks. And you go on to

say:

"However, in this case it would have required someone to make an estimate of the volume of Raychel's vomits to enable this to happen. This was not done --"

And then you surmise, if I'm right:

"-- because none of the staff considered them large enough to justify it."

A. Yes.

Q. That's a point I want to come back to, but can I tidy up the textbooks you cite? If I can go to 008 of this document. Those are the references and a brief quotation from each. The Lecture Notes on General Surgery; just on that, is that a standard publication used by surgeons?

A. The Lecture Notes on General Surgery is actually the standard student textbook, not even a postgraduate textbook, so that is a very sort of basic level textbook, which was I was able to find an edition dating from before that time. I think that one would have found similar advice even in older textbooks than that.

Q. And I think Mr Foster deals with that in his report. What the Lecture Notes publication contains is:

"Any additional losses should be replaced. For example, excessive drainage from a naso-gastric tube should be replaced intravenously by a similar amount of

normal saline or hyponatraemia and metabolic acidosis are likely to develop."

And then Sabiston, "A Textbook of Surgery", a typical textbook of that time; is that right?

A. Yes.

Q. "GI losses are usually isotonic or slightly hypotonic and are replaced with an essentially isotonic solution."

So going back then to 005 in the sequence, what you appear to be saying, doctor, is that, first of all, steps have to be taken, is that right, to identify --

A. Yes.

Q. -- gastric losses or an electrolyte imbalance?

A. Yes.

Q. And once that's done, then the job of the clinician is to work out how to replace those losses?

A. Yes. If I can just go a step back. It has been standard teaching and practice for many years before this, that where a child has had more major surgery than we're talking about here -- major bowel surgery or a situation where the intestine doesn't work at all for a few days -- to put a naso-gastric tube down and then to aspirate the tube, that is suck the stomach contents out of the tube. There are two reasons for doing that. One is to stop the child vomiting -- this is where the fluid from the stomach doesn't empty down into the

intestine because the intestine isn't working. So if you don't do that, the fluid will accumulate in the stomach and the child will vomit, which is unpleasant for the child. But also, when a child vomits, it's very difficult to quantify how much because it goes all over the place. By putting a naso-gastric tube down -- although putting the tube down is a thoroughly unpleasant procedure -- once the tube is down, it actually makes the child more comfortable and one can then quantify the amount of stomach fluid.

Gastric fluid varies in its composition, but it contains a much higher proportion of electrolytes than other types of fluid loss, and so although the child might be losing fluids from various mechanisms, gastric losses are particularly high in sodium and chloride and therefore it has been recognised for a number of years that part of the fluid loss when one is estimating how much fluid needs to be replaced, that part of the fluid loss should, even back then, have been replaced with normal saline as opposed to a hypotonic fluid. The problem in a case like Raychel's is, of course, there was no quantification of the quantity of gastric losses. I think it was justified not to put a naso-gastric tube down, but we can come on to that in a minute. Where there isn't a naso-gastric tube, staff tend not to

quantify the vomit. That is a fairly general failing in that, for very obvious practical reasons, it's difficult to do it. But there probably should be generally -- and certainly in this case -- a greater attempt to quantify the amount, how many millilitres of vomit have been lost. It is difficult.

Q. Yes. Just going back to the replacement issue, where Mr Gilliland is reflecting the view that replacement with 0.9 or with Hartmann's wasn't common practice at the time in Altnagelvin, are you saying that their practice was out of step with teaching that had been in place for many, many years?

A. I'm not sure what he meant by that, and it's something you may need to ask him. When he says "it wasn't common practice", what he might mean is that they didn't have many of the types of children that required that sort of treatment because they were treating fairly simple, straightforward cases. In other words, a child who had a much more severe and complicated surgical case would presumably have been transferred to Belfast and they wouldn't have managed them and therefore the staff wouldn't have been so accustomed to that procedure of giving normal saline replacements. So that may be what he means by that rather than they didn't know about it.

Q. But what you're saying is that, to avoid any ambiguity,

they should have known about it and where there was a need to replace, the appropriate replacement was a higher-solute fluid?

A. Yes.

Q. Just over the page, there's a point I wanted to pick up on before we move on to Raychel's condition. That is where you say, before we move on to Mr Zawislak:

"In this case it would have required someone to make an estimate of the volume of Raychel's vomits to enable this to happen. This was not done because none of the staff involved considered them to be large enough to justify it."

A. That's an assumption on my behalf. That may not be true, actually. That was my assumption.

Q. Can I ask you about that in these terms, while recognising that you might be speculating: the degree of vomit that was reflected on paper by the nurses was not an accurate reflection of the number of vomits that there were, and I think the evidence on that before this inquiry is fairly clear. So on the one part, you have Dr Devlin reporting a vomit at or about 6 o'clock that isn't recorded and you have Staff Nurse Gilchrist reporting that she has cleaned the bedclothes or changed the bedclothes at or about 8 o'clock and that vomit wasn't recorded. But apart from that and going back

earlier in the day, Mrs Ferguson reports the vomit at 12 o'clock that she says wasn't recorded, two or three vomits in the afternoon, which she claims haven't been recorded and equally Mr Ferguson has said there were three vomit fulls of a kidney dish that weren't recorded. I suppose the question comes to this: accurate recording of vomit in the fluid balance chart is essential to effective treatment of a child; is that fair?

A. Yes, it is. It depends what you mean by "accurate". Perhaps I'm appearing a little pedantic here, but on an intensive care unit, fluid balances are kept extremely accurately, so every millilitre that goes in intravenously and every millilitre that comes out through urine, faeces, or through a naso-gastric tube is accounted for and is very accurate. On a children's ward, that doesn't happen and it doesn't happen firstly because the need to do it isn't usually there because the children usually aren't that sick so it really doesn't matter, they sort themselves out. And secondly because there isn't the intensity of nursing care to enable that to happen to -- there isn't the manpower, if you like, to actually be able to do all that, which is very time-consuming.

Put another way, one reason to transfer a child to an intensive care unit is precisely so you can keep

a very close watch on their fluid balance. But on an average children's ward -- and I think that Ward 6 at Altnagelvin was probably no different to many other wards -- fluid balance is done poorly. I think it was done poorly here, but that was not abnormal for the time or even, I have to say, now.

Q. Yes.

THE CHAIRMAN: Sorry, I think there's really two points about your last point at the top of page 006, which says:

"None of the staff considered them to be large enough to justify it."

Well, they did in the sense that, in a rather imprecise way of doing it, but they had "vomit plus" or "vomit plus plus", and they had a scale which you may be familiar with from your own hospital in Salisbury of the number of pluses gave at least some idea of the volume of vomiting.

A. Yes.

THE CHAIRMAN: Even without the parents' view being taken, there are vomits which the staff acknowledge occurred, which are not recorded, and then the parents say there's even more than that. So there's some measurement of a volume of vomiting and there are undoubtedly unrecorded vomits. So I think your assumption in that

sentence looks a bit difficult to stand over.

A. I'm very happy to withdraw that comment because that was an assumption I probably shouldn't have made. However, I would just say that if anyone thought that the vomits were really that large so as to cause a significant fluid loss, then they should have been considering putting down a naso-gastric tube in order to measure them. If it had got to that stage that a more senior doctor was involved to make that decision, then they should have been checking blood tests at the same time.

MR STITT: Might I interject on this point? There is a matter which has been concerning me, and it is to do with the size of the vomits and, accompanying that, the type of the vomit because it's clearly going to be something which will be exercising your mind in due course, Mr Chairman, and perhaps now is a good time to bring this up. Could I ask for a document to be pulled up and then I'll put to you a question which, through Mr Wolfe, perhaps could be put to the witness? The document is Mrs Ferguson's statement, which is WS020/1, page 8. It's the paragraph (a) at the top, if that could be highlighted or magnified.

The background to my point, before I descend into the particulars, is this. This witness is an expert in paediatrics and we know that Raychel was 25 kilograms in

weight.

THE CHAIRMAN: Yes.

MR STITT: We have our chart showing the various vomits, but the evidence which we've just heard -- and is confirmed in statements -- is that there is a 12 o'clock vomit, which I'm going to turn to in a moment to formulate the question, and then it was put by Mr Wolfe that there were two or three unrecorded vomits, according to Mrs Ferguson, in the afternoon, and then Mr Ferguson will say that he witnessed three vomits in a kidney dish and that those weren't recorded. So that's generally the background to the unrecorded vomits.

If I may refer to this entry, there's a small vomit. I'll read it if I may:

"I now recall that, even before the 12 noon vomit, that at around 11 am Raychel vomited then as well. I think it was just a small vomit, but I cleaned this with a tissue. It was more like a slime."

So leave that to one side, that was just a read-in, as it were. This is the bit that I wanted to focus on:

"Then at 12, I remember carrying Raychel to the toilet with the intravenous drip also pushed by me as well. No one offered to help. She did use the toilet. Then I took her over to the sink in the toilet to wash her hands, but she said, 'I'm going to be sick'. Her

face was really red and I could see the sweat breaking out on her, although her head was cold to touch."

This is the bit:

"Then there was a huge vomit into the sink. I could see all the rice that she had eaten had come up. My first thought was that she had vomited because she was operated on with a full stomach."

Of course Mrs Ferguson is doing her best. She doesn't know if it's all the rice or not, but it's clearly a large vomit and it's undigested rice because it's identifiable as rice and it's still in the stomach. My question is this -- and if it could be put to the witness rather than me questioning the witness -- from his position of expertise, bearing in mind the age and size of Raychel, how much vomit as opposed to bile or other stomach contents can one reasonably expect? If one was looking for some form of telltale as to where the accuracy lies as to what happened later in the day as regards the vomits, we have nurses who have given their evidence and I know the Fergusons will give their evidence also. Because we have that reference from Mrs Ferguson and then there are further references in her statement to what are fairly significant vomits in the afternoon. And my question is: how much vomit per se can a child of Raychel's weight and size be

expected to produce?
THE CHAIRMAN: Is that a question you can answer, doctor?
A. Do you want me to respond directly to Mr Stitt?
MR WOLFE: Yes.
A. I'm tempted to say, "How long is a piece of string?", which is probably not a very helpful reply. Small children can produce surprisingly very large vomits in my experience. The stomach is a remarkably distensible organ and if enough fluid accumulates, even in a small child's stomach, and it all comes up at once, it can be quite impressive, even in a baby. A child can produce as much in a single vomit as a full-grown adult very easily. As I've said already, it is very difficult to quantify just from a vomit that goes in a sink or a toilet or all over the bed in terms of how much there is in terms of millilitres. If it's in a bowl, it's obviously much easier to quantify the amount. I'm not sure if that answers your question, Mr Stitt.
MR STITT: Well, it does give us a good physiological description of how these things operate. But I'm thinking more if one eats a meal at 5 o'clock on the 7th, is it likely that more stomach contents can be produced than was in the meal? Because presumably anything that was eaten before dinner time at 6 or 7 o'clock, 6 o'clock at night, will have gone through

the digestive system.
A. Just an interesting little sideline on this is Mrs Ferguson's very interesting observation that Raychel was bringing up what she had eaten maybe 18 hours previously, perhaps more than that, quite a long time previously, which should not still be in the stomach. The stomach should normally empty within 4 to 6 hours. I don't think it helps us very much with this, but it does suggest that Raychel had an illness that caused the abdominal pain in the first place that was associated with delayed gastric emptying. In other words, her stomach wasn't emptying as it should have been, presumably due to whatever illness it was that caused the abdominal pain because that's not normal to bring it up, undigested food, that long afterwards. To answer your question about can they bring up more than they had eaten, anybody's stomach is constantly producing gastric secretions, so you can have eaten nothing for many days and still vomit a considerable quantity of fluids which the stomach is producing all the time -- a mixture of acid, bile, mucus, all sorts of stuff. You can't really produce any more solid matter than you've eaten because the stomach doesn't produce its own solids; it only produces its own liquid matter. Is that satisfactory?

THE CHAIRMAN: Yes, thank you.
MR STITT: Thank you.
MR WOLFE: The point in your report that I was getting to was where you've said that none of the staff involved considered the vomits to be large enough to justify the investigations that you talked about. The point I wish to put to you is this: presumably, if all of the vomiting that did occur was reported, then it's less likely as a matter of common sense that a doctor would make that assumption.
A. Yes. Yes, I'd agree with that.
Q. In other words, it's important that the doctor has full information with regards to the vomiting so that he's in a best position to understand the severity of what he's dealing with and, in turn, that dictates the kinds of investigations he would want to do?
A. Yes.
MR WOLFE: Sir, it's 12.10. I was going to move on to a new section.
THE CHAIRMAN: Okay. I think you know the system, doctor. We'll break for 10 minutes and resume at 20 past.
(12.10 pm)
(A short break)
(12.20 pm)
(Delay in proceedings)

(12.25 pm)
MR WOLFE: Doctor, I want to move on to examining Raychel's condition during the day and into the night of 8 June. As we move along the narrative, we'll look at the interaction between the nurses and the junior house officers who came to attend Raychel.
I want to start by asking you a question about what might have been expected as the recovery pathway for Raychel. It's oft been said before the inquiry that no two children are the same and no recovery is the same. But could I ask you the question in this way? Raychel had had a mildly-congested appendix, a straightforward operation, had a good night post-operatively, and the expectation at the ward round, if Mr Zafar's evidence is to be accepted, is that he anticipated that the fluids would be gradually reduced during the day. Does that all fit with your experience of such matters?
A. Yes. The great majority of children with a straightforward appendicectomy, whether or not the appendix was inflamed, would expect, on the first post-operative day, to start taking some oral fluids, initially small sips, then greater amounts. As that happened, the infusion rate would have been decreased. I would expect, on average, that by the middle of the first post-operative day, the child would be off

intravenous fluids completely and, by the end of that day, on average, would be starting some solid food and, by the following day, possibly eating and drinking well enough to go home.

THE CHAIRMAN: Sorry, can you put that into this time sequence? If Raychel's operation was on Thursday night/Friday morning at about midnight/1 am, when might you expect her to be off fluids? Mid-afternoon or --

A. I'm intentionally being vague because I'm talking in generalities and averages.

THE CHAIRMAN: Of course.

A. So I would ... Obviously, a child doesn't eat and drink when they're asleep, so one tends to get them established on food and drink during the day, during the night, so even if the operation had been earlier the previous evening, one wouldn't really have expected her to start to eat or drink until the following day. So say even if the operation had been at 6 pm or 7 pm or something like that, then it wouldn't have been until later, so -- just because of normal day/night cycles. So -- but, yes, 12 to 24 hours post-operatively, if you want to put it in numbers.

THE CHAIRMAN: Thank you.

MR WOLFE: Of course, post-operative vomiting is not an uncommon phenomenon with children, we've heard,

particularly in the 5-to-12-years age bracket, where Raychel fell. You have said in your report at 222-004-017 that some children seem to be much more susceptible to post-operative vomiting than others and it is quite unpredictable.

A. Yes.

Q. And you think it's entirely reasonable that all staff should initially have attributed Raychel's vomiting to normal post-operative vomiting?

A. Yes.

Q. And there would have been no reason for them to consider any more serious diagnosis until much later?

A. Yes.

Q. So we have on the one hand, if you like, on the law of averages, smooth recovery, on oral fluids within a period of 12 to 24 hours, but it is not unusual to have vomiting, which might interrupt that recovery process; is that fair?

A. Yes. Some children get no post-operative vomiting at all of course. It's not universal. Some do and it generally settles 6 to 12 hours post-operatively.

THE CHAIRMAN: When that point was raised last week, it was then suggested to me: well, of course, she is asleep for the first 4 to 6 hours post-operatively, therefore you would not expect any post-operative vomiting in the

early hours of the Friday morning. So the fact that the first vomit was at 8 am doesn't suggest that that was not post-operatively vomiting. What do you think of that?

A. There are many different causes of post-operative vomiting. Sometimes one doesn't know the cause. Some of them will be less likely to happen when the child is asleep. If you, for example -- I think I gave a list in my report. Anxiety, which is one of the reasons, children are just anxious about being in hospital. Children can often vomit just because they're anxious. They're not going to vomit when they're asleep, if that's the reason. If it's something more physical, then they may do.

THE CHAIRMAN: So the fact that there isn't a vomit until 8 am doesn't really give us a steer in either direction about the nature of --

A. No. It's less likely to be one of the immediate operative causes of vomiting, ie the anaesthetic itself or the manipulation of the abdomen during the operation. That would cause, one would think, more immediate post-operative vomiting, but the other things, the delayed reactions to the analgesic drugs, antibiotics and, of course, the underlying problem of whatever caused the abdominal pain in the first place, which

might actually not be anything to do with the surgery.

MR WOLFE: And presumably an adequate response to the commencement of vomiting is for a nurse to observe, monitor and, if there is recurrence, to get a doctor along to carry out an assessment --

A. Yes.

Q. -- and perhaps consider for an anti-emetic?

A. Yes.

Q. Again, all cases are different, but thinking about Raychel's case: vomiting three, maybe four, times in the morning up to lunchtime, up to 1 o'clock, but a doctor isn't called along until 6 o'clock, a doctor doesn't attend until about 5.30/6 o'clock; is that too long a wait?

A. I think that's a very long time. Can I just tell you, knowing I was going to be appearing today, I did a straw poll amongst the nurses on my own ward the day before yesterday just out of interest. I gave them the hypothetical situation of a 9 year-old girl who had had a straightforward appendicectomy and I asked each of them how many -- I gave them a scenario: if a child was still vomiting 6 hours post-operatively, 12 hours post-operatively, 24 hours post-operatively, when would you call a doctor, if the child was on a drip, all other things being equal in a previously well child? They all

said they would call somebody at 24 hours and at 12 hours. At 6 hours, it was divided. Some said they would, some said they would wait a bit, and that's across a range of experiences of quite junior and quite senior. That doesn't prove anything, of course; it's just a straw poll I did. What I'm saying is most children's nurses would expect a degree of vomiting up to 6 hours at least and possibly a bit longer.

THE CHAIRMAN: But your own view is that not to call a doctor until whatever time it was -- mid to late afternoon on the Friday in Raychel's case -- was a very long time?

A. Yes, I think that was a long time.

MR CAMPBELL: The straw poll was conducted in 2013 and so much more knowledge of hyponatraemia is now at large.

A. Yes. I don't think so much knowledge of hyponatraemia, it's general awareness of a whole number of complications, but absolutely right. And I wouldn't want to make too much of my straw poll. I was perhaps hesitating whether I should have mentioned it or not and if you want to strike it from the record, please feel free.

MR WOLFE: And we have your own view, which is perhaps the more important view.

In your report, doctor, you have reflected upon, if

you like, the divergence of views in terms of just how unwell Raychel appeared to be by the late afternoon of 8 June.

A. Yes.

Q. If I can put it in this way. You have the parents' views and the views of some of the visitors that Raychel, by late afternoon on 8 June, appeared very unwell. So you have the vomits that they were saying were happening, which the nurses hadn't for whatever reason picked up upon, you had the mother coming back to the hospital after doing a school run, I think it was, at or about 4 o'clock and finding the child listless, retching, wanting to sleep, not being able to sleep, vomiting blood at 5 o'clock or a vomit with traces of blood. That's one perspective.

Then on the other hand you have the nurses saying the vomits that were recorded were the vomits that we were aware of and the child wasn't listless so far as we can tell. And that's your knowledge; is that right?

A. Yes.

Q. In light of that knowledge, you've offered if you like a nuanced view of what should have been done by late afternoon. You seem to be saying that, if you like, if the parents are right objectively, more should have been done in terms of investigating Raychel's condition;

is that fair?

A. Yes.

Q. Could you elaborate a little on that for us?

A. Yes. If I might just make a slightly more general point, Mr Chairman? Assessing a child, how unwell a child is -- and I obviously would say this as a paediatrician, but it's something which can be quite difficult and requires a certain amount of experience. It's more difficult than it is with adults. Of particular note in Raychel's case is that actually her observations, her vital signs were normal, and you need to look at more than just the vital signs when assessing a child of any age, but particularly younger children. Feeling that a child is not quite right, that there's something more than there should be for the illness that they've come in with is somewhat instinctive and somewhat subjective.

I would like to think, if you'll forgive a paediatrician's slight indulgence here, that we as paediatricians are quite good as that and I think we are better at it than our colleagues in other specialties because that's what we do. I think doctors who have very little experience of children -- and possibly nurses as well -- can miss these very subtle signs of a child being -- and people use words like "listless",

"not quite right", "not themselves", and, in fact, all the things Mrs Ferguson used in her witness statement. And it would appear to me that these factors were not picked up on, quite apart from the issue of the vomiting, and that her general condition, in a subtle and quite difficult to define way -- which is nothing to do with numbers and figures -- was not what it should be for a child who's recovering from a simple appendicectomy.

My view, if I might just take it a stage further, is that if a paediatric doctor had been involved at an earlier stage, even a relatively junior paediatric doctor like Dr Johnston, it is possible -- and I'm speculating here -- that that doctor might have picked up on Raychel being not quite right in a non-specific way, in a way that a junior surgical doctor who was not used to dealing with children would not have, and I think that's a very important aspect of this case.

THE CHAIRMAN: Thank you.

MR WOLFE: Can I attempt to confront what you've just said with a number of points? First of all, there's an important role for good communications between nursing staff and the parents of a child; isn't that right?

A. Absolutely, yes.

Q. And I think it was a cornerstone of nursing practice at that time that you had family-centred nursing care.
A. Yes.
Q. And it's oft said that parents are more capable of detecting subtle signs than nurses who don't know the child.
A. Yes, yes.
Q. So although you make the point that a degree of experience on the paediatric side is perhaps important and is what is perhaps missing from this case, experienced paediatric nurses have devices or equipment at their disposal, such as communication, such as observing the child more frequently, if they think it's appropriate, which can bring in the information which you think important.
A. Yes, and the parents' own instinctive feelings are vitally important as well. If I could just add something else that might be of interest, which is that in recent years something has been introduced of children's wards called PEWS, Paediatric Early Warning Score. This wasn't in use at the time. But the reason I'm mentioning that is that that is a mechanism whereby abnormal observations can trigger a nurse to contact a doctor if a child is causing concern, and things like a heart rate, blood pressure, et cetera, as you might

imagine. However, added to those things is parental concern and that is the, if you like, the added extra that goes on top of the numbers, the objective signs, that should in itself trigger concern.

Nothing like that was in use at all in 2001, so I'm not telling you that that's something that should have been done in this case. But I'm just making the point that parental concern is now considered to be much more important than it was then and it's something that can trigger a review of a child.

Q. It's useful then to build into this stage of the narrative the role played by Dr Devlin. Dr Devlin was a junior house officer on the surgical side and the evidence is that he had very limited paediatric exposure. So this perhaps comes back to the point that you've just made that he would not necessarily have had the experience or skill set to detect the things that needed to be detected.
A. Yes.
Q. Having said that, this was a child who the senior house officer at the start of the day expected to progress on a smooth or upward trajectory towards consuming oral fluids by about that time, I would have thought.
A. Yes, that's what would have been expected.
Q. So by the time Dr Devlin attended, should he not have

apprehended that this child was, if you like, deteriorating rather than getting better?
A. Yes. Well, I think this is one of the critical points of this case and I know witnesses have already discussed this. It all depends on what was made known to Dr Devlin at the time. I can't remember whether Dr Devlin said he examined Raychel or not from his statement.
Q. Let me help with you that. What he said was that he was told that Raychel -- there's a degree of vagueness about what precisely was told, but his impression or his memory is he was told this was an appendix patient who had been vomiting, please give the child an anti-emetic; he attended the bed without the nurse, so far as he can recall, the child was vomiting; he carried out a fairly perfunctory -- by his own admission, I think -- examination or assessment, and reached the view that it was okay to give the anti-emetic, which had earlier been prescribed on an as-required basis by the team in theatre.

So it comes to this: in his evidence, he said that the nurses weren't raising concerns with him. He would have hesitated about simply giving an anti-emetic if he appreciated that there were concerns.
A. Yes.

Q. So can I ask for your impressions of that and perhaps focus on the question which I just raised? Obviously, communications from the nurses and what they say is important. The doctor also has an assessment role; is that correct?
A. Yes.
Q. And should he also have known that, by that time in the afternoon, things were not going according to how you might have foreseen it earlier in the day?
A. To answer your last question, I would have thought that even at JHO level, the doctor should have been sufficiently aware that post-operative vomiting -- and this would apply to adults as well as children -- that long after, which by 5 o'clock was, what, 18 hours or so post-operatively --
Q. Yes.
A. -- is a very long time to attribute it to post-operatively vomiting. I think even at that level there should have been awareness. I would not have expected Dr Devlin or Dr Curran for that matter to have had the skills to assess Raychel. Going back to what you said about how he said he thinks he did a perfunctory examination, which may sound inadequate, but my feeling is that had a paediatrician done that perfunctory examination, they might have picked up the

subtle signs that Dr Devlin and Dr Curran didn't, as I have said previously. But I think there should have been an awareness that that was a long time post-operative vomiting to have been going on. It doesn't mean that it couldn't have been, but at that junior level it would have been worth considering other possibilities.

THE CHAIRMAN: I think the fairly basic question with Dr Devlin is whether he was brought in to do what the nurses were effectively telling him to do --

A. Yes.

THE CHAIRMAN: -- or the extent to which he had an independent role.

A. Yes. That's really important to the clinical governance aspect of this case, a little bit related to what I was saying earlier about passing doctors being asked to prescribe things is that when a doctor is asked to prescribe something, whether it's IV fluids or an anti-emetic, if they're being asked -- basically used almost as a technician to do it -- what is their line of responsibility? In many ways Dr Devlin was in a similar situation to that which Dr Butler was in earlier in the day in that he was a passing doctor. I don't think he was even a doctor on the team that Raychel was under; I think he just happened to be on the ward.

THE CHAIRMAN: No, there had been an inability to obtain a doctor from the team and he happened to be passing through Ward 6 doing something else.

A. So he was almost a random, passing doctor who was asked to perform this task, to give an anti-emetic, which of course surgical junior doctors spend an awful lot of their time doing in adults. That's one of their roles, to write up anti-emetics. And he just considered it presumably to be a routine thing that he was being asked to do by the nurses.

MR WOLFE: If I could be more precise about something that I've just said. I think I suggested he carried out an examination, albeit I used the word "perfunctory". His actual evidence was that he thought an examination was unnecessary when he gave evidence on 6 March. The impression certainly left with me -- and we can check the transcript on this -- he at least went through the rudiments of working out for himself that an anti-emetic was the proper approach. So perfunctory in all of those senses.

A. Yes.

Q. Could I ask you this then: the other experts who have looked at this have said that, objectively, by that stage in the afternoon an electrolyte profile was something that should have been done --

A. Yes.

Q. -- broadly speaking for two reasons: the continued intravenous fluid and the fact that Raychel had been vomiting. Whether or not we judge that Dr Devlin should have done that, do you agree with those other expert views that that should have been done?

A. That Dr Devlin should have taken a blood test for electrolytes before giving an anti-emetic?

Q. No, I'm separating that out. The expert view is that electrolytes should have been performed by that time in the afternoon.

A. Yes. I think, in my report, I was slightly more vague about that. But if the vomiting was as severe as it has now been revealed to have been and if Raychel's condition was as poor as we now know it was, then certainly it should have been done.

Q. Then just to go back to Dr Devlin, your impression is that even a JHO with limited experience in the nature of things should have been appreciative of the fact that to be vomiting 18 hours after surgery was unusual.

A. Well, yes. I mean, at a junior level, he should have spoken to a senior, I think, probably before doing a blood test or even -- although this wasn't common practice at the time -- gone straight to a paediatrician. In my honest view, that is actually

what should have happened rather than going to a surgical senior, but that wouldn't have been the procedure at the time, there or anywhere else.

Q. Just to be clear, you wouldn't necessarily expect this doctor to be thinking, "Right, I need to get electrolytes done", he should have realised that the vomiting was unacceptable and thought, "I need advice from a senior colleague --

A. Yes.

Q. -- to work out what should be done next"?

A. Yes.

THE CHAIRMAN: One of the points that has concerned me over the last few weeks is that the nurses have insisted that the vomiting which Raychel endured was not really that unusual and that's one of their explanations for failing to raise more significant concerns at the time. If that's right then what they're saying is that it wouldn't be unusual for a child after a standard operation, in inverted commas, like this to be vomiting through the morning, through the afternoon and through the evening. While accepting that that can happen, surely that would be unusual?

A. I think it's relatively unusual. You can have -- and some children do vomit unaccountably for no apparent reason for a long time after an operation. But I would

think they're a fairly small minority and the point is that you can't assume it's post-operative vomiting until you've ruled out other causes.

THE CHAIRMAN: And even if it is, as they think, not all that unusual, it's still worthy of investigation?

A. I would say so, yes.

THE CHAIRMAN: Thank you.

MR WOLFE: If we can then move along the chronology a little bit more, leaving Dr Devlin behind us, there is again some debate in the evidence about how quickly Raychel became unsettled after the anti-emetic was prescribed and administered. Mrs Ferguson, Raychel's mother, would have it that Raychel was vomiting within the hour. We know that Nurse Gilchrist cleaned up a vomit at or about 8 o'clock, shortly after that perhaps, which is two hours after the administration of the anti-emetic. More context for you: the father arrives at the hospital at or about 7 o'clock and is concerned about his daughter; a visitor arrives to see his daughter who's sitting nearby or lying nearby Raychel and witnesses vomiting at that time.

Can I ask you this: in terms of the anti-emetic that was administered, it was Zofran or ondansetron.

A. Yes.

Q. Is that considered to be a potent anti-emetic?

A. It's a relatively newer one. It hadn't been around for all that long. Cyclizine and Stematil and Maxolon, which have been around for a lot longer ... So it's ... It is thought to be more potent. I'm sorry I don't know the evidence of that, but it's often preferred in children because it has fewer side effects compared to some of the older ones.

Q. We know that Dr Curran prescribed and administered Valoid later in the evening.

A. Yes.

Q. I'm not asking for the science of it, but is there a difference in potency between the two?

A. Cyclizine has been around a long time and is a different class of drug to ondansetron. What would normally happen is one might use a first line one, what would have happened then, something like cyclizine or Stematil, which is prochlorperazine, as a first line and then moved to ondansetron if that wasn't working.

Dr Devlin, for whatever reason, decided to bring out the heavy guns first, if you like, put it that way round.

Q. And the heavy guns, on either account, if you like -- the mother's account or the nursing account -- hadn't settled the vomit, at least by 8 o'clock if not earlier, and I think you've reflected in one of your reports that

Raychel had received visitors and the description was that she didn't converse or communicate with a young friend who had visited, and you said that was far from normal behaviour.

A. Yes.

Q. So by the time of the vomiting on to the bedclothes at 8.15, or thereabouts, observed by Staff Nurse Gilchrist, was that a time for further action?

A. Yes. It was interesting reading Mrs Ferguson's witness report. 9 year-old children love their friends and for a little girl of that age not to react to a little friend coming to visit her, I think is quite striking. Even if she was really quite poorly and still not feeling all that well having just had an operation the night before, one would expect her to show some response. And similarly to other relatives visiting. So that struck me that things weren't right with her at that time.

Q. Of course again, it's proper for me to reflect that even around that timing, there's a conflict in the evidence in that Staff Nurse McAuley said in her evidence that she observed Raychel at or about 7.30 pm standing out in the ward with her brothers discussing the pictures on the wall, or some such effect, the impression being that Raychel was mobile and well at that point, a point

aggressively denied, if I may say so, by the parents, who were with her at that time. Is it possible for you to help us given what you know of the condition and how it's been described, even in the nursing notes?

A. I think that is an almost irreconcilable conflict between those two views. I don't know if this helps the inquiry or not, but if Raychel was at the very early stages of developing cerebral oedema as a consequence of the hyponatraemia, that doesn't always develop in a linear fashion. In other words, it can fluctuate, it comes in waves. It's possible that Raychel at the time that her friend visited was going through an early stage of diminished awareness, diminished conscious level and then later in the evening she was a bit better, well enough to walk around, but that seems quite unlikely to me.

Q. And then, building further factors into the picture, by 9 o'clock Raychel has had a medium coffee-ground vomit, followed some short time later by three small vomits and at or about that time was noticeably pale with a headache. Presumably the correct response then was to summon a doctor.

A. Yes. The issue of the coffee-ground vomit is actually significant. It's not significant, I think, inasmuch as the coffee grounds -- as I think has been explained to

you -- is altered blood that's been produced into the stomach, altered by the stomach acid and vomited up and it looks like coffee grounds. It's significant not in that the bleeding was of itself inherently harmful. It's unusual to lose significant amounts of blood that actually makes you unwell in that way; it's an indicator that there had been significant or moderate or moderately severe vomiting going on in order to produce this bit of bleeding in the stomach. Usually, but not always, that is as a result of fairly prolonged and fairly forceful vomiting, what's known as a Mallory-Weiss tear.

Q. Nevertheless, it's the presence of blood in the vomit that is an indicator, on one view, that vomiting has been severe and prolonged.

A. Yes, it can be.

Q. Albeit you have reflected in your report that you have seen such tears --

A. Yes. In my reflection, if you were to ask me: is it possible to get a Mallory-Weiss tear having vomited only once previously, I'd say yes, it is, and I've seen it. So it doesn't of itself prove that there has been prolonged vomiting, but normally it happens after there has been prolonged vomiting.

Q. And the headache, you say, was one of a range of

symptoms which, put together, should have prompted action --

A. Yes.

Q. -- albeit of itself it's not necessarily diagnostic --

A. Yes.

Q. -- of a big problem.

A. Of course headache is a terribly common symptom and children get headaches for all sorts of reasons and sometimes just say they've got a headache when they're feeling generally unwell for whatever reason. Cerebral oedema is a long way down the list of causes of headache, but it is certainly true that in the early stages someone who's developing increased pressure inside the head will complain of severe headache. But I don't think anyone would have made a diagnosis of cerebral oedema at that stage purely on the basis of Raychel complaining of a headache.

Q. Yes. So by this time in the evening -- and we're talking about that window between 9 o'clock and 10 o'clock -- Raychel had been on intravenous fluids for coming up to 24 hours; isn't that correct?

A. Mm.

MR STITT: Might I interject? I do apologise, but I hope it is in a constructive way. Could we just go back to two answers ago? It has taken me the two or three minutes

to find the reference. My note of the question and the answer was the question was -- it was a reference to the coffee-ground vomit and the answer was that it was significant. The witness then went on to say that it was indicative of significant vomiting. I hope that's a correct note that I've taken.

THE CHAIRMAN: It is an indicator of moderately severe vomiting, prolonged and fairly forceful, and normally a Mallory-Weiss tear follows prolonged vomiting but it doesn't necessarily follow prolonged vomiting.

MR STITT: The propensity of the evidence was it probably related to moderate and prolonged vomiting.

THE CHAIRMAN: Fairly forceful as well, moderately severe.

MR STITT: I think it's only reasonable for me to suggest, if I may pull up a reference --

THE CHAIRMAN: Go on.

MR STITT: 222-004-012.

THE CHAIRMAN: This is the witness's own report.

MR STITT: This is from the witness's second report. If we could highlight the top paragraph, 5(e), and magnify that. It's dealing with the observation of coffee-ground vomit:

"It occurs when there has been a small amount of blood ... It may occur in vomiting of any cause. In my view of itself it is not diagnostic of severe or

prolonged vomiting."

I have difficulty -- and I note the words "in itself" are put in there, but I had difficulty reconciling that statement with the answer given to Mr Wolfe.

THE CHAIRMAN: Is that not because the doctor said a few moments ago that he has seen it occur after a single vomit? Is that right, doctor?

A. Yes, it's very simple. It's not diagnostic is that it can occur when there hasn't been severe and prolonged vomiting, but it frequently does when there has. The "diagnostic" means that it definitely indicates that there has been. It frequently does, but not always.

MR STITT: So if I may put it this way: the witness is not saying that the coffee-ground vomiting is diagnostic in this case. In other words if you're looking, sir, for evidence to put in the balance as to whether there was prolonged and severe vomiting, this is not diagnostic of that, but not inconsistent with it.

A. Yes.

THE CHAIRMAN: I have to say, Mr Stitt, I would be astonished if it is the Trust's case that Raychel did not suffer prolonged vomiting. I would be utterly astonished.

MR STITT: No, I'm certainly not saying that, but I want to

going to the strength of the amount of weight that coffee-ground vomiting is being given in this case. I'm certainly not saying that there wasn't prolonged vomiting in this case.

THE CHAIRMAN: On that theme, doctor, Dr Curran said in his evidence that had he known that Raychel had coffee-ground vomiting, which he said he didn't know when he arrived, he would have regarded that as a red flag.

A. Yes.

THE CHAIRMAN: Dr Johnston wasn't quite on the same wavelength as him. Dr Johnston, who obviously got so many things right when he intervened, he thought: let's be a bit more careful about that. Is it something of a red flag?

A. Ironically, Dr Curran, as an adult -- primarily adult -- junior surgical house officer, would have learnt as a student that when a patient of any age vomits blood, it's a serious thing. He had no knowledge of paediatrics, so, yes, it should have been a red flag for him. A paediatrician with a bit more knowledge would have known, which Dr Curran wouldn't have known, that in children specifically, a small Mallory-Weiss tear following a relatively minor vomiting illness is actually quite common and not of any great significance.

So it should have been a red flag, but probably not for the reasons that Dr Curran would have thought it would have been at that time.

THE CHAIRMAN: Right, okay. Thank you.

MR WOLFE: In asking you as an expert, doctor, to comment on what should have been done for Raychel by that time of the night, your answer, I suppose, has to set aside at least initially what was or was not said to Dr Curran and we'll perhaps come to that in a moment. So the question is objectively, come 9 to 10 o'clock at night, what should have been done for Raychel Ferguson given all that we know about her condition and progress during the day?

A. Yes, well, it's really the same as at 5 o'clock, only more so. Dr Curran, again a very junior doctor, this time, though, he was the JHO on call for all surgical patients in the hospital that night, he wasn't just a passing doctor who had been asked to prescribe an anti-emetic. This patient was his responsibility for the whole of that shift, so that's slightly different. By that stage, the vomiting was going on for what was now about 20 hours post-operatively. I think he should have asked for more senior advice either from a member of the paediatric team or from his surgical seniors.

Q. So you're drawing a distinction between his acts or what

you would have expected in terms of his actions and what you might have expected from the actions of a senior colleague if a senior colleague arrived. What should a senior colleague then have done if brought to Raychel's bedside?

A. Examined her, spoken to the parents importantly, see what their concerns were, spoken to the nurses, looked at the charts, got some estimate of fluid balance, although that would have been difficult with the charts as they were. Also addressed urine output, by the way, which is something we haven't discussed yet -- but you may want to come back to that -- and then considered doing some investigations. There may have been many investigations. Obviously in this case it was the blood, urea and electrolytes, but depending on the findings there may have been other investigations to have been done, for example looking for evidence of infection, sepsis, which is actually a more likely scenario than hyponatraemia. So the various investigations would have been done for that and possibly, if it appeared there was an abdominal problem, doing some sort of imaging of the abdomen, X-ray, ultrasound and so on.

Q. And presumably, if urea and electrolyte profiling had been performed at that time, that would have identified

a low serum sodium?

A. It almost certainly would have been abnormal at that time, yes.

THE CHAIRMAN: Sorry, even before the bloods come back, would the level and type of fluids attract attention or do you wait for the blood results to come back?

A. Are you talking at 9 o'clock?

THE CHAIRMAN: Yes.

A. Before she'd had the seizure. No, you wait for the blood results to come back, I think.

MR WOLFE: And a point you've made earlier, if the bloods had come back showing low sodium, good practice would have dictated that you would think about changing the rate and think about changing the type of fluid?

A. Yes.

Q. And as you've said earlier, normal saline or Hartmann's would have been indicated on a low sodium result.

A. Yes. I'm speculating now, but if say, for example, the sodium had come back around about 130 or well below the normal range, but not as low as it was when it was done a few hours later, then the correct action would have been to reduce the infusion rate and to change to 0.9 per cent saline.

Q. Just in case I forget about it, you've mentioned the fact that we haven't really discussed urine output.

A. Yes.
Q. And you say that's relevant to be considered at this point.
A. I think it's very relevant, yes.
Q. What the fluid balance chart showed us -- I don't think we need to put it up on the screen -- is at about 10 am that morning there was a record of her having passed urine. We know from the parents that at least the mother brought her to the toilet and urine was passed at some point during the day, perhaps at about 12 o'clock before the vomit that the mother talks about. That wasn't recorded. So in terms of urine output, come 9 or 10 o'clock at night, what were the considerations that were relevant?
A. Well, correct me if I'm wrong, but as far as I can tell from the charts and all the witness statements, there's no record of Raychel having passed urine at all or having wet the bed from the middle of the day right until she deteriorated. That's a very long time for a child to go without passing urine, particularly if they're on a drip. So we know she's getting fluids so she's not dehydrated and she is not passing urine and, in terms of what actually happened to Raychel, I think that's highly significant.
MR CAMPBELL: Mr Chairman, with regard to that point, we do,

however, have evidence from the parents that she walked to the toilet on a number of occasions and we have that corroborated by Sister Millar.
THE CHAIRMAN: Well, we have her walking with -- Sister Millar says she saw Raychel walking with her father, right?
MR CAMPBELL: Yes.
THE CHAIRMAN: I think Sister Millar's assumption is she was walking to the toilet, but I'm not sure if it's a fact that she was necessarily walking to -- was she actually going to the toilet, Mr Coyle?
MR COYLE: [Inaudible: no microphone] the incident of her going to the toilet as is recorded, sir, at midday, but I don't think the parents agree that she -- certainly Mr Ferguson never took her to the toilet.
THE CHAIRMAN: And the time she went to the toilet was with her mother and that was the time when she was very sick.
MR COYLE: Yes, that's the same instance. It appears in the statement that Mr Stitt referred you to earlier, sir, but it is not agreed. And Mr Ferguson will say in his evidence that it would have been inappropriate, given her age, for him to have attended the toilet with her. That didn't happen.
THE CHAIRMAN: So Mr Ferguson says he didn't take her to the toilet?

MR COYLE: No.
THE CHAIRMAN: Mrs Ferguson says she took her to the toilet once.
MR COYLE: Exactly, sir.
THE CHAIRMAN: I think the nursing evidence, Mr Campbell, is that there's an assumption on Sister Millar's part --
MR CAMPBELL: That might be correct, yes.
MR WOLFE: The witness captures Mr Campbell's point. If we check the transcript, he said there's no evidence from about the middle of day that there had been urine and I think that captures the point made by Mrs Ferguson that there was an urine output perhaps at about the middle of the day when the vomit occurred.
MR STITT: I don't want to appear to be nitpicking, but it has been emphasised by the witness that this is -- he regards this as an important aetiological point and I would just like, for completeness, to refer to the fact that Mrs Ferguson does say -- to be fair to her, I'm sure it's terribly difficult for her to remember exactly for all sorts of reasons -- but she does say on page 11 of her statement -- and I will just read it, it's only one sentence:
"I am not sure. I have a memory of taking Raychel to the toilet again."
That's after the 12 o'clock because we deal with

12 o'clock and mum goes with daughter and she thinks, but she's not sure, but I just want to put that in the balance.
MR COYLE: She also says, "I may be wrong", so it's put forward by Mrs Ferguson most tentatively.
MR STITT: That's accepted.
THE CHAIRMAN: There's a possibility that Raychel was taken to the toilet one time beyond midday at some undefined point by Mrs Ferguson, but that is the only evidence there is of Raychel passing urine after the middle of the day. Even if she did go once beyond the middle of the day, do you still have a concern about the lack of urine being passed by a girl who has been on a --
A. Yes. I think that's very important, if I may say so, Mr Chairman. One small point is that young children will often think they need to go to the toilet when they don't very much and they'll go and not do very much. The fact that Raychel may have walked to the toilet once or twice does not really mean very much in terms of fluid balance. So that's one point. But can I just expand on why I think this is important?
THE CHAIRMAN: Yes.
A. Raychel's profound hyponatraemia was due not only to being given quantities of hypotonic fluid; it was because in my view -- and this is my opinion -- she did

have to quite an excessive degree this thing that we've mentioned called inappropriate ADH secretion, that is a secretion from the pituitary gland of this hormone, which in certain circumstances the body produces in too great quantities, which shuts the kidneys down, stops the kidneys producing urine. There are many causes for this, as I think this inquiry's heard a number of times.

The key to making that diagnosis, apart from doing blood tests, prior to doing blood tests, is the lack of urine output because that's what it does: it stops the kidneys producing urine. It is easy to see and if you have fluid going in and none coming out, too much fluid builds up in the bloodstream. If this fluid is hypotonic, as it was in Raychel's case, that leads to dilute blood and hyponatraemia, which led to the problems. And so although the vomiting was obviously important, the lack of urine output, I think, in my view, was equally important.

MR WOLFE: We had a bit of a debate there about the evidence on the inquiry documents about output from urine. Of course, what was available to the doctors and nurses that night was a fluid balance chart, which reflected one episode of urine output at 10 o'clock, 12 hours earlier; isn't that right?

A. Yes.

Q. And what you seem to be saying is that was, if you like, another red flag --

A. Yes.

Q. -- for investigation.

A. Yes. Going back to one of your previous questions, "What should a junior doctor or a more senior doctor, for that matter, have done if they were to assess Raychel at those times?" One of things that they should have done was look at the urine output, look at the chart. If they felt the chart was unreliable, ask the parents, the nurses, or even the girl herself how many times she had been to the toilet and how much wee she had passed. And that is something that a more experienced doctor would have done that perhaps the junior doctors wouldn't have thought of.

MR WOLFE: I want to come back after lunch and finish this sequence by just looking a bit more at the particulars of Dr Curran's input before moving on to the activity post seizure. I think we could usefully break for lunch now.

THE CHAIRMAN: We'll break. We're on track, doctor, to have your evidence finished, I think, by mid-afternoon. Professor Hanratty will be here to add to the evidence that Ms Ramsay gave yesterday. We'll get through both of those this afternoon. We'll resume at 2.15.

(1.18 pm)

(The short adjournment)

(2.15 pm)

(Delay in proceedings)

(2.22 pm)

MR WOLFE: Good afternoon, doctor. I want to bring you straightaway to Dr Curran's input into Raychel's care. If I could start by contextualising by reference to what he says he thinks he was aware of at the material time. He said in his evidence that he was simply asked to prescribe an anti-emetic. He draws a distinction between being asked to provide an anti-emetic and making an assessment of a child. He didn't make an assessment, albeit he carried out an examination of her abdomen because, of course, she had surgery in that region.

He claims that he wasn't told about the coffee-ground vomits and, if he had been told, as I think the chairman mentioned to you earlier, that would have been a red flag for him. Can I ask you this: on reading your report, you say at 222-004-012 that in summary, in your view, by 2100 hours on 8 June, with Raychel continuing to receive all IV fluid and very little by mouth, and in the presence of her persistent vomiting, an assessment of her blood electrolyte status was appropriate.

A. Yes.

Q. You go on to say that that was appropriate, even if the symptoms of coffee-ground vomits and headache were not appreciated.

A. Yes.

Q. Can I just translate that and correct me if I'm wrong? Are you saying that even if the doctor attending, and it just happened to be Dr Curran, wasn't aware of the coffee-ground vomits, wasn't aware of the headache, the fact of vomiting coming up to 20 hours post-operatively, the fact of the continuing fluids now coming up to close to 24 hours from the commencement at 10 o'clock the previous night, they were the main factors that ought to have been taken into account when deciding on the action to take?

A. Yes. As I said previously, 20 hours is a very long time to be able to categorise this vomiting as post-operative vomiting. That's too long after the surgery. So irrespective of whether there was coffee grounds -- which as I said previously I don't think is all that critical -- or whether or not Raychel was complaining of a headache, the fact that she was vomiting significantly and copiously, as it appears she was, so long after the operation should have prompted an assessment for other possible causes, and that should have been apparent to

somebody at Dr Curran's level of seniority, I think.
Q. I see. So in that sense -- and others can take their own view on this -- I think that Mr Foster, the surgeon, says that while it would of course have been appropriate for nurses to communicate effectively with Dr Curran by showing an indication of concern, nevertheless Mr Foster says Dr Curran should have used his own initiative.
A. Yes. I think when an inexperienced doctor is out of their own environment, particularly in what may be considered, to them, the alien environment of a children's ward, they are very much guided by the nurses. It would be wrong to me to say the obligation was on the nurses to tell the junior doctor exactly what to do. However, in reality, experienced paediatric nurses are much better at assessing children in many situations than a very junior doctor who's had very little to do with children. That happens all the time. So I can understand from Dr Curran's point of view that if he thought that these very-experienced nurses weren't all that concerned, if that was his perception, he may have been biased against calling a senior because he sensed that the nurses didn't feel it was necessary. He may have got that impression at the time and that might have discouraged him from contacting a senior.
Q. Yes.

THE CHAIRMAN: But isn't there one other point that Dr Curran made, which is the very fact that they called him, as a junior house officer, led him to think that the concerns were not significant?
A. That's a very interesting question. Is the onus on the nurse to deliberately bypass the most junior tier and go to a more senior tier if she thinks that there is a problem or should she stick to the rigid hierarchy and that varies very much from one unit to another, from one ward to another on what the prevailing culture was.
MR WOLFE: Could I bring to you another point which is germane to the action that Dr Curran should or shouldn't have taken? You've said, reflecting upon the fact that Dr Curran in his witness statement was unable to recall whether he was aware of the first anti-emetic, you have said at 222-005-004 that it should have been clear from the drug prescription that the Zofran had already been given, and you say this is significant because the lack of any improvement after the first anti-emetic should have prompted a reassessment.
A. Yes. Well, in any situation if you have a problem, you have given a treatment and the treatment doesn't work, rather than repeating the treatment, you think about what else the problem might be. That's talking in very general terms. In the specific, as we were discussing

previously, in anti-emetic prescribing, he actually prescribed what's generally regarded as being a less potent anti-emetic than what had already been given.
Q. So is it implicit in what you're saying that the doctor attending at the request of a nurse should do a bit of digging around to see what the recent history was and, if he had done that, he would have inevitably checked or should inevitably have checked the drug kardex to see what the full picture was?
A. The drug kardex is one thing, yes, but also the fluid charts, the previous notes, the operation notes and spoken to the parents as well, which didn't seem to happen. However, I qualify that again by saying that Dr Curran was at a very junior level. He would have reasonably expected to be guided by the nurses' generally feelings, even though the nurses may not have felt able to tell him exactly what to do, but what level of concern there was. So I think he has some justification in arguing that he didn't get that impression at the time.
THE CHAIRMAN: And interestingly, Dr Devlin said:
"If it had happened to be me who was called out for the second time, I think I would have been more likely to pick up that there was something more amiss."
And this is your point, which is made elsewhere in

your report, about people coming in and seeing Raychel once and only once.
A. Yes.
THE CHAIRMAN: That invites trouble, doesn't it?
A. It does. That's a really important point, Mr Chairman, about continuity of care. It's a huge issue throughout the NHS generally and I have to say that's one thing that's got worse since 2001 because doctors now work shorter shifts, so continuity is a problem. It's only human nature: if you come back to see someone yourself, as opposed to someone else as seen them, and you perceive they're worse than they were when you saw them the first time, you are more likely to take action than if somebody else had because you wouldn't have had the original impression that your colleague had.
MR WOLFE: Dr Curran signs off on the drug kardex at 10.15. There is a controversy, I suppose on the evidence, in terms of whether he spoke to any of the nurses. He seems to think that he did in his written witness statement. The nurses appear to have had no contact with him.
The next development of note is a further vomit written into the fluid balance chart at or around that 11 o'clock slot. You know the way the chart works, it's between two times.

You have said in your report:

"In my view [this is at 222-004-011] the lack of response to the first anti-emetic [that's, if you like, the Devlin anti-emetic] after four hours and certainly the lack of response to the second one should have prompted more concern and discussion by the junior medical staff with more senior colleagues."

A. Yes.

Q. So we've looked at the first one, obviously, and that was followed up by Dr Curran's involvement. What do you mean by "the lack of response to the second anti-emetic"?

A. She continued to vomit, I think. There was a short period where she didn't, but if I've got the timings right, she vomited --

Q. Certainly Staff Nurse Patterson, passing through the ward, is handed by the parents another vomit tray, which she puts into the fluid balance chart at or about 11 pm. There was then an unrecorded vomit or trace of vomit -- it depends how the evidence is viewed -- at or about 12.30. The nurses in their evidence say this was a mere spot on the pyjama top and they were, I suppose, unsure whether this was new vomit or a trace from an earlier vomit. So just to be clear, whenever you talk about the lack of response to the second anti-emetic, is that

a reference to the fact that a further vomit is reported by 11 o'clock?

A. Yes. The purpose of giving an anti-emetic is to stop vomiting and it clearly didn't.

THE CHAIRMAN: Sorry, can we bring this up, Mr Wolfe? I wanted to bring up one point. 222-004-011, please.

MR WOLFE: That's the answer to 5(b), I think.

THE CHAIRMAN: Yes. If you can highlight 5(b) for us, the middle third of the page. It's on the fourth line down, doctor:

"in my view, the lack of response to the first anti-emetic after four hours and certainly the lack of response to the second one should have prompted more concern and discussion by the more junior medical staff with more senior colleagues."

In terms of the lack of response to the second anti-emetic, the junior medical staff were not brought back in after that until the seizure.

A. Yes, I accept that. And maybe the way I phrased it there, I didn't take recognition of that.

THE CHAIRMAN: I just want to see: does that mean that when the nurses knew or should have known that Raychel was still vomiting after the second anti-emetic, that should have caused them to make further contact with doctors and perhaps at a level above JHO? Because by then the

vomiting's longer, there's a second anti-emetic and so on.

A. Yes. There was enough time for the second anti-emetic to work if it was going to and it clearly hadn't. Yes, I agree, they -- I think the nurses should have made some contact. Whether they should have bypassed the junior house officer and gone to somebody more senior, as I said just now, it is a debatable point.

THE CHAIRMAN: That's the local practice point, is it?

A. It's the local practice point, exactly. My personal view is they should have gone straight to a paediatrician, but that wasn't the practice at the time.

THE CHAIRMAN: Thank you.

MR WOLFE: You have made a point at various junctures about the role of the paediatrician, not unnaturally because you're a paediatrician yourself. Is there a particular issue there about the fact that, on a mixed ward such as this, you have probably very many more paediatric medical patients and the evidence tells us maybe only three or four surgical patients at a time? Surgical patients tended, at least in those days, to be cared for by the surgeons. Do you see a role or do I interpret some of your answers as suggesting that you see a greater role for paediatricians in the care of

surgical patients?

A. Yes. I can give you my views on that if you want, although it is very much a personal view and I'm not speaking on behalf of all my colleagues in the profession. I feel that surgical children in a district general hospital that does not have specialist paediatric surgeons -- it would not be the same in a teaching hospital -- but in district general hospitals where surgical children are looked after by general surgeons whose primary responsibility is to adults and some of whom don't have much paediatric training, the primary care of all those children, whether or not they have an operation, should rest with the paediatricians, certainly for the younger ones. Arguably, for the teenagers, they could be under the adult surgeons.

That's from admission because, as we've already discussed, many children who come in with acute abdominal pain turn out not to have a surgical condition, but also to their post-operative management as well because paediatricians are, in my view, better at assessing children's hydration, their general state of functioning and whether they may have infections and all these factors we've already been discussing. And also, better at doing the practical procedures, importantly, doing the things that children don't like

very much, like having cannulas put in and blood taken, which I think we do with greater skill, I have to say -- our surgeons have other skills, but I think paediatricians are better at doing those sorts of things. This is happening increasingly, but I still think there is a potential problem there.

THE CHAIRMAN: By way of illustration, does that happen in Salisbury or not?

A. It has changed a lot. I'm glad you asked me that, Mr Chairman. I don't want to take up the inquiry's time too much with stuff that isn't directly relevant.

THE CHAIRMAN: I'm trying to illustrate the point.

A. The issue of who they come in under -- the policy in my hospital changed about five years ago in that all children of whatever age with abdominal pain, even if the GP admitting -- the doctor who sends them up suspects that it's appendicitis come in under the paediatricians. That is now a universal rule and so they're assessed by us. More often than not, we don't need to involve the surgeons. We can either make a medical diagnosis and treat it -- for example, a urinary tract infection -- or we decide it's non-specific abdominal pain, not appendicitis, observe them overnight and send them home. We only involve the surgeons if we have a strong suspicion. So in that

respect it's changed.

The post-operative management is usually joint in that we both teams are involved. Just going back to what we were discussing about ward rounds earlier, we try as much as possible to have a joint ward round so that when the surgeons see a child on the ward in the morning, one of the paediatric team is there with them and that doesn't always happen, but we usually try and make sure that happens. So things have moved on since then.

However since 2001, I have to say in my own ward it wasn't much different to what was happening in Altnagelvin at the time.

THE CHAIRMAN: What you have just described is not standard but it's increasingly common in units that you're aware of?

A. It is in many places, yes.

THE CHAIRMAN: Thank you.

MR WOLFE: So we've looked at the role of the JHOs and the interaction with Raychel. We've looked at, if you like, perhaps an aspirational issue about whether the paediatricians might have made something of a difference here. Could I ask you about the part played by the nursing staff because you've commented on that in your report?

If I could have up on the screen, please, 222-005-006. Broadly speaking, you make two points:

"The nurses are consistent in their observation that Raychel was not sufficiently ill in herself ..."

Do you see that, doctor?

A. Yes.

Q. "... throughout 8 June to cause them concern. When the JHOs were called at 17.30 and 22.00, it was just to give symptomatic relief in the form of anti-emetic drugs, not because they were concerned about more serious complications."

And then you set out some specifics about what certain of the nurses were saying. You are obviously not approaching this from a nursing expertise, but in terms of the nursing observations, in your experience would you have expected the nurses just as much as the doctors, particularly experienced paediatric nurses, to have picked up on signs that this child was not recovering from surgery as well as she might have?

A. Yes. As I said earlier, the signs can be quite subtle and I was talking in the context of a paediatrician being better able to pick these things up than perhaps an adult-trained surgeon. The same could be said of the nursing staff in that an experienced children's nurse should almost instinctively be able to detect when

a child isn't quite right and then get a doctor, preferably a paediatrician, to assess her.

Q. Yes. We went over the ground this morning about vomits that occurred that weren't recorded and the impact that that might have had on the medical care because what is fed into the doctors affects, to some extent at least, the investigations and the treatment that they provide.

A. Yes.

Q. There's another point on this page, it's further up the page:

"They admitted ..."

This is a reference to the nurses accepting that there was incomplete recording on the charts, lack of quantification of vomit and fluid output:

"But, in my view, this is no different to what would have happened on any children's ward in the NHS at the time."

So what you appear to be reflecting is a looseness or a poor practice across the service with regard to the recording of these things.

A. Yes. I think, as we've already discussed, fluid charts particularly do tend to be rather poorly kept on children's wards.

Q. And I think many of the nurses, when they gave evidence, reflected upon the fact that urine output wasn't

recorded.
A. Yes.
Q. Input in terms of sips of oral fluids wasn't recorded. I should add the caveat to urine, of course, that one episode was noted. And they've accepted that there were other vomits that weren't recorded, albeit there is some controversy about whether they saw some of the vomits. The parents making the point, of course, that they were handing vomit trays to the nurses, so they couldn't have failed to have known about them.
But just to finalise on this, it is, of course, important from a medical perspective that the nurses are recording accurately --
A. Yes, very important.
Q. -- because when a doctor comes to see a patient, it would be an appropriate practice for the doctor to consider what's in the charts before deciding what investigations are necessary.
A. Absolutely, yes.
THE CHAIRMAN: Has that improved in recent years?
A. Do you mean keeping of fluid charts?
THE CHAIRMAN: And record keeping generally.
A. Record keeping generally has certainly improved. I'd hate to generalise about fluid charts because it varies hugely from one place to another. It will never be as

easy to maintain a good fluid chart in a child as it is in adults because, firstly, younger children are in nappies and therefore don't go to the toilet and therefore it's more difficult to measure it, although you can weigh nappies, but that's another issue. Secondly, people are reluctant to do invasive procedures, such as inserting urinary catheters or naso-gastric tubes in children, not surprisingly, because it is unpleasant, they hate it, whereas adults are more tolerant of those things. Also, slightly older children have a tendency to go off and go to the toilet on their own and not tell anybody and it's quite difficult to keep track of that sort of thing. And they may well wet the bed and that's difficult to quantify. There's a whole host of practical reasons why it's more difficult.
So while I am being critical of the fluid chart there, I do appreciate the practical difficulties that paediatric nurses have in monitoring fluid balance accurately. It is very difficult.
MR WOLFE: Before reaching the point of the seizure and the reaction to that, could I just ask you to look at some of your overall conclusions in terms of what the conduct of electrolytes and the change of fluid might have achieved in this situation. If we could have up on the

screen, please, 222-004-026. You say there under the conclusion:
"Had Raychel's electrolytes been checked in the early evening on 8 June, it is likely that a very low sodium level would have been discovered and intervention by reducing her fluid and changing it to 0.9 saline may well have prevented the later deterioration and her death."
Just on a point of precision, "by the early evening", what do you mean by that?
A. Well, again, I was intentionally vague in that conclusion because I think it's very difficult to be specific. But I think as we've already discussed -- sorry, there's really two answers to that. One question is, "How long should post-operative vomiting go on for before you think there's something else going on?", which I think we've already discussed. The other question is, "How early in Raychel's deterioration did hyponatraemia start to contribute to her deterioration?", which is much more difficult to define.
But as I've already said, if at the time she had her a first dose of anti-emetic, which is about 5 pm, so about 18 hours post-operatively, I think, and/or ... Then I would have expected there to have been a change, a low sodium level. So -- and if there had have been

and if she had been managed appropriately following that result, then an intervention -- I would have expected to have prevented this.
Q. And if the intervention had come later in the evening, by 9 or 10 o'clock when Dr Curran was in attendance --
A. I think it would have made a difference, yes. Other experts may have a different view on that. Her seizure was at about 3 o'clock in the morning, so it was about five hours before that. Would that have been enough time to reverse the cerebral oedema? Possibly, yes, but she would have needed fairly intensive management over that period of time.
Q. And of course, that would have required presumably a paediatrician to --
A. Yes.
Q. -- enter the fray and consider the appropriate fluids to use.
A. Yes.
Q. Might it have required a CT scan at that point to determine the --
A. A CT scan wouldn't have been done just on the basis of the electrolyte results or even on the history of vomiting. That would have been done on the basis of a decreasing conscious level and there is some disagreement, clearly, from the different witnesses as

to what extent her conscious level had deteriorated by that time of the evening, by 5 o'clock. If she had become unconscious, even before the fit, then a CT scan should have been considered, yes.

Q. You go on in the paragraph or two below:

"I do not consider that any blame should be attributed to any of the members of staff for prescribing or administering 0.18 saline in the first place as this was quite clearly routine ward policy at the time."

Presumably the emphasis in that sentence is on the words "in the first place"?

A. Yes.

Q. Because, as I understand your evidence, clearly there were opportunities at various points from late afternoon into the evening to carry out an electrolyte profile and change the fluids from Solution No. 18.

A. Yes. There would have been no indication, given the way people used intravenous fluids at that time, for anyone to change the fluids without doing an electrolyte profile first. There wouldn't have been any reason to sort of suddenly change to normal saline if it hadn't been routine ward policy in the first place. It all depends on the electrolytes.

I'd just like to make the point again, which I'm

sure has been made many times in the inquiry, but many, many, many children would have been given exactly the same fluid regime for exactly the same indications in the same situation and not developed hyponatraemia and cerebral oedema and I'm sure you've heard this from all the witnesses, but I'd like to say that. I personally have never seen this degree of hyponatraemia causing cerebral oedema in this situation in my entire career.

Q. And, of course, every case is different and the clinicians and nursing staff involved have got to meet the case that they have in front of them.

A. Yes.

Q. Can I suggest to you that what you've just said is not intended to suggest that the electrolyte profile investigation that you've indicated should have been done? You are not suggesting that that wasn't in any way appropriate?

A. Oh, it certainly should have been done, absolutely. What I'm saying is that the staff would have -- there may have been many other children in a very similar situation where the electrolyte profile would have been done, child vomiting this long after surgery, and so on, getting exactly the same fluids, and it would have been normal.

Q. That was a bit fast.

A. Sorry. Do you want me to slow down?

Q. Yes.

A. There would have been many situations where the staff would have come across children with a very similar set of problems, with vomiting post-operatively, where they may have chosen to do an electrolyte profile and it would have been normal and they would have been reassured and they would not have changed the IV fluids. So most children getting this amount of 0.18 per cent saline for this length of time in this quantity would not get dangerously hyponatraemic.

THE CHAIRMAN: Isn't there another aspect, doctor, which is, unfortunately, in our comparatively small jurisdiction there might have been lessons learnt from earlier deaths --

A. Yes.

THE CHAIRMAN: -- which could have carried over, and in particular, apart from the two deaths that we're aware of in the Royal, which were perhaps in different circumstances -- because everyone's circumstances are different -- there was the death only the previous year, in 2000 --

A. Yes. This is --

THE CHAIRMAN: -- which is effectively a gastroenteritis death?

A. Yes. Exactly, yes. This is a different aspect of the inquiry, Mr Chairman, as you'll be well aware. I really can't comment on if or why members of staff didn't learn from those previous cases. I don't really have anything to say about that.

THE CHAIRMAN: Thank you.

A. Apart from to say that all these cases were -- the question may arise for this entire inquiry, not just relating to Raychel, is why these all happened within a relatively short space of time in Northern Ireland. I can honestly say it was an unfortunate, unhappy coincidence. I can't think it was because of any way that paediatrics was practised in Northern Ireland which was different to the rest of the UK that caused this to happen, but that's not really for me to judge.

THE CHAIRMAN: But we know for instance that two of the deaths were actually missed at the time. Claire's death was missed, so that her inquest wasn't held for about another 10 years --

A. Yes.

THE CHAIRMAN: -- and it was only Raychel's death and inquest, which prompted a re-opening of Lucy's death.

A. Yes.

THE CHAIRMAN: So in the same way that of the four deaths that we're looking at in any detail, two of them were

not identified, two of them were missed at the time in terms of hyponatraemia. That might be exactly the same pattern as exists in Great Britain.

A. It may be, and there may be many other deaths that occurred previous to these in the rest of the UK which went unidentified.

THE CHAIRMAN: Yes.

A. We don't know.

THE CHAIRMAN: That must be a real possibility.

A. It must be.

THE CHAIRMAN: Just to expand on that a little, we wouldn't know about Lucy's death but for the fact of Raychel's death.

A. Yes.

THE CHAIRMAN: And we wouldn't know about Claire's death, but for the television documentary which was made about Adam, Lucy and Raychel. There's a few coincidences there, which suggest that perhaps an alternative explanation to your one, which is many other children have been treated the same and haven't suffered the same consequences, is that some other children may have been treated the same, may have had terrible outcomes whether in terms of brain damage and death and that was not recognised as being attributable to hyponatraemia in the same way as Lucy's condition wasn't noticed, nor was

Claire's. Well, Claire and Lucy.

A. Yes, it's possible that there may have been others. However, I still think it's a very rare occurrence.

THE CHAIRMAN: Yes, and what you're reminding me is it is still quite rare, so that because this is a hyponatraemia inquiry we shouldn't be fooled into thinking that it happens all the time.

A. No, it doesn't.

MR STITT: Mr Chairman, after that very broad and very perceptive point, if may say so, could I ask Mr Wolfe to consider putting this to the witness: if Dr Scott-Jupp with his expertise is saying that he hasn't seen a child on a similar fluid regime develop hyponatraemia to the degree where there is cerebral oedema, could he be asked what relevance, if any, he sees that ADH may have played or may not have played in this particular case?

THE CHAIRMAN: I think, from what you have said this morning, you regard it as having played a significant part?

A. I think it is. I'm speculating here, I have to admit, without much evidence and perhaps straying a little bit outside my brief. The most likely physiological explanation for me to explain Raychel's very rapid deterioration in a situation where other children might not have deteriorated and may not have become

hyponatraemic is for some reason, I don't know why, she produced a very excessive amount of ADH.

In other words, the syndrome of inappropriate ADH secretion, for reasons we don't understand, was much more pronounced in Raychel than it normally is and consequently her kidneys shut down completely, consequently the amount of fluid going in vastly exceeded the amount coming out from the kidneys, being excreted in the urine, and the only fluid she was losing was salt-rich fluid, ie vomit -- she wasn't losing urine, she wasn't losing stool -- and so that led to the hyponatraemia. I think it was a very unusual set of physiological circumstances that doesn't happen very often.

MR WOLFE: Nevertheless there was enough medical knowledge at that time to recognise that, because of the potential for SIADH physiologically, action should be taken to reduce input from intravenous fluids post-operatively?

A. Do you mean general medical knowledge or do you mean the individual doctors concerned?

Q. It was in the literature; isn't that right?

A. Yes, it was, but as we discussed before in this inquiry, obviously the very junior doctors involved at the time wouldn't have been aware of that.

Q. Yes.

A. So there was a knowledge of the -- there was a syndrome of ADH secretion. That has been around for a long time, that's not that new.

Q. Moreover, and the point that we've been dealing with for some time now, in the presence of what was known to be a low-sodium fluid and in the presence of vomiting over that period of time, it points up the importance of electrolyte profiles at an appropriate stage in the narrative.

A. Yes.

Q. Could I just deal with one other point before moving to post seizure. In reflecting in your discussion there about the situation outside of Northern Ireland as well as within Northern Ireland, one of the common themes perhaps is that administration of low-sodium solutions to children in the perioperative period is not uncommon or was not uncommon. Could I have up on the screen something that Dr Warde has said about this in his report to Altnagelvin, 317-009-010?

In that paragraph, the penultimate paragraph:

"Administration of low-sodium solutions to children in the perioperative period is not uncommon. Their use, I believe, stems largely from the fact that it has been known for many years that sodium excretion in the presence of sodium loading is far less efficient in

infants and young children than in adults. Ward policies regarding IV fluid administration in children's wards were developed, in part at least, to ensure that children were not given too much sodium [hence, presumably, the use of Solution No. 18]."

It goes on to say that:

"Unfortunately, such policies rarely took maturation of body organs with age into account."

Is there anything you can usefully add in that respect?

A. A very important point that he makes about the risk of hypernatraemia, too high a sodium level, which -- obviously, this whole inquiry is focused on hyponatraemia, but I also have experience of seeing children, a long time ago now, die and become permanently brain damaged because of too much sodium in their bloodstream. So there is obviously a tendency here for everybody to focus on hyponatraemia, but let's not forget that it is quite possible, under a slightly different set of circumstances, that Raychel and the other children that the inquiry is investigating could have come to harm from hypernatraemia, and the whole reason why, going right back to the early days of IV fluid policies and the whole reason why low-sodium containing fluids was because of a lot of concern and

almost paranoia amongst paediatricians about causing damage from hypernatraemia. So one has to keep that in the balance. I think that's the point he's trying to make there. We now know that we were unduly concerned about hypernatraemia when we shouldn't have been.

Perhaps I should also add, Mr Chairman, that even up until the early 2000s, when policies changed about using hypotonic fluids, I would have raised an eyebrow when being told we could never use 0.18 per cent saline, which is effectively what we're told now, because I would have said: that might mean a few children are going to have problems with hypernatraemia. We now know that that probably isn't true, but for people of my generation and older, there was a lot of concern about hypernatraemia.

THE CHAIRMAN: [Inaudible: no microphone] some resistance to the change of policy in Altnagelvin a few days after Raychel's death.

A. Yes, and that would have been the same everywhere, I think.

MR WOLFE: With regard to the point in relation to maturation of body organs, is he making the point that the older child might have been more tolerant of higher sodium content in the IV fluid and that was a factor that was perhaps being missed by the profession at the

time?

A. Yes, I assume that's what he means and that it is now safer to give normal saline to older children than we thought it was earlier.

Q. At 3 am, very unfortunately, Raychel suffered her seizure. And the nurses were apparently quite quickly on the scene, as was Dr Johnston. Dr Johnston was a senior house officer on the paediatric medical side. He took steps to stabilise her, as the inquiry has heard, and was reasonably immediately suspicious of an electrolyte imbalance and he arranged for bloods to be taken for profile.

You have said in your report at 222-004-014 that you do not think that any criticism should be attached to Dr Johnston for not assuming that hyponatraemia was the problem in advance of the blood results.

A. Yes.

THE CHAIRMAN: I don't know if you know, but Dr McCord gave evidence last week. His view on that was similar to your own and he said that the initial reading of the blood tests after 3 am was so extreme that it would -- I think, in his view, virtually inevitably -- prompt a second test.

A. Yes.

THE CHAIRMAN: Because it's so extreme that you might well

think, "That can't be right".

A. Absolutely. I read the transcript of Dr McCord's evidence and I would agree with him absolutely that it's so extraordinarily low that if somebody phoned me in the middle of the night saying they had a sodium of 118, my first reaction would be, "It's wrong, it's a mistake, it can't be that low". And I would ask, as happened in this case, was it taken from the arm in which the drip was flowing, which it clearly wasn't, and I would insist on it being repeated because it's so outside one's normal experience. Sodiums of mid 120s, 125 to 130, are not uncommon, and we do see that. But less than 120 is exceedingly uncommon.

MR WOLFE: Let me then just take these various developments in bite-size chunks if I can. One question that arises is whether Dr Johnston should have been concerned to bring a more experienced, more senior colleague into play earlier than he did. It appears that he took care of the necessary, which was to stabilise the child, and only by approximately 4.15 -- that's about an hour and 15 minutes after the seizure started -- did Dr Trainor come to the bedside.

A. Yes.

Q. Clearly, the situation might have benefited from earlier input.

A. Yes. In terms of treating the seizure, it would have been within the competence of Dr Johnston as a paediatric SHO to do an immediate first aid treatment of the seizure, which it sounds like he did very effectively. And he then rightly suspected an electrolyte abnormality and needed to get the blood test confirmed in order to do that. To answer your question, it would depend on how experienced and confident he was as an SHO and also how tied up he knew his registrar to be because I think Dr Trainor was busy on the neonatal unit and may have been critically involved with a baby that she was unable to leave and he probably would have known that. So those factors come into play as well.

Q. The next step, if I can call it that, is for Dr Trainor to arrive at 4.15. At that point, she's receiving, almost as soon as she arrives, the electrolyte result, which, as you've described, is abnormally low. It's either 118 or 119. It doesn't make much of a difference. That fact of an abnormally low result, should that have prompted Dr Trainor to aggressively tackle the electrolyte imbalance by changing the fluid at that point, in your opinion?

A. If she was certain that it was genuine, and I think by that stage she was, yes. She, I think, reduced the infusion --

Q. Sorry, at this point, just to be clear this, is 4.15, this is the first result --

A. Sorry, following the first result. As I've said, because it's so extraordinarily low, I think it was the right thing to do, to repeat it, before changing the management. In the amount of time it takes to repeat a sample, which I think was about half an hour or so, which is fairly typical, it wouldn't make a huge difference, not in the great scheme of things, in not changing the fluids immediately. As I said, if you got it wrong and the sodium was high rather than low, you could end up going the wrong way and treating it or there may be other completely different reason for the deterioration.

Q. Her perspective, to put that into the mix, is that she had never seen such a low sodium. She had been taught or instructed in her training to repeat when the finding is abnormal because of, if you like, the fear, the preoccupation with the possibility that the lab had produced a rogue sample.

A. Yes.

Q. And that is why she asked for it to be repeated. That's a view you concur with?

A. Absolutely, yes. And I would always say to any junior I was teaching: if any laboratory result or any other

kind of result doesn't fit with what you see or it seems to be completely out of the normal range of experience, repeat it. And I think that was the right thing to do.

Q. Can I just test that in this way? Raychel's notes and records, had they been analysed, would have shown that this was a surgical patient and with surgery you have the risk of the antidiuretic hormone's inappropriate reaction. You also have at the bedside the record of the vomiting all day and you have the record of the hypotonic fluid being given all day, arguably at a rate which was too high. Would it not have been possible for a registrar on the paediatric side to have worked out that the fluid or the electrolyte reading that she was getting was in fact very consistent with that history that I've just outlined?

A. I think it's very difficult to expect a trainee doctor in the middle of the night to go through those thought processes and come out with that conclusion quite so rapidly, especially as we've said several times, this degree of hyponatraemia is outwith anyone's experience, either her or the other doctors present or anybody else involved. So I repeat, I think the right thing to do was to repeat it, even if she had been fully aware of all those other things going on because she would have come across other children on the same fluids in the

same situation who had normal sodiums and where it may have occurred for completely different reasons that had nothing to do with the chemistry.

Q. Dr Haynes is an anaesthetic intensivist and he has placed a perspective on the record which I would ask you to consider. It's set out at 220-003-018. He says on that page in his report:

"Although the attending doctors may have seemed hesitant to correct the hyponatraemia, it must be remembered that it was of a severity that none of them would previously have seen. Information regarding the correct dose of hypertonic saline would not have readily been available, but I would have expected Dr Trainor to have made some attempt to obtain hypertonic saline to correct the abnormality, even if it meant giving an estimated dose and making serial serum electrolyte measurements."

Again, it's the same point that I've been putting to you.

A. Well, it's not quite because the issue of giving hypertonic saline -- if I could just address that, because I didn't mention that at all in my original reports because it's so rarely ever used, it's not within the normal competence or the normal range of options open to paediatricians in this situation.

I don't think I've ever in my entire career given hypertonic saline outside of a neonatal unit. It is rather different with newborns compared to an older child. So I didn't consider it as something that should have been done when I wrote my original report.

Having now read the experts' reports subsequently, I thought maybe that, if they had got to that stage and thought of it, then could it have made a difference. Well, I suppose conceivably it could, but this is such an unusual situation. If I asked myself what would I have done in that situation and I had known about the low sodium, I don't think I would have given hypertonic -- or I wouldn't have told the registrar on the phone to give hypertonic immediately. I would have spoken to a paediatric intensivist first and got some advice because it's so unusual and certainly, if you are using hypertonic saline, you're almost certainly in an intensive care situation by then and you will be involving intensivists. So my response to that would be that treatment would only be given on the advice of a paediatric intensivist.

Q. Just going back to the repeat point, just so that we can put all the bits out on the table: Mr Foster, the surgeon, is of the view that the appropriate response would have been to repeat the battery of electrolyte

tests before you consider what fluid to use. Moreover, the inquiry has heard from the consultant paediatrician Dr McCord, who was contacted by the registrar Dr Trainor. He is of the view that the advice that he would have given would have been to repeat the test before deciding on what fluids to use going forward.

Can I just ask you about the interaction between Dr Trainor, the registrar, and the consultant? What would you have expected the registrar to impart to the consultant when she got him on the phone?

A. Right, well, actually the skill of a junior doctor phoning a consultant at home in the middle of the night is now something we actively teach because it's not that easy to do it well and not do it badly.

But anyway to answer your question, it's not always easy. But she should have stated the patient's age, gender, location, what the background was, a very brief summary of the reasons for admission -- in this case the timing and the nature of the surgery -- and then explained the -- sorry, if I can go back a bit. The very first statement made by the doctor, by the registrar phoning the consultant before getting into that stuff is either, "I want your advice", or "I would like you to come in". If the registrar states, "I want you to come in", then the amount that needs to be said

on the phone is very brief, so the consultant can get on, get ready and come in as quickly as possible.

So having said that, let's just say that the initial statement wasn't "I want you to come in" but "I want your advice about this patient" --

THE CHAIRMAN: Sorry, that wasn't, because Dr McCord was quite clear. It was, "Come in as quickly as you can".

A. In those circumstances it is difficult because one doesn't want to waste time when you're coming in anyway and you can pick up the story when you get there. And how many treatments -- what treatment is the registrar going to be able to give in that short period of time while the consultant gets in that it really matters where those few minutes are critical, and the answer is probably fairly few. The immediate life saving treatments they should all be doing anyway, the ABCs, airways, breathing and resuscitation, stopping fits, that kinds of thing should all be done automatically anyway.

So to answer your original question, under these circumstances it would have been quite a brief conversation. It would have been, "9 year-old girl who's fitting post operatively following appendicectomy. The sodium is very low". And that would be about it. And I guess if it was me, I would say, "Are you sure

that's right? Repeat it if you haven't done already and I'll be in. By the time I get in, you might have the repeat back".

MR WOLFE: So you would have expected the sodium result, albeit it might have been suspicious of a rogue result -- you'd expect that to be said?

A. Yes.

Q. Dr McCord's response to that was can't remember whether he was told, but, "Had I been told that, I would have been instructing a repeat --

A. Yes.

Q. -- I wouldn't have been suggesting using hypertonic solution."

But what he went on to say was that if he could be confident about the result, he would have been suggesting normal saline as opposed to hypertonic saline because, like you, he had no experience of 3 per cent hypertonic saline or anything like that.

A. That probably would have been my response as well, yes, and I would have said very much the same as Dr McCord did in that situation.

Q. He said in his evidence that digesting all of these things quickly and learning about the fact that there were petechiae. Learning about that, he was thinking meningococcal infection, and he did suggest starting

antibiotics, and he added the advice that be sure to ensure that the anaesthetists are available if she deteriorates.
A. Yes.
Q. In terms of the advice that he gave, how would you comment?
A. Absolutely. I would agree with that. Certainly, when a child is rapidly deteriorating, generally most registrars or resident paediatricians would have already thought of contacting an anaesthetist, but just in case they didn't, you'd remind them and tell them not to leave it too long, get your anaesthetist there sooner rather than later, to prepare for a possible need for intubation, which might mean moving them to a different room and getting all the equipment out.
The issue of the petechiae is interesting because actually the -- meningococcal septicaemia or meningitis is actually a more likely diagnosis than hyponatraemia, it's more common, and not entirely implausible because, amongst many other ways, that can actually present with abdominal pain. So it's not implausible that the early symptoms of meningococcal meningitis could have been abdominal pain, which led mistakenly to the appendix being taken out and then the rash comes out a bit later. So that wasn't as implausible as one might think. As it

happens, the petechiae were probably nothing to do with any infection, but as a consequence of the vomiting.
Q. One other possible response that has been implied or hinted at in some of the reports was perhaps the use of mannitol, and you have dealt with that in your report. You said it's virtually never prescribed unless there's objective evidence, usually following a CT scan of a cerebral oedema.
A. Yes. Mannitol is an emergency treatment for cerebral oedema. Unless you're confident that's the problem, you wouldn't give it. Again as with hypertonic saline, my own practice would be to give it only on the advice of a paediatric intensivist, only when you knew you had done the most immediate things, which is securing the airway and ventilating the child and treating the fits, and then you give mannitol. By that time, you would be considering admission to an intensive care unit anyway.
Q. And it would appear that in terms of a surgical response to this emergency, the sole presence for a long period of time, relatively speaking, was the junior house officer.
A. Yes.
Q. Other doctors such as the SHO, Mr Zafar, were otherwise detained and he eventually came at or about 5 o'clock, I think the timing is, with the registrar Mr Bhalla. In

circumstances where you have an emergency facing a patient being cared for under the surgical team, what is your expectation in terms of whether the consultant surgeon on call should be contacted?
A. Well, this is difficult because one could argue there was nothing specific for the surgeons to do and, it's true, it was fairly clear that this wasn't a surgical problem in the sense of being an abdominal surgical problem and there was no surgical intervention required at the time. However, simply because she was a surgical patient and still under that team, and because the situation was so critical, this was a child deteriorating and going to intensive care, I think it would have been good practice for a senior surgeon to be involved. Whether that's at registrar or consultant level is arguable, but somebody more senior than an SHO, I would say.
MR WOLFE: Doctor, thank you very much. I don't have any further particular questions for you.
THE CHAIRMAN: Mr Quinn? Mr Campbell? Mr Stitt?
MR STITT: There was one point, if I may, and if you think, sir, that it has been covered, then I apologise. Could we pull up 222-005-007? This is Mr Scott-Jupp's most recent, third report. If we could highlight the middle paragraph, which is numbered 2, beginning "awareness".

If that could be highlighted.
May I ask the question directly?
THE CHAIRMAN: Let me hear the question.
MR STITT: That was following Mr Quinn's style. I'll ask it through you, sir.
The first paragraph says:
"None of the witnesses including their senior consultants had experienced anything similar previously. None were aware of the previous cases in Northern Ireland. None were aware of the literature from 1992 or 2001. None were aware that there was any risk of hyponatraemia associated with using 0.18 per cent saline. None had received any specific training in this area at any stage in their careers."
The next sentence:
"I do not find this surprising. If the same questions had been addressed to any group of doctors or nurses working on a children's ward at the time, I believe the same responses would have been received."
When there's a reference to any group of doctors or nurses, is that within the UK as a whole?
A. Yes. The point I'm trying to make, as we discussed earlier, Mr Chairman, was that these ... It could have happened that the series of hyponatraemia deaths could have occurred in another region of England or Scotland

or Wales and then that region would be having its own inquiry now and why it happened in Northern Ireland I have no explanation for. My feeling is that there was no specific deficiency in the way medical practice was carried out that led to this series of deaths in this thing apart from the obvious issue of learning from the previous deaths, which I think you're going to address anyway.

THE CHAIRMAN: Yes. My big concern here is I would be, I think, very, very complacent if I thought that the only deaths which had occurred in the UK from hyponatraemia were the deaths with which this inquiry is concerned, for the reasons that I was expressing earlier, that within Northern Ireland two of these deaths were completely missed, and in fact highlighting of the issue of hyponatraemia is largely as a result of the response from Altnagelvin after Raychel's death because there was nothing learnt outside the Children's Hospital after Adam's death.

Thank you very much. Doctor, unless there's anything further --

A. May I be permitted to ask you a question, Mr Chairman?

THE CHAIRMAN: Of course.

A. When you publish your report on the entire inquiry, will it be disseminated widely throughout the entire UK or

will it stay in Northern Ireland?

THE CHAIRMAN: I send it to the local Minister for Health and he will then publish it. I suspect from what I have heard indirectly from the inquiry's own advisers, there's interest in it beyond Northern Ireland.

A. I think it would be a tragedy if the lessons that will be learnt from this valuable inquiry were just kept within the Province because, I think, those of us in the rest of the UK -- and the rest of the world for that matter -- have much to learn from this.

And if I could just -- if you'll -- this may be well beyond my brief, Mr Chairman, but the issue of paediatric care of children on surgical wards, not just in the context of IV fluids and hyponatraemia, but in many other areas which is still, I think, an issue, perhaps more so than some of the other things we've discussed, which have been fixed. That is something that, in my personal view, requires a lot of attention and there is still a potential for things to go wrong with lines of responsibility and so on.

THE CHAIRMAN: Just while you're on that, do you have a cut-off point for the age of a child coming on to your paediatric ward?

A. Well, that's something else I could talk about for hours. That is a controversial area about adolescence.

You're talking about the older children?

THE CHAIRMAN: Yes.

A. Traditionally, it has been 16. But that has been blurred a lot in recent years. 16 to 18 year-old adolescents can sometimes to go to a children's ward and sometimes go to an adult ward. A few hospitals are fortunate enough to have an adolescent ward specifically for that age group, but most don't. If there is no adolescent ward, they can either go to a children's ward or an adult ward.

My view is they should go to a children's ward up until their 18th birthday and there's a tendency now to move towards that on the basis that, although neither is ideal for an adolescent, they should go there. In terms of who cares for them, in a district general hospital they would be -- if they came in with a surgical problem, they would be cared for by a general surgeon, whatever age they were. But for a medical problem, paediatricians would look after them on the children's ward and adult physicians on an adult ward.

THE CHAIRMAN: Thank you very much indeed for coming back again and for all your help. Thank you, doctor. We'll take a break for ten minutes and then we'll have Professor Hanratty. Thank you.

(3.28 pm)

(A short break)

(3.38 pm)

(Delay in proceedings)

(3.48 pm)

MR WOLFE: Professor Mary Hanratty, please.

PROFESSOR MARY HANRATTY (called)

Questions from MR WOLFE

THE CHAIRMAN: Professor, thank you for waiting. It has taken us a bit longer than expected to reach you today.

A. That's okay.

MR WOLFE: Professor, the inquiry is grateful for the fact that you've provided a detailed report, described as, "A chronology of nurse education in Northern Ireland and comparisons with UK mainland and Republic of Ireland", which has obviously been distributed in advance of today and will enable us to go through your evidence with the benefit of that having been read.

Before we embark on an investigation of what you're saying in that report, could we just have your CV up, please? It's at 303-048-574. Do you recognise that, professor?

A. Yes, I do.

Q. You tell us there that you qualified as a registered general nurse in 1965 and as an RMN in 1967. Did you practice as a nurse at all?

A. Yes, I practised between 1967 and August of 1972. I worked as a staff nurse in outpatients, casualty, children's ward, and care for the elderly with skin ward attached.
Q. And looking at that paragraph, you have set out your academic qualifications.
A. Yes.
Q. You're a registered clinical instructor, registered nurse tutor, and you have a Bachelor of Arts --
A. That's right.
Q. -- as well as Masters degree in 1994.
A. That's right.
Q. In terms then of your employment, you have told us that you practised as a nurse for some five years or so. Is that when you became a clinical instructor?
A. Yes, I did the clinical instructor's course September to December 1972. And in the beginning of January 1973, from that until August of 1974, I worked as a clinical instructor at Craigavon Area Hospital. Then in 1974 to 1975, I did the tutor's course at Magee College, as it was known then. Following successful completion of that programme, I came back and worked as a tutor at the Southern Area College until -- I think it was 1983, and I taught students on the adult part of the register -- or general nursing, as it was known then -- and I also

taught nurses who worked in mental health. But I also taught nurses who were being prepared to work in all wards, including children's wards.
In 1983, I was asked to take on a role in the continuing education of nurses, so I went then to work with trained staff and did that until 1990 -- whenever the Project 2000 programme came in. It was 1989 actually. When the Project 2000 programme came in, I was asked by the director to take on the responsibility for implementing and introducing the Project 2000 programme at the Southern Area College.
I stayed there as the assistant director and Director of Education until 2005, and then I was appointed as the Director of Nurse Education at the Royal Victoria Hospital, which was known as Northside College, until 1997, when the students went into Queen's University.
At that point, I then moved to the Beeches Management Centre and headed up the in-service training programme for the Southern and Eastern Health Boards, which encompassed about 10,000 trained nurses and midwives and we were responsible for providing ongoing continuing education for that group of nurses and I retired from that post in 2007.
Alongside that, if I continue, I was the elected

nurse, first of all, and then the appointed nurse for Northern Ireland to serve on the regulatory body in London. So from 1998 until 2006 I was the Vice President of the Nursing and Midwifery Council, previously known as the UKCC.
Q. If we were to summarise that career, from 1973 or thereabouts to 2007 ...
THE CHAIRMAN: I'm just engaged by your optimism about summarising that career, but go on.
MR WOLFE: Let's see if I can do it.
In the period from 1973 to 2007, you were engaged in nursing education.
A. I was.
Q. Leaving aside the four or five years in practice, you have, for 35 years or so, exclusively focused on nursing education --
A. Yes.
Q. -- both pre-registration nurses and in-service training and education?
A. That's right. And if I could just say that my time at the regulatory body in London was responsible for setting up the curriculum of both pre and post-registration, but more importantly for the continuing professional development and what was known as prep, that was introduction of the statutory updating

that nurses undertook from 1997. I was involved in the development of that.
Q. Yes. And I know you're probably too modest to mention it, but your contribution to nursing education has been recognised both in terms of the award of a visiting professorship at the University of Ulster and by a special award from the Royal College of Nursing.
A. Yes. And I got the CBE for it also, just to continue to be modest.
Q. Very well. The report that you have provided to the inquiry involved you bringing together all available documentary evidence in relation to curriculum content, training and continued professional development of nurses in Northern Ireland on the themes of fluid management and record keeping.
A. That's right.
Q. I want to ask you some questions about that today, but I also want to ask you, within your area of competence, whether you can assist us with training provided to nurses in relation to some of the post-operative things that the inquiry's interested in, including, for example, observations, communications with doctors and suchlike.
A. Yes.
Q. Are those things within your area of competence?

A. Yes, absolutely. I should be able to address all of those areas.
Q. And I should say, perhaps of less relevance to us today, the second part of your report contains a comparative approach, which is there on the record for those who wish to consider that.
A. Yes.
Q. Before we get to the specifics of what the various curriculums over the years had delivered in terms of teaching for nurses, can we just take a brief journey through the recent history of nurse education? You have said in your report that the Nurses and Midwives Act (1970) triggered a new training programme for nursing.
A. That's right.
Q. And it was known as "the experimental scheme"; is that right?
A. Yes, that's right. Do you want me to elaborate on that?
Q. Please, briefly if you would. It was introduced in 1973; is that correct?
A. It was experimental in a number of ways. Experimental in that we had six by six-month modules, and within those six-month modules there were preparatory theoretical preparation followed by a period of clinical experience and ending up with a consolidation period of -- really to tie up the ends of the learning. And

that was very novel because, up until that, a lot of the training was ad hoc and night duty was as and when, but in the new experimental scheme, it was much more regularised and nurses knew exactly where they were going to be right across the three-year period.

The other thing that happened there was they had a common foundation programme and a branch programme. And it was important that nurses from a variety of specialties came together, but then towards the end of the programme they stayed in the area that they'd applied for, like adult nursing, children's nursing or mental health nursing. Where I was working in the Southern Board, we didn't have children's training in those days, we just had adult and mental health and latterly then we had learning disabilities -- or that's what it was latterly known as.

However, all of the colleges or group schools, as they were known in those days, all had a very similar approach. The Northern Ireland Council was responsible for overseeing exactly the content of the programmes. So whether you trained at Craigavon or the Ulster Hospital in Dundonald or Altnagelvin, it was exactly the same content because the officers of the council approved the content and it had to be similarly laid out in the way that I've explained with the

modules.
Q. Yes. The 1973 experimental programme, as it has been described in your report, it stayed in place until 1983 when a new syllabus was prepared?
A. That's right.
Q. So charting this as best we can, the nurses who have given evidence to the inquiry who, if you like, would have fallen within the 1973 academic programme appear to have been: Staff Nurse Roulston, who studied at the Royal Belfast hospital between 1981 and 1984; Staff Nurse McGrath who studied at Altnagelvin between 1973 and 1976; Staff Nurse Bryce who was at the Royal between 1977 and 1980.

Could I just ask you about Sister Millar? According to her evidence, she was a qualified children's nurse who studied via the Royal Belfast Hospital between 1969 and 1971.
A. Yes. She was more my era in respect of what was an ad hoc preparation. There was a curriculum, of course, and that had to be approved by -- there was a body that did it, but what actually happened prior to the 1970 act coming into being in Northern Ireland is that we were working with the English regulatory body and using their syllabi for all the preparation of nurses in Northern Ireland. And believe it or not, that goes back

as far as 1919, when all of Ireland -- I'm not going to give a history lesson, but when all of Ireland was under the umbrella of the UK. That one act, the 1919 act, governed the South of Ireland, Northern Ireland and all of the UK countries. So it was the same syllabus in those days.
Q. In 1983 then, a new syllabus was introduced.
A. Yes.
Q. We'll come to the specifics of what each of these syllabuses might have held for the students, but briefly was there any connection in terms of content between 1973 and 1983 in general terms?
A. In general terms, the content from when I trained in 1962 to 1965, the content in terms of the nursing input didn't ever change. And that went even right through to the Project 2000 programmes because the nursing course -- any of the programmes that were developed were developed primarily with a focus on the nursing care of patients. Therefore, what did change as we went through the different syllabi was a greater depth of knowledge more on the sciences side, like physiology, sociology, psychology. But actually, the nursing content never really changed.
Q. In terms of the 1983 syllabus, could I have up on the screen, please, 303-048-584? In this section of your

report, you refer to the guidance for the syllabus in the middle of the page --

A. Yes.

Q. -- and the guidance emphasised two new broad concepts. Can you help with us that, read that for us?

A. "The guidance emphasised two new broad concepts, which should underlie curricula. This first is the importance of appreciating that in the study of nursing it is essential to integrate theoretical teaching and supervised practice. The second concept is the delivery of individualised care within a framework of assessment, planning and evaluation. It is acknowledged that the nursing process method is an effective basis for a framework of individualised patient care."

Q. I understand from reading your report that this concept of the nursing process method is of some significance?

A. It was brought in by the chief nurse, called Doreen Heywood, back as far as 1972 and it was a requirement of the Department of Health in those days that all nurses, midwives, health visitors, wherever they were practising, had to use that approach, which was about assessing the patient, planning their care, implementing their care and evaluating the care. And alongside that it was very, very important that there was a care plan, which was meant to be a contemporaneous document that

would be upgraded depending upon the progress or deterioration of the individual patient.

Q. With regards to the 1983 approach, by my reckoning, Staff Nurse Gilchrist, who studied via the Altnagelvin Hospital between 1984 and 1987, Staff Nurse Patterson, who studied via the Royal Belfast Hospital between 1985 and 1988, and Staff Nurse Noble who started in 1982, would she have been caught by that syllabus?

A. No, she would have been taught by the 1973 syllabus.

Q. So although her --

A. Yes, but the legal position with regard to students in training was whatever programme they commenced under they had to stay with that. We often had to run two different type programmes parallel until the students who started on the 1973 syllabus completed their programme while we commenced the 1983 or, when it came to the Project 2000, we had a similar situation to cope with.

Q. I understand. Project 2000, then, that was a significant new departure, which --

A. Yes --

Q. -- was introduced in 1990; is that correct?

A. Yes, there were a number of significant features of the Project 2000 programme. First of all, there was legislation that had to be enacted in order to remove

the student from being an employee to having what was described as "supernumerary status". What that meant that the student was no longer an employee of the hospital or the unit of management or the trust that they were working in and there had to be legislation put in place to give them access to caring for patients under the supervision of the particular hospital employees. That was the first thing.

The second thing that was significant was that the previous training programmes that were in place were 20 per cent theory and 80 per cent practice. That changed under Project 2000 to become a 50 per cent theory and 50 per cent practice, which was a significant reduction in the amount of time that students spent in the presence of patients. But that was augmented by the amount of deepening in the knowledge of the nurse because at the end of it they were awarded diploma status rather than certificated status.

Q. So Project 2000 signalled a significant change in the sense that nurses were now being delivered of a deeper --

A. That's right.

Q. -- biological, scientific understanding of their role?

A. Yes, the strapline for Project 2000 was "the knowledgeable doer". I don't know what it meant for

those who went before, but it was that nurses had to have a greater understanding of physiology, psychology, before they -- alongside learning about the importance of patient care.

Q. There were obviously changes in the decade just gone into the noughties, which we don't necessarily need to concern ourselves with this afternoon. They're dealt within your report.

A. Yes. It was because I was the lead person in the UK for taking forward the 2002 changes that students, before they were registered, would have to demonstrate competencies in six areas of competence by the nurses who were mentoring them on the wards and that the universities couldn't sign them off as a registered nurse, except they had met those competences. But that was of necessity because there was a bit of less than satisfactory reporting by employers that nurses coming out from the university system were not necessarily fit for practice and fit for purpose.

Q. So to take an example, Staff Nurse McAuley commenced on Project 2000 in or about, I think, 1996 but spent the last two years in a university setting. And what you seem to be saying is that as a result of concerns --

A. Yes, there were concerns by employers.

Q. -- that the NMC developed six core domains which were

then examined --
A. That's right --
Q. -- and tested in practice.
A. That's absolutely right. And that work commenced in, I think, about 2004.
Q. I want now to spend some time on the content of the syllabi that you have highlighted in your report and try to tie that into the themes with which this inquiry is concerned with regard to Raychel.
Could I start by going to page 303-048-599 of your report, please? You have said there -- and it's a point that I was putting to some of the nurses -- that all of the curriculum guidance documents listed above, and maybe I should just stop there. Curriculum guidance documents are what?
A. Curriculums for the 1973 and 1983 syllabus. The 1973 syllabus was based on the 1970 act and the Northern Ireland Council set out the components of content that should be in a curriculum. So they set out the guidelines and then it was up to the particular School of Nursing to take those guidelines and put meat on the bones and develop it into a three-year programme, which then the Northern Ireland Council officers would have come and approved before it was ready for delivery by Schools of Nursing staff to the students. And that

was done in what I would describe as a chronological way because, in the first year, most of the students will have spent their time in what was described as basic care activities, which was about the importance of feeding, bathing, helping, giving assistance with movement. But it did deal in very great detail with observations of patients and the importance of the different observations of what temperature, pulse, blood pressure, what the significance of vomiting, diarrhoea, colour of skin, all of that -- so it took that all into account.
Q. We will go to look at some of the curriculum guidance documents in a moment. At this stage in your report, what you're doing is emphasising that within those curriculum guidance documents it is quite clear that all students from 1973 forward were presented with education in relation to the importance of a body's ability to maintain fluid balance and health --
A. Yes.
Q. -- and the disease processes that might undermine that.
A. Yes.
Q. And I want to look at that with you presently in terms of just what that might mean. You go on to say on that page that nurses are taught about what type of observations are required and to make appropriate

records. We see that ...
THE CHAIRMAN: It's the short six-line paragraph, over halfway down.
MR WOLFE: You say:
"They would also have understanding of what types of observations of the patient's condition would be required and the need to make appropriate records."
And we'll come on to explore that in a moment.
Just over the page, please, to page 600. Again, you say that:
"Comparison of pre and post 1990 curriculum documents indicates that all students would have had many opportunities to learn about the importance of fluid balance maintenance to the health and well-being of an individual."
There is a distinction, as I think you've highlighted earlier, between pre-1990 and post-1990 --
A. Yes.
Q. -- and what that might mean in terms of, if you like, the nuts and bolts of teaching.
A. Yes. In terms of the pre-1990, I think irrespective of the 1973 or 1983 syllabus, the 20 per cent time spent in the classroom, a lot of the lectures on disease process would have been delivered by a doctor and then the nurse education picked up the associated nursing

care. So we had surgical blocks, medical blocks, children's blocks -- and when I say a block, I mean a period of time which had preparation, clinical experience and a consolidation block. So the nurse teachers would have done a lot of the actual teaching and emphasising the importance of the care in respect of the particular conditions. So it was disease-orientated modules that we were looking at all the time.
Q. Yes. Let's move forward and look at some of the curriculum content in the various stages of recent history. If we go forward to page 602 where you begin to set out the syllabus for the 1973 programme. You say that as part of the 1973 programme, which we know remained in place for some 10 years --
A. That's right.
Q. -- that measuring and recording fluid intake and output was a feature.
A. Yes.
Q. Going down that list, general pre and post-operative nursing care was a feature of the syllabus. Intravenous, subcutaneous and other parenteral infusions was also a feature.
A. Yes.
Q. And then over the page, the curriculums were expected to deal with the skills of communication.

A. Yes, that's right.
Q. And is that between nurse and patient as well as nurse and --
A. Nurse and patient, nurse and family. And that was irrespective of the age of the patient. We had always had an emphasis on the importance of communication with the family, but more particularly, when you were dealing with children. But it wasn't exclusively children that we had that emphasis on in the programme.
THE CHAIRMAN: It is just a different type of communication with an adult's family rather than a child's family, is it?
A. Well, to some degree, sir, but the anxieties were similar and the wanting of information and the explanation of doctors -- well, I wouldn't want to call it jargon, but they always talked in medical terms, so that needed to be followed up with a nurse, explaining what that meant, that the patient understood it, and the relatives.
MR WOLFE: I shouldn't have skipped so fast past the previous page. Where you list as part of the syllabus, under the heading of "Principles and practice", that measuring and recording of fluid intake and output was a feature of the syllabus, what, as precisely as possible, was being taught?

A. First of all, that's a direct lift from the syllabus. So I think that the people who devised the syllabus recognised the importance of that as a nursing responsibility and therefore they highlighted it as something we had to build information around. First of all, in terms of anatomy and physiology -- and that's going back even to pre-1973, we were taught the importance of the fluid make-up of the body and how important the maintenance of hydration was. So that was a theme that ran through from when I started in 1962. And the significance then of fluid loss, whether that be vomiting, whether it be diarrhoea, whether it be fluid lost through the skin or indeed from wounds.
So in the teaching, you'd have started off with looking at what normal body hydration was and how that was maintained and moving on then to the ways in which that could be disrupted. And that followed then with the importance in terms of the patient's well-being, how the nurse with her responsibility for caring for the patient would take and make note of any ... We all know what normal urination and the amount during the day or faecal matter -- vomiting's not normal, so therefore when you got into the abnormal, it was important to make a record of any abnormal fluid loss. That was emphasised and, in my own clinical experience on the

wards, that was totalled up every night and the person in charge of the ward had to check that it balanced or why there were gaps and so on, because measuring and recording intake and output was a very significant part of the continuing care of the patient. I'm emphasising this because that's how I practised it and that's what we had to teach when we were teaching the students in the classroom.
Q. Yes. Presumably, students were taught a baseline of what was normal.
A. Oh, absolutely, yes.
Q. Were they taught to recognise what was abnormal?
A. Yes, we were taught and I taught myself about the importance of osmosis and diffusion, all of -- and the function of the role of the kidney in performing that and the importance of extracellular, intracellular, that was all taught. Even in the days back in the 60s that was taught.
Q. Leading on to what might be regarded as abnormal, what were nurses taught in terms of their role --
A. Well, their role --
Q. -- if abnormalities arose?
A. Their role, first of all, was to make sure that they had proper information about what the particular fluid loss was, whether it was -- well, first of all can I say that

in the classroom, in respect of vomiting, diarrhoea, whatever, there was great detail in the classroom on the variations. For example, if you take vomiting, whether it was food undigested, whether it was bile, whether it was coffee grounds, if it was diarrhoea what the colour was, all of that, all very difficult to talk about, but by the same token significant in terms of nurses observing patients. So that when the nurses went out on to the ward, when they observed whether the vomit was bile or whether the diarrhoea was green, not only did they record the amount, but they had to record the consistency, the colour and so on.
Q. Yes.
A. And those were absolutely fundamental points of teaching.
THE CHAIRMAN: Was that a fundamental point of teaching all through your experience of teaching?
A. Absolutely.
THE CHAIRMAN: Over 30-plus years?
A. What I said, sir, was that irrespective of the different programmes that we delivered, the emphasis that I'm putting on observations and the care for the patient never waned. The difference was that there was some deeper knowledge, but the actual nursing care never waned and the emphasis was on the importance of the

nurse being at the bedside and knowing what was happening to the patient.

THE CHAIRMAN: What about in terms of something which has been a bit inconsistent and may necessarily be about volume, whether it's vomit plus, plus plus, plus plus plus? Because I've had at least three different interpretations from different nurses of what plus plus means. It means anything from small to medium to large.

A. Well, I listened to that too.

THE CHAIRMAN: Is that inevitable?

A. It probably is. If a person spontaneously vomits, you cannot measure that because it's all over the bedclothes, but you'd know if it was something that they had spit up or if there was a fairly hefty vomit and in that case you would, but it has always been encouraged if at all possible, whether it's a urine output or whether it's vomit, that you would make sure that you give the receiver and then -- because if the patient is being sick and nauseated, there would have to be something by the bed in case the patient spontaneously vomited. It's not difficult to measure that, sir.

THE CHAIRMAN: That's what Mr and Mrs Ferguson say they did: they did catch Raychel's vomit in these kidney bowls and handed them over.

A. I heard that. I have no difficulty whatsoever with the -- I mean, the -- and I'm not talking about any particular patient here, I'm speaking generally. If a patient complained of nausea, the first thing you did was you went and got a receiver, set it on the locker by the patient's bed in case they were sick. Patients never wanted to vomit on their bedclothes or on their nightdress or pyjamas. It gave them a comfort that there was something there they could be sick in to. In my experience and in the way we taught, you would always have made every effort to measure the amount that a patient vomited and particularly when that vomiting was persistent because that was very significant in being able to continuously assess the patient.

THE CHAIRMAN: Thank you.

MR WOLFE: We've highlighted here measuring and recording fluid intake and output. To what extent was the teaching designed to impart, if you like, a more sophisticated knowledge of when electrolytes were in danger of being imbalanced?

A. There would have been reference in the 73 and 83 syllabus to the importance of -- as a reason for recording, say, the amount of vomit. There would have been reference in the lectures to explaining to the nurses that it wasn't just the fact that the patient was

vomiting, but it was the impact that that vomiting was -- continuous vomiting would have had on the patient's fluid balance. And I've already referred to us having taught that. And about the importance of whether or not the patient was being dehydrated. It wasn't until the Project 2000 programmes where we had a deeper emphasis and more time to spend on physiological aspects that there would have been greater emphasis put on the electrolytes and what the nurses might have known.

So what I would say for the 73 and 83 syllabus, the nurses would have known what was normal, they would have known about the importance of observations and they would have known about the importance of observing and measuring because of the impact it was going to have on fluid balance and beyond that it then became a problem or an issue for the doctor to -- because the important thing from the nurse's perspective is they had to tell the doctor, otherwise the doctor wouldn't have known. Because the doctors have 50-and-one different things to do. The nurse is the person on the 24/7 around the bed by the patient and therefore they had a responsibility and a duty of care to keep the doctor informed of what was happening to the patient, and in particular, in relation to children, they had to be the child's

advocate if the parents weren't readily available.

Can I just say, sir, that I'm not talking about an ideal world here? I'm talking about what is expected of any reasonable nurse. And I want to make that point. These are the things that nurses were taught in respect of caring for patients.

Q. And I ask that question about whether the education was such as to give nurses an insight into the potential for electrolyte imbalance because presumably it was necessary to have at least a basic understanding of that so that you knew when to red flag the doctor?

A. I mean, they had to know what the adverse effects of either continuous and significant vomiting or diarrhoea was having on the patient, so that they would be able to alert the doctor to that.

Q. Yes. If we could then go over the page to 603 and highlight there another part of the syllabus, "The study of man and his environment". So what you're telling us or what this curriculum is telling us is that there was education afforded to nurses and during that period in relation to the general structure of the body --

A. Yes.

Q. -- in relation to function, how the body works.

A. Yes.

Q. And is --

A. We went from the normal to the abnormal, sir, if I can put it that way. So the nurses had an understanding of what normal body functioning was, what the different structures within the body, what their role and function was and we moved from that then to how disease and illness could affect them.

Q. On down the page under (iii), you set out part of the programme, which was "The nature and causes of ill health, principles of prevention, nursing care and treatment of sick people". And under the bullet point within that section, there's a requirement to have an ability to interpret the observations made.

A. Yes.

Q. "To understand the significance of disturbed function and to know the pattern of defined diseases and the patient's response to treatment [et cetera]."

When it talks about observations there, is it talking about vital signs, the pulse, the temperature, blood pressure, or observations broader than that?

A. That's part of -- I mean, what I would call the technical observations, that's the taking of a temperature, the checking of a pulse, the counting of respirations of the taking of blood pressure. When you went to a patient, you didn't only depend on what recordings you made, you also listened to what the

patient had to say, you asked them how they were in comparison to earlier in the day or if they had some treatment had they responded positively or negatively to that. And you looked at things like the colour of their skin, you looked at whether they were alert, whether there were drowsy. So you weren't just doing the -- you weren't doing tasks, you were dealing with a whole individual and that was the whole process.

When we talked earlier on about assessment, planning, implementing and evaluating, and when also that made reference to what was described as "individualised care", because you could have two patients coming in with bronchitis, for example, but they wouldn't necessarily have exactly the same set of symptoms. One might have a more harsh cough with blood in the sputum, another might have a hacky cough. So you had to listen to the individualised symptoms that the patient complained of, and that process that I have described earlier on ran through in terms of an individualised approach.

So when you went to the patient, you just didn't take their temperature and walk away, you had a sixth sense sometimes about patients also. From experience, you would know that that person wasn't as good as they were earlier in the day. Maybe they were a bit more

cyanosed or restless.

Q. Part of this must be experience --

A. Yes.

Q. -- but to what extent were nurses educated or trained as part of their educational programme in relation to these observations?

A. Without a doubt, observation was not just temperature, pulse and respirations. Observations was all the things that I have just described.

Q. But how can that be taught? How was it taught?

A. How was it taught? Well, for example, very much you'd have taught observations as a nursing lecture and then when you went to -- I'm taking bronchitis because it takes us away from why we're here -- but when you went to teach about bronchitis, you'd have gone again into the vital symptoms that the patient would have demonstrated, so the nurse would have not only known about blood pressure, pulse, temperature, but then she'd be looking at respiration rate, and it would be raised, whether the patient could breathe easily or whether they had pain. And you'd be looking at the colour of the skin because quite often it would be quite cyanosed.

So it's wrong to say that temperature, pulse and respiration and blood pressure was the beginning and end because they're four and they're only four of a variety

of symptoms that a patient would present with. And the nurse would know from the medical diagnosis of the patient coming in what to expect. So therefore, you would be looking for more than just the things that are very often described as observations, which are temperature, pulse and blood pressure, respirations.

Q. Could we go over the page to 604, please? For the nurse to be carrying out observations, both technical and these more general type observations that you've described, they will need to know something about the expected course of a disease; isn't that right?

A. Yes.

Q. I see listed at (e), "Normal course of illness, possible complications". Was that part of the syllabus?

A. Yes, oh absolutely.

Q. Can I ask you this: we're dealing here in this inquiry with Raychel's care and treatment, we're dealing with intra-abdominal surgery.

A. Yes.

Q. The inquiry has heard a lot of evidence about what might have been expected following a, if you like, straightforward piece of surgery and what are the possible complications. Was something as specific as that kind of surgery in the child patient something that was taught as part of the 1973 and subsequent education

programmes?
A. In respect of -- if you take the removal of the gall bladder, which is a fairly simple straightforward operation, or you can take appendicectomy if you wish, the normal healing process and the normal expected outcome would be taught. And there was always a section in each of the lectures that we did for what was described as possible complications. And the possible complications that you could expect in, say, appendicectomy, would be where the gut has been handled and have the appendix removed, that you would maybe get a period -- and the doctor referred to it this morning -- where the bowel activity stopped. And in respect of that, it'd be very important, the nurses would be taught that when you start to give the patient fluids after surgery, that you start with very small amounts because if the gut isn't working in the peristaltic movement way, which is like contracting and relaxing, if you give them too much fluid, the patient starts to be sick, so you have to pull back from that. Nurses would know that, they would have been taught that, they would have reported when the doctor come to do the round that they had attempted to give fluid, but it didn't work, or whatever the situation was.
If you had an appendicitis that was burst -- and I'm

sure we've all heard of a burst appendix -- that is a much more serious situation because in that situation there would likely have been some faecal matter would have released out into the abdominal cavity. That again is a serious complication and the nursing practice is of greater intensity around that patient because that patient has the potential of being ill, they would be put on maybe intravenous antibiotics. So all of that was covered, it wasn't just a light lecture on somebody has their appendix out, you do this. You go into the straightforward -- what the normal pathway would be and then you look at what complications might arise, and the complications that might arise, one of them would be vomiting. I've partly given a reason for why that would be.
Q. Yes. Before leaving the 1973 syllabus and moving on, could I put to you some perspectives offered by some of the nurses who came through that programme? Just having said that, can I start with Nurse Millar, who didn't come through that programme --
A. She came through the same era as I did, so I'm well able to speak to that.
Q. She said in her evidence on 28 February 2013 at page 21 that she didn't know anything about a replacement regime, she had never had any training on IV fluid

administration. She said Solution No. 18 was the fluid that she understood to be a safe fluid because it had a little sugar in it. But just dealing with the point about training in relation to IV fluid administration, and just that point, would she have had training in relation to IV fluid administration if she had followed the education arrangements before 1973?
A. Yes, because I was in that period and we were very clearly taught in the classroom. In fact, there was a bed in the practical room, there was a giving set, there was a fluid -- bag of fluid attached to it, and we were all taught about -- now, in those days it was very much the prerogative of doctors to put up the giving set, to put the needle into the patient's vein, so the doctor did all of that. And we were taught -- and I taught also -- that the responsibility then of the nurse was, once the fluid was erected, to make sure that the prescribed rate and flow and that the site where the cannula or the needle was in the arm -- or wherever it was -- that that was not infected and that it was still in place and that the amount was to be given over a period of time or whatever particular ... That was part of the teaching prior to 1971. Most definitely.
Q. Moving into the point that she makes about not knowing anything about a replacement regime --

A. I can't really comment on that because not until latterly would I have also learnt about the difference between what we would have called maintenance fluid and I mean I was familiar in my clinical experience of a No. 18 Solution being put up, but I'm not speaking about children, sir, I'm speaking about adults. But No. 18 was the fluid of choice that was put up if somebody was losing fluid until more monitoring was done as to what electrolytes -- replacement, whether it was potassium, sodium or whatever that needed to be replaced.
THE CHAIRMAN: Sorry, just to get that clear, professor, it's only latterly that you know of the difference between a replacement fluid regime and a maintenance fluid regime?
A. Yes.
THE CHAIRMAN: And until then, the general point that the nurses have made is that they understood the big risk for Raychel was dehydration and they understood that, as long as she was getting IV fluid, that would prevent her getting dehydrated and therefore they thought she was safe in terms of fluid. And that is the context in which they were being asked about the difference between replacement and maintenance fluid. Do I understand from your last answer that, in broad terms, you accept their

evidence?
A. In broad terms I would say that there wasn't a great differentiation made between maintenance and replacement. I think that's the point I want to make, that the importance was that whatever fluid was prescribed by the doctor was -- that the nurse's responsibility was to make sure that that fluid was given at the right rate at the right time and all of that. So it was really about ensuring that the patient was getting fluid replacement or maintenance, as the case may be. It wasn't terminology that was widely used back when I was in practice. It was something that has come in much latterly because people are making that differentiation now.
THE CHAIRMAN: When you say "latterly", are we talking about the last 10 years or ...
A. Well, when I hear that I'm 35 years teaching, I find it difficult. But it would probably have been more around the introduction of Project 2000 where there was a greater emphasis on the nurses knowing in more detail about the whole electrolyte balance thing. Because prior to that -- and even to this day -- that responsibility still rests with the doctor. They have the responsibility for making sure that the right fluid is in place for the patient.

THE CHAIRMAN: Thank you.
MR WOLFE: Just to build on that point with some of those who went through the 1973 curriculum, to take for example Staff Nurse Noble, she says she was familiar with maintenance, what maintenance fluids meant, but she had used the term "replacement fluids" almost interchangeably with maintenance when she came to write her statement to the inquiry. That level of confusion on the part of nurses, thinking that because an infusion was in place while a child was vomiting, those fluids were being replaced, is that a confusion that you can understand of those who came through the 1973 programme?
A. Yes, because, like I've said already, the differentiation between maintenance and replacement wasn't all that often articulated. It was the fact that the patient would have an intravenous infusion put up or erected to make sure that their fluid balance was maintained. What was put up was the responsibility of the doctor.
Q. Again, Ms Ramsay, who has given evidence to the inquiry, said in her report that, as a minimum, she would expect experienced paediatric nurses to be aware that where there are gastric losses, they needed to be replaced. Perhaps the difficulty is that the nurses were assuming that because an infusion was in place, they were being

replaced. Can I ask you this: should nurses have appreciated the different types of fluids and their composition that were available?
A. Yes, they would have been -- that would have been part of the teaching in respect of when you were talking about intravenous fluids. For example, if you're talking about a patient coming in with diabetes, for example, in the main it would be like a glucose infusion. Where somebody was vomiting, you would be talking about maybe a normal saline being put up. But the point I'm trying to make to you is that while we talked about that and they would have recognised that when they were checking the infusion that they needed to make sure it was a No. 18, or it was a normal saline or it was a dextrose infusion so, that they didn't put up the wrong one, and that they were doing was following the doctor's prescription.
With experience and indeed with discussion, nurses would have picked up that there needed to be different fluids put up and sometimes, for example, something like potassium had to be added. Nurses would have known that. And that would have been the result of blood sample being taken for electrolytes and urea, that will go off to the laboratory and come back and just by the very presence that you're there and you're knowing about

the patient and you would see because the laboratory technicians would highlight abnormalities, you would know that this patient needed some of those things. But you know, this was a partnership working between the nurse and the doctor with the doctor taking the lead in respect of what fluids go. So I don't want to say here categorically that the nurses would have, should have known back in those early days about the difference between maintenance and replacement. What they would know was that the patient needed to have intravenous fluids and that the doctor would direct as to what that should be.
THE CHAIRMAN: Let's suppose you had a nurse who, through experience or training, is more alert to the fact that the fluid can be supplemented with potassium or sodium and that isn't happening, what was the training of a nurse to do in that scenario?
A. Well, any time that -- I mean, taking the example that I've been listening to where you had a patient who was on an ongoing intravenous infusion and the vomiting was continuing, then the responsibility -- I'm back to saying that the responsibility for the nurse was to make sure that the doctor heard loud and clear that this person is continuing to vomit.
THE CHAIRMAN: In practical terms, that means that the

doctor's bleeped, the doctor rings the ward to find out why and then comes to the ward. Is that the importance, when the doctor arrives at the ward, of having a discussion, even if it's a short discussion, with a nurse?

A. Well, first of all, the nurse exercised her duty of care to the patient by ringing the doctor. But she has to continue that, and if she's not going to be there when the doctor comes, she needs to make sure that whoever is there will give the doctor the right message.

THE CHAIRMAN: It cuts both ways, professor, doesn't it? Doesn't the doctor have to make sure he gets the right message?

A. Yes, but the doctor is -- I've said it before. The nurse is there 24/7. So the nurse is the person observing the patient and making sure that any difference in the health status of the patient is picked up. It is for the nurse as the accountable practitioner -- and I'm saying that deliberately -- who has experience of dealing with patients to be picking up on what are the changes that have happened in the patient's life from when they were seen previously, making sure that that is -- and it would be verbal and written records, which is important. And that the doctor is made absolutely clear as to what it is that

the nurse -- you see, I think it's important that the doctor understands why the nurse is concerned.

THE CHAIRMAN: Yes.

A. And that's the message, that's the communication that has to exist first of all. Because if I bring a doctor just because somebody has had one vomit, the doctor will say, "That was a bit of a fuss about nothing because anybody can be sick". But if the patient is vomiting and continues to vomit and the amount of vomit and all of that -- and that has got to be emphasised to the doctor that this is somebody who is not as well as they were in the morning --

THE CHAIRMAN: Right.

A. -- and here are the reasons why, because it's important to back that up.

THE CHAIRMAN: Thank you.

MR WOLFE: The 1983 syllabus. You deal briefly with that in your report, moving along to 605. I think the problem for you was that you weren't able to obtain a copy of the relevant guidance; isn't that right?

A. Yes. The --

Q. You can see it in front of you. You say:

"In relation to the IV management, record keeping and communication, the outlying content is very similar to that set out in the 1973 syllabus. The layout is

different, using language that was familiar at that time. The information presented is based on general nursing guidance as it has not been possible to locate a 1983 guidance document."

A. Yes. The responsibility for the approval of all syllabi for the schools of nursing in Northern Ireland were held by the Northern Ireland National Board and that was from 1983 through to 2002. So when I went to look for all of those documents nothing was available at the Public Records Office from 1986 to 2002. So the best efforts was to see what colleagues who had retired and had gone elsewhere and to see what I could get -- but there didn't appear to be a significant difference in what was in the 73 syllabus and what was in the 83 syllabus. So the emphasis would still have been there on records, record keeping, input and output charts, observations and so.

Q. And so the points that you have made and illustrated by reference to the curriculum guidance document for 1973, we can imagine that they were in place in 1983 as well?

A. Absolutely, they didn't waver because it was about nursing care.

Q. On this page then, you indicate the introduction of the Project 2000 programme.

A. Yes.

Q. And you set out over the page the curriculum reference to IV fluid management, record keeping, communication skill and accountability, and if we could look at that at page 606. What are you setting out here, just to be clear? You've highlighted at the top that you're looking at a particular unit, unit C8 of "The well child".

A. Yes.

Q. Is this part of the general nursing Project 2000 course or is it specific to children?

A. It's specific to children. This is part of the Altnagelvin-approved programme that was delivered in respect of the care of children because they had a children's programme.

Q. Yes.

A. And the Project 2000 programme was very much based on a wellness model or a health model and looking at what the healthy child was like and then moving into the difficulties that children can encounter. So the unit 9 then, that was looking very much at the importance of the communication that should be used with the child and family.

Q. Can I just stop you there? One of the nurses, that is Staff Nurse McAuley, came through Project 2000 towards the end of that decade and into Queen's for the final

two years of her studies. Broadly speaking, albeit that she attended for her training in Belfast, this is an Altnagelvin programme?
A. Yes.
Q. But broadly speaking, is this the kind of material that she should have followed when studying for her certificate in children's nursing?
A. Well, first of all, she started in -- what year did you say she started? Started in 1996, did she?
Q. Yes. That's right.
A. Well, like I said earlier, because that was the programme that she started with, she would have continued on that particular syllabus, even though the students were moved into Queen's, because that was a legal requirement, that they would complete the programme they signed up to in the beginning. So all that's on that page would all have been part of her theory and then the associated practice would have been got in the clinical areas.
Q. And then just looking through it at various aspects, section 12, number 7, communication with children and family will have been taught?
A. Yes, absolutely.
Q. And again, we've heard of a concept of family-centred care. Is this the principle that's being articulated in

a course such as this?
A. Yes. The first thing I would want to say about that is that in the main that Project 2000 programme -- the students who were undertaking that course of study had to have their nursing care delivered by nurses who were already registered sick children's nurses and who then went on and embarked on an teaching programme. And that again had to be underpinned by them having a degree because they were teaching students up to diploma level at that stage. So the whole notion of the child as part of a family coming into hospital to be cared for was the setting in which the nurses would have been taught. So they weren't looking at just the child, they'd have had to have looked at the child in the context of the family, whatever that family looked like. It could have been grandparents or it could have been, you know, mother and father. So it had to be looked at -- and indeed the impact of the child's illness on siblings.
Q. It goes on in this page under section 8 towards the bottom:
"Nursing theory and practice. Fluid and electrolyte imbalance."
That's something that was taught?
A. Absolutely. Yes, that's a direct lift, sir, out of their programme in Altnagelvin, and therefore everything

that's on that -- and can I just emphasise that that would have been checked out by about the National Board officers who would have come and inspected what the teachers were doing in the colleges to make sure that the components of the syllabus that they set out were being taught.
Q. It was something you said earlier, professor, where I think you said that by contrast with the programmes of 73 and 83, by Project 2000 trainees, pre-registration nurses are getting in a bit deeper in terms of the detail that they're getting about electrolytes and what have you.
A. Well, even the very fact that it's mentioned there about fluid and electrolyte imbalance is a deviation to what I would have been able to put in the 73 and 83 syllabus.
Q. Over the page to 607. We jump around a little bit, but at the bottom of the page, under unit C10, again number 3, "Adequate fluid and electric [sic] balance" --
A. I think that should be "electrolyte".
Q. -- is being taught in that part of the programme as well. Just help us with this: does that suggest that under the various units that are being taught, this issue is coming up on a repeated basis?
A. Yes, you can see that the knowledge base is deeper, so therefore under the Project 2000 programmes there was an

expectation that the nurses would have a deeper -- they were described as "the knowledgeable doer", so therefore there was an expectation that they would have a greater knowledge base. Now, that -- can I just say that while they were being taught that, that was not to undermine in any way the role the doctor had for making sure that the patient got the right fluids. But it gave the nurse a knowledge base on which to make an accurate report to the doctor. Is that fair?
Q. Yes.
THE CHAIRMAN: Is this part of what has been broadly described to me as the developing importance of nurses and them asserting more of their own professional obligations and standards?
A. Yes. And to be fair, sir, that only comes about when you're knowledgeable.
THE CHAIRMAN: Yes.
A. It can come about with experience also, but the whole purpose of having the Project 2000 programme and having it at diploma level was to make sure that nurses were more knowledgeable and therefore could make informed decisions on the basis of the care they were delivering and what the patient's response to that was so that they could -- I'm not saying that the pre-1990 nurses couldn't actually reflect what the patient's state was,

but this was to equip the nurses with a bit more knowledge and make them -- what they described as "knowledgeable doers".

THE CHAIRMAN: But it enables them to make a more significant contribution?

A. Yes.

THE CHAIRMAN: And if they can do that, then is it their obligation to do that by raising issues with the doctors that they didn't necessarily raise before?

A. I'm not sure that I agree with that.

THE CHAIRMAN: "To be more assertive" is how I think it was described to me at an earlier stage in the inquiry.

A. I would say this: that in all of my own experience and in teaching, that what was important was that you did what was required by way of giving good care to a patient, that you were clear about the observations you were making and that you made sure that if there was any deviation that you were concerned about, that that was communicated to the doctor.

THE CHAIRMAN: Okay.

A. The point that I think I'm making here at C10 is that the nurse, having come through the Project 2000 programme, would have a greater knowledge base upon which to maybe make a better decision about why a deviation has occurred, but again it doesn't absent

her from referring it to the doctor because, at the end of the day, all we do is carrying out the doctor's instructions --

THE CHAIRMAN: Thank you.

A. -- in most cases, except you were very sure that something that they were advising wasn't, and then you can take that up at a more senior level.

MR WOLFE: Towards the top of the page, there's a reference to continuous evaluation of care. In practical terms, what is that getting at?

A. That's ... If you are delivering an aspect of care such as pain relief, it's not enough to just go and give the patient the medication that's been prescribed, it's very important to go back after half an hour or so to find out if that medication had the desired effect, or indeed, if the patient calls you and said, "I don't feel well, I've got this or that", it may be that the patient's reacting to the medication that's been prescribed. That's what I mean by continuous evaluation. When you're working with patients, you're continuously observing purely by the content of conversation and by your own powers of observation whether or not you think the patient is -- I mean, if you're ... On many occasions, nurses are looking after unconscious patients and therefore they have no way of

the patient responding in terms of how they're getting on or how they're improving or deteriorating. So the nurse has to use all the powers of observation to make sure that they're capturing any changes in the patient's condition. It's much easier to do it when a patient is conscious, but I'm throwing that in because it highlights the need for nurses to use their powers of observation all the time and to -- if they see something that they think is going wrong, at least report it to the sister or talk to the doctor about it. Continuous evaluation is making sure that whatever care is being delivered is having the desired effect.

Q. To use an example closer to home, we've heard about the fact that Raychel was nauseous and had vomited on the morning of 8 June and there was some period of time into the late afternoon before an anti-emetic was prescribed. In that context, what should the teaching or the education of nurses have taught them which would have assisted them in that context?

A. I think, first of all, it would be important to remember that when somebody's had an anaesthetic and they have been fasting for a period of time before they had the anaesthetic -- when patients in general are recovering from an anaesthetic it is very, very common for patients to be nauseated and to vomit. So that is almost like

a normal reaction to the anaesthetic and indeed because the patients were hungry and that means that their stomach is filled with gas and that makes a patient sick. So you have to differentiate between that as a kind of normal reaction to the anaesthetic and then something that develops as the day goes on because I can't -- and you may help me, but my understanding was that the patient's progress after surgery, which was about 1 o'clock in the morning, through, was uneventful, I would describe it as uneventful. Therefore they had started to give the patient sips of water.

Q. Yes.

A. Am I right on that?

Q. That's right.

A. That was a period of natural progression, which you would have expected. Then when you started to find that there was nausea and vomiting, then you began to think something else isn't right. My first thought would be: has this peristaltic movement that I talked about earlier, is that not functioning? So you would begin to be concerned about why the person who was well and taking sips of water suddenly began to be sick. So even at lunchtime your concerns would begin to be heightened.

MR QUINN: Mr Chairman, I think the learned professor may have got it slightly wrong in that the parents will say

all she had was maybe one sip of 7 Up.
THE CHAIRMAN: Two capfuls.
MR QUINN: Maybe two caps of 7 Up.
THE CHAIRMAN: Yes.
A. I knew she had some fluid.
MR WOLFE: Two small amounts, described as "capfuls".
THE CHAIRMAN: We are talking about negligible amounts of fluid. I mean, very small caps; is that it?
A. Yes.
THE CHAIRMAN: Two small caps.
A. In fairness, when you're starting a patient off post anaesthetic, or post surgery, you'd be talking about a spoonful, a sip of water, just to see how that is tolerated by the patient. So that's not that abnormal an amount. But as the day went on and the patient got more nauseous and vomiting, then you would be -- if I could just say that as it moved towards what I would call close of play for doctors, it would be very, very important that the people on the ward would have made sure that the patient was seen before doctors go home.
MR WOLFE: Is that 5 o'clock or 6 o'clock?
A. About 5 o'clock or 6 o'clock. Once the consultants and senior staff leave the hospital, it's actually quite difficult to get them back. So it is important that if you see somebody whose condition is deteriorating then

you highlight that so something can be done.
Q. You have gone on in your report --
THE CHAIRMAN: Sorry. To be fair, that did happen. Because there had been a delay in a doctor responding to the bleep in the mid to late afternoon, it was Sister Millar who went out on to the ward and effectively grabbed a passing doctor, Dr Devlin, to ensure that Raychel would be seen. So she was making -- so that fits in with what you think --
A. Yes.
THE CHAIRMAN: -- should have been done, to make sure that a doctor does see --
A. Yes.
THE CHAIRMAN: Okay.
MR WOLFE: You've gone on in your report at page 609 to set out the syllabus from Northside College; is that the Belfast based --
A. Yes.
Q. -- campus? When I asked you about Staff Nurse McAuley earlier, I should perhaps have been pointing you in the direction of this syllabus because she was following the syllabus in Belfast and she was working towards a certificate in children's nursing.
A. Diploma.
Q. A diploma in children's nursing, which she achieved.

Again, it would appear that there's overlaps or similarities between that and the one that we've just been looking at. If we could --
THE CHAIRMAN: There should be, shouldn't there, because they're all coming from the same base document?
A. Yes, it's all coming from the National Board's guidance, which had been circulated to all the colleges of nursing.
MR WOLFE: What Staff Nurse McAuley said in her evidence was that she can't recall whether she was taught about the circumstances in which a risk of electrolyte imbalance might occur. Looking at the syllabus, certainly electrolyte imbalance was something that was apparently taught.
A. Yes, yes it was. And if I could just say, sir, I'm not a trained children's nurse, but we did a module for children's nursing within the adult syllabus and very specific attention in preparation for nurses going to work on the children's ward because the ratio of fluid content in the body is greater in a child than it is in an adult, and therefore any deviation in relation to fluid imbalance in a child is more significant. So even as an adult-trained nurse working in a children's ward, we were taught that and the students were taught that. So I'm not accepting at all that that wouldn't have been

taught.
Q. In fairness, it's a recollection issue that she has raised, not a denial that it was taught.
A. Well, if I could just say, being taught -- but working in the Sick Children's Hospital in Belfast, because I had responsibility for that when I was the Director of Nurse Education there, it would have been quite unusual to have had a child in the Children's Hospital that wouldn't have at some point needed intravenous fluids. It's a very common procedure, given the serious -- because that was the central hospital for the sick children.
THE CHAIRMAN: Yes, you got the sickest children.
A. Yes. The sickest children, and therefore they were the ones who needed the greatest care.
MR WOLFE: She says that she was certainly taught that an electrolyte profile was carried out to assess electrolyte balance as directed by medical staff, so she can certainly recall aspects of that.
So just to sum it up, Professor Hanratty, what you're saying is that throughout the recent history of nursing education in this jurisdiction in the periods described, you are confident on the basis of your research and practical experience that nurses had a thorough grounding in the importance of fluid balance

in a patient?
A. Yes, I'm absolutely certain of that, and indeed also not only of fluid balance, but in the importance of the maintenance and the delivery of fluid, the whole management of fluid processes, whether it be intravenous or parenteral or whatever. That was all taught because that bit of it is very much the purview of the nurse, to be there at all times for the patient.
Q. And you've reflected the fact that the degree of intensity of that education programme in that area was, if you like, ramped up after 1990.
A. Yes.
Q. And that's reflected in the syllabus that we've just looked at.
A. There was 30 per cent more time for the students to be in the classroom and to get that increased depth of knowledge. It wasn't made available to students who did the earlier programme, so they only had 20 per cent of classroom time.
Q. And the second point then, in summary, is in relation to that important area of observations throughout the whole recent history of education delivery to nurses. That was a point that was again emphasised, not just the technical observations, but these more generalised observations and the importance to evaluate a patient's

care when you've carried out these evaluations.
A. Yes, and I used the unconscious patient as an example to highlight that. The nurses were taught about the care of an unconscious patient. Therefore, irrespective of what communication there was between nurse and patient or nurse and relative, the nurse had to have developed a very acute sense of observation of the patient and their condition because there was no response coming from the patient and you had to be able to report that when the doctors came to do the round if you didn't have to send for them in the meantime. I think that's a very important part of all of this, that emphasises that it's not just about the taking of pulse, blood pressure or temperature, it's about the skills that a nurse has.
Q. And the third point, in summary, was that nurses had a grounding in terms of the education provided of what to expect --
A. Yes.
Q. -- in terms of a normal recovery and deviations from that?
A. We called them complications, but, yes, or potential complications was probably a better way of describing it. But that was all part of the lecture that was given and we looked at specific entities such as cholecystectomy, appendicectomy, thyroidectomy. It was

all, in turn, delivered to the nurses and they would have had notes and handouts to support that.
MR WOLFE: Very well. Sir, I have no further questions?
THE CHAIRMAN: Can I take you off track for a moment? One of the things that worried me much more so in Adam's case than Raychel's is that, when Adam died and there was some form of inquiry or scrutiny of what happened in the Royal, no nurses were involved in that. In fact, it was so poor that the Director of Nursing, Ms Duffin, who I guess you know --
A. Yes.
THE CHAIRMAN: -- wasn't even aware that Adam had died, despite the fact that it was described to me as "the talk of the hospital". That suggests that at least in 1995 when the events around Adam took place that nurses were almost regarded as being irrelevant to any investigation or any follow-up or any scrutiny of what happened. Are you surprised that when Adam's death was being looked at by surgeons, anaesthetists and nephrologists, that the nurses were effectively excluded, or you're not surprised but ...
A. I really do feel I want to say something, but it's going to be on the record, I take it.
THE CHAIRMAN: Either you respond on the record or you don't respond, professor.

A. Well, I will respond because I have made great play in what I've said here this afternoon about the significant and important role that nurses play in relation to the 24/7 care of patients. So if you're going to have an investigation into a sequencing of events, how can you do that sequence of events if you haven't got the people who are there 24/7 to add to it?
THE CHAIRMAN: Yes.
A. That's what I would say, if that makes sense.
THE CHAIRMAN: It does, thank you very much.
Mr Quinn, any points?
MR QUINN: I have a question, Mr Chairman. I would like to ask in relation to the vomiting, the large number of vomits that went on in the day that the nurses observed, in the professor's experience would that be cause for concern among the nurses, having observed the child vomit two, three, four, seven, eight, nine times?
THE CHAIRMAN: I picked up an answer that you gave a few moments ago, professor, saying that you would have been concerned by lunchtime or certainly from lunchtime on.
MR QUINN: Yes, I picked that answer up. I just want to emphasise that. I wanted to ask, following on from that, when should that concern have become, as it were, urgent?
A. I'm not sure. I mean, I've heard the information that

has been imparted here between yesterday and today about what the family had reported in respect of their -- I mean, the whole emphasis of the care of a child, whether they're in hospital or wherever is meant to be a partnership arrangement between the nurses, the parents and the child. So if the parents were coming to me and telling me that their child was vomiting and if they were bringing receivers or kidney dishes, whatever they called it, with vomit in it, I would be absolutely making sure that that was recorded and I'd be making sure -- and that would be taught to nurses to make sure that that was imparted to a doctor.

I made the point about 5 o'clock or 6 in the evening because if the vomitus was gaining momentum and the nausea was there, it was really quite important that this was not left as a problem for the night staff coming on. I haven't heard that mentioned, but that is quite an important part of the relationship between day staff and night staff. You don't set problems on the night staff's hands that you could maybe have done something about before the night staff come on.

So listening to what I've heard -- and I can only listen and hear what I heard -- that really should have been -- there should have been some action taken to make sure that the night staff were not being left with

children who was gradually becoming more ill. I'm not sure at what point the coffee-ground vomit -- but that for me was absolutely something that I as the nurse in charge would not have been looking to a junior doctor to help me out with.

MR QUINN: Thank you very much for that answer.

THE CHAIRMAN: That takes us back into Claire's case a bit because there was an issue about the day doctors leaving, Dr Steen was one, and two others, Dr Webb and Dr Sands, who all go away, and there's little enough left being picked up about Claire on the evening; isn't that right?

MR QUINN: That's correct. And following on from that, could I ask through you again, this is for the governance issues, trying to tidy up with a view to looking forward to those issues. Could you ever envisage a meeting occurring where the nurses, or one or two or three nurses, sit back at that meeting and say that they had no cause for concern about Raychel's demeanour and her whole observations on that day?

A. Well, I suppose --

MR LAVERY: That's pure speculation, Mr Chairman.

THE CHAIRMAN: I think we had this point before, Mr Quinn. I understand the point because it reads very starkly on the witness statements, but I interpreted it as that

they had no concern that Raychel's life was in danger as opposed to not having a concern that she was vomiting all day. Now, I'll take submissions about whether they were concerned enough, but I think it's clear, and this goes back to Claire again, I'm not sure that anyone really picked up what was happening.

MR QUINN: Claire's case is slightly different.

THE CHAIRMAN: It's different in a whole lot of ways.

MR QUINN: Because no one realised how ill Claire really was. The point I'm making in Raychel's case is -- the parents make the point and they must make it through me, that the nurses told them there was no cause for concern at the September meeting. That's the point I'm making here.

THE CHAIRMAN: Okay.

A. I think the time of day that that was articulated is what's relevant here, if you don't mind me interjecting, sir.

THE CHAIRMAN: If the nurses said in September -- sorry, Raychel died in June, there was a meeting in September with the family, at which some nurses were present. And if it is the case that they said at that meeting that they had no cause for concern about Raychel, then if it's meant as starkly as that, that might be surprising.

A. Any time from particularly the 8 o'clock version that

I've heard onwards was cause for great concern.

THE CHAIRMAN: 8 pm?

A. Yes. I mean, I'm not sure that I've got exactly the sequence of events, but there was --

MR WOLFE: Could I make the point clear that in terms of this witness, Professor Hanratty, she has been briefed to deal with the education process and so any example that's put to her has to be filled out with the details so she can adequately comment.

MR CAMPBELL: Sir, the questions of the nurses' concern and the way that was expressed has to be put in the context of them saying that they were analysing this in the context of their expectation of this being normal post-operative nausea and vomiting.

THE CHAIRMAN: Yes. I think there's probably a limit to how far we can go on that.

Mr Campbell, do you have any issues? Mr Lavery?

Professor, thank you very much. Thank you for your paper and thank you for topping it up today with your evidence over the last hour and a half. You're free to leave. Thank you very much.

(The witness withdrew)

Ladies and gentlemen, that brings an end to today's hearing. Tomorrow we're having Mr Orr and Mr Foster, who are going to give evidence together as the expert

surgeons and taking into account also the additional statement made by Mr Gilliland, as we discussed yesterday. I understand that tomorrow morning there's to be a consultation involving Ms Anyadike-Danes, I think Mr Stitt and Mr Lavery maybe, and Mr Orr, and I'm told to tell you we are starting at 10 o'clock sharp tomorrow morning. We'll see.

(5.22 pm)

(The hearing adjourned until 10.00 am the following day)

I N D E X