SCOTTISH HOSPITALS INQUIRY

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Sara Mumford
Linda Dempster

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10:04

THE CHAIR: Good morning. Now, we're resuming with Dr Mumford and Ms Dempster.

MR MACKINTOSH: Yes, we swapped their positions just, sort of, out of a sense of equity.

MS DEMPSTER: Good morning.

THE CHAIR: Good morning, Ms Dempster. Good morning, Dr Mumford.

DR MUMFORD: Good morning.

THE CHAIR: Now, Mr Mackintosh.

Questioned by Mr Mackintosh

MR MACKINTOSH: Thank you, my Lord. Good morning. This morning, I want to look at root cause analysis as a topic, and I should perhaps explain why I want to ask these questions. We've had evidence from Greater Glasgow and Clyde, particularly from the IMT minutes and from Pamela Joannidis, about root cause analysis being carried out in the latter part of 2019 for a number of cases. We've also had evidence from the expert panel of the case notes review that they were carrying out something that to amounts, to some extent, to root cause analysis.

I think it's fair to say that neither group necessarily think the other one is doing it right. I don't want to put to you the details of what they said because then that will take too long, but I would like to understand what it is that you think, both of you, root cause analysis actually amounts to in substance, so that we have a point of reference when we look at the different positions expressed. So, Ms Dempster, could I perhaps start with you? What do you think root cause analysis is in the context of IPC?

MS DEMPSTER: It's a process that's commonly used in England that was introduced really on the back of-- for infection prevention and control on looking at cases of MRSA. It's a very structured process that you go through to look at the patient's journey, not just one event, what caused the MRSA, but the whole process.

So, you would look-- define the problem. What's the problem? We've got a patient who's got infection A, B or C. Then you would collect all the relevant data that you've got. I say data, but I mean clinical records. It could be laboratory results.

MR MACKINTOSH: Well, can we perhaps get a complete list of what you might collect?

MS DEMPSTER: You would have the-- Probably a step before that

is to get the right people in the room.

MR MACKINTOSH: Right.

MS DEMPSTER: So, this is a process that's best done in real time. So if I've got the patient with an infection, I would want the clinician, the consultant in charge of that patient to do the root cause analysis, the ward sister or manager, whatever title you like to cause them-- call them – you might have an antimicrobial pharmacist, you'd have an infection control doctor maybe, an infection control nurse, relevant people who've actually provided the direct care for that patient – and then you would look through-- So you would start with their notes, when they were admitted, a kind of timeline of the care of the patient. Then you would look at perhaps different interventions.

So if they had had, for example, a Hickman line put in, you would look at where the line was put in, who put the line in, how did they put the line in, did they follow the correct procedures? Excuse me. So it's following all the care of that patient, and then you look at why do you think they ended up with the infection? What could be the cause of that infection? Then perhaps you're going to say, "We think it might be a line infection," but you always ask yourself again, "But why do we think it's a line infection?"

MR MACKINTOSH: So, it's a constant iterative asking of why, why, why.

MS DEMPSTER: Yes, why, why, why, the five whys classically we would have used, but it----

MR MACKINTOSH: So, why five?

MS DEMPSTER: I don't-- I think that's the structure. Certainly, that's my personal----

MR MACKINTOSH: Yes.

MS DEMPSTER: -- the process we used from-- that we used to advocate from the NHS England side of things, but----

MR MACKINTOSH: When you say five whys, it's not five different whys. It's just why did that happen? Well, if that's happened, why did that happen?

MS DEMPSTER: Yes, so was that because you had no staff on the ward? Well, why wasn't there any staff on the ward? Well, because they were all off sick with-- So it's asking, you know----

MR MACKINTOSH: And then why were they all off sick?

MS DEMPSTER: Yes, yes, and it's actually because there was a big problem, or we had agency staff. So it's pushing down and down and down

to try and find the root of the problem, not just to start by saying they had a line infection.

MR MACKINTOSH: Is it essential that this sort of exercise be done contemporaneously with the events? Is that part of it, or can it be done retrospectively?

MS DEMPSTER: It can be done retrospectively, but you probably lose some of the depth of the information you might get if you're doing it in real time. If you're doing it quite close to the patient's admission and their care, people remember the patient. They remembered what went on. They might say there was a problem on the ward with-- I'm trying to think of a good example, the toilet had broken down. You remember the patient, and a doctor will probably decide-- say why they made the decision around perhaps giving a certain antibiotic----

MR MACKINTOSH: Right.

MS DEMPSTER: -- at that point in time. So, also, we would look at drug charts. You might have a pharmacist there if you thought it was an issue about prescribing or incorrect prescribing. But, equally, you might follow this RCA through and find that there was very good care. It's not all about trying to find things wrong. It's also about identifying best practice, good practice, things that went well.

MR MACKINTOSH: Is the idea that the team-- it's a collective exercise. Is that a core part of it or an add-on, as it were?

MS DEMPSTER: I think it should be collective to get the different views.

MR MACKINTOSH: You need to have an involvement of the clinicians?

DR MUMFORD: Ideally, definitely, yes.

MR MACKINTOSH: Right. Dr Mumford, is there anything you'd like to add to that process that Ms Dempster's described?

DR MUMFORD: Yes, so I'd like to absolutely confirm that (a) it needs to be as close to the event as possible, (b) you need to have as many people involved in that patient's care as possible, because no one person will know absolutely everything that has happened to that patient and what was going on in their ward environment at the time.

MR MACKINTOSH: Would you expect to see in a root cause analysis, for example, the use of environmental testing results if that was an issue in----

DR MUMFORD: If that was-- if that was thought to be an issue, yes, but you would also include, you know, what other patients on the ward--

whether they had similar infections. You'd look at your infection control guidance and the audits of that guidance to make sure that practice was up to scratch and there were no issues with that either.

MR MACKINTOSH: Might a root cause analysis include epidemiology data about the numbers of cases of a similar sort that have been in that unit over time in the past?

DR MUMFORD: I think it very much-- It wouldn't be a routine part of it, but if you were doing a root cause analysis with-- of a individual patient within a period of increased incidence of a particular infection then you may well look at the epidemiology. Certainly, if you're looking at where you've got several different patients on the same ward with a similar infection, you would look at their pathways too and whether or not they have crossed over or if there was an opportunity, whether there was any shared equipment and that kind of thing, to see if there's any opportunity for infection to spread between them.

MR MACKINTOSH: Might there be a role for the various typing technologies of connecting different bacterial samples to each other?

DR MUMFORD: Ultimately, yes. If you waited for that, you would lose a lot of the richness of the process, so that would be done more as a confirmatory process later, rather than something that would be imperative to have as a detail within the root cause.

MR MACKINTOSH: I mean, what's your take on why there are five whys?

DR MUMFORD: I think it's because it's thought that if you ask why five times, that you usually get to a sufficient level of granularity. If you-- if you keep asking the whys and you can't ask another one, then that's the root cause.

MR MACKINTOSH: Right. It's sort of the opposite of a toddler continuously asking the questions.

DR MUMFORD: Yes.

MR MACKINTOSH: Right. That, I think, might be helpful-- In a sense, it might be complete. Yes, would it be possible for two root cause analyses exercises to come up with different answers?

DR MUMFORD: On the same patient?

MR MACKINTOSH: Same facts.

DR MUMFORD: Same facts. I think depending on the knowledge that each group doing the root cause analysis had and the information they had access to, potentially it could.

MR MACKINTOSH: I'm not

going to ask this question of Ms Dempster because she was involved in the case notes review exercise. I'll just limit it to yourself, Dr Mumford. From your perspective-- I appreciate you may not have seen the actual full documents produced by either the root cause analysis carried out in GGC in the second (inaudible) or the individual case analyses in the case notes review. I think that's right, is it?

DR MUMFORD: Mm.

MR MACKINTOSH: Yes, remember the transcript.

DR MUMFORD: Sorry, yes.

MR MACKINTOSH: Yes. Do you have any views about whether either, neither or both of the exercises that we have heard about had features or were root cause analyses exercises?

DR MUMFORD: I think that they were really case note reviews rather than root cause analyses.

MR MACKINTOSH: What do you see as the distinction?

DR MUMFORD: They can be the same thing but they often-- but they can also be quite different. So, often, you don't in a root-- in a case note review, you have the case notes, and you have paper and you have data, but you don't have the people who will provide that additional information. The-- I think I've seen a couple of root cause analyses related to cases within the Inquiry, and they don't have the detail that I would expect, so they don't have the detail of the entire patient journey. It, kind of, very much focuses right from the beginning on what the hypothesis is. You shouldn't go into a root cause analysis with a hypothesis, apart from, you know, "We have to find out how this patient acquired this infection." If you have a hypothesis when you go into it, you bias the whole process.

MR MACKINTOSH: What are the principal features then of a case notes review?

DR MUMFORD: Well, a case note review, if it's a purely exercise and data process, would be looking at what has been documented, and it's a case of, to some extent, if it isn't documented, it didn't happen.

MR MACKINTOSH: So, you can't get the detail from people?

DR MUMFORD: You can't get the detail and you may not have things like the patient's journey through their admission, you might not know if they changed rooms, you might not know if they left the ward to go to a treatment or an imaging somewhere else. It might not bring it all together in the same way.

MR MACKINTOSH: Right, and when we hear people saying that root cause analyses are used-- Well, Ms Dempster explained that root cause analyses are used in England.

DR MUMFORD: Not so much anymore because we have a new process now.

MR MACKINTOSH: What's the new process in England?

DR MUMFORD: The new process is called the patient safety incident framework, so it's PSIRF----

MR MACKINTOSH: Right.

DR MUMFORD: -- and----

THE CHAIR: Sorry, can you give me that again?

DR MUMFORD: Patient safety incident review framework.

THE CHAIR: Patient safety incident review framework.

DR MUMFORD: Framework, yes.

THE CHAIR: Thank you.

DR MUMFORD: So, that was only introduced earlier this year----

MR MACKINTOSH: How does that work?

DR MUMFORD: -- and it's based on something called an after-action review. So an after-action review is where you say, "This has happened. This patient, you know, had the hip put in the wrong side," so had the wrong hip replaced, for instance, and then you say, "What should have happened to this patient?" and you go through the pathway in the process of exactly what should have happened to that patient in a perfect world and how they would have gone from being brought into the hospital to having the surgery and all of the processes in between, and then the second question is what actually happened. So you do the same exercise but you look at exactly what happened to the patient, and you do both of those things by continually asking the same question. So you repeat the question over and over again----

MR MACKINTOSH: So, "What should have happened and what did happen?"

DR MUMFORD: -- yes, to every person in the room. So you get that multidisciplinary team into the room and you ask them the same question and then you get a kind of amalgamated answer, and then you say, "How did it go wrong?" So, how did this go wrong, and you look at each stage and you identify across what should have happened, what actually happened, what the difference is and was it preventable, why did that happen? So, was it because an x-ray was put up the wrong way around and

everyone thought they were looking at the right hip when actually they were looking at the left hip, that kind of-- I mean, that doesn't happen----

MR MACKINTOSH: Shouldn't happen.

DR MUMFORD: Shouldn't happen, but it's that kind of process where you look at absolutely everything, you know, who said what, what was documented, what's everybody's recollection of the event, and, to do that, it's really important that we have everybody who is involved in the room at the same time.

MR MACKINTOSH: So, this can be quite time consuming?

DR MUMFORD: It can be, but it should also be, again, as contemporaneous with the event as you can possibly get it, so that it's fresh in everybody's minds and they understand.

MR MACKINTOSH: Is there a particular reason why you ask the same question of everybody?

DR MUMFORD: Because everybody might have a different recollection and you need to-- and everybody has a different point of view. So the nurses might have a different point of view of what's supposed to happen to patients from the doctors and the nurse will know more probably about what was supposed to happen to the patient than the doctor will, and so when you get the two together, you get a richer picture of actually what should have happened and what did happen.

MR MACKINTOSH: I suppose what I'll do is I'll go back to Ms Dempster and come back to you, Dr Mumford. These two mechanisms of a root cause analysis and this new English system, how do they compare to the way you've seen IMTs work in this hospital? Because, there, there's a certain amount of considering what's happened, hypothesis, working out what to do happening with lots of people in the room, contemporaneous to events. How do these processes compare to the way that the IMTs appear to have been operating in Glasgow?

MS DEMPSTER: I think they're distinct processes.

MR MACKINTOSH: Right.

MS DEMPSTER: The IMT is not doing an RCA, so an RCA is about-- or the case review is about a patient, an individual patient.

MR MACKINTOSH: So, this exercise has to involve-- it wouldn't necessarily involve, for example, people from Estates and people from higher up in the organisation, it would

be a clinician-focused exercise.

MS DEMPSTER: It would be, but if you found-- You might need Estates in the process if there was a failure in the ventilation in that room that the patient was in. So, sometimes, you might have started to do whatever review you're going to do, whatever you call it, and then, as you begin to investigate, you think, "Actually, this is due to a failure of"-- I don't know, it could be the heating was down or something; you then might think, "Actually, we do need to seek the advice from somebody else and ask the questions of them, what went wrong."

MR MACKINTOSH: Anything you'd like to add to that, Dr----

DR MUMFORD: No, I don't think so.

MR MACKINTOSH: I'd like to move on to another aspect of IPC practice, and what I wanted to do, and I promised to do this yesterday, is to look at the National Infection Prevention and Control Manual with Ms Dempster, part 3, which is bundle 27, volume 4, document 16 at page 178. Now, this may not be the final, current version. I think it's the 2023 version. I hope it will do. It's mainly the definitions, Ms Dempster, that I want to look at because it's all very well for me to say, as I've observed a few times, that as a lawyer, it looks as if it has gaps in it, but it may be that, as an infection control professional, you don't see that, and I wonder if we just look at a couple of the qualifiers within these texts, and then perhaps I'll see what Dr Mumford thinks as well.

If we look at the third line within 3.1, "Definitions of Healthcare Infection Incident, Outbreak and Data Exceedance," an exceptional infection episode is defined as:

> "A single case of infection which has severe outcomes for an individual patient OR has major implications for others, the organisation or wider public health [and gives some examples]."

Am I being unreasonable to imagine that there might be weaknesses in this definition by having words like "severe" and "major" within it, or is that a lawyer being unnecessarily nitpicky?

MS DEMPSTER: Well, when I'm reading this, I think it's quite clear because of the choice of-- they've put VHF or, you know, drug-resistant TB. They've given some examples.

MR MACKINTOSH: So, these things tell you how serious it is?

MS DEMPSTER: It does to me, yes.

MR MACKINTOSH: Right. Okay, that's helpful. Then, if we move on to, "A healthcare infection exposure incident," the use of the words, "near miss," is that creating a level of uncertainty that is a problem or, again, is it me being overly pedantic as a lawyer?

MS DEMPSTER: I think it's more open to interpretation by the person assessing the patient.

MR MACKINTOSH: Than the previous one?

MS DEMPSTER: Yes, yes.

MR MACKINTOSH: Right. Is there anything that you observe that might be-- Is there any particular risk that arises from that openness interpretation?

MS DEMPSTER: Perhaps if we-- if I was in an organisation and we assessed it and thought, "Is it or isn't it?" and we didn't escalate it, we might be losing the knowledge that goes with that.

MR MACKINTOSH: We're losing the knowledge when it goes up to the national agency?

MS DEMPSTER: Yes, yes.

MR MACKINTOSH: If we turn to, "A healthcare associated infection outbreak", it's defined as, the first of two definitions:

> "Two or more linked cases with the same infectious agent associated with the same healthcare setting over a specified time period."

Again, I want to check whether I'm being overly pedantic or not. The first is the "specified time period" which hasn't been specified, which seems strange, and the second one is "linked" because presumably this decision is being made at the beginning of an investigation when you wouldn't know things were linked. Again, am I being unreasonably pedantic or is there a point here?

MS DEMPSTER: I think the period of time is probably, if we're thinking about different infections have different incubation time. So if it's a norovirus outbreak, we'd expect a quick----

MR MACKINTOSH: A short one.

MS DEMPSTER: -- short one and then we would be saying, "I think this is viral", we can look at 24 hours, 48, whereas if we were looking at a case of TB, we might be looking at months. So I think it's very hard for the manual to write, "You must do it in-- look at 10 days, 28 days, 100 days," but, I think, if I was in the position of

the lead, we would rather escalate something as suspected and then de-escalate rather than waiting to prove they were linked. So we would probably act-- well, I would have acted on-- we escalate at the time of suspicion and then, if we did the investigations, we could then say, "Actually, we don't think these two cases are linked."

MR MACKINTOSH: Are you being overly perfect here? I mean, if you look across NHS England, an organisation you obviously had some responsibility for, is it generally the case that infection control teams were escalating things on a-- perhaps they didn't have to, and then de-escalated them?

MS DEMPSTER: I think it's frequent internally for an organisation to start thinking this might be a link, there might be cases linked – we have a different way of escalating – but you would internally say, "We've got something going on, on Ward X, we think these cases might be linked." We hold our incident outbreak meeting – whether you call them PAG, whether you call them an IMT – and then start investigating, assuming they're linked, but we wouldn't have a problem, and Sara will obviously come in on that. It's quite okay to escalate up, and then

people know what you're doing, why you're doing it, then actually, at the end of the day, say----

MR MACKINTOSH: I'm going to come back to a question related to that but I wanted to go through to the end.

MS DEMPSTER: Okay.

MR MACKINTOSH: Then, in the second definition:

> "A higher than expected number of cases in a given healthcare area over a specified time period."

Again, it's "higher than expected," "given healthcare area," "specified time period." I'm assuming the specified time period is the same sort of issue as the previous one, it would depend on the organism.

MS DEMPSTER: Yes, and, also, what's the expected number? Is it okay to say we have 10 cases of C. diff a month or not? So, again, I suppose it's how you set your limits internally.

MR MACKINTOSH: Does it get back to the "what is an unusual infection" thing?

MS DEMPSTER: Well, again, you probably-- if you had one case, you wouldn't be-- it wouldn't meet.

MR MACKINTOSH: Because one of the things I've noticed in this

Inquiry is that we've got a lot of cases where there's one case in a quarter or one case in a year, one extreme case, one case in three or four years, and should one assume that one case in a very unusual infection should trigger this limb?

MS DEMPSTER: Well, yes, if you've never, ever had a case of something, you would.

MR MACKINTOSH: Okay, and then "a data exceedance-- healthcare infection data exceedance," this gets into the background rates we've discussed with Dr Mumford, but am I right as a lawyer to be suspicious of "greater than expected" and "usual background rate," because they seem to be rather open to interpretation, or is that being unfair?

MS DEMPSTER: I think it is open to interpretation and you could have a very high rate which isn't acceptable.

MR MACKINTOSH: Sorry, could you explain that? You mean a high rate that wouldn't----

MS DEMPSTER: Well, I could say, "Oh, it's quite okay in my Trust, we have 10 of those a month all the time."

MR MACKINTOSH: "So, we don't report them"?

MS DEMPSTER: "So, we don't report them," yes, whereas if I was another health board, I should be saying, shouldn't I, "We have zero," they might say, "We've had one, we're really worried."

MR MACKINTOSH: Right, so people might get inured to something happening which they shouldn't be relaxed about?

MS DEMPSTER: Yes.

MR MACKINTOSH: Then, "A healthcare infection near miss incident," again, "potential to expose," is that a similar point to the previous near miss issue? Remember, there's a transcript person.

MS DEMPSTER: Yes, I was reading it as well, wasn't I?

MR MACKINTOSH: Am I being needlessly pedantic here, or is there a----

MS DEMPSTER: No, I think what you're demonstrating is open to interpretation. One hospital A, health ward A, may interpret them slightly differently. I don't know if behind this does sit a list of what's agreed.

MR MACKINTOSH: Well, indeed, and I'm not asking you on that basis, I'm just taking a top-level view. The final one, "A healthcare infection incident should be suspected if there is", and I'll come to Dr Mumford in a moment, "a single case of infection of

which there has been previously no cases in the facility." Now, you mentioned that these examples are important.

What happens if you have one case of an unusual infection in year 1 and a second case in year 2? Is there not a risk that it can fall between a healthcare infection data exceedance? I think for all of them, because at the one case, "Well, we don't report just one case," that's sort of fine, and then, "We don't report it in the final one because we had one case last year, so now it's not"----

MS DEMPSTER: We've had one before, yes.

MR MACKINTOSH: Yes.

MS DEMPSTER: I think there is a risk.

MR MACKINTOSH: Dr Mumford, is there anything you want to add to my paranoid questioning?

DR MUMFORD: I think overall the questions are very, very loose, and some of the things that we do investigate, and should investigate, are not-- don't come into any of these categories. So I'm thinking if you have a patient who had measles, for example, who sat in your A&E reception area for a couple of hours waiting to be seen because nobody realised it was measles, that would be an infection incident that you would have to then go and investigate. It's not an infectious disease of high consequence, so it wouldn't really come into your exceptional infection episode, and it doesn't come into anything else. So this isn't a fully comprehensive list, and I think that should-- the people working with it need to appreciate that it's a framework, but it's not everything, and personal judgment or team judgment has to come into whether or not you investigate something.

MR MACKINTOSH: The question I want to come back to, Ms Dempster, was you mentioned your view that in the different English system, hospitals might report and then de-escalate.

MS DEMPSTER: Yes.

MR MACKINTOSH: Now, I'll be corrected, I'm sure, if I'm wrong, but in the Scottish system now, all cases that are taken to a PAG end up being reported, because if they're assessed as a green, they still get reported.

MS DEMPSTER: Mm-hmm.

MR MACKINTOSH: Do you have any view about whether a system where as soon as you go to a PAG it's reported creates a reluctance to even have a PAG, or is that being overly suspicious?

MS DEMPSTER: I think if, for example, you've got a case of something in your hospital, to actually talk to your colleagues in HPS is actually helpful anyway, because they might actually have a wider picture, a wider view, and so it's interesting you're telling us about this case, because we've actually seen something happening in St Elsewhere, so sometimes it's also about the bigger picture.

MR MACKINTOSH: You seem to be approaching this on the basis that reporting is a good thing.

MS DEMPSTER: I do, yes. I think reporting is a good thing, yes. And you shouldn't be-- If a reporting thing-- Reporting is seen as being good. You know, we'd encourage organisations to do it whatever it is, whether it was incidents of any kind. Reporting culture is a good culture, I believe.

MR MACKINTOSH: Dr Mumford, anything you want to add to that or----

DR MUMFORD: No, I think that's quite right. I think a reporting culture is a good culture, so that you report no harm or minor harm as well as moderate to severe harm. I think-- And, again, Linda's absolutely right about that discussion with other organisations. I've reported two episodes of a certain infection to our local-- it's now the UK HSA, and they said, "Oh, that's strange, because we had another one from one of the other hospitals," and tied it together, and there was a massive outbreak associated with it which had gone completely undetected because they hadn't been able to join the dots, because not all the cases had been reported in. It's not a formal reporting. It's an informal reporting.

But coming back to the point about the escalation, I think the internal way of going through a process and then deciding whether to step something down or escalate it higher up is really important, and actually having to report everything externally, rather than having really good, interrogable systems internally, it does create that kind of top-down management thing that, actually, some of the-- you lose a little bit of the autonomy because you're having to follow this process which always externally reports something. And being able to develop those systems internally, not just about infection control but wider, and then being able to look at your own data and work out your own trends and be able to see what you need to work on, I think that's

absolutely invaluable.

MR MACKINTOSH: Because do you see it's important to remember that you need to have local autonomy within the health system to ensure that service is delivered effectively?

DR MUMFORD: Absolutely, and I think that's what we wrote in our reporting section in the report, was you have to have an open and transparent way of reporting things, but there's internal reporting as well as external reporting, and internally you can manage most things without having to take external advice, or you should be able to, because you have the expertise.

MR MACKINTOSH: Especially if you're a big organisation.

DR MUMFORD: Yes.

MR MACKINTOSH: What I'd like to do is to move on to a question which I'll direct initially to you, Dr Mumford, and then see if Ms Dempster has any comments. It relates to the use of epidemiologists inside infection prevention control teams and a couple of questions that arise from that. Obviously, you've worked with Mr Mookerjee on this Inquiry. Had you worked with him before?

DR MUMFORD: No.

MR MACKINTOSH: Before you met him, had you met an epidemiologist embedded within an infection prevention and control team?

DR MUMFORD: No.

MR MACKINTOSH: Do you have one of your own in Maidstone?

DR MUMFORD: No. I have a data analyst who punches numbers for me, but they don't do epidemiology.

MR MACKINTOSH: Do you think there's any advantage in having such people in teams, now that you've met Mr Mookerjee and talked to him over a number of years? Do you see there's an advantage or disadvantage in having these sort of people embedded in teams?

DR MUMFORD: I think it's useful to know the phone number of one, and I will definitely be thinking that I will go and ask Mr Mookerjee to do some work for me if I have an issue in the future, but to have somebody embedded in every local organization, I don't think is feasible.

MR MACKINTOSH: Because it would be expensive?

DR MUMFORD: Expensive, and I think they'd spend quite a bit of time not doing epidemiology as a result.

MR MACKINTOSH: Right. I wonder whether you are willing to comment on whether the level of comparative epidemiology carried out by Mr Mookerjee is actually required

typically or regularly during the management of hospital infection outbreaks.

DR MUMFORD: I think if you're looking at something over a long period of time and you're concerned about whether your rate of something is higher than anyone else, then that comparative data is really useful because it just benchmarks for you, and you need to look at multiple other organisations for all the reasons that have already been described, but having that baseline-- And in fact, my chair at----

MR MACKINTOSH: When you say baseline, is that an internal baseline or external baseline?

DR MUMFORD: No, an external baseline. So an expectation-- And some of this is governed by national-- You know, all the mandatory data, there is a national benchmark. So a national mean is published of all of the organisations submitting data, so that everyone knows, "Oh, I'm a little bit above the mean," "I'm a bit below the mean," or, "I'm doing really well," or, "I think we need to do some more work on this," and I think that benchmarking is really important because you can get caught up in, "Well, actually, we're a bit better than we were last year, but we're still a bit rubbish," or, you know, "We've got two cases more than we did last year. Oh, my God." Well, actually, you're still really well below the baseline, so it's just normal variation. So it gives you a reality check of actually where you are compared with other organisations.

MR MACKINTOSH: Is there an argument that actually the best comparator is having a clear idea of the history in a particular unit, ward or hospital and therefore being able to compare with yourself and the past?

DR MUMFORD: No, because how do you know that your previous performance is good enough?

MR MACKINTOSH: Right. I think you might have already answered this when we talked about root cause analysis, but to what extent do you think that, or when do you think, a full epidemiological report is needed, what sort of scale of incident, to understand a problem?

DR MUMFORD: So, to take you back to my previous experience, the outbreak that I was brought into my role to investigate, or not to investigate but to manage and turn around, that was where 80-something patients were thought to have died as a result of C. diff in the organisation which I was brought into. That definitely is of a scale where you would get some

epidemiological support, and I think if you've got an uncontrolled outbreak, you have no idea what's going on, then a bit of support can help, but you can do a lot yourself as well. I mean, just plotting on a graph, you know, the number of incidents and where they are and watching that, looking retrospectively and seeing that over time can be enormously helpful without having to resort to a full-blown epidemiological study.

MR MACKINTOSH: You explained that it might be appropriate in a big case, a big outbreak. In this particular scenario that this Inquiry is investigating, we began to see these sort of bits of work being done in the summer of 2018 in the form of Ms Harvey-Wood and Dr Peters, then Dr Kennedy, then the HPS report that got rather delayed until 2019 in appendix 4 to their document. Was that the right time to start doing that work, or should it have been done earlier, or should it have waited later? Was it too early?

DR MUMFORD: You know, I listened to Ms Harvey-Wood with interest because she described collecting cases over a number of years and monitoring them to the point where she eventually shared her data in that presentation, and that's the kind of data-- You know, data is no good if it's just data and it sits in a computer somewhere. Data is more powerful if you use it, so it's no good to just collect it. You have to look at it, analyse it, and say, "What does this mean?" So, I think that the time to have done it would have been as the increase in cases was noticed and to start plotting it and to start seeing what was happening.

MR MACKINTOSH: And when do you think that was?

DR MUMFORD: I think it was mid to late 2016, wasn't it?

MR MACKINTOSH: So it's the step up that Mr Mookerjee has identified and we discussed yesterday.

DR MUMFORD: Yes. Because one case, or a couple of cases, you just say, "Well, you know, it's bad luck. We know that we have had cases from time to time in the past that's not-- but let's keep an eye on it."

MR MACKINTOSH: You don't think you're being overly demanding of the ability of a team of-- well, I'll use the word team advisedly-- a group of microbiologists and infection control doctors and nurses to notice events in '16?

DR MUMFORD: Well, towards the end of '16. Well, they had a biomedical scientist who was noticing.

MR MACKINTOSH: Okay.

What I want to move onto now is the topic of Cryptococcus, unless, Ms Dempster, you have anything you want to add to the section I just dealt with, with Dr Mumford.

MS DEMPSTER: No, I was really going to agree, but I think a lot of our bigger organisations in England have epidemiologists – I can't even say the word today – and they're often related to facilities undertaking research as well, so they have joint roles that would be doing that.

MR MACKINTOSH: In university hospitals, particularly.

MS DEMPSTER: Yes. But, equally, the sort of data that we saw from Ms Harvey-Wood is the sort of data that I'm used to seeing from most microbiology departments that would have the ability to provide those reports ongoing, and I've seen them regularly in different reports, whether it be relating to haematology patients, or it might look at rates of infections in neonatal intensive care. So that data is often used.

MR MACKINTOSH: Okay. I think this question is quite difficult to ask, and I think it would be quite understandable if you sort of recoiled from answering it, but I did notice that one of the steps that Dr Armstrong took, in 2018, was to ask for help from public health to understand what was going on, and she spoke to Dr de Caestecker, and she instructed Dr Kennedy to get involved. He started attend the IMTs and he ultimately produced his first report in 2018, and it may be that the boundaries in public health and infection control are different in Scotland and, therefore, you're nervous about getting involved. Do you think that's the right place to go for that sort of support, Dr Mumford?

DR MUMFORD: It can be. I think I'm going to sit firmly on the fence on that one. I think it depends to a large extent. One of the problems with public health professionals is that they are very much outwith the acute hospital service. So although-- if we have an outbreak, we would invite our local public health team to send a representative to our outbreak meeting, we wouldn't actually expect them to tell us what to do or how to resolve the outbreak. They're there for information purposes and in case we need them to support with anything outside the hospital, but-- So, for-- they do-- they do do, you know, some epidemiology work, so they could assist with that, but actually to advise on what's going on inside the acutes, I think their knowledge base is much more centered outside an acute.

MR MACKINTOSH: And who would you see as being able to provide that device within a-- If it's not Public Health, who is it?

DR MUMFORD: Probably the HPS.

MR MACKINTOSH: So, externally, as was indeed done?

DR MUMFORD: If you haven't got anyone internally who can----

MR MACKINTOSH: Right.

DR MUMFORD: You know, if your microbiologists aren't confident to give that advice to your infection control doctors, because they would be the people who would be expected to have the most expertise.

MR MACKINTOSH: Okay. I'm going to turn now to Cryptococcus. Obviously, your main report predates Mr Bennett's report on Cryptococcus, and we just put them on the screen. Bundle 21, volume 1, document 9, page 738. I'm not going to, obviously, go through it, but I want to check that both of you have read it when it came out.

DR MUMFORD: Yes.

MS DEMPSTER: Yes.

MR MACKINTOSH: You're nodding, and-- You cover your views on Cryptococcus in chapter 10 of your main report, which is at page 168 of the same bundle, and your conclusion is at paragraph 10.28, if we could just step through to that. Now, you-- the last two paragraphs seem the most important ones to focus on, that Greater Glasgow conclude that:

> "…there's not a 'sound evidential basis on which to make a link between the cryptoccocal infections, subsequent deaths, and the presence or proximity of pigeons or their excrement'."

And you then reach the conclusion at this stage:

> "However, failing to provide HEPA filtered mechanical ventilation to the haemeto-oncology (neutropenic) patients(sic), minimal air changes per hour, poor airflow and lack of air-locks, allowing air to flow from a general ward into [the unit 4B] … reducing the effectiveness of that protective isolation, and allowing pigeon ingress into plant rooms, resulted in unmitigated risks which, in our opinion, have contributed to the risk of patients acquiring airborne infections whilst in the hospital."

Now, at the very top level-- I'll start with Dr Mumford. Is there anything within Mr Bennett's report that causes you to adjust, change or

revise the conclusions you reach in this chapter of your report?

DR MUMFORD: No, there isn't. I think Mr Bennett's report supports our view that the failure to provide adequate isolation through ventilation was a likely cause or a likely contributor.

MR MACKINTOSH: Are there any particular parts of Mr Bennet's report that you feel are significant in that view?

DR MUMFORD: Well, I mean, the part of his report where he went through each hypothesis----

MR MACKINTOSH: Within the report?

DR MUMFORD: --and-- yes, and explained why each hypothesis-- what his opinion was on each hypothesis and why I think that's significant in where we've-- where we've taken that his view would agree with ours.

MR MACKINTOSH: Ms Dempster, have you got any thoughts from what was in Mr Bennett's report and how it affects your conclusions here in this chapter 10?

MS DEMPSTER: No, I agree with Dr Mumford.

MR MACKINTOSH: Now, I wonder if we can look at something Ms Devine says, which is in bundle 25, page 371. Now, this is a paper I'm going to come to in detail after the coffee break, and it's a-- I'm just going to get to my page on my copy so I can take you to a particular paragraph.

So, this section deals with Ms Devine's take on the expert advisory subgroup, which is Professor Hood's report, and if we go over the page onto the next page-- sorry, if we go back to the previous page, have you had an opportunity to reading this section before?

DR MUMFORD: Yes.

MR MACKINTOSH: What I want to-- wonder is, looking at this analysis of Professor Hood's reports, do you recognise Professor Hood's conclusions in this section, Dr Mumford?

DR MUMFORD: Which paragraph for you?

MR MACKINTOSH: It's the----

DR MUMFORD: The bottom three?

MR MACKINTOSH: The bottom three. What I wondered was, and if you're the wrong person to ask about this-- is if you see at the top of the screen at the moment, the short paragraph:

> "The report's rationale as to why it considered latency to the most likely hypothesis is

summarised below … [and then there was] the very significant issue of dormancy and reactivation."

And:

"The most probable hypothesis as included in the report was from the subgroup-- was the patients acquired Cryptoccocus neoformans prior to their admission, and the infection lay dormant until their immune system was sufficiently compromised. The literature review supports the hypothesis. However, as reported in many other cases within the literature, due to the length of time that may have elapsed since first exposed and the complexity of how reactivation occurrs, this is very difficult to prove."

And I wondered if you felt that was an accurate statement of the conclusions of the Hood report?

DR MUMFORD: It is. I mean, it is very difficult to prove acquisition and the timeline to symptomology.

MR MACKINTOSH: But, I wonder, if we go back to your report and your paragraph 10.28, to what extent-- I'm going to phrase this carefully. There have clearly been two deaths, and so one must be careful about how one talks about these, but to what extent does the question of whether it is determinable-- it can be determined whether the deaths of those two patients were caused by Cryptococcus that came in through the ventilation system in any way relevant to the question of whether there should have been HEPA filters, positive pressure and, depending on your view of Mr Hoffman's evidence, air change rates for those patients?

DR MUMFORD: They're completely independent from each other.

MR MACKINTOSH: Why do you say that?

DR MUMFORD: Because there is absolutely no question that they should have been provided with HEPA filtered mechanical ventilation and the appropriate level of isolation facilities that their conditions needed. The fact that we can't prove where the patients acquired it from is kind of immaterial, because, as we say in paragraph 10.28, the risks were unmitigated. So nothing-- there was nothing to prevent this happening and for the infection to have been acquired in the hospital.

MR MACKINTOSH: Now, I appreciate that this question may push at the edge of your expertise, so I'd be

grateful if you tell me I've gone too far, but we had a discussion yesterday about the consequence of the hospital generally being at three air changes, albeit there's no requirement for those general areas to have HEPA filters, and only having a number of isolation rooms and not treating the whole of wards 2A and 4B as neutropenic wards.

I mean, we discussed all those issues yesterday. Had 2A been built in this-- a neutropenic ward in terms of the ventilation guidance, would it have had HEPA filters for the whole ward space?

DR MUMFORD: I would like to think so, because the guidance says ward, not rooms, but I suspect it's open to some interpretation but, in an ideal world, yes, it would.

MR MACKINTOSH: But in any event, Ward 6A as built was never going to be a neutropenic ward, was it?

DR MUMFORD: No.

MR MACKINTOSH: No, and outside Ward 4B, there were no other HEPA filtered spaces and the individual isolation rooms in intensive care. There were no other HEPA filtered wards in the hospital.

DR MUMFORD: No.

MR MACKINTOSH: Do you have any comment about whether the limited number of HEPA filtered spaces for patients in the hospital might have contributed to these patients being in non-HEPA filtered spaces? Or do you not have that information?

DR MUMFORD: No, because you-- Do you want to-- Would you like to rephrase that because you-- I think you just asked if not having HEPA filtration widely is contributing to patients not being in HEPA filtered spaces.

MR MACKINTOSH: I'll rephrase it, because that question didn't quite come out right.

THE CHAIR: I don't think it did.

MR MACKINTOSH: Internally, in my head, it sounded an excellent question, but I'll rephrase it. It seems to be the case that the only HEPA filtered spaces in the hospital were a small number of isolation rooms at that point in time and parts of Ward 4B. Now, we have two patients who end up in non-HEPA filtered spaces. 6A was never going to be a HEPA filtered space. To what extent is there any connection between the limited number of HEPA filtered spaces in that hospital and the fact that these two patients ended up in non-HEPA filtered spaces, even though they were without

prophylactic antimicrobial medication?

DR MUMFORD: I-- It's clearly significant, isn't it, because the more-- the more HEPA filtered isolation rooms you have, the more flexibility you have to place patients appropriately and, clearly, if you have patients who cannot take antifungal prophylaxis for whatever reason, you would want them to be in a highly protected area when they're neutropenic.

MR MACKINTOSH: Ms Dempster, is there anything you'd like to add on this topic, particularly over the patient placement issue?

MS DEMPSTER: No, I think I agree with Sara. If you've only got ten rooms, you've got to choose the ten people that can go in there.

MR MACKINTOSH: Now, I want to move on to a different topic within Cryptococcus. Over the spring and summer of this year, the Inquiry asked NHS Greater Glasgow for confirmation of the total number of Cryptococcus cases or infections in patients in the health board area with any connection to the hospital between 26 January 2015 to date, and it's fair to say these included both patients with a limited connection to the hospital and patients who had spent a considerable amount of time there.

And these are summarised in various notes within the papers, one of which you've seen and commented on, which includes both the patients who unfortunately died, but also includes other patients in 2019 and in 2020, but there's a new document which I don't want to put on-- that I'll put on the screen, which is bundle 24, volume 2, document 208. Now, I can put it on the screen because it doesn't contain an awful lot of information. No, it's document 208, I'm sorry. I neglected to write down the page number. Yes, it's on a different version that was uploaded two days ago. Perhaps we'll come back to this topic once we've found the correct version of bundle 25, because we reissued this bundle to see these.

THE CHAIR: Sorry, you just said bundle 25. Are we not looking at bundle 24?

MR MACKINTOSH: 24, volume 2. So bundle 24, volume 2. There's a document 208, my Lord, which is not in this version, and what we'll do is we'll come back to that after the coffee break. So, I'll park that topic and turn to that once the correct version is there. I wonder if I can take that off the screen and take you to bundle 25 this time, page 364.

So, this is a paper produced by Ms Devine, which was submitted to the

Inquiry last year, which I think it's only fair that we should consider it on its own terms with both you, Dr Mumford and Ms Dempster, and if you see in the top paragraph, in the fourth-- third line, it says:

> "The sequencing of organisms within the clinical cases environment is explored in reports elsewhere. However, this paper aims to describe what indicators we have that can provide some assurance that patient outcomes on this campus were as expected or, in some instances, better than expected."

Now, I only want to look at this paper for the purposes of what it was attempting to do, rather than critique it for something it wasn't attempting to do. Firstly, is the issue that we're dealing with, that you've been asked to deal with in the Inquiry, about patient outcomes on the campus as a whole, or is it a more focused subset of the campus?

DR MUMFORD: No, it's a very much more focused subset.

MR MACKINTOSH: What do you understand the patient group that this Inquiry is focusing on-- that your work is focusing on?

DR MUMFORD: The patients who-- what we called the Schiehallion cohort, so patients who were inpatients or day cases on Ward 2A, 2B and subsequently 6A, 4B.

MR MACKINTOSH: Obviously, we'll come back to the patient outcomes on the campus as we go through this report, but I wonder if we could go to the next page, 365. We have a heading, "Social deprivation." Have you read this report? I'll turn to Ms Dempster first. Have you read this report, Ms Dempster?

MS DEMPSTER: Yes.

MR MACKINTOSH: There is a suggestion just at the top of the next page that high levels of ill health-- If we go back to the bottom of the previous page, I'll read the whole sentence:

> "Compared to the population as a whole, illness itself requires contact with healthcare, and we know that anyone who received medical care"--

I'll read the whole paragraph. Go back again.

> "Comparing rates of illness across boards has always been problematic in Scotland because it has a diverse socioeconomic spread. Patients from Greater

> Glasgow are more socially deprived and therefore have poorer health outcomes, due to factors such as smoking, alcohol, drug use, etc., compared to the population as a whole. Illness in itself requires contact with healthcare, and we know that anyone who received medical care is at greater risk of infection. [Over the page, please] It would therefore follow that areas with high levels of ill health may also have higher rates of healthcare-associated infection."

Now, Ms Dempster, is that a familiar analysis that you've come across before?

MS DEMPSTER: No. I think particularly in the context we're dealing with, we were dealing with a cohort of children who came from the whole of Scotland, not just from a small area. I'm saying "a small area", one health area. So deprivation does play in obviously to ill health and health outcomes with groups of patients, but I don't think-- when you're running the national service, you're taking children from all kinds of areas, I assume, of----

MR MACKINTOSH: But if we recollect that the paper's author is referring to the campus as a whole and not the Schiehallion Unit, in terms of the role deprivation might play in healthcare-associated infections, is that something that you've come across as a topic for consideration in NHS England?

MS DEMPSTER: Not specific to infections, but obviously as a broader health outcome, yes.

MR MACKINTOSH: In a broader healthcare outcome, and so you've not been aware of suggestions that areas of England that might have similar patterns of deprivation to Glasgow having understandably higher rates of healthcare-associated infections?

MS DEMPSTER: No.

MR MACKINTOSH: No, anything like that----

THE CHAIR: I have to say I have some difficulty in following the rationale here. If we are considering a particularly vulnerable population in any event and focusing on the Schiehallion Unit, I think I can understand that social deprivation has an impact on disease experience because those suffering from social deprivation are likely to be physically less able to deal with disease. I mean, I assume that. That's a very broad brush.

MR MACKINTOSH: Dr Mumford, is that broadly something that's understood, or are we out of

date?

THE CHAIR: Just to finish, I just have a little bit of difficulty of transferring that no doubt accurate observation to a population which their primary vulnerability is-- by being immunocompromised is likely to be much more important than other health problems resulting from broader considerations.

MR MACKINTOSH: Dr Mumford----

THE CHAIR: I don't know if putting that very well.

DR MUMFORD: There-- No doubt that there is a link between deprivation and ill health, secondary to deprivation, leading to poorer outcomes in general in hospital treatment. Whether that necessarily includes a higher risk of healthcare-associated infection, I would question because I think the extremes of age, so the very young and the very old, have much higher rates whether or not they are deprived or come from a low socioeconomic background. And I think Lord Brodie is correct in saying that, you know, the neutropenia represents a much, much higher risk than any risk associated with social deprivation, but it may be that there are underlying issues, such as poor nutrition, which could impact over and above the impact of neutropenia.

MR MACKINTOSH: Thank you. What I want to do is go to the next page of Ms Devine's paper, which is page 367 and discusses various external datasets that she suggests are relevant to outcomes across the whole campus. I wondered whether they're relevant to the issue that you were asked to investigate, the two of you. So the first one, the national point prevalence study of healthcare associated infection and Antimicrobial Prescribing from 2016. This is described-- I don't think you've actually seen the report itself, have you, Dr Mumford?

DR MUMFORD: No, but I'm familiar with the survey because we do it in England as well.

MR MACKINTOSH: Right, so what relevance does this point prevalence study have to the issues that we asked you to investigate in terms of infection link for the Schiehallion group?

DR MUMFORD: I think it's important to understand the methodology of how the national point prevalence survey is run. So point prevalence is a really important phrase because it's a point in time. So although the data collection for the survey can be over two or three

months, each clinical area is looked at for one day. So whichever ward you're doing that day, that's the ward where you look for infections present on that day for antimicrobial use on that day. And then that data is set, and then next day, you'll go to another ward and do the same exercise. So, this-- What it doesn't do is present to you a longitudinal study of healthcare-associated infections, environmental infections, whatever. It's literally a one day on each ward, so potentially would have the facility to miss infections.

MR MACKINTOSH: Thank you. What I want to do is pop on to the next page, page 368, and there's some data drawn out from this study. The second paragraph on this page begins:

> "The overall prevalence of hospital-acquired infections in the Queen Elizabeth Hospital during this survey was 4 per cent in 2016. The national rate was 4.5 per cent. QEUH has some of the most vulnerable and complex patients in Scotland. Despite this, the rate was lower than the national average."

Are we entitled to draw any comfort from that paragraph, Dr Mumford?

DR MUMFORD: You can probably derive some, but I take you back to my previous answer. This is a one day per ward, and you can-- therefore, depends what-- which patients are in that ward. I mean, suppose you go-- you went onto a surgical ward on a Monday where every patient is pre-op rather than post-op, you wouldn't have any infections, whereas if you went at a later date, you might find some.

MR MACKINTOSH: Isn't there something in the fact this is a whole hospital result?

DR MUMFORD: Yes.

MR MACKINTOSH: And we weren't looking at the whole hospital.

DR MUMFORD: No, we weren't, no.

MR MACKINTOSH: The second paragraph, I just wondered-- two questions about this, which reads:

> "The children's hospitals throughout Scotland are sufficiently different that comparisons are less meaningful – The Royal Hospital for Children Glasgow, 3.6; Royal Aberdeen Children's Hospital, 0; and the Royal Hospital for Sick Children Edinburgh, 7.7."

Now, firstly, could that difference be explained by the fact that it's a point

prevalence study?

DR MUMFORD: Yes.

MR MACKINTOSH: Is that a different position taken from some witnesses when they read the HPS report that compares whole hospital infection rates between the Royal Hospital for Children and Aberdeen and Glasgow?

DR MUMFORD: Not really. It's still the same. You're looking at the whole hospital. You're not-- You're looking at the global rate, rather than a specific rate for a specific specialty. You don't look at what the patient mix looks like. So I think you have to look back. For each individual hospital, they're also provided with how you did last year and what the average is so that you can say, "Well, actually, we're improving on last year. We might still have a bit of a way to go to get to the average," or----

MR MACKINTOSH: So, people do use this as a comparison thing?

DR MUMFORD: Yes.

MR MACKINTOSH: So, it's not completely useless as a----

DR MUMFORD: No, it's-- when you're dealing with a whole hospital, it's actually a really useful report to have.

MR MACKINTOSH: So, how would you use it for a whole hospital?

DR MUMFORD: It tells you where you might need to focus. So it will give you a result by specialty, so-- or ward, so you can see where you might have an issue that you might want to investigate more if one area is higher than the others. I've got two hospitals. It'll tell me the comparative rate between my two hospitals and whether or not there's some work that we need to do to investigate that further and see if that is a thing over a longitudinal period of time, rather than just a point. So it's helpful in the way that-- But, in itself, it's a point in time. You have to then go and do more work and validate what your point prevalence survey said to the reality of what is going on in your hospital.

MR MACKINTOSH: Do you know enough to tell us whether this sentence, that, "The children's hospitals throughout Scotland are sufficiently different that comparisons are less meaningful," do you know enough-- whether that's accurate?

DR MUMFORD: I don't know the detail of the patient populations.

MR MACKINTOSH: Right. Before we move on to the annual operational plan targets, I'm going to direct the questions to Ms Dempster. Ms Dempster, do you have anything you want to come back on about the

point prevalence study?

MS DEMPSTER: No, I agree. It is that; it's a point prevalence study, one point in time.

MR MACKINTOSH: I'll move on to the second section on page 368, the annual operational plan targets. Ms Dempster, is this something that has any comparison to material you're used to in England?

MS DEMPSTER: Yes.

MR MACKINTOSH: Right. What would the English equivalent be called?

MS DEMPSTER: I think it was called the operation plan when I left.

MR MACKINTOSH: What I wanted to do was to ask you whether you think that that sort of result is relevant. It seems to be a rate for the whole Health Board. Do you think it's relevant to the exercise we asked you to carry out of whether there was an infection link for the Schiehallion cohort?

MS DEMPSTER: No.

MR MACKINTOSH: Well, why do you say that?

MS DEMPSTER: Because, as you said, it's for the whole Health Board.

MR MACKINTOSH: If it's for the whole hospital, is it relevant?

MS DEMPSTER: No.

MR MACKINTOSH: If we go on to the next page, the ARHAI review of AOP in the hospital itself, I'm going to ask both of you about this particular quoted text here. What relevance to Clostridioides difficile, E. coli and Staphylococcus aureus have to the work we asked you to carry out and the conclusions you've reached? Dr Mumford?

DR MUMFORD: None at all.

MR MACKINTOSH: Why?

DR MUMFORD: Because they're not environmental organisms.

MR MACKINTOSH: Anything you want to add to that, Ms Dempster?

MS DEMPSTER: No, I agree.

MR MACKINTOSH: If we look at the ARHAI report from October 2019, now, this appears to be the report which you have seen before, which is, just for completeness, bundle 7, document 6 and 7. That's the two October 2019 HPS reports. You've read those both reports in October 2019. You're both nodding.

MS DEMPSTER: Yes.

MR MACKINTOSH: Is this a complete conclusion-- summary of conclusions from the report or would you feel there's anything that should have been taken from the reports that hasn't been?

MS DEMPSTER: It doesn't

actually state what the report is about. This is about----

MR MACKINTOSH: So, what was the report-- as you understand it, the 2019 report about?

MS DEMPSTER: This was about looking at the cases specific to the Schiehallion group.

MR MACKINTOSH: Yes, so this is a Schiehallion Unit only report unlike the other ones, right.

MS DEMPSTER: Yes.

MR MACKINTOSH: First bullet point, if it is the case that the 2019 report says that approximately a third of cases of positive blood culture of environmental organisms had a polymicrobial episode, Dr Mumford, is that reassuring in the way that the author of this report seems to think it is or is it consistent with your conclusions?

DR MUMFORD: No, it doesn't. I don't think it makes any difference. It's an observation more than a recommendation, isn't it?

MR MACKINTOSH: Is it an observation that's relevant to the conclusions you've reached?

DR MUMFORD: I don't think so. I mean, it's interesting in that if a third of the cases were polymicrobial, that means the risk of having a polymicrobial blood culture when you

have environmental organisms involved is higher than the normal you would normally see in a blood culture.

MR MACKINTOSH: So, what sort of rate of polymicrobial blood infections would you find in blood cultures?

DR MUMFORD: It would be low, it would be, you know, definitely less than 5 per cent or possibly less than 2 per cent.

MR MACKINTOSH: Is there any connection that one can make to having a 30 per cent, 33 per cent rate of polymicrobial blood cultures and particular sorts of infections?

DR MUMFORD: I think you could construct an argument that there was a contamination source but I don't think you could pursue that argument to the conclusion.

MR MACKINTOSH: Right. The next bullet point says:

> "The data presented in this report does not provide evidence of a single point of exposure."

Are either of you aware of whether-- Do either of you think there was a single point of exposure in the hospital?

MS DEMPSTER: No.

MR MACKINTOSH: Dr Mumford?

DR MUMFORD: No.

MR MACKINTOSH: Any particular reason why?

DR MUMFORD: Because we know that the issues with the water were widespread and it wasn't like every patient who went into Room 7 acquired an infection with a particular organism. It was spread across the whole unit and different organisms were involved, so that would preclude-- unless you want to call the whole water system a single point of exposure, then that would preclude----

MR MACKINTOSH: Would that be a reasonable thing to say?

DR MUMFORD: I think it's-- I think it's using a very narrow phrase for quite a wide risk.

MR MACKINTOSH: Ms Dempster, as far as you're concerned, what points of exposure were there in 2A, 2B, 6A?

MS DEMPSTER: Well, we know there was obviously the water, then there was evidence about the drains at the wash hand basins. There was issues around the ventilation and mould.

MR MACKINTOSH: What sort of issues around the ventilation mould are you referring to there?

MS DEMPSTER: Where air sampling found-- When there was cases of Aspergillus and air sampling was undertaken.

MR MACKINTOSH: Okay. I wonder what significance you thought the third bullet point has:

> "All patients within this cohort are at risk from developing gram-negative bacterium due to their comorbidities and treatment plans."

Is that a source of reassurance, which is what the purpose of this paper is, Dr Mumford?

DR MUMFORD: No. I mean, I think any clinician working with that group of patients could have told you that, but it's not-- they're not just at risk of gram-negative, they're at risk of all infections, so I'm not quite sure why it's there, to be honest. It doesn't tell you anything significant or new.

MR MACKINTOSH: Now, the fourth bullet point I think refers to the observation in the final version of the 2019 report which we can just go to, which is bundle 7, document 7, and it is page 272 and it's the fifth bullet point:

> "NHSGGC should consider current control measures around restriction on services for newly diagnosed patients as there is no evidence from the HPS review of

the data that supports the continued restriction of services."

Now, I'm going to come back to that later on today when I want to ask you a series of questions about decisions taken in 2019, so I'm proposing just to park that for the moment. If we go back to Ms Devine's document at page 372 of bundle 25, page 372, please. Now, I want to look at Ms Devine's conclusions:

"The question posed at the beginning of this paper was, did the Estates issues in Queen Elizabeth/RHC impact on the safety of patients who received clinical care within these buildings? This paper is a summary of what we can say with regards to patient safety using the indicators that are available. The data presented shows the hospital has lower rates of hospital aquired infections than other hospitals in Scotland, that whole genome sequencing has not supported links to the environment (water and air) that our population is vulnerable due to both deprivation and-- resulting ill health and deprivation. The context of health provision must also be considered in that GGC provides new, innovative, national services often require more creative, complex, aggressive or invasive techniques to cure patients of disease that unfortunately often has, as an unintended consequence, an increased risk of infections."

Ms Dempster, would you agree with that summary or would you take issue with any parts of it?

MS DEMPSTER: Well, as we went through, excuse me, the points that we thought about, they're not documents or resources that would provide assurance that the risks of the environment were there, which is what she's saying.

MR MACKINTOSH: It's effectively these sources don't provide the reassurance----

MS DEMPSTER: Yes, the assurance about the environment.

MR MACKINTOSH: Would you accept the final paragraph-- final sentence?

MS DEMPSTER: On the page? The final----

MR MACKINTOSH: The final sentence on the paragraph I read out----

MS DEMPSTER: Okay, sorry.

MR MACKINTOSH: -- the one

that begins, “The context of health provision.”

MS DEMPSTER: No.

MR MACKINTOSH: Why not?

MS DEMPSTER: Well, the way I read that, it’s like-- it’s saying people got infections because it’s okay, because they were very----

MR MACKINTOSH: You don’t think you’re being a little bit cruel there?

MS DEMPSTER: I probably am being very cruel but if I read that and that was my child or they were my relatives in that hospital, I wouldn’t like to read that statement.

MR MACKINTOSH: Given your previous role in NHS England, are there units in England that provide equivalent national services to the Schiehallion Unit?

MS DEMPSTER: Yes, we have specialist children’s hospitals in England, yes.

MR MACKINTOSH: Have there been similar cases of high levels of infections or suspicions of high level infections there that you’re aware of?

MS DEMPSTER: Not that I’m currently aware of. I wouldn’t have that detail, to be fair, about relating to gram-negative bloodstream infections.

MR MACKINTOSH: Right, okay. Well, I won’t press it any further then. Dr Mumford, is there any part of this-- well, do you agree with what’s in the summary as a conclusion drawn from the paper?

DR MUMFORD: No, I don’t think it’s answered the exam question.

MR MACKINTOSH: In what way?

DR MUMFORD: Well, it hasn’t discussed the Estates issues and it hasn’t discussed in sufficient detail the impact that there was suspicion that those Estates issues were having on patients, so----

MR MACKINTOSH: I think you’re doing your quiet thing because I’m looking at Lord Brodie leaning in.

DR MUMFORD: Sorry, they are extrapolating positive results from the mandatory surveillance from the point prevalence study and saying that shows that the Estates is not causing infection, and that’s not the question that those data answer.

MR MACKINTOSH: With the exception of the 2019 HPS report, what were the questions that the point prevalence study and the national mandatory reporting surveys were trying to answer? What were they trying to answer?

DR MUMFORD: So, the mandatory reporting is specific to those organisms because there has

previously been concern about all of them, and it just holds you to a standard within the organisation and it presents the data of where you are, and they do create a report annually, which is quite interesting but not hugely useful, because your data is, by that time, a year old. The point prevalence study, as I said, is a more useful document because it provides you with a little bit more granularity of information.

MR MACKINTOSH: Thank you. Is there anything else you'd like to add, Ms Dempster?

MS DEMPSTER: No.

MR MACKINTOSH: My Lord, I know it's five minutes early but I'd like to not move on to my next topic before I've gone back and done the Cryptococcus thing on the right page. I wonder if we might take the coffee break now.

THE CHAIR: I can't see any difficulty in that. We'll take our coffee break and if I could ask you to be back at quarter to twelve. Thank you.

(<u>Short break</u>)

THE CHAIR: Mr Mackintosh.

MR MACKINTOSH: Thank you, my Lord. Now, I wonder if we might go to bundle 24, volume 2, document 208, page 216, which is a document refreshed on the system earlier at the end of last week. Now, Ms Dempster and Dr Mumford, I wonder if you'd seen this document----

DR MUMFORD: Yes.

MR MACKINTOSH: -- and indeed the detailed RFI that lies behind it.

DR MUMFORD: Yes.

MS DEMPSTER: Yes.

MR MACKINTOSH: Right. I don't particularly want to go – you can take it off the screen – into the details of these patients but, in essence, the Inquiry learned that this year there were four cases, which are described in that paper, with a diagnosis of some sort around Cryptococcus that have some connection to the hospital, and at least three of them were not reported to HPS ARHAI, and I wanted to ask your views on that absence of reporting.

Before I do that, I'm conscious that Ms Devine in her leadership role for the infection prevention and control team has already given evidence, and so I don't have her take on the reason, and I felt it important for fairness to ensure that the reason is something that you can consider, and so we obtained an explanation from Greater Glasgow and Clyde for the decision

not to report and also the question of whether root cause analysis should be carried out for these cases. Now, I'm going to read out that explanation. I know you've had the opportunity to see this already, but the reason given is these were not a healthcare infection episode in terms of the National Prevention Control Manual, which we looked at earlier on today because:

> "Cryptococcus cases are not rare and are an acknowledged risk for patients who have organ transplant or who are immunocompromised. Cryptococcus does not pass from patient to patient, therefore, the implication for others, the organisation or wider public health is not considered in this context. In addition, the literature confirms the incubation period is wide/largely unknown, and these patients will spend the majority of their time in the community where Cryptococcus is ubiquitous in the environment."

And then in respect of whether it's a healthcare infection incident in the National Infection Prevention and Control Manual, chapter 3, it was because "there was more than a single case and therefore did not meet the requirement that there had been previously no cases in the facility." NHS Greater Glasgow have also pointed out that in Scotland the root cause analysis is not undertaken for referrals and is not referred to in the National Infection Prevention and Control Manual.

Now, with that in mind, and I'll start with Ms Dempster, do you have any concerns about the decisions not to report some or all of these cases in patients who have had organ transplants or are immunocompromised in the context of earlier cases you've discussed?

MS DEMPSTER: Yes. I think it goes back to our earlier discussion this morning, realistically, that even if you're not totally sure, is this healthcare associated or not, I believe it would be better to have reported. I say "reported", but discussed it, raised it. And in all the papers, it's discussed that the incubation period for Cryptococcus is uncertain, so I don't know how you also say with certainty that it wasn't acquired in a hospital where people have had sometimes quite long stays. So I would have erred on the side of caution or that there's potential link to the environment that might not-- the

hospital as a whole, so I would have thought it was in everyone's interest to let ARHAI know.

MR MACKINTOSH: What do you have to say to the response that you're setting too high a standard or you would be overreporting in this case if you were to report these cases?

MS DEMPSTER: I don't think it matters if you overreport. If you're letting people know there's been a case, you're not actually doing any harm by reporting a case.

MR MACKINTOSH: Dr Mumford, anything you have to say about this issue?

DR MUMFORD: I agree with Linda, but I would add that (a) Cryptococcus is very rare, it's not common; and (b) when you have a rare infection which most sources will tell you there is a hundred cases or less in the UK as a whole each year, and you have four inside a year in one place – I'll say "place" rather than hospital – then there is a potential public health interest in that as to why there is an apparent data exceedance in the number of cases in a geographical area. So, for that purpose alone, I would have reported it and, again, I absolutely agree that there is no harm in overreporting.

MR MACKINTOSH: Do you have any observations to make about the reasons that I read out or not, considering it fell within particular categories of the manual?

DR MUMFORD: So, it is rare. I don't think that saying, "Well, we've had two cases so that means that we don't need to report it", because it is very rare and, as I said, I think it's a data exceedance, so I would expect that to be reported.

MR MACKINTOSH: How can you say it's a data exceedance? I mean, we saw in Mr Bennett's report, him-- I think he thought a lot about whether he could work out what the national rate was and I think, cutting it short, found it hard, because of course the national laboratory only has what's reported to it.

DR MUMFORD: Absolutely.

MR MACKINTOSH: And so it might be there's a bigger rate than he was able to work out, so how can you say it's a data exceedance given that lack of certainty?

DR MUMFORD: I agree there is lack of certainty. However, I've never worked in a lab that didn't report all of the Cryptococci to the reference laboratory. It's a sufficiently rare thing to be one of those unusual organisms where the biomedical scientists would

come running out to see the microbiologist and say, “I’ve got a Cryptococcus,” and the next thing that would come out of the microbiologist’s mouth would be, “Send it to the mycology reference lab.” So they do get sent, and I think they get sent pretty uniformly, so if-- Let’s assume that that’s happened and that all of the cases have been reported. We are looking at 100 cases a year. So in the small geographical area compared with the whole of the UK, that’s potentially a cluster, and there is something that is worth looking into from the public health point of view, if nothing else.

MR MACKINTOSH: Now, it’s probably worth saying for this point, we haven’t got into the Inquiry the exact wards these patients were in, the nature of the condition they were in for, beyond the category of organ transplants or immunocompromised patients, and we’ve done that for reasons of patient confidentiality. And because my interpretation of the remit of the Inquiry is to focus on the building and our term of reference 9 in terms of HAI reporting, and so I’ve restricted myself to that basis. Is there any other observations you have about the way NHS Greater Glasgow has responded to what are now more than a handful of Cryptococcus cases with some connection, albeit in some cases quite short periods of time, to this particular hospital?

DR MUMFORD: I think I would want to be taking it much more seriously than they appear to be doing. I would certainly want clinical reviews on all of those cases to see if was anything that would predispose them to Cryptococcus, if there was anything both in and out of the hospital that would suggest a cause. I mean, “Did the patient keep pigeons?” for example would be a good question to ask.

MR MACKINTOSH: I mean, you’ve seen an RFI response that contained a patient who kept pigeons, so that is not an unreasonable question.

DR MUMFORD: No. So, I think you should have a curiosity. Curiosity is a really important quality to have when you are in the kind of roles that Linda and I have done and when you are looking at healthcare and you have unusual things happen, and I think to have that curiosity is really important. That’s the approach I would have taken with these four infections, like, curious, “What else can we find out about this? (a) can we reassure ourselves that it’s not come from the hospital; but (b) is there something

bigger going on that we need to know about?"

MR MACKINTOSH: Thank you. Ms Dempster, anything else you want to add on this topic before we move on?

MS DEMPSTER: No, thank you.

MR MACKINTOSH: No. What I want to move on to now is a series of questions that have been posed by core participants. Now, they're not particularly on the same topic, so this will be a little bit eclectic. I think I'll direct the first question to Ms Dempster, which is, are you familiar with the term, which I think was used by Dr Inkster, of "opportunistic premise plumbing pathogens"?

MS DEMPSTER: No.

MR MACKINTOSH: Had you heard that before it was heard in evidence?

MS DEMPSTER: No.

MR MACKINTOSH: Dr Mumford, have you heard it before?

DR MUMFORD: No.

MR MACKINTOSH: Dr Mumford, as a----

THE CHAIR: Perhaps I should get a note of----

MR MACKINTOSH: "Opportunistic premise", as in a place, "plumbing pathogens", OPPPs. Dr Mumford, do you recollect the evidence from Dr Inkster about this?

DR MUMFORD: I don't, actually. No.

MR MACKINTOSH: Well, in that case I think I'll have to-- I'll move on. We've covered this specifically before, but I wanted to cover it again because there's a particular question we asked. To what extent can Enterobacter and a Klebsiella be acquired from an environmental source, and not the patient's gut? Dr Mumford.

DR MUMFORD: I think different organisms on that list have a different risk. So, the Enterobacter is known to populate drains, for example, in the biofilm within a drain. I wouldn't expect to find a Citrobacter under those conditions.

MR MACKINTOSH: What about Klebsiella?

DR MUMFORD: Klebsiella, again, you can find in drains, and there have been very well recognised outbreaks associated with Klebsiella in biofilms and drains.

MR MACKINTOSH: If there was a gut translocation taking place amongst the Schiehallion cohort patients that gave rise to bacteria anaemias from organisms such as Delftia, various-- Delftia acidovorans, Cupriavidus pauculus and Chryseomonas indologenes, would we

have noticed these?

I think it would be very unlikely that those organisms would be in the patient's gut in order to be translocated. They would be in-- If they were in there, they'd be in exceptionally small numbers because of the pressure of the rest of the biome.

If we look at-- This is a different topic, but I'll come back to Ms Dempster in a moment on this one. If we look at the context of an immunosuppressed patient showering with a Hickman line, would it be fair to say that very low concentrations of bacteria in the water may be sufficient to cause an infection?

DR MUMFORD: Yes.

MR MACKINTOSH: Ms Dempster?

MS DEMPSTER: I agree.

MR MACKINTOSH: What does "very low" mean in that context? I mean, I asked the question, but what is the level of-- how little bacteria do you need in the water before it would cause a risk of infection to a Hickman line and immunocompromised patient?

DR MUMFORD: I'm not sure that's ever been scientifically proven, but the problem would be that bacteria naturally adhere to plastic surfaces. So if you-- if the bacteria adhere to the plastic surface, that would be a-- you know, give them a portal of entry, either through the skin where the line enters or through the port at the end.

MR MACKINTOSH: I suppose there's a supplementary question I might try and ask----

THE CHAIR: Can I just clarify, and I may just be revealing extreme ignorance, I'm just slightly concerned about movement between risk and possibility. I think I'd assumed that one requires only one bacterium to result in-- or contact between a person, and one bacterium is sufficient to actually cause an infection in that person. Am I right about that or wrong about that?

DR MUMFORD: I think you're wrong.

THE CHAIR: I'm wrong.

DR MUMFORD: I think so.

THE CHAIR: Can you help me with that?

DR MUMFORD: So, most bacterial infections will have what we call an infectious dose.

THE CHAIR: Sorry, an infectious----

DR MUMFORD: Dose. So, that is the number of bacteria that you need to cause infection.

THE CHAIR: Right.

DR MUMFORD: Now, obviously,

if you have one bacteria and it gets into the body, the chances of it being caught and attacked by the various mechanisms that the body has – albeit in neutropenic patients, though some of those mechanisms still work – is low, and so you need potentially more than one bacteria, and I haven't got the numbers to hand, but there are some bacteria, particularly some of the gastrointestinal infections, where you can literally have an infection by imbibing five or seven organisms, but other bacteria, the infectious dose will be into the hundreds.

THE CHAIR: Right, okay. So, could be a small number, but needs to be a certain number.

DR MUMFORD: Yes, and there's patient factors in there as well. So, obviously, an immunosuppressed patient will be more susceptible to a smaller number.

THE CHAIR: Right. Thank you.

MR MACKINTOSH: I'd like to explore this issue about the showering patient a little bit, because obviously the question I have here is a very low concentration of bacteria in the water. Let's see if we can try and nail that down a bit. Mr Walker discusses in his report – I'm not going to go to it, but just for the purposes of everyone else – section 4.3 on page 211 of bundle 21, the concept of wholesome water. Do you recollect that, Dr Mumford?

DR MUMFORD: Mm-hmm.

MR MACKINTOSH: If we assume for a moment that the public water supply in everyone's home is wholesome water, is it possible to answer this question: could the concentrations of bacteria in water that is wholesome – so it meets the wholesome definition test, sufficiently few bacteria meets the wholesome definition – be sufficient to cause an infection on a Hickman line?

DR MUMFORD: Potentially.

MR MACKINTOSH: Potentially. If you increase the number beyond the definition of wholesome in the water supply by some means, can we know when there is a point when it becomes a sufficient risk to be more concerned that the water of a shower will cause an infection?

DR MUMFORD: Single point, I don't think so, because it would be possibly bacteria-dependent and it would also be dependent on other factors of the patient themselves. So I don't think there is a single point you can say over that----

MR MACKINTOSH: Is there a way of understanding this sort of threshold that you could help us with?

DR MUMFORD: I think you have

an increasing risk-- the more bacteria you have in a water supply, you will have an increase-- steadily increasing risk.

MR MACKINTOSH: Will patients with Hickman lines be discouraged from getting them wet?

DR MUMFORD: Yes, or covering them when they shower.

MR MACKINTOSH: Right. Ms Dempster, is there anything you want to add on that topic?

MS DEMPSTER: I was just going to add that any patient with a Hickman line's given very-- they're talked about, the Hickman line, how to manage the line, how to clean the line, how to-- you know, they really understand the risks associated with having them----

MR MACKINTOSH: They're not showering with enthusiasm.

MS DEMPSTER: No, I wouldn't have thought so, no. This is a very significant part of their treatment.

MR MACKINTOSH: Okay. Yes, if as proposed – and this is one of the other core participants saying this by NHS Greater Glasgow – there is no evidence to demonstrate any increased rate of infection within the hospital from microorganisms related to the environment, what would be the probable causes for the 167 bacteraemias considered in Mr Mookerjee's report or the 118 bacteraemias considered by the case notes review? Dr Mumford.

DR MUMFORD: It's hard to think of another source which would cover all of those at that variation of---

MR MACKINTOSH: Could there be multiple sources that cover them all?

DR MUMFORD: Many of them are ubiquitous in the environment, but soil, water, that kind of environment. So coming into contact with soil and water is the primary source for those organisms. Otherwise, it would have to be something that was brought in. I know there's-- somebody's mentioned in one of the papers I've read about people bringing it in on the sole of their shoes, but I don't-- that's not-- for me, that's not a viable proposition.

So for all of them, I don't think there is another viable-- though you could, you know, Enterobacters and Klebsiellas, they could be translocation, but, again, I haven't seen anything in any of the IMT reports that has said a discussion was held about if-- whether or not any of these infections could be translocation, whether that can fit the clinical picture better than an external source.

MR MACKINTOSH: Why do you

think that's significant enough to mention?

DR MUMFORD: Because I think we go back to the discussion about analysing an infection. If you have a group of patients, you can't-- who have all got different infections – some of them similar but many of them different – you can't-- you have to view it fairly openly in an unbiased way and ask those questions. You know, what are this patient's risk factors? What's happened to this patient? What could be the cause of this-- of this bacteraemia?

And the clinicians, I would have expected if they had-- if they had suspicions that the case was due to translocation or another reason such as a patient having a UTI, then that would-- that would come out in the IMT for completeness and for-- to be evidenced as part of the discussion about the patient.

MR MACKINTOSH: So, the clinicians would say, "This case, I'm treating it for a gut translocation"?

DR MUMFORD: Yes, and take it out of the numbers of the outbreak or the incident.

MR MACKINTOSH: Ms Dempster, do you have anything to contribute to that particular observation about the----

MS DEMPSTER: No. I agree. It's the clinical-- you know, the clinician's descriptions, isn't it?

MR MACKINTOSH: A question that I've-- actually arises from my colleague Mr Connal's thoughts is-- I think he asked this of a number-- of Professor Leanord. If the source of these infections might have been many different things, but was not the hospital environment, would you expect to see similar sorts of infections occurring in other units around-- similar rates of infection occurring in other units around the UK?

DR MUMFORD: Yes, or I-- maybe-- if you still argue that it's likely to be water, it would be other cases in units in Scotland or-- no, but I think----

MR MACKINTOSH: Could I ask you to lift your voice a bit?

DR MUMFORD: Sorry. If the-- I don't-- I-- Yes. I was going to say, I don't think that you would see this pattern of increasing infections if the source was outside, unless it was something like the entire water supply being contaminated.

MR MACKINTOSH: Scotland doesn't have a single water supply.

DR MUMFORD: No.

MR MACKINTOSH: If you look at the rate of change of these infections over time-- Now, we're not

going to go back to those graphs with the variations in SPC charts and that whole conversation again, but it does seem to-- fair to say there is a-- there are some changes that happen over time.

If the rate of-- If the cause of these infections was not the environment, it was one of these alternative explanations that you've touched on, would we expect to see change in the rate in the hospital over time?

DR MUMFORD: You potentially could, I suppose, if there was a new treatment which affected the patient. If you brought in a new form of chemotherapy which had a particular effect on the gut, and that was widespread amongst the patient cohort, then you could see, under those circumstances, a kind of step change in the number of infections.

MR MACKINTOSH: But would you see that step change without any change in the way the patients are being treated?

DR MUMFORD: It would be highly unlikely.

THE CHAIR: Sorry, what was that answer?

DR MUMFORD: It would be highly unlikely.

MR MACKINTOSH: Now, Dr Mumford, again, the GGC view that I used to structure that question was expressed to me by one of the other core participants, but if that view is correct, that there is no evidence to demonstrate any increased rate of infections but in the hospital from a microorganism related environment, if that's correct, to what extent does that evolve acceptance of the idea that the patients were bringing these infections into the hospital with them, which I think has been the subject of some media comment? Is that a connection you can make? If the first thing is true, is the second thing true?

DR MUMFORD: I think you can only-- you can't make that assumption of all of these patients. A lot of them had been in hospital for a long period of time and were not going outside, and that's why we have the definition for healthcare-associated infections as occurring after the day of admission and the following day. Anything occurring later than that is healthcare-associated, and, you know, I've had clinicians arguing with me about whether or not an infection is hospital-associated. You have to draw the line somewhere, and there is an official line drawn at that point.

But for the patients who've been in for a substantial length of time, there

is no-- it doesn't make sense that they would've brought the organisms in with them. Then you could argue that if they keep going out and acquire it-- if they acquired it from their home environment, keep going out, they would keep coming back with the same thing, and that's not being seen, as far as I'm aware.

THE CHAIR: Mr Mackintosh, the expression "patients bringing infection into the hospital" is, kind of, a layman's expression----

MR MACKINTOSH: Well, I think it's been----

THE CHAIR: Let me just, at least for my purposes, make it a little more precise.

MR MACKINTOSH: Well, I think the question that I've asked, I think, has its origin in the characterisation of a particular press report.

THE CHAIR: Yes.

MR MACKINTOSH: If we go back to the question I asked the two of you a moment ago, if there is no environmental link at all, then we should perhaps come up with a list of alternative scenarios that are at least possible and that are consistent with what was seen in terms of patterns of infections, species, and the way the clinicians behaved. That seems a big task to do at quarter past twelve on the second day of your evidence, but let's have a go.

So, you've discussed gut translocation, Dr Mumford, so that is a possibility. If there's no environmental link, that goes on the list, and you've discussed that already. If patients bring things in with them at the start of their infection, that goes on the list. Is that a fair-- That would go on the list as a possible alternative source?

THE CHAIR: Well, again, it says "bringing in"-- Patient enters the hospital----

MR MACKINTOSH: With an infection.

THE CHAIR: Right, with an infection which is in the course of being incubated.

MR MACKINTOSH: Yes.

THE CHAIR: Right.

MR MACKINTOSH: So, if we're looking at an infection that is acquired elsewhere, is already in the patient, and the blood test that identifies it occurs after admission, would that be your definition of they brought it in with them?

DR MUMFORD: Yes, but they could also have skin contamination with it, so it could be-- it could've colonised their skin as well----

MR MACKINTOSH: Then get into bloodstream later?

DR MUMFORD: Yes.

MR MACKINTOSH: So, if we look at those groups of infections, is the existence of that as the cause consistent with the sort of infections that we see?

DR MUMFORD: I don't-- I can't think of a scenario when-- that would create that curve-- the bell curve of infections and that sudden increase. Uniformly, across the-- with multiple patients coming in separately from different parts of the country, being a tertiary referral centre, that would all come in with environmental organisms all of a sudden, I can't see a scenario that you could build that into.

MR MACKINTOSH: So, that's not consistent with what you see in terms of the numbers of infections?

DR MUMFORD: No.

MR MACKINTOSH: No. Are there any other possible means by which these organisms could get into the patient's bloodstreams if one excludes environmental sources, gut translocation, and the patient bringing it in either as a brewing infection or on their skin?

DR MUMFORD: So, there's a few other things to think about, such as pharmacy and whether or not any medications that have been prepared in pharmacy have been contaminated.

MR MACKINTOSH: Is that rather like the aseptic pharmacy instances back in '16?

DR MUMFORD: Yes, or if the outside of the medication bag has been contaminated but I think the-- that's probably-- or aside from that one Cupriavidus case, I don't think that's been looked at. The other option might be equipment that comes up into the ward that has got wet and damp and dirty, or its packaging has, bringing in organisms, but these are really tenuous arguments. I think that that was raised in the Cryptococcus one as well, wasn't it, with potential for bird faeces contaminating the outsides of boxes.

MR MACKINTOSH: Why do you say that the movement of equipment perhaps around the hospital is tenuous as a possibility?

DR MUMFORD: So, it wouldn't be the movement itself. It would be that it had been contaminated in a store somewhere, maybe the outside packaging had got wet, potentially, with contaminated water. I mean, you know, it's a very complex scenario, and then that would come up to the ward. Maybe the outside of it would still be contaminated, and then you have to rely-- because most things that you would use of any significance are

individually packed inside a bigger package.

But then you would have to build a scenario where whoever unpacked it and got their hands contaminated then didn't wash their hands, didn't use any hand hygiene, and then had to go and deal with a patient who they then didn't use hand hygiene and didn't use an aseptic technique to do whatever it was they were doing with the patient, and so on. So it would be a really complex pathway for that infection to be transferred----

MR MACKINTOSH: Is this not dissimilar to that-- I think it's 2020 Burkholderia investigation involving an operating theater when they realised that some beads have come in contaminated?

DR MUMFORD: Mm.

MR MACKINTOSH: We're talking that sort of process?

DR MUMFORD: Yes, and the other one, again, Burkholderia within ultrasound gel, which is non-sterile, which is used on patients who have intact skin, and occasionally you might use it close to a port, which you shouldn't because you should use sterile gel, but there have been episodes where it's been used erroneously, and then the patient has got an infection.

MR MACKINTOSH: Could such a thing be part of an increase in '16, '17?

DR MUMFORD: Yes, and the-- well, in '16, '17. The problem is that it's multi-- it's polymicrobial. It's not a single organism, so something like that scenario wouldn't quite-- wouldn't fit, very complicated.

MR MACKINTOSH: Now, I'll come to Ms Dempster in a moment, but is there anything----

THE CHAIR: Can I just make sure that I've followed that point? (To the witness) You were thinking of other explanations, and you explained this hypothetical contaminated equipment. Just so that I've followed the reasoning, you say, "But the experience in the hospital was of infection by a number of microbes," whereas if we are being asked to consider the possibility of contamination from equipment, one would suppose the contamination would be of one particular microbial source. Is that----

DR MUMFORD: Yes, yes.

THE CHAIR: Thank you.

MR MACKINTOSH: I'm going to ask Ms Dempster to comment in a moment, but is there any other potential mechanisms that-- could we add to this list that we haven't

discussed?

DR MUMFORD: I think I'm going to pass to Linda for----

MR MACKINTOSH: Any other mechanisms you can think of that are not environmental and haven't been discussed already?

MS DEMPSTER: Well, I think environmental's probably-- there are other environmental sources. So we were talking about the water and ventilation, but if you think of in a patient's bedroom, there's the actual environment of the room, as in the mattress that they're sleeping on, the equipment, their blood pressure machine. There's stuff----

MR MACKINTOSH: Then there's the cleaning regime.

MS DEMPSTER: Yes, cleaning, decontamination. You know, was the room cleaned properly when the previous patient left? Was everything decontaminated, cleaned, whatever the process followed? Is the mattress intact? Is the chair that they're going to sit on clean? So that's a different, sort of-- the environment, as in the cleaning of the environment and the equipment that's in that room, near patient equipment or, you know, right next to the patient.

MR MACKINTOSH: Do we see any-- Have you seen any evidence of attempts to enhance cleaning regimes in '16, '17, '18 in Ward 2A?

MS DEMPSTER: There was talk about upping cleaning and concerns raised about cleaning and dust and having to clean more, and particularly perhaps the chilled beams. Cleaning was looked at, I know, and there was discussion earlier on, but I can't remember the dates off the top of my head anymore, where it was assumed the cleaning was happening with a chlorine-based product, and it wasn't, so perhaps the cleaning wasn't being done to a standard. But, again, it leads back to we probably will be seeing more of a single problem if it was one room that hadn't been decontaminated, and your investigations would go back to, "Actually, that's really strange because the patient who was in there before had that same organism, same bug, the same infection," and will be part of your investigation.

MR MACKINTOSH: Thank you. I want to move on to another question.

THE CHAIR: Mr Mackintosh, before you move on, just so I've got the list. First point, I think I've been assuming that an enteric source of infection or translocation is-- these are really two ways of expressing the same thing----

MR MACKINTOSH: I've been assuming that as well, so I'm going to look at Dr Mumford and see if she nods.

DR MUMFORD: Yes.

THE CHAIR: Yes, just two words really for the same thing. The other point is that if one was looking for the totality of possibilities, would I be right to add to that list the possibility of infection from another human source, member of staff or visitor who is colonised but not symptomatic because they are not immunocompromised? Should I add that to the list or not?

DR MUMFORD: It is theoretically possible, and certainly working within the healthcare environment, you know, the hands of staff are the key source of cross-infections between one patient and another, but I say only theoretically possible because it would be an unusual organism to be able to pick up in the quantity needed in order to be able to transfer it to another patient, but theoretically possible. It goes along with what Linda was saying about equipment, blood pressure machines and things that more than one person on the ward might use and then not clean sufficiently between uses.

THE CHAIR: Mm-hmm, and I suppose if one is considering this, as I say, possibility but bear in mind your polymicrobial point that this-- and also the bell curve point?

DR MUMFORD: Yes.

THE CHAIR: Right, thank you.

MR MACKINTOSH: Thank you. Now, this question we can come back to later if we have to, but, Ms Dempster, what are key learning points which you would highlight in looking at the management responses of NHS Greater Glasgow that were raised over the years between, say, '15 and '19 about links between infections and the environment? What do you think are the key learning points to be taken from the way the management executive-level responded?

MS DEMPSTER: I'm sorry, I don't quite understand your question.

MR MACKINTOSH: So, what are the key learning points you would take, from your understanding of the way that the management of NHS Greater Glasgow responded to the concerns about links between infections in the environment between, say, 2015 and 2019-- end of 2019?

MS DEMPSTER: I think there is-- I don't know if this is going to answer what you've just said, actually, but for

me there's the point about moving into the hospital-- I don't know if this is what you're asking, actually-- moving into the hospital when there was risks that were unknown around the water, for example, and the risk assessment, that the move happened; the patients were admitted to the hospital. So I think that's the first learning point about how you take over a hospital. Is this what you meant or not?

MR MACKINTOSH: Possibly.

MS DEMPSTER: Yes, how you then take over the hospital, how you accept a hospital, a new build, as fit for purpose. You wouldn't want to be finding the holes in-- you know, months down the line when you did a walk round. There's lots of things that you would've thought at pre-handover, snagging, whatever you like to call it. You would've gone through all of that preoccupation and checked off to find out----

MR MACKINTOSH: Is there any other particular learning lessons for events over the next few years that stand out for you, the way that the Health Board at management level responded to these environmental concerns?

MS DEMPSTER: For me, there was the issue that things were unknown, the fact that the ventilation was sort of discovered further down the line when problems started to arise, rather than knowing what the ventilation was again when you came into the hospital. So, once things became-- excuse me, once cases happened, they appear to have been investigated individually, people have looked at what happened, and then they begin to get more linkage occurring, thinking, "This is unusual now, we're seeing more of these," so-- I don't think I'm answering your question.

Then, there was perhaps good management. The IMTs were then started. They were convened and were going through the cases, looking at what's happening. Then actions were happening, so people were responding and testing the water, thinking what we should do, but I struggle with the concept of how perhaps it was not taken as seriously as it should have been at the beginning. Perhaps, if it would-- I don't mean "jump", that's not the right word, acted upon more rigorously at the beginning----

MR MACKINTOSH: So, when you say "the beginning", what do you mean by the beginning?

MS DEMPSTER: Well, I mean, the beginning perhaps of the water

incident, when they----

MR MACKINTOSH: So, that's 2018?

MS DEMPSTER: Yes, when there clearly was concerns about the water.

MR MACKINTOSH: The response must be that the Water Technical Group was set up, HPS were brought in, point of use filters in place is pretty fast. Isn't that a serious response?

MS DEMPSTER: Well, again, you would have thought the water group would have been already established so-- I think I'm struggling with your question. I would have expected there to have been a lot more in place prior to those things happening.

MR MACKINTOSH: I think we'll come back to that after lunch because I've got some other questions that might relate to it. Dr Mumford, is there anything you'd like to add to this particular question? I'm going to come back to this topic later.

DR MUMFORD: I think-- I accept what Linda has said and agree with her, but I would go back further in the process. I think one of the frustrations that is very, very common is that Infection Control is quite often presented with an architect's drawing

of a hospital and they're asked, "Is that okay?" What they're not involved with is really having proper input into what it is that we want this building to do and how we want it to be and what sort of patients we're putting in there and what would be appropriate for each of the patient groups that we're putting in and where are they all going to go. I think that needs-- Ideally, that would be in a much more structured way going forward with more specialist knowledge.

So, once they'd taken over and we started seeing the incidents increasing and the IMTs increasing, it's-- Whenever I've read the documents and looked at all the IMTs that were happening, it seems like a lot.

MR MACKINTOSH: A lot of IMTs?

DR MUMFORD: Yes, even for a hospital the size of QEUH and RHC, just seems to be a lot, and I just wonder whether anybody at any point stood back and said, "Is this normal, is this right, should we be seeing"----

MR MACKINTOSH: Well, they did that in 2019, there was a discussion about what is normal there.

DR MUMFORD: They did it in 2019, yes, but they didn't do it in 2017 when the number of cases increased,

the number of IMTs increased, and the earlier that you can get a handle on something happening, the quicker it is resolved, and so to not have any mechanism--

One of the things that a DIPC does is produces an annual report to the Board. Now, in that annual report, when I write it, I put in all of the outbreaks, incidents, whatever you want to call them, that we've had for the year, and I would imagine that, if a Board was suddenly faced with the number of IMTs that actually occurred in 2017, that they would say, "Is this right? Is this normal? Can you tell us more about this? What have we been doing? Do we have confidence that there isn't anything else going on?"

It comes back to that curiosity thing, which is so important, but then there's the other half of it, which is you have your IMTs and you have your lead IMT chairing and the support does not appear to be there. So you leave your lead IMD with this huge responsibility to run this IMT with the expectation that a solution is going to be found for a situation that a microbiologist is not equipped to resolve. They can't resolve it.

MR MACKINTOSH: Why can't they resolve it?

DR MUMFORD: Because they

don't have the expertise. They can advise. They don't have the expertise to say, you know, "This is the size of ducting that we need in this ventilation system and that's the size of pipe we need and, you know, this bit of plumbing needs to be replaced." They don't have that expertise. They can advise on the expertise that they do have.

So-- And I think that the point at which that IMT started to struggle and really realise just how big the water incident was and the implications for those patients and the thought that they might have to be moved, there should have been a stepping-in at that point and saying, "Actually, an IMT"----

MR MACKINTOSH: Who should have been stepping in?

DR MUMFORD: Well, I think possibly Dr Armstrong, as HAI lead for the Board, steps in and says, "Actually, an IMT is not the right process here."

MR MACKINTOSH: When are we talking about, in your mind, at this point?

DR MUMFORD: I'm talking middle of 2017 when it first started to be realised that it was such a big incident----

MR MACKINTOSH: Sorry, before you go any further, I think it's fair to put out that Dr Armstrong's

position is that she doesn't know there's a systemic water problem until March '18. So are you suggesting that she should have intervened before----

DR MUMFORD: Yes, I apologise. I'm in the wrong year.

MR MACKINTOSH: Right.

DR MUMFORD: That's me. Yes, so everything I said "'17," I meant '18.

THE CHAIR: So, 2017, put in 2018?

DR MUMFORD: Yes, apologies, my Lord.

THE CHAIR: Right.

DR MUMFORD: So yes, so I-- you know, I would have hoped that, you know, if I'd ever been in that situation, that somebody-- you report upwards, you report your concerns and that they would have said, "This isn't an IMT-appropriate thing anymore, this is a big, big issue. It needs executive oversight and leadership and we will change the structure, and we'll take the IMT," maybe maintain it as a subgroup, just to do the ongoing infection control issues around it, but actually manage the incident as a whole separately so that the correct people are taking executive responsibility for what is going on.

MR MACKINTOSH: Is this----

DR MUMFORD: They pull in the experts from wherever they need to get them.

MR MACKINTOSH: Is this not dissimilar to the executive control group that Dr Inkster talked about as something she wanted in early '18?

DR MUMFORD: She wanted someone to report to, didn't she? She wanted a group to report to. She didn't suggest, I don't think – I could be wrong – that they would take over the management of the----

MR MACKINTOSH: So, you're suggesting an actual takeover by the HAI Infection Lead and a group of people which would have included whom?

DR MUMFORD: The director of Estates, probably the operating officer, because there was implications for service delivery, and then you would need various other people. You'd certainly need the lead ICD to sit on that to advise the wider group, but it ultimately concluded, though perhaps no one could see that it was going to do this, in some really big decisions about the decant, about the whole stripping out of the ward, and it's easy for me to say with the benefit of hindsight that it was clearly too big a thing. As soon as there was a suggestion that the patients might

need to move, for me, that's getting too big for the lead IMD to have the responsibility for making decisions on.

MR MACKINTOSH: I want to just check that we're talking about the same thing because I don't want to be in a position where, later on, we are discussing-- Do you recollect the minute of the water review group that discusses the decant decision from 20-- Let me just find the page reference, I think I might have----

DR MUMFORD: I remember reading it. I think it was around 18 September.

MR MACKINTOSH: Yes. Bundle 19, document 35, page 614. So, you're just talking about it ended up being a group and I want to see if we're talking about the same group. Is this the group you're talking about who decided the decant?

DR MUMFORD: So, this was the executive group that made the final decision, wasn't it?

MR MACKINTOSH: So, what, from your point of view, is wrong with this group of people making that decision?

DR MUMFORD: So, firstly, I don't know what the Infection Control manager is doing there. That should have been the ICD.

MR MACKINTOSH: Well, he would, I think, point out that he's in charge of the Infection Control team in compliance with the Vale of Leven report.

DR MUMFORD: Yes, but he's not a subject matter expert.

MR MACKINTOSH: Do you think it's as that simple?

DR MUMFORD: You have a group of executives and directors there. In order to make the best decision they can make, they need to be able to question the subject matter expert----

MR MACKINTOSH: That's not Mr Walsh----

DR MUMFORD: -- because they probably had questions that they didn't get answered because there was no one there that could answer them.

MR MACKINTOSH: There was an earlier meeting on the Friday which Dr Inkster was at, but she wasn't at this one. So am I right in thinking that your learning point is that, at some point earlier in '18, before this, and there's actually a group comprising most of the people on this list but Dr Inkster rather than Mr Walsh, should have taken control of the whole incident?

DR MUMFORD: Yes, with, you know, advice from the IMT continuing on specifically the infection control

aspect.

MR MACKINTOSH: No doubt water subgroups and that sort of thing happening----

DR MUMFORD: Yes, so that the lead IMD is supported. I think to be able to make some of these decisions and to work in a supportive environment where actually you don't feel that you're on your own and that you're isolated is really, really important and all of these people were dealing with a really tricky problem, and to have that mutual support is really important and so, yes, I think there should have been more of this.

MR MACKINTOSH: Right. Moving on to a different topic, it's about benchmarking and you sort of discussed it already, both of you, but I've got a particular question. Would you expect a hospital or a unit with a particular organism-- the question there suggests MRSA, but a particular organism in that unit being of concern to need to compare rates with other hospitals to determine whether an outbreak existed?

DR MUMFORD: Not for that purpose, no.

MR MACKINTOSH: Not for determining whether an outbreak existed?

DR MUMFORD: Yes

MR MACKINTOSH: Ms Dempster----

MS DEMPSTER: I agree, yes.

MR MACKINTOSH: For what purpose would you want to compare with another hospital?

DR MUMFORD: Well, you'd want to compare around your comparative performance to see whether the outbreak is an isolated thing or it's actually your rates have been high all year, so you would look to someone else and say, "What do your rates look like?" or you would look to the national mean because it's a reportable organism. So you might want to look at the national mean and see what the data was there and compare----

MR MACKINTOSH: You wouldn't use the comparison to determine whether there's an outbreak?

DR MUMFORD: No, any infection control professionals should be able to identify an outbreak when it happens.

MR MACKINTOSH: It's been suggested that benchmarking might be more useful to identify those units or hospitals with good practice who one might contact for advice, rather than using the information to suggest that you don't have a problem. Would you

agree with that or disagree with that?

DR MUMFORD: Yeah, that's a useful----

MS DEMPSTER: Yes, I agree completely.

MR MACKINTOSH: What I want to do now is move on to the topic of Mycobacterium chelonae.

THE CHAIR: Just reflecting on that last answer, I suppose one would have to be satisfied that the apparently well-performing institution is actually comparable to your institution.

DR MUMFORD: From the point of view of MRSA, as long as it was an acute general hospital, I don't think that that would make a difference.

THE CHAIR: Okay. Right. Thank you.

MR MACKINTOSH: Would it make a difference for the group of organisms being seen in the summer of 2019?

DR MUMFORD: I mean, there aren't many hospitals, I don't think, that have had the experience of these organisms to this extent.

MR MACKINTOSH: I mean, there was discussion----

DR MUMFORD: So it would be hard to find a peer organisation that would be able to say, "Oh yes, we had that and this is what we did."

MR MACKINTOSH: There was discussion in August 2019 about Great Ormond Street as a comparator, and it comes up in about three different ways. It comes up because Dr Peters produces some numbers of rates of infections, and I can't remember what the infections are, but I seem to remember her being challenged by Professor Steele and him being particularly annoyed about the way she responded during her evidence. You're both nodding. The second scenario involves a discussion as to a follow-up IMT, either on 23 August or afterwards, about a visit to Great Ormond Street. Do you both recollect that?

DR MUMFORD: Yes.

MR MACKINTOSH: I just wonder whether, had that actually come to something, which it didn't appear to have done, would that have been a useful comparison point to have sought between this hospital and somewhere like Great Ormond Street?

DR MUMFORD: I think we've heard, haven't we, that Great Ormond Street is not a direct comparative for the Schiehallion Unit, but as a wider paediatric hospital facility, yes; but because they only take very small children, don't they, and babies in their haem-onc unit, rather than the spread of ages that we see in the Schiehallion

Unit, that wouldn't be a direct comparison. But if you're looking organisationally or environmentally for the whole hospital, then it would be a good fit.

MR MACKINTOSH: Ms Dempster, anything you want to add about that?

MS DEMPSTER: Well, I agree, and Great Ormond Street's got a microbiologist there who's very well-known, I don't know, eminent on her work on the environment. So there's advantages to contacting others, yes.

MR MACKINTOSH: Right. Well, let's now move to Mycobacterium chelonae. Now, I think what I have to do, because obviously this infection has become particularly significant to a particular core participant, is I want to just understand exactly where we stand now at the end of this Inquiry about the number of infections. I've discussed it briefly before, and I think we need to nail this down to be definitive. This will mainly be directed at Dr Mumford, but I'm sure, Ms Dempster, you can come in if something arises.

So, if we can go to your report, bundle 21, volume 1, page 139, and it's footnote 95, which appears in the second bullet point on the page, and you report in this report that there was one case of Mycobacterium chelonae in 2016 which was not escalated to a PAG. Now, your source is the bloodstream infection database.

DR MUMFORD: Yes.

MR MACKINTOSH: And is it described as Mycobacterium chelonae in the database?

DR MUMFORD: That case is, yes.

MR MACKINTOSH: Is it in a blood sample?

DR MUMFORD: It's in the blood culture.

MR MACKINTOSH: Is it in 2A, 2B or somewhere else?

DR MUMFORD: It was not in 2A.

MR MACKINTOSH: Right. Could you double-check over lunch whether it was in 2B?

DR MUMFORD: Yes.

MR MACKINTOSH: We then have two tests in 2018 with the same patient. Now, were both of them recorded on the database that you had as Mycobacterium chelonae?

DR MUMFORD: The second case that had two episodes is recorded but not recorded as Mycobacterium chelonae.

MR MACKINTOSH: Did either of that patient's two results, are they recorded against 2A or another ward?

DR MUMFORD: I can't

remember.

MR MACKINTOSH: Because I put it to you that neither infection is recorded as Mycobacterium chelonae and that one of them is recorded against a different ward – 3B is ringing around my head – and the other one is recorded against 2A. Again, is that your recollection?

DR MUMFORD: It rings a bell, but I can't say with confidence----

MR MACKINTOSH: Can you double-check it over lunch, please?

DR MUMFORD: Yes.

MR MACKINTOSH: And the 2019 case is recorded against 6A?

DR MUMFORD: The 2019 case is not on the database because it wasn't a blood culture. It was a superficial infection.

MR MACKINTOSH: And from the point of view of the lay audience, i.e. the lawyers in this room, what's the difference?

DR MUMFORD: So, the sample that was taken from the patient was a swab of the skin because it was an infection around the site in which the Hickman line went through the skin, and so it wasn't a blood culture where blood is put into a culture medium and cultured. So the patient didn't have a bloodstream infection.

MR MACKINTOSH: So, two issues arise from this. It seems you're the first person to spot the 2016 case in the recent years. Did you see any reference of it in the Oversight Board report, the case notes review or the independent review?

DR MUMFORD: I don't think so, no.

MR MACKINTOSH: The 2018 case is missed from your chronology in this report. You're nodding.

DR MUMFORD: Yes, sorry.

MR MACKINTOSH: And it's then raised with you in a direction 5 response from Professor Cuddihy and you mention it in your answer.

DR MUMFORD: Yes.

MR MACKINTOSH: Why did you not include it in the chronology?

DR MUMFORD: Because when I searched the database, it didn't come up as a Mycobacterium chelonae, so it unfortunately got omitted for that reason.

MR MACKINTOSH: Is it in fact described in an IMT as something else at the time, in 2018? Or an email to Annette Rankin?

DR MUMFORD: That doesn't ring a bell. It is eventually described in an IMT, but retrospectively, I think.

MR MACKINTOSH: In 2019?

DR MUMFORD: Yes.

MR MACKINTOSH: And in

terms of environmental samples, can you help me about-- We know from IMTs the word “Mycobacterium chelonae” is associated with environmental water samples in 2019. It’s discussed in the IMT, and we don’t need to go there. What awareness do you have of whether Mycobacterium chelonae was found in 2A’s water system at any point?

DR MUMFORD: I believe it was. I couldn’t tell you the date.

MR MACKINTOSH: Do you know when the tests were done?

DR MUMFORD: No, sorry.

MR MACKINTOSH: There’s some evidence it was done retrospectively. Now, what I want to understand, then, is why is Mycobacterium chelonae not in Mr Mookerjee’s dataset, his list of infections?

DR MUMFORD: Because it’s a mycobacterium, so it’s not a gram-negative, and we discussed this yesterday, and I don’t think at that point that we recognised that it was-- when we were putting the dataset together, I don’t think we had recognised that it was within the data.

THE CHAIR: Sorry, you hadn’t recognised it was----

DR MUMFORD: Within the data.

THE CHAIR: Within----

DR MUMFORD: Within the data on the blood cultures.

MR MACKINTOSH: And in any event, of the four infections that you now know of, only three are bloodstream infections.

DR MUMFORD: Yes.

MR MACKINTOSH: And of those bloodstream infections, we think that only one is in 2A, and you’re going to check that over lunch.

DR MUMFORD: I’ll check.

MR MACKINTOSH: Had you known about all four infections, would it have been consistent with the methodology discussed with Mr Mookerjee, as far as you understand it, to add Mycobacterium chelonae to his infection list?

DR MUMFORD: Yes, it would have been a reasonable thing to do.

MR MACKINTOSH: But how many of those infections would have gone in to his bloodstream infection list?

DR MUMFORD: One.

MR MACKINTOSH: Which is the 2A one?

DR MUMFORD: Yes.

MR MACKINTOSH: Right. Now, I want to understand a little bit about the 2016 case, and this is where I’m going to bring in Ms Dempster. Now, we had a little bit of evidence from Dr

Inkster about her thoughts about why it didn't trigger, wasn't reported, seemingly, is her view from the microbiology lab. Without wanting to get into the details – actually, we don't have the evidence – can either of you help me whether knowing about the 2016 case, had it been actioned in some way, taken to a PAG or reported nationally or even discussed with infection prevention and control, could that have caused a series of understandings that might have prevented later infections? Ms Dempster?

MS DEMPSTER: I think if it had been investigated, you'd have had one case, so I would have expected that the microbiologists would have told the infection control team. They would have gone to where the patient was and they would have done some of this investigation, look at where the patient's been, what's going on with the patient. Potentially, they would have requested water sampling. So there's potential for interventions at that point that may have identified some risks for that patient.

MR MACKINTOSH: I mean, this is in January 2016, isn't it?

MS DEMPSTER: Yes.

MR MACKINTOSH: Is this well before there's a realisation there's a problem with the water system?

MS DEMPSTER: Yes.

MR MACKINTOSH: So, Ms Dempster, are you being a little bit optimistic to think that realisation that there was a single Mycobacterium chelonae case in January 2016 would have fundamentally changed anything?

MS DEMPSTER: I don't know if it would have changed anything further down the line, but it would have investigated the case, which doesn't seem to have happened.

MR MACKINTOSH: So, you can't tell us what might have happened?

MS DEMPSTER: No. Not without----

MR MACKINTOSH: Anything you want to add to that, Dr Mumford?

DR MUMFORD: It's a sufficiently rare organism and known to be associated with water sources, including water within medical equipment, and so I think you're almost duty-bound to investigate if you find it because you need to make sure that none of your equipment in particular is associated with this patient. So you would have to do a full look at her pathway: where she'd been; what equipment might have been used near her; was any of it

associated with water; had she, for instance, had an endoscopy; had she had dialysis; all of those questions, in order to assure yourself that you didn't have a problem, because these have been really well documented and known about, and you would have to do that.

MR MACKINTOSH: I think, my Lord, this might be a good place to pause. I know it's a little bit early, but I'm moving on to a significant new chapter at this point.

THE CHAIR: Very well, we'll do that. We'll take lunch now, and if I could ask you to be back for two o'clock.

(Adjourned for a short time)

THE CHAIR: Good afternoon, Ms Dempster and good afternoon, Dr Mumford. Mr Mackintosh.

MR MACKINTOSH: Thank you, my Lord. Dr Mumford, before the lunch break, I asked you during the lunch to double-check the locations and descriptions of the 2016 and 2018 Mycobacterium chelonae infections results. Are you able to help us of which ward the 2016 case was located?

DR MUMFORD: I am. It was on 2A.

MR MACKINTOSH: 2A, and it was a bloodstream infection?

DR MUMFORD: It was.

MR MACKINTOSH: And was it described as Mycobacterium chelonae?

DR MUMFORD: Yes.

MR MACKINTOSH: Of the 2018 infections, was one of them located on 2A?

DR MUMFORD: Yes.

MR MACKINTOSH: And was it described as Mycobacterium chelonae?

DR MUMFORD: No. The one on 2A was described as gram-positive bacillus.

MR MACKINTOSH: Is that a sort of higher-level grouping within which Mycobacterium chelonae would fall?

DR MUMFORD: Yes, it's a very-- yes, very high level.

MR MACKINTOSH: And the other 2018 case, which ward was that in?

DR MUMFORD: That was in 3B.

MR MACKINTOSH: And was-- how was that described?

DR MUMFORD: That was described as a presumptive mycobacteria.

MR MACKINTOSH: It-- We----

THE CHAIR: Sorry, did you say

an atypical----

DR MUMFORD: Presumptive mycobacteria.

THE CHAIR: Presumptive. Thank you.

MR MACKINTOSH: The patient who had the 2018 infections gave evidence to this Inquiry, and within her statement and that of her family, it describes that she was only in that Ward 3B, or 3-- Sorry, I misheard you. Was it 3B or 3A?

DR MUMFORD: 3B.

MR MACKINTOSH: 3B for a matter of a day or so before the infection-- before the blood test was taken and previously been in 2A.

DR MUMFORD: Right.

MR MACKINTOSH: In the context of the sort of work that Mr Mookejee was doing, would there be-- would it be legitimate to effectively add that 3B result to the 2B-- 2A dataset and include it within the 2A dataset?

DR MUMFORD: So, when we assign a ward to a healthcare-associated infection, we apply the same rule as we do as to whether it's community or healthcare-associated. So if a patient comes in and they have the blood culture on the day of admission or the next day, then that is community acquired. After that, hospital acquired.

So if the patient moved from 2A to 3B and had that blood culture taken within that day or the following day, then it would be reasonable to assign it back to 2A.

MR MACKINTOSH: Would you be able to tell that information from the dataset that you have?

DR MUMFORD: No.

MR MACKINTOSH: No. Is that the sort of information that you'd have to acquire from the medical records?

DR MUMFORD: Yes.

MR MACKINTOSH: I think we had some evidence from Dr Kennedy about how he did that in his work. A few more questions about Mycobacterium chelonae. It's about water testing----

DR MUMFORD: Yes.

MR MACKINTOSH: -- and when it should take place. What do you think the guidance should be in Scotland in respect of whether there should be water testing once a Mycobacterium chelonae or atypical mycobacteria has been suspected or confirmed in a hospital?

DR MUMFORD: So, for mycobacteria I would say, yes, it should be part of the investigation to do water testing at the earliest opportunity in an area related to that patient when they acquired the

infection. For other atypical mycobacteria, they're not all water-related and you would have to go on a case-by-case.

MR MACKINTOSH: So, it would depend on which one they were?

DR MUMFORD: Yes.

MR MACKINTOSH: But for Mycobacterium chelonae, you should water test?

DR MUMFORD: Yes, because it's well recognised as a contaminant in water in healthcare.

MR MACKINTOSH: Ms Dempster, do you have a view on that question of whether you should water test having found Mycobacterium chelonae?

MS DEMPSTER: I think you would as part of your investigation of that case.

MR MACKINTOSH: Can either of you help me on whether there is a policy or guidance in England that covers this issue as to whether-- in England and Wales as to whether one should test having found Mycobacterium chelonae in the hospital?

DR MUMFORD: I don't think there is, no.

MR MACKINTOSH: Right. I've got a series of questions which come down to yes/no answers. Now, I think I'm going to direct them to Dr Mumford because they seem like a microbiologist sort of question. So, after the 2016 case was found in Ward 2A, should the water have been tested in that ward?

DR MUMFORD: Yes.

MR MACKINTOSH: In 2018, once the tests had come back that confirmed they were Mycobacterium chelonae tests, the two that were done in 2018, should the water in 2A have been tested then?

DR MUMFORD: Yes.

MR MACKINTOSH: In 2019, I think-- I don't need to take you to it. I hope you recollect, there was some discussion about where the Mycobacterium chelonae was found. Do you remember where that was?

DR MUMFORD: I think it was in the theatre from a scrub sink, I think.

MR MACKINTOSH: Could it also have been found in the showerheads?

DR MUMFORD: I don't recollect that.

MR MACKINTOSH: Right.

DR MUMFORD: I may be getting confused with a different patient, but I think that's what-- it comes back to what I was saying about needing to track back that patient's journey and see where they had been and what the

water test----

MR MACKINTOSH: So, that's the primary thing that you would do when you found it, is track back?

DR MUMFORD: Yes, and that would guide your water testing.

MR MACKINTOSH: Can you derive any information from the finding that I think there was, that there was Mycobacterium chelonae in Ward 6A in June 2019 in the water inside the filters, as it were? Can you derive any understanding of whether there would have been Mycobacterium chelonae in the water in previous years from that information?

DR MUMFORD: No. I think a water test is as good as the day that you take it. It doesn't tell you what was in it previously.

MR MACKINTOSH: Thank you. Right, what I'm proposing to do is ask a couple of other questions which I passed over rather too quickly. Now, going back to your report, if we go back to your report which is bundle 21, volume 1, it's all in section 10 and 11, and I wonder if we can go to page 172, please. So this refers to your final paragraph of 10.28, and I've been asked to check your source of a piece of information.

So do you see that within paragraph 10.28, Dr Mumford, you

record "a lack of airlocks allowing air to flow from a general ward into the BMT Unit 4B"?

DR MUMFORD: Yes.

MR MACKINTOSH: What's the source of that particular information?

DR MUMFORD: So, there was an investigation-- Within the cryptococcal report-- and I can't remember if it was-- I think it was Dr Hood's report, there was examination of the air flows around the entrance to 4B and they found that the air pressures were such that if you open door of 4B and you open the door of the next ward, the air flowed from the next door ward into 4B.

MR MACKINTOSH: So, that's the source of that?

DR MUMFORD: That's the source of that, because there was some comment about there not being airlocks in place and therefore when they opened all these doors that was the way that the air flowed.

MR MACKINTOSH: If we can go on to the next page, page 173, which is a chapter about Aspergillus, in 10.31, you refer to Aspergillus biofilms being capable of causing disease and render those diseases resistant to antifungal therapies. In the event that such antifungal therapies were used over a sustained period of time due to

the risk of fungal disease in the environment, could it be inferred that, effectively, the antifungal therapies-- antifungal resistance is a consequence of using the antifungal treatments?

DR MUMFORD: Not necessarily. You can-- you can-- Organisms can develop anti-- they can develop resistance, but it's not as common and not in the same-- doesn't use the same mechanisms as antimicrobials. So it can happen, but it's not common.

MR MACKINTOSH: Right.

DR MUMFORD: Or less common.

MR MACKINTOSH: If we move on to your-- I'm just going to take this one out of-- I'll leave those ones until we get to the conclusions section. That's probably the easiest.

So, what I want to do now is to-- I thought it would be a good idea just-- I don't think I did this with you yesterday. Both of you, Dr Mumford and Ms Dempster, have made a declaration of your role in the report, which is bundle 21, volume 1, page 105 in section 2.2. Now, obviously, you can see it on the screen, but I wonder, Ms Dempster, if you could explain in your own words how you see your relationship to the Inquiry in terms of your independence.

MS DEMPSTER: Well, we were approached and asked to do that piece of work and to look at-- I'll call it "evidence", whatever the information we had received, and to assess it.

MR MACKINTOSH: Do you have any obligations in terms of what information you have to give in your report, how complete it has to be, what viewpoints you have to consider?

MS DEMPSTER: We've-- I've considered-- We've considered everything that we were asked. Is that what you're----

MR MACKINTOSH: Well, if, for example, you found out information that contradicted your initial thoughts, are you under any obligation of whether you should produce that contradictory information?

MS DEMPSTER: Yes, definitely, yes.

MR MACKINTOSH: Have you used-- To what extent have you used the information that you acquired, the understanding you acquired of the hospital from either your visit with the independent review or your work for Gaynor Evans in reaching your conclusion?

MS DEMPSTER: It hasn't impacted on our conclusions here because I was doing two completely different things.

MR MACKINTOSH: Has it in

any way ensured that you understand what's going on, or has it affected your thought processes in any way?

MS DEMPSTER: Probably in a way it helped me understand easier and quicker what was going on because I knew about the hospital, the site.

MR MACKINTOSH: So, it's contextual from your point of view?

MS DEMPSTER: Yes.

MR MACKINTOSH: Right. Dr Mumford, how would you explain your duty to the Inquiry as an expert witness?

DR MUMFORD: So, it was to write the report for the Inquiry and to study all of the evidence that we were given and to report in an unbiased manner our findings.

MR MACKINTOSH: Have you had to deal with the other Inquiry experts over the time you've worked for the Inquiry?

DR MUMFORD: Yes.

MR MACKINTOSH: So, what is your connection between your work and that of-- apart from Ms Dempster's joint report, but the other Inquiry experts with whom you dealt, how much exchange of information or, indeed, exchange of opinions has there been?

DR MUMFORD: So, with Dr Bennett and Mr Poplett, very little. I think we've maybe had a couple of Teams meetings with them but no more than that, and just to talk about how they were getting on rather than the detail. With Mr Walker, we have had discussions prior to him writing his report, and I helped him to proofread and edit his report, at Lord Brodie's request, to try and get-- make it smaller.

MR MACKINTOSH: Because it was quite a long report originally.

DR MUMFORD: It was originally, and with Mr Mookerjee we have obviously-- we helped to determine the methodology at the beginning, taking his advice on the epidemiological process.

MR MACKINTOSH: Because originally he was producing a report jointly with the two of you.

DR MUMFORD: He was, yes, so we were going to-- originally asked to do a joint report the three of us, and then it quickly became apparent that it would be better to split the quantitative from the qualitative, as it got-- the format of the report became too complicated and we lost some clarity. So we separated them out, but that was actually relatively early in the writing of the report process.

MR MACKINTOSH: Was it

originally intended that your report would be the last one to be written?

DR MUMFORD: Yes, and we were asked to take into account the work of the other experts when we were writing our report.

MR MACKINTOSH: Might it well be the case that I had to press you to produce your report, even though Mr Poplett's water report wasn't finished?

DR MUMFORD: You did indeed.

MR MACKINTOSH: Right, in order to get it to core participants in good time. Right, I'd like to turn on to a group of questions that relate to the role and actions of the IMT chair and lead ICD. We've already discussed some issues in 2015 and early '16, and I think what I'll do is I'll divide these questions between the two of you, but I'll start, because it's the lead IMT and lead ICD, with Dr Mumford each time. I'm conscious that in England, a DIPC might well be a nurse consultant. Is that correct, Dr Mumford?

DR MUMFORD: It is, yes.

MR MACKINTOSH: I'm very keen to hear Ms Dempster's point of view as well. So, we've heard quite a lot of evidence about the IMT chair being in charge, the lead ICD chairing the IMT, bringing evidence to it, organising its meetings, inviting people to attend. What's your assessment, Dr Mumford, of the level of authority granted to the then-lead ICD in NHS Greater Glasgow, each of the following years? It's really to see whether you felt that the ICD chair in their role-- the chair of these IMTs had what you considered to be the appropriate amount of authority. In 2016, after Dr Inkster took over, in those IMTs that year, perhaps before until she went off on sick leave, did she appear to have the appropriate level of authority for the task she was doing?

DR MUMFORD: From the IMTs that I've read, she appeared to have the authority towards additional testing, to ask for additional information, to form the IMT to influence the outcome, but I think that's as far as it's possible, from what I've read, to say what her level of authority was. But for those things, it was appropriate.

MR MACKINTOSH: Was there anything that she didn't appear, as far as you can tell, to be able to do at that point?

DR MUMFORD: I didn't-- don't think I remember seeing anything.

MR MACKINTOSH: No. Now, obviously during 2017, she wasn't in post and IMTs were chaired by a number of different people.

DR MUMFORD: Mm.

MR MACKINTOSH: So the question is more diffuse, but I might as well repeat it. During 2017, did the people who were chairing IMTs appear to have the appropriate level of authority in that role, as far as you could see?

DR MUMFORD: I think so. I mean, obviously it was more difficult with the number of people who were taking those chairs, and I think there was some disparity in the experience of some of the people who were taking the chair, and that-- So whether they exercised authority in that space is-- may've been variable.

MR MACKINTOSH: Ms Dempster, just focusing on 2016/2017, do you have any comment about whether the IMT chairs at that point had the necessary level of authority to do their tasks?

MS DEMPSTER: I think they appear to, but we're reading a note of a meeting, so it's very different to actually being present and understanding----

MR MACKINTOSH: I appreciate that, and there's more, of course, granularity as we get on into the following year.

MS DEMPSTER: Yes.

MR MACKINTOSH: Dr Mumford, if we think about 2018 – and to keep it simple, I think if we think about the whole year – obviously there's lots of events going on. You've had some evidence already this morning about how you felt the matter should've been managed after a certain point during that year.

DR MUMFORD: Mm.

MR MACKINTOSH: But have you any thoughts about the level of authority that was being granted to and exercised by Dr Inkster as chair of those IMTs in 2018?

DR MUMFORD: I don't think the level of authority changed. I think the expectation may have changed for such a big incident about her ability to carry on as normal, if you like, and manage in the same way that they'd previously managed, and-- So I think for the expectation that there was, that this very large incident would be managed in the same way without additional resource, for example----

MR MACKINTOSH: By "resource", you mean additional sessions?

DR MUMFORD: And people.

MR MACKINTOSH: And people.

DR MUMFORD: Yes, but sessions, people's support, all of those things, and I think the-- and I know from other sources that the laboratory

struggled with the increase in testing, so there was a-- there was a definite need for further, additional support, but I don't think her level of authority was different.

MR MACKINTOSH: You've already described what you thought should have happened at that point, so we'll, sort of, park that as part of it.

DR MUMFORD: Mm.

MR MACKINTOSH: Do you have any issue one way or the other with the number of more senior managers, that is sector managers who are managing service or associate medical directors, deputy medical directors, heads of Estates, who start turning up at meetings in '18 and into '19, or is that something that's, sort of, to be expected, given what was going on?

DR MUMFORD: I think it is a factor of what was going on, and it's also a factor of the complexity of it and the-- and, yes, it was definitely because of the complexity and what was happening.

MR MACKINTOSH: Ms Dempster, do you have any thoughts about how the IMT chair was working in 2018?

MS DEMPSTER: I think it must've been incredibly difficult for one individual to sustain that momentum of ongoing meetings, and whether you had a deputy chair who you could share some of the workload with, I would've-- think it would be incredibly onerous. You need somebody who's close to the IMT to understand because you don't want a random chair to arrive who doesn't understand what's going on, because then you have to go back, explain it all again. I think it was what Sara said, really, support to the IMT chair or a deputy.

MR MACKINTOSH: So, support might have been more sessions for her or a deputy?

MS DEMPSTER: Yes, yes.

MR MACKINTOSH: Would you agree or disagree with Dr Mumford's comments this morning about the need for a, sort of, management structure over and above the IMT?

MS DEMPSTER: I think there is when it comes to a big incident and you're going to take some major, you know, steps in your hospital. It needs to be made by the executives as well.

MR MACKINTOSH: Now, before we move on to 2019, I'm going to ask both of you to comment on what you've heard, and I appreciate you haven't heard all the evidence.

DR MUMFORD: Mm-hmm.

MR MACKINTOSH: So I don't think either of you heard Ms Dodd's

evidence. I think you've heard Dr Inkster and you've heard Sandra Devine and you've heard Dr Kennedy, but you haven't heard all the members of the IMT. So with that, sort of, rider, do you notice any change in the relationship between the IMT chair and the rest of the organisation at any point between the start of the water incident and, say, the end of July 2019?

DR MUMFORD: I think there was some frustrations building. I suspect some of that was because of the complexity. Some of it was because of the pressure, both on the chair and the IMT as a whole, to resolve the issues which were proving so difficult. And I've read reports that, you know, people have behaved badly in IMTs and so on, and I think it's a-- it's a-- it's a function of the stress under which everybody was trying to work, I think, that, you know, you do begin to become tetchy with each other, and you do become-- to not be as cohesive a team as perhaps you were at the beginning of the incident.

MR MACKINTOSH: But is there any point when you see that frustration or tetchiness coming to the fore, from the material you've looked at?

DR MUMFORD: I'm rubbish at dates. I think at the point that Dr Inkster was removed as chair----

MR MACKINTOSH: So, you'd see that as an August 2019 issue-- point?

DR MUMFORD: I think there were problems all the way through, but that was, kind of, the culmination of it.

MR MACKINTOSH: Right. Ms Dempster, do you have any thoughts about, given the material you've listened to, whether there's any point of inflection or change in the level of frustration across the IMT?

MS DEMPSTER: I agree with what Sara said. There was clearly building up to the change of chair, and we heard-- we've read-- I've read, but don't ask me where, about colleagues who were attending from Health Protection Scotland, attended in pairs rather than individually----

MR MACKINTOSH: I think that might have been later in the year.

MS DEMPSTER: Was that later? Okay, so apologies----

MR MACKINTOSH: No, but was that the point you see it as a significant----

MS DEMPSTER: Well, I see that as----

MR MACKINTOSH: Significant, right, okay.

MS DEMPSTER: Yes, yes.

MR MACKINTOSH: So, thinking about 2019, Dr Mumford-- Well, I think

I'll come back to 2019 and do it differently because I think it's probably more complicated. What I want to do is think about the actions of Dr Inkster in 2019, and I want to ask you-- Well, I'm not going to ask you whether what you think-- whether Dr Inkster did the right or the wrong thing, because then that's possibly unfair, but I'd be keen to know if you think it's something you can answer, whether what she was doing was reasonable or unreasonable in the circumstances. If you haven't got enough information, if you're not comfortable, then please do say so. There are only four of them, and the first one is, do you think setting up the expert subgroup for the Cryptococcus IMT was a reasonable course of action for Dr Inkster?

DR MUMFORD: Yes.

MR MACKINTOSH: Any particular reason why?

DR MUMFORD: Because they needed to take away some of that work to a defined group in order to not have to do that all within the IMT. Splitting yourself is absolutely the right thing to do, to allow certain people to concentrate on that with the IMT continuing its work.

MR MACKINTOSH: There was a decision on 18 January 2019 to decant the patients for a short-term

decant of the clinical decision unit. Now, without even suggesting it's Dr Inkster's decision, was that itself, a decision of the IMT, was that decision reasonable or unreasonable circumstances, looking at it from where you stand now?

DR MUMFORD: I think if I-- It wasn't all the patients, was it? It was a small group of them but, I think, if you have a situation where you need to do some work on a ward and you have vulnerable patients who you need to protect, and the reason you need to do the work is because it's putting the patients at risk, then it's reasonable to move them temporarily to allow some of that work to go ahead and it's safer for the patients and it enables a safer environment to be developed as a consequence.

MR MACKINTOSH: Now, I think I'm going to ask the next question to both of you, which is, there was a decision made by the IMT at the start of August '19 to cease new admissions to Ward 6A and to divert patients to Aberdeen, Edinburgh. Now, you've obviously read a lot of material around about those events. Ms Dempster, given what you know now, was that decision reasonable or unreasonable in the circumstances?

MS DEMPSTER: I think it was

reasonable because people were concerned.

MR MACKINTOSH: Wouldn't there be an issue that it causes disturbance to the patients that happen to go to a strange city and some distance away from their family potentially?

MS DEMPSTER: Yes, and I'm sure that those risks-- issues would have been considered by the clinical team. It wouldn't again-- I'm sure the decision wouldn't have been made by the IMT chair to completely divert patients, that would have been made by the clinical team, and I'm sure the clinicians with responsibility wouldn't have wanted those children to go there if they could carry on providing the care where they were.

MR MACKINTOSH: Dr Mumford, do you have anything you want to add about this decision?

MS DEMPSTER: I slightly disagree. I'm not saying it's not-- wasn't a reasonable decision to take, but I think it's a decision which involves service provision and changes to that service provision and, on that basis, I would have expected that to have been taken at a higher level.

MR MACKINTOSH: Rather like the decant in 2A?

DR MUMFORD: Yes, because any decision that affects service provision in that way should be escalated up rather than taken lightly.

MR MACKINTOSH: Would that have involved-- Well, there wasn't an equivalent to the water review group before 6A at that point, as far as we know, but would that involve effectively an executive group similar to the one we looked at for 2A?

DR MUMFORD: Yes, yes.

MR MACKINTOSH: Right. Now, I'd also like to look forward into-- past August '23 to the time when Professor Leanord was reporting to the IMT, I think alongside Professor Jones, and there was a point at an IMT on 18 September when the two of them gave advice to the IMT that they considered the Ward 6A then to be microbiologically safe. Now, there was some pushback from HPS, ARHAI and it took a few more weeks before that decision was approved of by HPS, effectively by Scottish ministers.

Knowing what you know and all the information you've been able to review, do you have a view on whether that declaration that the ward was then microbiologically safe was reasonable or unreasonable in the circumstances?

DR MUMFORD: I think it was unreasonable and I think that they

didn't have enough data to prove that the ward was safe.

MR MACKINTOSH: Why do you say that?

DR MUMFORD: Well, it's not recorded in the IMT that they had enough data, but I think they were trying to-- obviously, trying to reopen it as quickly as possible and the HPS and ARHAI were absolutely right in saying that, "We're not comfortable with the amount of assurance that we've had"----

MR MACKINTOSH: But they did eventually.

DR MUMFORD: They did eventually, and that's fine but on that day when they made that declaration, I remember reading it and going, "No, it's not."

MR MACKINTOSH: So, you think it's possible-- that it's reasonable this might have changed by the time we get to November when they do make that decision?

DR MUMFORD: Yes, but, you know, it's not a decision that you can do a bit of work and not test and not check and, you know, make sure that it's all done properly and that it's safe and do all the testing that Dr Inkster had done previously on particle counts and all of that. That would have been helpful to have done that again, in order to ensure that the amount of fungal contamination in the atmosphere had gone right down.

MR MACKINTOSH: So, if we can move forward to November, to the point after the October-- or the final version, November, the 2019 HPS report is published and that bullet point we looked at before lunch, where HPS recommend that GGC review the closure of the ward to new patients, how do you feel about the decision they then made in November to reopen the ward for new patients?

DR MUMFORD: I don't think I'm as close to detail of that to-- but I think it's reasonable in circumstances when the risk to the patients being transferred elsewhere was greater than a risk that they faced on the ward.

MR MACKINTOSH: So, you see there's a sort of balancing act there?

DR MUMFORD: You'd have to do a balancing risk assessment, yes.

MR MACKINTOSH: I mean, it's difficult to look at this from hindsight from years afterwards, but what is it that's different between the 18 September suggestion and the November decision to actually make the decision? What additional information do you feel comes across-- becomes available?

DR MUMFORD: I think they

have-- Do they have Dr Hood's report then?

MR MACKINTOSH: No, Hood's report doesn't arrive for a year.

DR MUMFORD: No, that was later. Then, my memory is letting me down. I'm sorry, I can't remember.

MR MACKINTOSH: Could it be within the 2019 HPS reports?

DR MUMFORD: Yes.

MR MACKINTOSH: Should we just look at them because----

DR MUMFORD: Yes.

MR MACKINTOSH: -- I think it's important to get to the bottom of this. So, it's bundle 7 and the final version of the report-- I'm conscious that Professor Stevens noticed a change in the text, but we'll look at the final version. So, we'll go to the "Summary and Recommendations," which is bundle 7, page 271, and this-- what we'll do is we'll look briefly at this page to see if it assists you, and then over the page. I just wondered the extent to which this report provides support for the suggestion that----

DR MUMFORD: This report doesn't answer that question. It wasn't designed to answer that question. It was around ensuring that the various databases, ECOSS and GGC's databases were compatible and similar enough to be reliable.

MR MACKINTOSH: If I recollect, the evidence of Dr Crighton and Professor Leonard is that it's the combination of Dr Kennedy's work on the numbers of infections in the presentation that's made that we looked at yesterday, and Professor Leonard's work on whole genome sequencing that seems to be important. Is that enough information to reach the conclusion that was reached in November, that the ward was then microbiologically safe?

DR MUMFORD: Well, by that point in time, they had chlorine dioxide and they had point of use filters, so it should have been safe for that group of patients.

MR MACKINTOSH: But they had chlorine dioxide and point of use filters in the spring when that round of infection started up.

DR MUMFORD: Yes, but the chlorine dioxide, as we know, takes a while to have its full effect so it could not have been expected to instantly cure the problem, but the point of use filters were in place, but then they also detected some contaminated point of use filters at some point as well – contaminated on the outside, not the inside. So not having the full information that was available at the IMT and not having been there, it's

difficult to comment on exactly how they came to make their decisions.

MR MACKINTOSH: Have you looked for an explanation about why they made that decision?

DR MUMFORD: I couldn't find one.

MR MACKINTOSH: Could it be that the information was there in the sense that Dr Kennedy, Professor Leonard, Ms Rodgers, Professor Jones made presentations to an IMT that were listened to, considered and the conclusions reached, it's just they're not recorded in the material we have?

DR MUMFORD: Oh, absolutely. Absolutely, because the minutes of any of the IMTs are not verbatim. They are notes and decisions and actions. They're not the full debate that has taken place within the IMT.

So, if we can recap, you have some concerns about the suggestion on 18 September from Professor Leonard and Professor Jones that the ward was then microbiologically safe. You're more reassured by them making the decision later because there's more information, but you can't tell what the basis is?

DR MUMFORD: Mm.

MR MACKINTOSH: Okay, probably-- well, I'll leave that. Now, I want to put something to the two of you which is a little bit diffuse and so it's not impossible for you to respond and say, "No, that's just too soft, I can't deal with that." I get the impression from the way that Dr Inkster was acting in 2019 and the way she described events that she considered what had happened before, in 2018, to be relevant to the decisions that were on the table in August 2019. Ms Devine talked potentially in a different context, at paragraph 330 of her statement, about the importance of resetting IMTs so that all possible hypotheses were on the table.

The reason I mention those two things is to ask you a question, which is, do you have any views about how an IPC team should deal with a sequence of IMTs investigating matters over a longer period of time that might be or might not be related? Should they look back into the past or approach everything with fresh eyes, or is there some form of happy medium between the two?

DR MUMFORD: I think there comes a point where you need to do a stock take and you need to look, and I can absolutely understand why you wouldn't do it in the heat-- why they couldn't get their heads around doing it in the heat of the moment but, looking

back on it, if they had done a stock take, if they got information on all of those IMTs and reviewed them and done a review in the context of all the other IMTs, then they may well have identified connections or processes that, you know-- and how what they had done in each IMT had actually affected what happened next, if they were connected, whether they'd made any impact by the changes that they put in place, and just review the whole thing, the lessons learned, the actions implemented and how the whole thing happened over a longer period of time.

I think that's really important to do, and just as important as when you're doing a long IMT, so for the water incident, perhaps take stock at various points within that too and when you stop and look and-- because, otherwise, it's really easy to go down a rabbit hole which you don't notice until you're too far down it. If you do a stock take, you can see what the lessons are, you can see what actions you've done, you've seen what the effect of those actions is and whether or not you need to change anything, and what you think the next things are going to be rather than just deciding all of your actions at the beginning and following them through.

MR MACKINTOSH: Is this sort

of exercise the sort of thing that we saw in the meeting chaired by Ms Imrie at the end of May 2018, the water incident review meeting, or is it something else?

DR MUMFORD: Possibly. I can't remember the minutes of that meeting and what that outcome was.

MR MACKINTOSH: I'm going to put it to you just in case-- Actually, I think I won't. If you can't remember, there's no point in doing this on the hoof. I have a question that-- Well, firstly, Ms Dempster, have you got any thoughts about this idea of how you deal with an ongoing incident?

MS DEMPSTER: I think it is important to take stock and to also keep some kind of overall timeline of what you're doing, otherwise, you forget when did you put the point of use filters on, when did the admissions change or stop? So it is really good to see what you did when and then see what impact that has on infections as well.

MR MACKINTOSH: All right. Now, Dr Mumford, I should have asked you this question a moment ago when we were discussing the decision to stop new admissions, but I didn't realise I'd written it down at that point. So, Dr Armstrong gave some evidence that she had formed the view that that

decision to stop new admissions was the wrong decision, and that was her evidence. I wondered, what should she have done as medical director if that's what she thought at the time?

DR MUMFORD: So, I think, as an executive, if you really disagree with a decision that's been made further down, you should challenge it nicely. You know, I can imagine a scenario where she could have gone to Dr Inkster and said, "Can we talk about this decision? I'm not sure if I understand why you've made it. Could you talk me through it? Let's discuss it," and then present her argument as to why it's the wrong decision and to actually come to an agreement. Maybe they would leave it but reassess it in a week or whatever.

But the worst thing you can do in that situation is make the person feel bad about the decision they've made, because they make it with good intent. So especially as a medical director, you really have this duty that you have to not tell people off. You work with them. They're all part of your wider team and you do it in a collaborative way, and there is a way of telling somebody that they've done something stupid and there's a way of not telling them, and I think just a conversation, face-to-face, at that point could have made everybody feel happier.

MR MACKINTOSH: I mean, there were conversations, face-to-face, at the time, it's worth saying. How do you respond, which I'm sure someone has just thought if they're watching this, that you've only been a medical director for just over a year and she's been a medical director for 12-plus years?

DR MUMFORD: So, prior to being a medical director, I was a deputy medical director dealing with a large part of the medical director portfolio, which included doctors' discipline and patient safety. So I came up against a lot of issues where I had to talk to people in difficult circumstances where I might have disagreed with them and needed to get the best out of them in the best possible way.

MR MACKINTOSH: And that's the reason you say what you've just said.

DR MUMFORD: Mm-hmm.

MR MACKINTOSH: Right. I want to look at part of your report, which is at page 116 of the report bundle. If we go to page 115 to start it off. So, you've got a section called, "Potential issues and areas of failure." I wonder if you can explain what the

purpose of this section is. I don't know whether, Ms Dempster, might you be able-- Who wrote this section? Because it's maybe the work of one hand, I don't know. Ms Dempster, would you be able to explain what the purpose of this section is?

MS DEMPSTER: I think it's-- Well, certainly from our experience of working in IPC for many years, there's often many points that things begin to not quite go to plan.

MR MACKINTOSH: So, is this a sort of list of potential problems?

MS DEMPSTER: Yes.

MR MACKINTOSH: Should we assume that everything on this list went wrong in NHS Glasgow?

MS DEMPSTER: No, it says potential issues.

MR MACKINTOSH: Okay. If we go over the page, at 3.30, you say:

> "The lack of an open culture that supports reporting of cases and incidents in an honest manner leads to a failure in recognising, learning and ensuring that these lessons are learnt and shared within the organisation, ultimately resulting in the same errors occurring."

When you wrote this, were you writing this about what you had observed in NHS Greater Glasgow or listing a possible list of problems that could occur?

MS DEMPSTER: We were listing a list of possible things that could occur.

MR MACKINTOSH: Since we're looking at it, is there anything in this list that you have identified as occurring in NHS Greater Glasgow?

MS DEMPSTER: Shall I----

MR MACKINTOSH: Maybe break it down by this-- by the commas. So, we look at the first bit, the "lack of open culture that supports reporting of cases and incidents in an honest manner". Is that something you've identified, Ms Dempster, in NHS Greater Glasgow in your work?

MS DEMPSTER: Well, whether it's in an honest manner, perhaps that's a bit different, but I think we would say we would report probably more often.

THE CHAIR: Sorry, I didn't pick up----

MR MACKINTOSH: I think if you could say that a bit louder.

MS DEMPSTER: We have identified cases where we think things should have been reported.

MR MACKINTOSH: But you haven't identified a lack of honesty.

MS DEMPSTER: I can't say it's

honesty, no.

MR MACKINTOSH: No. Now, is there anything you'd say about that, Dr Mumford? Is there anything that you've identified about that first sentence?

DR MUMFORD: No, I would agree that we have seen cases where we would have thought that cases should have been reported. I think, moving on to the next part of the sentence, I haven't seen evidence, and I hope it does exist somewhere, about how the learning is shared. I know it goes through a committee structure into governance meetings, but I haven't seen further evidence of how learning from incidents is shared with the wider staff of the organisation.

MR MACKINTOSH: So, you haven't looked at call briefs or anything like that, or at least briefing emails and documents?

DR MUMFORD: No.

MR MACKINTOSH: No. Have either of you noticed, in the case of NHS Greater Glasgow, examples of errors reoccurring in the field of infection prevention and control around these cases in Schiehallion? Dr Mumford, do you want to help with that?

DR MUMFORD: So, the same mistakes are reoccurring. I think,

looking through the IMTs, there are a few themes which come up over time. There's something about cleaning, which appears as an issue not in every IMT, but from time to time. There's obviously the repeated issues about the ventilation and about the water and so on, but I don't think I can think of anything else other than that.

MR MACKINTOSH: Can you think of any other-- I mean, you may not have found any, but any examples of the same errors reoccurring that you've identified, Ms Dempster?

MS DEMPSTER: I can't think of any off the top of my head.

MR MACKINTOSH: But, in any event, that paragraph 3.3 is a list of things you in a sense were looking for, not what you found.

MS DEMPSTER: Yes.

MR MACKINTOSH: Yes. Okay. Dr Mumford, I wanted to ask you-- I think you've already touched on this, which was the duties of a responsible officer, but it occurred to me as I was reflecting overnight that actually there was some evidence I need to put to you. We have some evidence from Dr de Caestecker about annual appraisals. To what extent would you agree with the characterisation that a doctor is basically entitled to write their own appraisal?

DR MUMFORD: An appraisal should be a two-person thing between the appraiser and the appraisee. The appraisee obviously provides a lot of information which is written within the appraisal, and then it is for the appraiser to write their comments, which are based around the conduct documents of the GMC, and they should be split into those domains of good medical practice, demonstrating that that doctor abides by those good practices, and there should be no opportunity for the doctor to write the appraiser's comments for them. They can review them before the appraisal is signed off, and they can comment and they can disagree with comments, and if they want to disagree then they should write that in the box provided but, ultimately, an appraisee should not write their own appraisal.

MR MACKINTOSH: What comment do you have on the evidence that an appraisee can choose their own appraiser?

DR MUMFORD: Yes, that is an accepted practice in a lot of organisations. Peer appraisal has been widely used under the GMC for as many years as I can remember. I think there's a movement in some hospitals to move to a split process whereby you have a certain number of

years where you can choose your peer appraiser and then there's a few years where you have somebody nominated to be your appraiser. I think that is thought to just add that richness because you'll get somebody who is maybe outside your specialty and has a fresh look so that you don't have one of your best friends appraising you for five years in a row.

MR MACKINTOSH: I'm going to ask you a series of questions about some evidence that Dr Armstrong gave about the behaviour, as she saw it, of Dr Inkster and Dr Peters, but, just at generality level, if a doctor goes through appraisal for a number of years, can they derive reassurance-- in a sense, does appraisal almost in a sense wipe the slate clean in the sense that everything should be outed in an appraisal; it shouldn't hang over you in some secret place?

DR MUMFORD: Well, the appraiser is not there to do the bidding of the medical director. So the appraiser should not be there to ask questions on behalf of a medical director or anybody else. It is a conversation. It is partly coaching. It is supportive. It is not there to be in any way disciplinary or to tell people off. It's very much a supportive process.

MR MACKINTOSH: If we look back in the history of Dr Peters and Dr Inkster in this hospital, we heard evidence from Dr Stewart, amongst others, and Dr Cruickshank about a review that he carried out in 2015. We'll just put that on the screen. It's at bundle 14, volume 1, document 41, page 463. Have you read this document? No, that's definitely the wrong place. 464. Have you read this informal review by Dr Stewart?

DR MUMFORD: Yes.

MR MACKINTOSH: Now, it's fair to say that in it, it makes certain findings, some of which, perhaps subtly, relate to what other people think of some ICDs; and is it reasonable to think that any concerns about an ICD microbiologist in this report would make it into their appraisal process, or would it have to get picked up a different way?

DR MUMFORD: Well, if this report was prepared with the microbiologists concerned, I would expect them to then take it to their appraisal and discuss it and reflect on it with their appraiser.

MR MACKINTOSH: But if it wasn't shared with them, they couldn't do that.

DR MUMFORD: If it wasn't shared with them, it wouldn't make it there.

MR MACKINTOSH: If it wasn't shared with them, can the author of it-- I didn't ask him whether he did this, but could an author of such a report get it to the appraiser the other way around? Is that allowed?

DR MUMFORD: They could, but it wouldn't-- the appraiser couldn't bring it up. The appraiser is not there to say, "I've seen this report and it's not very good. What do you think about it?" The appraiser is there to have that conversation which is supportive and not to, as I said before, ask questions on behalf of the medical director or deputy medical director.

MR MACKINTOSH: So the evidence in the appraisal comes through the appraisee, effectively?

DR MUMFORD: Yes.

MR MACKINTOSH: They collect together their evidence.

DR MUMFORD: Yes. What you can do is, if you have a particular-- say a complaint or a serious incident that you want to be discussed at the appraisal, you can ask both the appraiser and the appraisee, if they're involved in that complaint/serious incident, to discuss it----

MR MACKINTOSH: So, the medical director can ask that?

DR MUMFORD: -- and to

document some reflection.

MR MACKINTOSH: Right. So, if we move on to perhaps a more specific piece of allegation, which is in Dr de Caestecker's stage 2 whistleblowing report following Dr Redding's stage 2 whistleblowing, which is bundle 27, volume 4, document 6, page 81, at page 83, bottom half of the page, we have, perhaps surprisingly, in a report into a whistleblow by Dr Redding, a critique of Dr Peters in the final six bullet points, which was discussed with her and a number of other people in evidence. Given this report wasn't shared with Dr Peters, she couldn't take it to the appraisal, could she?

DR MUMFORD: No.

MR MACKINTOSH: But if we go back up to the previous page, we see that Dr Green was one of the people interviewed. She's the appraiser. Can she or should she take this information, if she has it, into the appraisal?

DR MUMFORD: Not if it hasn't been shared, no.

MR MACKINTOSH: No. And could the medical director direct the two of them to discuss it?

DR MUMFORD: Only if they shared it with both of them in advance.

MR MACKINTOSH: In advance. And if it wasn't shared, they couldn't discuss it?

DR MUMFORD: No.

MR MACKINTOSH: No. If we just take that off the screen and we just think for a moment here about where the world stands after that report, Dr de Caestecker was quite determined that she felt it was important to write it down, what she was told about Dr Peters. What, if anything, can a medical director do once they receive that report to take action in response to these concerns expressed by unnamed people about Dr Peters?

DR MUMFORD: So, every organisation should have a doctor's discipline policy, SOP, or some description which will help them through that particular mire. My approach would be to sit down with Dr Peters informally to discuss the comments that had been made about her and to ask her how she reflected on it and have a coaching conversation about how she could adapt her behaviour in order to not run into the same issues going forward.

I think it's-- You know, she's already a whistleblower, so most people think you do have to tread more carefully if you-- if you're having that kind of conversation with a

whistleblower, but it's it's absolutely a conversation that should have been had.

MR MACKINTOSH: Is it appropriate to-- I think Dr Armstrong's evidence was to delegate it in some sense – she wasn't particularly specific –to Dr Green. Is that an appropriate course of action?

DR MUMFORD: Potentially. It depends if Dr Green was skilled at having those kind of conversations or not and certainly couldn't have done it in the appraisal.

MR MACKINTOSH: If we look forward to where we are now, so that's now six years on and the whistleblow is still, in a sense, going on, is it in any way notable that it doesn't seem to be the case that these particular concerns have been ventilated in some sort of formal or informal process with Dr Peters? Does that give you any concern, or is that in a sense understandable given there's a whistleblow?

DR MUMFORD: No, I'd be surprised that it hadn't been dealt with at least informally. I mean, there's nothing there that would stand up-- just from that document, there doesn't appear to be anything that would stand up in a doctor's disciplinary process formally. It wouldn't reach-- I don't think it would reach the threshold of even a first written warning, but to have that-- informal conversations-- to have an informal conversation, to document in writing what you discussed, and to say-- to give advice very clearly about your expectations of her behaviour going forwards, puts a marker in the sand.

And then if that-- if your advice is not taken and she fails to follow those changes to the way she behaves, you could then have her back in and doing that you would reach a point where you might end up in a formal procedure because you've asked for some changes. She hasn't done it. You've asked her again. You know, there would reach a point where the good practice domains would kick in, and you could-- you would expect something more formal if there was no change made.

MR MACKINTOSH: I wondered, did you watch Dr Armstrong's evidence?

DR MUMFORD: Yes.

MR MACKINTOSH: Do you recollect the last few minutes of it?

DR MUMFORD: Yes.

MR MACKINTOSH: I need to just put the right page on the screen and I'm afraid my note-- Give me a moment, please. My recollection is

that Dr Armstrong wanted to express the view that she felt that neither Dr Inkster nor Dr Peters were putting the interests of patients first and they were putting their own desire to be right ahead of that. That's not, I'm sure, exact quotes, but that's roughly the position that was pressed.

DR MUMFORD: Yes.

MR MACKINTOSH: Do you recollect that?

DR MUMFORD: Yes.

MR MACKINTOSH: Do you have any views about whether that issue should still be live now, five years afterwards?

DR MUMFORD: No, that should have been dealt with at the time.

MR MACKINTOSH: And how would it be dealt with?

DR MUMFORD: Again, through initial formal-- informal conversation, but I think that if you genuinely had evidence that a doctor was not-- was putting their own best interests before a patient's, then you would have to take disciplinary action, put them through a maintaining high professional standards process.

THE CHAIR: Sorry, just lost the last few words. "Put the doctor through"----

DR MUMFORD: A maintaining high professional standards process.

THE CHAIR: Thank you.

MR MACKINTOSH: I think it's supposed to be the internal (inaudible) of the GMC process.

DR MUMFORD: It's not the same as what the GMC would do. It's a process by which you investigate a doctor. So you'll appoint a case investigator. You appoint terms of reference and you have the case investigator working with somebody from the HR team who do an investigation, talk to witnesses, come back, present you with a report and then the medical director, acting as a case manager, would then decide what further action to take, whether there is a case, or-- in which case you might want to take it to a hearing.

MR MACKINTOSH: And each board might have a different approach to that in terms of procedure?

DR MUMFORD: It's-- Certainly, in England and Wales, it's a fairly standard process and it's governed and by a thing called the Practitioner Performance Advisory Service.

MR MACKINTOSH: But that's the England and Wales thing.

DR MUMFORD: That's England and Wales. I don't quite know what the equivalent-- I don't think you have the equivalent in Scotland, but the other way of approaching it is to talk to

your GMC employment liaison adviser who are always a wealth of advice and information and can advise you on the best process to follow and the best course of action to take.

MR MACKINTOSH: Do you have any-- Are you willing-- you might not be willing. Are you willing to express a view based on what you've read and what you've heard about whether there's any basis that you've identified for that statement that they're putting the interests of patients behind the-- to be right? If you don't feel you can reach that conclusion, then please say.

DR MUMFORD: I have seen evidence of where behaviours from everybody involved, almost, have not been what you might want them to be, but I haven't seen any documented evidence that would suggest that.

MR MACKINTOSH: Thank you. What I'll do now is turn to Ms Dempster and ask a few-- slightly fewer number of similar questions.

MS DEMPSTER: Okay.

MR MACKINTOSH: They basically turn on the evidence we had around concerns about instruction-- an instruction given by Dr Peters to a number of nurses, including, I think, Ms Urquhart, to wear FFP3 face masks, if I've got that right, to treat a particular patient with an RSV virus in 2015. Is that something you remember hearing evidence about?

MS DEMPSTER: Yes.

MR MACKINTOSH: And there's an email thread----

MS DEMPSTER: Yes.

MR MACKINTOSH: -- which I won't take you to, but, for the purposes of later reference, it's volume 27-- bundle 27, volume 11, document 11, page 70.

I have two questions about this. The first relates to-- Do you have any views on the actual event? In that it seems have been the case that Dr Peters advised that a face mask should be worn. There was a small amount of pushback. Dr Inkster then said, "No, no, it's probably a good idea." They were worn, but there was a suggestion that it should be dealt with through a process. Do you have any views on this sort of process-driven approach to these things?

MS DEMPSTER: Well, I think the first point is if the face mask was needed it was needed today, not following a process. So, if staff needed to wear some respiratory protection, they needed them at the point that they were advised to wear them. Couldn't wait for a decision or a meeting with an SMT to decide yes or

no.

MR MACKINTOSH: As a senior nurse consultant – I think it's probably fair to describe you as such – will you have come across occasions in your career when some doctor has got a view-- microbiologist has got a view about something which you're a little bit suspicious of, but you have to deal with their advice?

MS DEMPSTER: Yes, on many an occasion.

MR MACKINTOSH: Generally speaking, what would you consider to be the appropriate way to deal with advice from an on-call microbiologist?

MS DEMPSTER: Well, I think we would always start-- Well, I would always start from the point that the person on call made the best advice that they could give at the time, probably without full information, perhaps had a phone call in the middle of the night, I don't know. They've made a decision. So then, in the cold light of day, if you like, I myself would-- or a member of your team----

MR MACKINTOSH: But you'd follow it initially?

MS DEMPSTER: Yes, definitely. Yes.

MR MACKINTOSH: Yes.

MS DEMPSTER: Well, the microbiologists wouldn't have told-- I'm assuming they would have, when they phoned the ITU, would have said, "Now wear masks."

MR MACKINTOSH: They would've told them-- the clinical staff?

MS DEMPSTER: Yes, yes. So, I would have expected when I arrive on ITU, they would be wearing masks, because the microbiologist has advised them to wear them.

MR MACKINTOSH: Yes.

MS DEMPSTER: And it's interesting in the response to the initial email was that the infection control nurse said, "Actually, I don't think you recommended the best mask," and went back with a higher-level mask.

MR MACKINTOSH: Right.

MS DEMPSTER: And then there's a bouncing of emails, but if it was against what was in the National Manual and you thought the advice was wrong, I personally would have gone to ITU with, say, Sara, to meet up with the team there and review the situation and then either recommend we carry on wearing masks or we stop it because we've got further information. We've got the results back on the patient. We know what we're dealing with. But even if I didn't agree with the-- a microbiologist's advice, I would work with them to come to a resolution.

MR MACKINTOSH: My second question is about the fact that this pops up again and again.

MS DEMPSTER: Mm-hmm.

MR MACKINTOSH: So, it's mentioned in the whistleblowing report we've just looked at and, again, it's mentioned in the letter from the chief executive to Professor Stevens on 1 March 2021, which we might just put on the screen, bundle 25, document 3, page 151, and I think it's on the next page. I think it's the page after that. Keep going. Just going to double-check this.

THE CHAIR: Page 153?

MR MACKINTOSH: Yes, 153. Thank you, my Lord.

THE CHAIR: Paragraph above--

MR MACKINTOSH: Yes, we're, of course, unable to see the evidence.

MS DEMPSTER: Yes.

MR MACKINTOSH: The reason I'm raising this, Ms Dempster, is because it comes up in this one with a different year, 2018. I want to put to you a, sort of, hypothetical scenario and see how it should be carried out. Let's imagine a scenario where there's a hospital, that something like this happens.

MS DEMPSTER: Mm-hmm.

MR MACKINTOSH: In what circumstances would it still be relevant six years later?

MS DEMPSTER: I don't think there would be any.

MR MACKINTOSH: I mean, presumably if it's a real problem, you'd take it up with the medical director and----

MS DEMPSTER: And it would be dealt with, and even if you had members of the team saying, "We're going to the RCN," people do go to the RCN if they've got issues at work. That happens.

MR MACKINTOSH: Yes.

MS DEMPSTER: But I don't see the relevance of raising it.

MR MACKINTOSH: When it comes to, for example, if it is the case that Dr Peters sent quite a lot of emails, what's the correct process for infection control nurses who are receiving those emails and feel they're too many?

MS DEMPSTER: Speak to Dr Peters and have a conversation.

MR MACKINTOSH: I think what I want to do now is to move on to some of your conclusions, but, before I do that, I'd like to think about the role of mitigations in your decision-making. If we can take that off the screen, please? So, am I right in thinking that some of your decision-making, Dr Mumford, involves to some extent

assessing that the taking of certain mitigation measures, such as fitting point-of-use filters, having a decant, or fitting chlorine dioxide, is supportive of the conclusion that there's a link between the environment and the infections?

DR MUMFORD: Yes, those actions on the outcome in the decrease in number of infections as a result of all of the-- all of the work that was undertaken on 2A, 2B.

THE CHAIR: Right, so, I mean, I'm picking that up as two really quite separate points. The fact that mitigation was taken presumably reflects what was believed at the time by those taking the mitigation measures.

DR MUMFORD: Yes.

THE CHAIR: That's one point. Quite a separate point is the consequent outcomes, which I take to be that the mitigation measures worked.

DR MUMFORD: Ultimately, yes.

THE CHAIR: Ultimately?

DR MUMFORD: Yes.

MR MACKINTOSH: How would you respond to the suggestion that one shouldn't take that approach? Because a mitigation method might simply be just best practice and, therefore, one can't read into it that there have been some form of admission that there's a connection with the environment.

DR MUMFORD: So, having point-of-use filters on taps is not best practice. They----

MR MACKINTOSH: Why?

DR MUMFORD: Because they are very much a secondary approach to controlling a problem rather than preventing a problem in the first place.

MR MACKINTOSH: But is chlorine dioxide-- I mean, actually, it might be outside your area of expertise, but would chlorine dioxide be best practice?

DR MUMFORD: Yes. In a building of that size where it's very challenging to control the water purely by temperature, chlorine dioxide is a really useful primary control to put in.

MR MACKINTOSH: The decant, do you feel that you are entitled to draw any inferences from the decision to carry out the main decant of 2A to 6A, in terms of your views on causation?

DR MUMFORD: The decant was initially done so that the issues could be investigated, wasn't it, rather than 6A being suggested as the safer place. So that doesn't really play into that argument, I don't think.

MR MACKINTOSH: It doesn't

play into the best practice argument?

DR MUMFORD: Yes.

MR MACKINTOSH: Right. I wonder if I can take you to the GGC direction 5 response, which is bundle 6, volume 5, page 21, at paragraph 22. So it's page 21. I think it might be volume 4, actually, on reflection, yes, volume 4, page 21. So it's looking at-- If you could zoom in to the top half of the page, please, that'd be helpful. This is discussing your selection with Ms Dempster and Mr Mookerjee of the organisms to include in the dataset for the epidemiology exercise, and it says, you've:

> "...also included gram-negative bacteria and fungal taxa, e.g. moulds, that are widespread in water distribution systems, but for which there are few or no case reports of human disease and that are exceptionally rare or absent from the NHSGGC infection data shared with the expert panel. These taxa do not cause disease with measurable frequency [which I think might be a quote from your text]."

They want you to explain your approach to selection of environmental pathogens. Would you like to break that down in sections, or do you have an overall view?

DR MUMFORD: Well, we discussed how we selected the organisms that we looked at yesterday, and they were based on the organisms that grew from the blood cultures taken from the children who were in 2A and 2B. So to say that they were absent is wrong, rare possibly, but they were still there.

MR MACKINTOSH: Given-- I hope that particular core participant doesn't take this the wrong way. Given the number of questions I've asked about Mycobacterium chelonae not being included in this dataset, how do you think other patients or families might've reacted if, for example, you had excluded Klebsiella or Enterobacter from these lists because potentially there might be an alternative explanation?

DR MUMFORD: I think they would have been upset and rightly.

MR MACKINTOSH: Why do you say "rightly"?

DR MUMFORD: Because we, you know, set about doing what we did without bias and to represent the facts, and, you know, the facts are that Enterobacter and Klebsiella are found in water systems, and we included them.

THE CHAIR: Mr Mackintosh, if this is an appropriate moment, can I just walk back on paragraph 22? I'm just wondering if it's saying quite what I think it's saying:

> "The authors have included gram-negative bacteria and fungal taxa, for example moulds, that are widespread in water distribution systems, but for which there are few or no case reports of human disease."

Now----

MR MACKINTOSH: I was about to come to that.

THE CHAIR: Sorry?

MR MACKINTOSH: I was about to come to that.

THE CHAIR: Right, well, Greater Glasgow does communicate in quite clear ways, and it just does seem to be-- Well, take me through it.

MR MACKINTOSH: Well, so what I wanted to explore with you, you've addressed that these bacteria and fungal moulds, yeasts, are widespread in water distribution systems, and you've asserted that and you've explained your basis for that. You've explained that they're present in the dataset, but I wonder if you can explore with me, "...but for which there are few or no case reports of human disease." Do you take that to be a reference to published literature?

DR MUMFORD: Yes.

MR MACKINTOSH: Is that accurate?

DR MUMFORD: I haven't checked every single one of the organisms, but there are very few reports-- case reports of Cupriavidus, for example.

MR MACKINTOSH: Why is that?

DR MUMFORD: I think probably-- Well, there's two potential reasons, either that it occurs and it's not identified, or it occurs and it is identified and it doesn't get reported in the literature, or there are very few events where Cupriavidus is a problem.

MR MACKINTOSH: If you as a microbiologist wanted to carry out a research exercise to work out, "Has there been an event like my event?" when you're looking at a particular infection, if you want to look out for-- Let's say you're investigating something like the aseptic pharmacy, a single sink or a couple of sinks in a single room in a hospital. If you go out there into the literature, will you find articles about investigations into single rooms and single sinks?

DR MUMFORD: Porbably, yes,

you will.

MR MACKINTOSH: If you go out into the literature, will you find investigations, or could you find when you were reading up for this, articles about whole hospitals potentially having a contaminated water system over a period of three or four years?

DR MUMFORD: I don't know.

MR MACKINTOSH: You didn't----

DR MUMFORD: I didn't do that particular search, no.

MR MACKINTOSH: Right. So, your basis of this is that there may well be few case reports of some of these, but you ascribe it to there not being the papers, rather than there not being the infections?

DR MUMFORD: I think it will be both. I think----

MR MACKINTOSH: But what's the primary driver of the inclusion of these organisms in your list?

DR MUMFORD: The primary driver of inclusion is that we had a positive blood culture with the organism.

MR MACKINTOSH: What was the question that Mr Mookerjee asked the comparator hospitals to provide in terms of data about infections?

DR MUMFORD: I can't remember.

MR MACKINTOSH: It's getting late. I'm not going to press you on this.

MS DEMPSTER: But he asked for all positive blood cultures, didn't he?

DR MUMFORD: Yes. The other----

MR MACKINTOSH: Thank you, Ms Dempster.

DR MUMFORD: The other thing to point out about rare or-- rare organisms is that it's only relatively recently that we've had the technology to identify all of these organisms on a routine basis in a local hospital laboratory. So many of them would either go unrecognised and-- I mean, when I first went into microbiology, and probably up to about 10 years ago, you know, the biomedical scientists would say, "We've got this funny organism. I think it's-- I think it might be this. Do you want us to pursue it?" And if it wasn't in an immunosuppressed patient, you go, "No, it's environmental. Get rid of it. You know, don't go any further." And I think-- So we don't actually know historically because we've not been able to identify all of these organisms in the local laboratory. Obviously, they have for research purposes but not locally.

MR MACKINTOSH: So I'd like to ask both of you this question. Dr Mumford, how do you respond to the suggestion that your conclusions are undermined by heavy reliance on the conclusions of Mr Mookerjee?

DR MUMFORD: I don't think that's the case.

MR MACKINTOSH: Is it that they're not heavily reliant or they're not undermined?

DR MUMFORD: Sorry, they're not undermined. I think we can see the evidence for ourselves.

MR MACKINTOSH: Ms Dempster, do you have any views about the impact of your conclusions on your reliance on Mr Mookerjee?

MS DEMPSTER: No.

MR MACKINTOSH: You don't have any views?

MS DEMPSTER: No, I don't have any concerns, sorry.

MR MACKINTOSH: That's all right.

MS DEMPSTER: Don't have any----

MR MACKINTOSH: What I want to do is to ask, I think, three or four more questions. I think I've already done that. I'd like to understand from both of you your understanding of a particular concept that the lawyers use, and I want to make sure that we understand what you think it means, in case it's different, and that's the concept of the balance of probabilities. Ms Dempster, can you help me with what you understand to be the meaning of "balance of probabilities", if something is likely to the balance of probability?

MS DEMPSTER: I think it's looking at what you've got to see if it's probable to be the outcome of what we're seeing.

MR MACKINTOSH: What does "probable" mean?

MS DEMPSTER: Well, we could get into possible, probably. I think----

MR MACKINTOSH: I'm quite interested to see what difference you see between possible and probable.

MS DEMPSTER: I think from the work we've done, we haven't seen any other-- I don't know if the word is "evidence", to explain these infections. So for me, the probable position is that they were caused by the water or the environment----

MR MACKINTOSH: I think I'm making more of a higher-level definitional concept.

MS DEMPSTER: Okay.

MR MACKINTOSH: What does it mean to say something is more----

MS DEMPSTER: I think I've become braindead at this point.

MR MACKINTOSH: What does it mean to say something is probable?

MS DEMPSTER: It could happen.

MR MACKINTOSH: What does it mean to say it's possible?

MS DEMPSTER: It could possibly happen. It may happen.

MR MACKINTOSH: Are either of those words synonymous with the idea that it's more likely than not to happen?

MS DEMPSTER: I think "probable."

MR MACKINTOSH: Right.

THE CHAIR: Sorry, what was that? I----

MS DEMPSTER: "Probable," yes.

MR MACKINTOSH: I think you said, "I think probable."

MS DEMPSTER: Yes.

THE CHAIR: Right.

MR MACKINTOSH: Dr Mumford, when we talk about "more likely than not," how does that connect to either probable or possible, in your mind?

DR MUMFORD: So, "more likely than not" is probable. I think "possible" is more of a 50/50 than a "more likely than not".

MR MACKINTOSH: So, is "more likely than not" more than 50/50?

DR MUMFORD: Yes.

MR MACKINTOSH: Right. So, we asked a question of you both, which was question 4, key question 4, "Is there a link, and if so, in what way, and to what extent, between patient infections and identified unsafe features of the water and ventilation system?" You gave your answer in chapter 11, and there's a couple of questions I have arising from chapter 11 so if we can go to page 175 of your bundle, of your report. If we go on to page 176, it's been suggested there might be a small-- 177, a small error in paragraph 11.19 where you stated:

> "This was not the case for the Schiehallion Unit or indeed the rest of the hospital, apart from Ward 4B, as the ventilation system did not meet the expected number of air changes per hour."

Dr. Mumford, is it the case that Ward 4B had the expected number of air changes, i.e. 10, or did it have 6?

DR MUMFORD: No, I understood it was HEPA filtered by that point, the rooms were HEPA filtered.

MR MACKINTOSH: In terms of the air change rate, was it ever 10, or did it only get to 6?

DR MUMFORD: No, it didn't

reach 10.

MR MACKINTOSH: Right. So, in that case, 4B didn't----

DR MUMFORD: Yes, so-- Yes, I think I probably had in mind the HEPA filtration in Ward 4B rather than the air changes.

MR MACKINTOSH: So, in this case, 4B doesn't meet the expected air changes rates per hour?

DR MUMFORD: Yes.

MR MACKINTOSH: We can go to 11.34. Now, you've only given your answer in respect of 2A, 2B and 6A. You've not given this answer in respect of 4B. I'm going to explore the answer itself in a moment with you. Why did you not give an answer in respect of 4B?

DR MUMFORD: I think I was-- Because I was saying inadequate ventilation system and I think I was thinking it was HEPA filtered and therefore I'm not giving mind to the air changes.

MR MACKINTOSH: Right. If you wanted, could you have made an assessment along the lines of 11.34 in respect of Ward 4C, given the piece of work you did?

DR MUMFORD: No.

MR MACKINTOSH: Why not?

DR MUMFORD: Because I haven't examined the infections within that ward.

MR MACKINTOSH: Why have you not examined the infections in that ward?

DR MUMFORD: Because I wasn't asked to.

MR MACKINTOSH: Might that also be because Ward 4C didn't contain the Schiehallion cohort?

DR MUMFORD: Yes.

MR MACKINTOSH: If we look at your-- Go back to the key question. Take that off the screen because I want to just keep this at a higher level. You've given your conclusion as to whether there is a link between the patient infections identified unsafe features of the water ventilation in chapter 11 and I don't propose to revisit it at this time, but what I want to understand from both of you is something which you perhaps didn't do in the report, but, actually, on reflection, that might be helpful, is to understand, in a sense, when the link actually came about and what confidence you have in it. I'm proposing to walk through each year from '15 to the end of '19 and to ask you not to differentiate from your opinion, which is in chapter 11, but simply to say whether you feel the link you identified in chapter 11 existed in '15, and your level of confidence with

that answer. Does that make sense?

DR MUMFORD: Mm-hmm.

MR MACKINTOSH: Let's start with Ms Dempster. In 2015-- I mean, would you like to have the end of your report on screen to remind you what you said?

MS DEMPSTER: No, I've got it here.

MR MACKINTOSH: Got it here, right. In 2015, do you feel the link you identified and described in chapter 11 existed in 2A, 2B, 6A in 2015?

MS DEMPSTER: We didn't see the infections in that year.

MR MACKINTOSH: So that would mean----

MS DEMPSTER: No.

MR MACKINTOSH: No. What level of confidence do you have in that answer?

MS DEMPSTER: Using the infections as a marker, confident. Yes, I'm confident.

MR MACKINTOSH: Do you have any views on that, Dr Mumford?

DR MUMFORD: No, I agree.

MR MACKINTOSH: Can I ask you, Dr Mumford, about 2016? Again, thinking about the conclusion you reached in chapter 11, did that link exist in 2016?

DR MUMFORD: I think it was beginning to emerge in 2016. We had the case of Cupriavidus which was shown to match a water sample in the pharmacy.

THE CHAIR: Can I encourage you to keep your voice up----

DR MUMFORD: Sorry, my Lord. We had the case of the Cupriavidus which was shown to match a water sample in the pharmacy in 2016. We had a case of Mycobacterium chelonae which wasn't investigated, as far as we are aware, and there was two cases of Aspergillus infection which, while you might not have been able to make the link except in retrospect, certainly shows the beginning of the problem starting to emerge.

MR MACKINTOSH: What's your level of confidence in that answer?

DR MUMFORD: Yes, I'm very confident.

MR MACKINTOSH: Ms Dempster, anything----

MS DEMPSTER: No, I agree.

MR MACKINTOSH: Ms Dempster, I'm going to ask you about 2017.

MS DEMPSTER: Okay.

MR MACKINTOSH: Do you have a view about whether this link that you identified existed in 2017?

MS DEMPSTER: I think it did. There was cases of Aspergillus, there

was-- patients were put on antifungal treatments. There was other blood infections coming through---

MR MACKINTOSH: Does the fact that there doesn't seem to have been a report to the executive level that there was a problem with the water system at this point, impact on your view that there was some form of a link existence there?

MS DEMPSTER: No.

MR MACKINTOSH: What's your level of confidence in that?

MS DEMPSTER: I'm confident.

MR MACKINTOSH: Any thoughts about 2017?

DR MUMFORD: Yes, I think it's when we first saw the step change in the numbers of environmental infections, and so, yes, and it was also the main hypothesis that all of the IMTs related to those infections, so I-- yes, I'm confident in making that connection then.

MR MACKINTOSH: What about 2018? I think it's worth breaking it into two parts, the part in 2A and the part-- Looking at just 2A, did the link that you've identified exist in 2A in the first nine months of 2018?

DR MUMFORD: Yes, we were still seeing a high number of environmental organisms.

MR MACKINTOSH: Is that not contradicted by the fact there was point of use filters in place so the opportunity to catch infections would have reduced? As a matter of fact, the number of infections did drop off in the summer.

DR MUMFORD: Yes, but we also started to see drain-related infections as well and there was clear issues with the drains. So if you take the water system as a whole, I think you can confidently say that that continued.

MR MACKINTOSH: Ms Dempster, any thoughts about the first nine months of 2018?

MS DEMPSTER: No, I agree it was.

MR MACKINTOSH: It's a bit more difficult after that. I'd like to break it to two parts: the rest of 2018, and then 2019. So the rest of 2018, Ms Dempster, I'll ask both of you the same question, which is given that there seems to have been a view in the early part of 2019 that maybe it was all fixed, chlorine dioxide was working, was there, in that winter of 2018/'19, was the link that you described still there? Who wants to go first?

MS DEMPSTER: I would say yes, it was still there.

MR MACKINTOSH: What's your

level of confidence about that?

MS DEMPSTER: I'm very confident because there were still cases coming through.

MR MACKINTOSH: But would not the existence of the chlorine dioxide system suggest that actually the risk of the water was reducing?

MS DEMPSTER: It may have been reducing but we were still seeing cases and the figures were still there.

MR MACKINTOSH: Dr Mumford, any thoughts about that winter of '18 into '19?

DR MUMFORD: No, I agree. We were also seeing-- You know, very late '18, we saw the Cryptococcus and then we had some Aspergillus risk identified and they put HEPA filters in, so, again, the environment was the source, or seen as the source, of those infections.

MR MACKINTOSH: Now, 2019 is a lot more complicated because there's lots of discussion of different hypotheses, so I'm going to ask the question much more vaguely and openly. Which link-- which particular links, of the ones you've discussed, Dr Mumford, existed in 2019 of infection?

DR MUMFORD: So, I think the Cryptococcus link with ventilation, or lack of, persisted into 2019 until there was more confidence about that.

There was the risk of Aspergillus related to the bathrooms which needed to be refurbished, and there was still some water-related organisms found in blood cultures going through 2019, albeit not at the same level as 2018.

MR MACKINTOSH: What thoughts, if anything, do you have about chilled beams in 2019?

DR MUMFORD: So, I don't-- I think the chilled beams question is harder to prove. We know that there was dust accumulating on the chilled beams, and we know that there was some unusual organisms isolated in the dust from the chilled beams, and we know that we had leaks, but I don't think there is an established infection link between the chilled beams and a direct infection link between the chilled beams and the patients. They are difficult things to manage, I agree with the SHTM that they shouldn't be in hospitals, but I'm not sure that we can identify an infection that is related directly to a chilled beam.

MR MACKINTOSH: Ms Dempster, do you have any thoughts about 2019 in that sort of open way, any particular links that you've seen?

MS DEMPSTER: No, I can't think of anymore.

MR MACKINTOSH: Now, the final question relates to what happens

afterwards. I thought about asking the same questions about 2020 and so on, but, of course, the pandemic comes along and rather confuses matters. I appreciate you might not be able to answer this, given the information you have, but now, or at least at the end of 2023, when you were looking at documents and writing your reports, does that infection link you identified in chapter 11 still exist, or do you have any thoughts about that?

THE CHAIR: The way you've asked that question, "Does the link still exist"----

MR MACKINTOSH: Well, does the conclusion----

THE CHAIR: -- is that the way that you----

MR MACKINTOSH: Yes, so is the conclusion that you've reached in your report about infection link, do you have any thoughts about whether that linkage that you've identified is still current or are you not able to answer that question?

DR MUMFORD: So, within 2A, I don't think we have any evidence that the risk is continuing. I think the levels of infection have-- with environmental organisms have dropped right down. There were two patients who had infections with environmental organisms in 2022, and they were both

in 2B rather than 2A, and without knowing more about those two individual patients, you couldn't say how they'd acquired their infection. So, I think the work that was done on the Schiehallion Unit has mitigated the risk, bringing it in line with other units across the country.

MR MACKINTOSH: Ms Dempster, any thoughts on 2A/2B?

MS DEMPSTER: I think it is since the move's gone back that the data shows, you know, significant improvement.

MR MACKINTOSH: There's been some discussion in evidence about the Health Board considering removing the point of use filters. Do you have any thoughts about how they should go about assessing whether that's a good idea or not? Looking into the future, given that you're not a water expert but you are a microbiologist, what's the whole process they should follow?

DR MUMFORD: It's really difficult because once you've got them on-- once they're on the taps, then it's very natural to take a very risk-averse approach to point of use filters.

MR MACKINTOSH: And keep them on.

DR MUMFORD: And keep them on, but that's not ideal in any way,

shape or form, apart from the fact that they're ridiculously expensive. It's just not good. You should be able to use your taps as your taps.

One approach would be to experiment with-- if you had a room that was vacant, and you could keep it vacant, and then you could experiment with that particular sink and outlets to take the filter off, test the water, run it as it would get used normally on a day-to-day basis, test it very regularly and just see if there is anything that throws up suspicion in your mind, and that would provide assurance or reassurance that there is potentially a way to remove the filters, but you might have to go through that process for more than one room before you gave yourself total confidence that that was the best thing to do.

The other approach might be to take a less of a risk-averse approach, take them off so that you're confident that your water is safe. That's a really difficult thing to do.

MR MACKINTOSH: Might another approach be to test in vast quantities, repeatedly, all over the hospital over many years and hope to reduce the number of out of specification results to low single-figure percentages?

DR MUMFORD: Yes. Over

many years is the daunting part of that, isn't it, to maintain that. Once you've got the system under control, once the chlorine dioxide is fully functional, which I would hope it would be by now, you shouldn't need to do that. Because once the system is safe, you should be able, to some extent, to revert to testing your augmented care areas and not everywhere, and doing a much more targeted approach with some central testing as well.

MR MACKINTOSH: Do either of you have any advice as to how one would carry out such a decision-making process in a way that would provide assurance to people who might be anxious about the water system? Given the opinion you've just reached, how would NHS Greater Glasgow and NSS and the other agencies involved reassure the public, the patients and the staff that it was all right to remove filters if they'd carried out one of these exercises you described? How would you communicate that?

DR MUMFORD: I think you'd have to very much share data. So it's not enough just to say, "We've tested it and it's safe." You need to share some of the data so that you can demonstrate in visual aids of graphs and so on that, actually, the level of

contamination has come right down. I think the more communication that you can do with the public and the staff, the better, but it would have to be backed up with visual aids, infographics whatever that would look like, in order to demonstrate that you can evidence that decreased risk.

But, also, to plan and state what you're going to be doing further onwards to keep it safe, and not just, "It's safe this moment. We're going to take all the point of use filters off. We're not going to do any more testing." You have to lay that all out to give people confidence that, going forwards, they know that if there is a problem it will be detected early and action will be taken.

MR MACKINTOSH: Ms Dempster, do you have any thoughts about this?

MS DEMPSTER: No. Well, I'm saying no, but yes. It also would be easier to start in probably the lower risk areas to start. You would work-- I would look at removing filters if they're still-- I don't know if they're still across the whole board or not, but you could remove them in different areas to start with.

MR MACKINTOSH: Right. My Lord, I think I have asked all the questions I think I need to ask, but I'm conscious that these are the last two witnesses and it's ten to four, and I wonder if we might break so that I see if any of my colleagues have questions and perhaps renew at about five past.

THE CHAIR: Right. Well, we'll do just that. As I think you understand, Ms Dempster and Dr Mumford, I need to check that there are no unasked questions in the room, so we'll aim to sit again at five past four, but it may depend on how long that process takes. So in the interim, I'll ask that you be taken back to the witness room.

(Short break)

THE CHAIR: Now, Mr Mackintosh.

MR MACKINTOSH: My Lord, I have around about 20 questions from my colleagues.

THE CHAIR: We have some more questions.

DR MUMFORD: Yes, we just heard.

MR MACKINTOSH: So, the first question arises, I think, for Dr Mumford. It relates to the-- returning to the question of what's in the dataset that you received from Greater Glasgow and Clyde of bloodstream infections, and particularly what is

tagged 2A, 2B, 4B, 6A. So if, for example, there was a pediatric Cryptococcus bloodstream result from PICU the latter part of 2018, that wouldn't make it into Mr Mookerjee's list, would it? Because it's not tagged as 6A or 4B at that point.

DR MUMFORD: No.

MR MACKINTOSH: Returning to Mycobacterium chelonae, we've had some evidence that Mycobacterium chelonae is not necessarily particularly well controlled by chlorine dioxide. Are you able to comment on that?

DR MUMFORD: Yes, that's the case. It's an organism that has a level of resistance to chlorine dioxide, and is able to survive.

MR MACKINTOSH: Does that fact that there are organisms like that have any impact on the value of the reassurance derived, I think, by some witnesses from the fact that chlorine dioxide system had been fitted and was operational in 2019?

DR MUMFORD: It does have a little bit of impact, however, chlorine dioxide is not your only control mechanism. So provided that you have your water temperatures correct, so your hot stays hot and your cold stays cold, and you have the chlorine dioxide, and you have the regular testing, you should be able to detect any problem before it gets to the point where it poses a risk.

MR MACKINTOSH: What about the circumstance where you're worried there might be a significant biofilm in your water system and your chlorine dioxide isn't going to control all the organisms, and maybe the temperatures won't reach the right points in all places? Is that not a concern then?

DR MUMFORD: That is a concern.

MR MACKINTOSH: Specifically, I've been asked to press you on this. When you went on your visit to the hospital, why did you go to the cystic fibrosis ward on the seventh level?

DR MUMFORD: It was the ward that we were taken to.

MR MACKINTOSH: Was there any particular reason-- Did you express an interest in it?

DR MUMFORD: No, not at all. It was part of the tour. There seemed to be a sort of pre-ordained tour that we were taken on.

MR MACKINTOSH: Again, for Dr Mumford, are you aware that a Mycobacterium chelonae result was found-- test result sample was taken from a shower head in a cystic fibrosis ward in 2017?

DR MUMFORD: No, I don't think

I am.

MR MACKINTOSH: Is that the sort of thing that should have prompted action in the same way that 2016 bloodstream results would've prompted action?

DR MUMFORD: Yes.

MR MACKINTOSH: Again, a question about biofilms. I'm sorry we're staying on the microbiology, so I'm leaving Ms Dempster out of this. If you imagine a biofilm-- Can you test a biofilm for Aspergillus? You've discussed biofilms and Aspergillus in your report.

DR MUMFORD: You can certainly test it. Whether or not you would find it is a different question.

MR MACKINTOSH: What are the problems about finding particular organisms in biofilms?

DR MUMFORD: So, some organisms-- Well, you would find your main water organisms in biofilms. Aspergillus, although it can be found in water, is much more likely to be found in the air and dust rather than in water. So it would probably be something that you wouldn't really expect to find.

MR MACKINTOSH: Is it reasonable to think that if you did find Aspergillus in any form of environmental sample, you should look to see if that Aspergillus, or the majority of it, is somehow antifungal resistant and take that information on board in thinking about how you manage your patients, in terms of antifungal prophylaxis?

DR MUMFORD: Yes, that would be helpful. If you detected that you had a particular issue, it would be helpful to you in guiding----

MR MACKINTOSH: The issue with Aspergillus?

DR MUMFORD: -- in guiding-- Yes, particularly with Aspergillus because the antifungal treatments are so toxic and have side effects, and if you get it-- if you get the wrong one, it can make a difference to the individual patient, and then of course the infection itself can be devastating. So you want to get that right.

MR MACKINTOSH: Does that involve effectively always checking your Aspergillus samples from the environment to see what they tell you about antifungal resistance?

DR MUMFORD: I don't think you would need to always check them. It would depend on the time period over which you were testing because it wouldn't necessarily change quickly, and then you also get into the question of whether or not you've got different strains of Aspergillus, some of which might be more sensitive than others.

So you would have to test a selection.

MR MACKINTOSH: But you think it would probably be useful to do some testing and antibody resistance within----

DR MUMFORD: I think if you had a particular issue, if you had vulnerable patients in a non-HEPA filtered environment and you had ongoing building work, for instance, outside, that it would be prudent to know what the resistance patterns were in your locality.

MR MACKINTOSH: Thank you. When you went into-- I'm going to turn to Ms Dempster now because I feel she's missed out. You described going to a series of meetings on the tour with GGC employees. I think there's four presentations you talked about. Why did you not ask to meet any of the whistleblowers for the purpose of preparing your report?

MS DEMPSTER: Are you talking about when I went with the independent review?

MR MACKINTOSH: No, when you went with Dr Mumford and Dr Walker.

MS DEMPSTER: We did suggest some people we would like to meet with and suggested groups of clinicians, like the infection control team or management, and then it was GGC who decided who came to the meetings.

MR MACKINTOSH: Well, why did you not suggest meeting Dr Peters, for example?

MS DEMPSTER: We didn't----

DR MUMFORD: We did. We did. We asked to speak to both Dr Inkster and Dr Peters.

MR MACKINTOSH: What were you told?

DR MUMFORD: We didn't get any feedback. We were just told that these were the meetings that had been arranged.

MR MACKINTOSH: Moving on to the appraisal point around Dr Peters, it's quite a long question, so I'd better read it accurately. Should Dr Peters have been given a chance to respond and refute the allegations made about her in Dr de Caestecker's second whistleblowing report?

DR MUMFORD: Yes.

MR MACKINTOSH: Should she have been shown and given an opportunity respond to what was said in Dr Stewart's report in 2015?

DR MUMFORD: Yes.

MR MACKINTOSH: Are your observations that someone should've spoken to her about things, predicated on the assumption that these two reports contain well-founded

criticisms?

DR MUMFORD: No, it's the right thing to do. If you-- if you investigate somebody and you write a report, the right thing to do is to share it with that-- with that doctor.

MR MACKINTOSH: I think you said that if a medical director genuinely had evidence of a patient-- of a doctor putting their own interests before a patient, it would take some form of disciplinary action, paraphrase of what you said.

DR MUMFORD: Yes.

MR MACKINTOSH: You then said that you'd seen no evidence of ICDs putting-- doing so, putting in their own interests in favor of that of patients. Have I got that right?

DR MUMFORD: Yes, not in any of the-- Obviously, in the reports, it was there, but in the documents such as the IMTs and other documents, I didn't see anything that raised that concern.

MR MACKINTOSH: Are you talking about a group that includes Dr Peters and Dr Inkster?

DR MUMFORD: Yes.

MR MACKINTOSH: In the sense the ICDs who you didn't see doing this, includes them?

DR MUMFORD: Yes.

MR MACKINTOSH: Yes. What

comment, if any, do you have to make about a medical director expressing this sort of view about doctors in their organisation?

DR MUMFORD: So, this is the view that they were putting themselves ahead of their patient care----

MR MACKINTOSH: By Dr Armstrong.

DR MUMFORD: I think no medical director should be expressing those views without taking some form of action, and there is a huge range of action that could be taken, starting from an informal chat up to referral to the GMC. I would probably veer closer to the informal chat to start with, but you shouldn't-- you shouldn't-- it is the medical director's role to ensure that doctors are fit to practice. Putting yourself above your patients is absolutely against the guidance in good medical practice published by the GMC. You should-- You would have to take some sort of action in order to make sure that that behaviour didn't continue.

MR MACKINTOSH: Thank you. Ms Dempster, I don't know whether you heard this evidence from Dr Imrie. It seems that GGC is currently the only board that has a weekly meeting with ARHAI at consultant level, which Dr Imrie certainly explained was set out--

concerns about, amongst other things, reporting and relationships. In that context, do you find it reassuring or not reassuring, or indeed something else, in assessing the current state of the hospital that these four Cryptococcus cases were not reported by NHSGGC for the reasons they gave the Inquiry?

MS DEMPSTER: I don't really know what the remit of the meeting is with the two parties. If it's just having a chat over the phone, just going through things, that's very different to being in a formal arrangement about concerns about an organisation, but perhaps that meeting would've been in a time to actually discuss those cases. So I don't know if the meetings are a formal arrangement, but then does Laura Imrie feed them back somewhere, or is it-- You know, it's very hard to comment without understanding the nature of the relationship.

MR MACKINTOSH: But if there are weekly meetings and you think that these four cases should've been reported, one means would've been to raise them at the meeting.

MS DEMPSTER: Yes, ideally, and then you could've discussed, "Do you think I should report this? I've got case ABCD."

MR MACKINTOSH: Right.

MS DEMPSTER: Yes.

MR MACKINTOSH: Either of you, do you have any view about whether these Cryptococcus reporting issues that we discussed today have any-- do they give you any thoughts about whether NHSGGC have either learned or not learned any lessons that you think they should have learnt about the problems they've had with infections?

DR MUMFORD: I think there is something about the reporting culture and what we were discussing earlier about reporting being a good thing, rather than a thing that means you're failing. So there's a school of thought that says if you report more, it means you've reported more incidents, which means you're not doing well, but acutally a reporting culture should be seen as a very positive thing because you're identifying incidents even when there is no harm involved and reporting and investigating and learning lessons. It is that learning lessons part which is the most important, and I feel that those-- not reporting those Cryptococcal cases suggest that the reporting culture is not working as it should do.

MR MACKINTOSH: Is there anything you want to add, Ms Dempster?

MS DEMPSTER: No, I agree with that, yes.

MR MACKINTOSH: Ms Dempster, obviously we've heard lots of evidence about this issue of reporting, and the Health Board's input in various stages of ministerial intervention. There have been multiple reports. Now there's the Public Inquiry, and there's the evidence we've discussed today. One response to this would-- simply to require more reporting by all health boards to ARHAI. Do you have any views on whether increasing the list of things that need to be reported is a reasonable solution to the issues this Inquiry has been investigating?

MS DEMPSTER: I think when you're working in an organisation, you can drown in reporting. So you don't want just put in reporting for the sake of reporting to give a bigger headache to everybody working in the Health Board. But if you've got a list of certain things that you always report-- So perhaps it's appropriate to review what gets reported and then is reported by everybody.

MR MACKINTOSH: In terms of recommendations for this Inquiry, should we be in any way nervous about encouraging-- mandating rather than encouraging a greater proportion

of infections to be reported to ARHAI, from your point of view as a senior nurse consultant in a neighbouring jurisdiction?

MS DEMPSTER: I don't think so because we're told these are rare cases anyway, so it wouldn't be like you were picking an organism that there was a thousand to report. We're talking about tiny numbers.

MR MACKINTOSH: Dr Mumford, I think you've already answered part of this, but what sort of changes do you think are needed at NHS Greater Glasgow to improve the culture of reporting in the way we've just been discussing?

DR MUMFORD: I think ease of reporting is important.

THE CHAIR: Sorry, I missed that.

DR MUMFORD: Ease of reporting.

THE CHAIR: Ease of reporting.

DR MUMFORD: You can't have a system which is too onerous because it just puts people off, and you need to have-- and it-- again, it comes back to where you are reporting. Is this reporting internally? Is it reporting externally? But if you're reporting internally, you need to have an idea of where that information is going to go, who's it going to be

viewed by, how is it going to be used, and there needs to be a-- And this is really hard if it exists, to get rid of-- you need, like, a no-blame culture approach, an adjust culture approach to incident reporting so that there is fairness, and ensure that no one is treated badly because they have chosen to report something.

MR MACKINTOSH: How do you-- Do you know of any examples of how an organisation has changed its culture of reporting to bring in such a no-blame culture of reporting?

DR MUMFORD: I think very many organisations, including my own, have made big strides towards that. It's something that comes from the Board downwards and is very-- there's a-- there's a-- there will exist still a culture amongst certain groups of staff who believe that there is a blame, and they're still nervous about reporting because they believe and they don't take in whenever you talk about a no-blame culture until they've experienced it, until they've been involved in an incident investigation, or some sort of lookback where actually nobody gets the blame, and what you do is pull out learning. So you don't identify who it was that did something wrong, but you pull out why did it happen, how did it happen, and what can we do to

prevent it happening again?

And if you work on instilling that kind of process within your organisation, then you eventually get to the point where more and more people are more confident that it's about learning and it's not about blame or assigning-- or point-- finger pointing or anything else.

MR MACKINTOSH: Thank you for that. I'm going to move on to the final couple of questions. This one's quite esoteric, but I want to see if I get it right. In the process that you developed with Mr Mookerjee, you created a list of infections that is grounded in the experience of the Schiehallion cohort. You then obtained a complete list of all bloodstream infections from four hospitals in England and Wales.

DR MUMFORD: Yes.

MR MACKINTOSH: You counted the number of deduplicated infections of those organisms.

MS DEMPSTER: Well, Mr Mookerjee did.

MR MACKINTOSH: Well, Mr Mookerjee did the work, but you asked him to do that, in a sense. So one can have a debate about whether he succeeded, but what he attempted to do is to compare the number of infections in the Mookerjee list, in 2A,

2B, 4B, 6A, with the number of infections on the same list in Cardiff, the Vale, Oxford, Leeds, Great Ormond Street.

Is there a risk or a problem with this methodology that it might be the case that in, I mean, one of those other units, there's another group of organisms that occur in the environment, perhaps a couple of species that didn't happen to occur in Glasgow and, therefore, weren't on the Mookerjee list? Because they weren't in Glasgow but they are in one of those other hospitals and, therefore, might that distort the conclusions that can be drawn from his work?

DR MUMFORD: I can see where you're going with that. However, the organisms on the list were very-- definitely the most common. I think, on the other list that we've seen, there was a couple of organisms that were-- well, at least one that I'd never heard of, which are so rare that you wouldn't-- I doubt very much if there would have been a problem in missing them out. So I don't think so.

MR MACKINTOSH: Might you effectively be saying that in the Mookerjee list there were tens of organisms whether it was just one or two, and in the other hospitals, there might have been a handful of other such organisms that weren't in his list but the numbers are really small?

DR MUMFORD: Yes.

MR MACKINTOSH: Right. The final question is: given that your position, the two of you, is that there is a connection between the water system in the hospital and the increased risk of infections in the patients, and you say that's there because of increased rates of infections in those patients, wouldn't we not also see perhaps a smaller increase amongst the adult population over in the Queen Elizabeth? They're drinking the same water, they're having the same showers, they're using the same water.

DR MUMFORD: There's every possibility that that's the case, yes.

MR MACKINTOSH: Did you look for it?

DR MUMFORD: No.

MR MACKINTOSH: Did anybody, apart from the HPS first report, appendix 4, look at it with the bottom of those SPC charts, as far as you're aware?

DR MUMFORD: I don't think so because they took the whole hospital, but there could easily be some of the higher risk areas which have an issue.

MR MACKINTOSH: Who would know whether there were or were not

increases in the risk to the hospital?

DR MUMFORD: Infection Control team, I presume.

MR MACKINTOSH: If we just take as an assumption that because no one's made a fuss about it, there weren't increases in infections in the adult population, does that not tend to suggest that there is no link to the water because there had to be an increase of infections amongst the adults as well?

DR MUMFORD: Well, the children in the Schiehallion Unit are by far the most vulnerable group of patients, apart from perhaps the Neonatal Intensive Care Unit, but they don't tend to use water----

MR MACKINTOSH: Remember your voice at the moment.

DR MUMFORD: Sorry. In the hospital, and so that's going to be your marker, is that they are the most vulnerable patients. You may have infections at a much lower rate, which are not causing concern because they're not seen repeatedly as they were in the Schiehallion Unit.

MR MACKINTOSH: So, it's possible that there are infections there. You just feel it wouldn't draw them to our attention?

MS DEMPSTER: Yes, but they were added when-- Sorry I've interrupted, but they-- HPS did add those organisms in appendix whatever of the National Infection Control Manual to say, "Look at these."

MR MACKINTOSH: Yes.

MS DEMPSTER: So they weren't----

MR MACKINTOSH: What I'm putting at----

MS DEMPSTER: They would look at everybody.

MR MACKINTOSH: What I'm putting, Ms Dempster, is that-- what's your view on the merits of this argument, that the absence of complaint, concern, about water-borne infections amongst adult patients in the hospital means that it somehow undermines the conclusion that there was a link between the water and the infections in the pediatric haemato-oncology population? Do you have a view on that?

MS DEMPSTER: Well, I think it was as Sarah said, we didn't look at that data but there could be infections in that group.

DR MUMFORD: But the lack of complaint about them, if they were very sporadic but still occurred, would not undermine the argument, I don't think.

MR MACKINTOSH: Why not?

DR MUMFORD: Because just

because somebody didn't complain about it doesn't mean it wasn't happening.

MR MACKINTOSH: I'm just going to glance at the rest of the room, my Lord, in case anyone is bouncing up and down. I think I have no more questions for these witnesses.

THE CHAIR: I think you're entitled to draw that conclusion. Ms Dempster and Dr Mumford, thank you very much for your attendance and answering questions today and yesterday. Thank you very much for all the work that went behind that, including the reports but, as far as oral evidence at this hearing is concerned, you're free to go. Thank you.

DR MUMFORD: Thank you very much.

(The witnesses withdrew)

THE CHAIR: Now, Mr Mackintosh, as I understand things, this-- we've now heard all the evidence from witnesses at this phase of our oral hearings.

MR MACKINTOSH: Yes, my Lord. We have heard all the oral evidence in Glasgow III, and it's perhaps of assistance to-- I'm sure those in the room have already read direction 8 but in case anyone who's watching on the YouTube feed, the next stage will be that my team will produce written submissions from the counsel to the Inquiry team, which we will lodge with the Solicitor to the Inquiry by twelve o'clock, noon, on 20 December, which will then be distributed to all core participants, legal teams, as an early Christmas present from the Inquiry.

However, they will have until 31 January at noon to provide their closing statements, their closing written submissions, to the solicitor to the Inquiry. Of course, those will all be placed on the Inquiry website.

There will be a further hearing, which we're referring to as Glasgow IV, which I hope will be the last evidential hearing, running for five weeks from 29 April, which is a Tuesday, 2025, until Friday, 30 May, which all remaining evidence necessary to address the remit in terms of reference will require to be heard. There's other dates in the direction 8, but those are the ones that seem important for me to make clear at this stage.

THE CHAIR: Thank you, Mr Mackintosh. If I could take the opportunity of just highlighting two other points that are addressed in the direction 8. The first is paragraph 1,

which I have no longer an intention to produce a Glasgow interim report. There will be a report in relation to Edinburgh, which will be an interim report, as interim report is defined in the Inquiries Act 2005, but I don't intend to produce an interim report in relation to the Glasgow hospitals. Rather, there will be one further final report which will address that.

Now, the other point I draw attention to is raised in paragraph 5 of direction 8, and that is that I left open the possibility of an oral hearing, following receipt and consideration of the closing statements by counsel to the Inquiry and core participants. I am minded to hold such an oral hearing, and I think the dates provisionally indicated for that, but can be taken to be the dates that we're aiming for, are 11, 12 and 13 March. I think what I would add is I think it is likely that I will issue a further, probably fairly brief, direction in relation to what I would wish to see in closing statements, and, clearly, I should do that in the very near future, given the timetable.

But I think that's all that we require to say, other than can I thank all the legal representatives for their attendance, their attention, and their provision of questions which require to be asked but had not been asked by the Inquiry counsel. So can I extend my thanks to everyone in the room, and that includes the core participants who are represented. We shall meet again, all being well, in the end of April of next year but until then, can I wish you all well.

(<u>Session ends</u>)

16:41