Scottish Hospitals Inquiry
Witness Statement of
Dr Dermot Murphy

Witness Details

1. My name is Dermot Matthew Murphy. I am a Consultant Paediatric Oncologist at the Royal Hospital for Children (RHC), Glasgow. My employer is NHS Greater Glasgow and Clyde.

Background, General and Overview

2. I have worked in the RHC in Glasgow since January 2003, both at Yorkhill and since the hospital moved to the Queen Elizabeth University Hospital (QEUH) Campus in 2015. Previously, between 1989 and 2003, I worked in various hospitals in England and Australia, including in training posts in Paediatric Haematology and Oncology.

3. In addition to my current Consultant role, since 2020 I have been an Honorary Clinical Associate Professor at the University of Glasgow, College of Medical, Veterinary and Life Sciences and, since late 2021, I have been National Clinical Director for the Managed Service Network for Children and Young People with Cancer.

4. My professional qualifications gained between 1988 and 2007, including an MBBS degree, which is Bachelor of Medicine, Bachelor of Surgery, from the University of London, Imperial College, which at the time was Charing Cross and Westminster Medical School. I have a membership of the Royal College of Physicians of London, I have a fellowship of the Royal College of Paediatrics and Child Health and I have a Master of Science fin Epidemiology from The London School of Hygiene and Tropical Medicine and a Diploma from the London School of Hygiene and Tropical Medicine.

Professional Background

5. I have held consultant posts in paediatric oncology for over 19 years. During this time, I have consolidated my interests in neuroblastoma and palliative care. I sat on the United Kingdom Children's Cancer Study Group (UKCCSG) Neuroblastoma Subgroup and was vice chair of the group as the organisation evolved into the Children's Cancer and Leukaemia Group (CCLG).

6. I spearheaded the provision of a therapeutic radio-nucleotide service in the RHC and established the Scottish Molecular Radiotherapy Service (SMaRT), one of only three in the British Isles and only one of five in Western Europe. I am the Clinical Director of the Scottish Molecular Radiotherapy Service for Children and Young Adults (SMaRT Kids)

7. I am very actively involved in the Innovative Therapies for Children with Cancer (ITCC) phase I/II unit in Glasgow and am currently and have been Principal Investigator on numerous phase I/II/III trials, and a co-investigator on many more.

8. I advised the UK Government on the use of cannabis related medical products as an author of the recently published National Institute for Health and Care Excellence (NICE) review.

9. I am part of the Relapsed Neuroblastoma (BEACON) Working Group of the International Society of Paediatric Oncology (SIOP) Neuroblastoma subgroup (SIOPEN). We design and implement salvage strategies for children with relapsed Neuroblastoma and ensure these are delivered within a trial framework.

10. I also have extensive Palliative Care Experience and have recently finished my rotation on the executive of the Association of Paediatric Palliative Medicine (APPM). I was treasurer for 3 years. This organisation represents doctors working in paediatric palliative care across all settings in the UK and Republic of

Ireland. It is responsible for a whole host of resources including the Paediatric Palliative Care Master Formulary and for providing advice to the Royal Colleges and General Medical Council on matters pertaining to Paediatric Palliative Care. We work closely with Together for Short Lives and hold an annual educational meeting as well as organising the annual Palliative Care session at the Royal College of Paediatrics and Child Health meeting. Prior to joining the APPM executive I chaired the Children's Cancer and Leukaemia Group Palliative Care subgroup.

11. I was Co-Chair (with the chief executive of CHAS) of The Scottish Children and Young Peoples Palliative Care Executive (SCYPPEx). I was a founder member of this group and central to writing the Scottish Government Framework for Paediatric Palliative Care Document which was launched with a Chief Executives' Letter in December 2012.

Overview of Role in RHC

12. The role of a Consultant Paediatric Oncologist is essentially a children's doctor who has subspeciality training in solid tumour malignancy, so I look after children and young adults who have a malignant diagnosis of their solid organs, including the brain. At the weekends and at nights, I cover the children who have a malignant diagnosis within their blood – that's leukaemia and lymphoma patients Prior to the formation of the Paediatric Palliative Medicine department within RHC I also had a role as the lead practitioner for palliative medicine within the hospital and a greater role outwith the hospital at a strategic level. I currently have a greater strategic role outwith the hospital as the National Clinical Director for Children and Young People with Cancer.

13. My clinical role is unchanged since moving to the RHC in 2015 but, on the strategic side, I dropped the palliative care/palliative medicine role about three or four years ago. I took on the National Clinical Director role last year.

14. In my consultant role, I work with a group of four colleagues, equating to about three and a half full time equivalents, and we have a system whereby for a week

you are completely front facing, so you accept all referrals for children who have either got cancer that you know about or referrals from colleagues or from primary care to see if children have a malignancy. That would involve being on the ward. On a normal day, I would start with a ward handover at 9am. I would round with my junior colleagues. Round means that I go round and see the patients and we go through their results, examining and discussing them and making decisions. That normally takes two or three hours. Then I will normally go over to day care and see children who don't need to be in hospital but need to have some review. I should also clarify that “Junior” is a very pejorative phrase. “Junior” in the health service just means anybody who's not a consultant, so a bit like Junior Counsel. You could be a very experienced lawyer and still be called “Junior,” so these are experienced children's doctors or some of them are still in their training stages. I’ll round with them.

15. Potentially, in the afternoon, you are then going off to wards around the hospital to see children who may or may not have cancers, to aid the team in working them up as part of a diagnostic process. It may be that the team are as sure as they can be that they have a child who’s got cancer and they would refer them over to me. In those circumstances, I would see the child in my own unit – again, normally on day care – to facilitate that diagnostic process. We take calls from colleagues around Scotland, either from district general hospitals with referrals or from one of the other two Principal Treatment Centres, in Edinburgh and Aberdeen, for advice and discussion. We have some fixed sessions, so Wednesday afternoon is my clinic, for instance, where I see follow-up patients. On Mondays at midday, we have a neuro-oncology meeting, which is where we discuss all the new referrals with neurological tumours – this is a multidisciplinary team (MDT) meeting. On Wednesday afternoon have what we call a Tumour Board, which is another MDT discussion of all new patients and all patients that are currently undergoing therapy who have had imaging or pathology to review, and we would have colleagues who would refer into that tumour board. Again, that’s about ensuring diagnosis and that the correct treatment plan is being instigated and you get peer input into your decision making and peer approval of that decision making.

16. Other fixed commitments are a Monday afternoon meeting, where every patient who has either a solid tumour, brain tumour or central nervous system tumour - so spinal cord as well – is discussed. “Solid tumour” is any tumour that isn't in your blood, so it is in a bit of your body. In most of these meetings, there will be nurses, physiotherapists, occupational therapists, every colleague that you can imagine working in a hospital, present so that the patient is at the middle of everything, and you don't forget anything. For instance, I won't focus on what their home needs are, but their social worker certainly will. I won't be thinking too much about their gait, but their physiotherapist will. I won't be thinking too much about their weight, but their dietician will. You therefore need all those folk who are chipping in to ensure that each child has every potential need addressed. That's a typical kind of service week, it’s extremely busy.

17. The week after your service week, you are mainly picking up on the new referrals you’ve taken during the week prior, because they’ll need working up. For instance, a child comes in with a lump in their stomach will need to have blood tests done, urine tests and potentially biopsies too. They’ll need to have lines put in, bone marrow done, lumbar punctures and all kinds of various procedures. In your week after you’ve seen the patient, you’re either setting those things up or you’re getting the results of the things that you’ve set up previously. Then you will be working out a treatment plan, and obviously that means meeting the patient and the families because not only do you need to talk to your colleagues, there is also the direct communication with the patients and families.

18. The third week is mainly about doing all the paperwork you should’ve been doing in the last two weeks, but you couldn’t do because you were doing all the clinical work.

19. That’s a very broad summary of the cycle. I've left out the academic work we do because paediatric haemato-oncology is very evidence driven subject. We are constantly updating ourselves, we’re constantly part of a clinical trial process, we have a big clinical trials team, and we meet up with them weekly. From that, again we’ll be meeting up with the families as well as sending samples off

around the UK, occasionally to Europe and the USA, to get further opinions about the tests done. All this needs to be co-ordinated and discussed with the wider clinical team. My working week is probably summed up as about 80 per cent clinical, 10 per cent strategic and 10 per cent clinical research.

20. Clinical in this context means anything directly related to patient care. That might not be front facing. I might not be therefore spending 80 per cent of my time with children and families, but I will be spending 80 per cent of my time doing nothing but working on children with cancer and communicating with their families. So, the big clinical meetings that I described, like the Tumour Boards and the neuro-oncology sessions, are absolutely vital to (a) diagnosis and (b) providing a robust, transparent treatment pathway and delivering that treatment pathway.

21. Attendance at Incident Management Team meetings (IMTs) would not be in the 80% as I wouldn't call that clinical work, they're extraordinary so, at least prior to the problems at the hospital, a typical week would not have an IMT in it. In fact, I think if you went to any other hospital in the country and said, "Do you have an IMT?" they would have no concept of what an IMT was. IMTs would not form part of our routine clinical practice up until the problems started.

22. We do conduct root cause analysis with every infection that comes up, so that now becomes part of my general clinical role. When I'm on service, I will be liaising with my microbiology and infection control colleagues about bugs that have come up in blood or in sputum or wherever they've been found and whether it is a routine type of infection or not. That is routine for us.

Function of Department

23. We are a haematology and an oncology department. Oncology is relatively simple to define; that is the management of children and young adults with solid and central nervous system tumours, so, essentially, anything that isn't a leukaemia, or a lymphoma is looked after by us. Our haematology colleagues look after blood malignancy, so that's leukaemia and lymphoma, but they also

have a wide non-malignant haematology practice. This includes things like clotting disorders, sickle cell disease, haemophilia. They also have a laboratory remit; all the key haematology blood tests that get done in the RHC come under them, so they have a lab role as well as a clinical role.

24. We also have a bone marrow transplant or stem cell transplant service which is embedded within the haemato-oncology department, and that is operated jointly between the oncologists and the haematologists, though mainly driven by the haematologists.

Reporting Structure

25. The named lead for the stem cell transplant service is Professor Brenda Gibson. She is our clinical lead. Though the clinical lead is your immediate line manager, it's a bit of a misnomer as they have very little in terms of managerial responsibility for you. They certainly have very little in terms of clinical responsibility for what you do; that's your peers. There are three and a half whole time equivalent oncologists, and there were five and a half haematologists who spend various amounts of time doing different things, for instance one of them spends most of the time at the university; one of them spends most of his time doing non-malignant haematology and one spends most of her time doing transplant. One has a remit for teenagers and young adults and one for leukaemia and lymphoma. They had differing roles, but they looked after that service together. So, we are a single department, essentially looking after children with malignancy of all sorts, plus the laboratory haematology, and the non-malignant haematology patients.

26. Along with Brenda Gibson as our clinical lead, the manager for sub-specialties within the RHC is Dr Philip Davis. Again, we have very little to do with Phil, beyond routine tasks such as signing off job plans." Our next line manager is Mr Alan Mathers, who is the Clinical Director for Women's and Children's Services. If we had any major concern about clinical services, we would usually go straight to Alan. Alan will then report up into the GGC clinical managerial

structure, and the chain goes up to Dr Jennifer Armstrong, Medical Director of GG&C and Ms Jane Grant Chief Executive of GG&C.

27. On the non-clinical managerial side of things, it's now Jamie Redfern who is the Director, Women's and Children's Services in Glasgow. Kevin Hill was his immediate predecessor and in charge during most of the infections period but Jamie has always been the conduit of most of our discussions, even when he was one rung below. Now, with Jamie in Kevin's post, he is still my go-to person. He then feeds up again into the GGC managerial hierarchy described above.

28. If I need to escalate an issue, the route depends on what the issue is. If it is an issue relating to departmental clinical concerns, then I would go to Brenda Gibson or Phil Davis and ultimately to Alan Mathers. If it were a non-clinical issue it would also go via service management colleagues and ultimately to Jamie Redfern, or prior to his promotion, Kevin Hill.

Management of Children's Cancer

29. We deal in very rare diagnoses. Nearly everything I deal with in a normal day, while common and routine for me - is extremely rare and I can't over-emphasise just how rare children's cancer is, which is why it's regionalised as it is. There are only 20 centres within the British Isles that do children's cancer, including three in Scotland. When I see a patient with a diagnosis that I only see once every five years or ten years, I will be phoning my colleagues, emailing my contacts around Scotland, the United Kingdom, Europe, and worldwide. Location doesn't matter because our world is so small, we know who the absolute experts are. It's fairly common for me to email to three or four colleagues, in different parts of the world to say, "I am looking after a child with an incredibly rare diagnosis, or a clinical picture that doesn't quite add up. This is what our local discussions have been. This is what our discussions within the UK clinical community have been. Have you seen something similar? What would your take on this situation be? Would you propose a similar treatment plan, or can you offer something we can't offer in the UK"?

30. I would define this as clinical activity and it takes a lot of time. You have to synthesise all the information and evidence. So clinical work isn't patient facing the whole time, but the synthesis of all that their information is. You then have to go and talk to the patient to say, "Do you remember I was telling you that I would be talking to whoever in Germany or whoever in France or The USA or Australia or Italy? Well, I emailed three of them and we've got three slightly different answers here and this is how we've synthesised all those three answers together."

31. We have good engagement with the other centres in Scotland and we have a very tight network with them. We have a very close working relationship with Grampian. Grampian – which is Aberdeen - join our Tumour Board and our neuro-oncology meetings, which means that they have their discussions about patient management with us. They send all their children who are going to require intensive care after surgery, which is the vast majority of children who require surgery, to us to have their surgery done in the RHC. They also send us all their brain tumours for surgery and all patients that require radiotherapy or stem cell transplant.

National and International Forums

32. In Scotland, we have something called the Managed Service Network for Children and Young People with Cancer, to which I referred earlier, and that has all kinds of network functions, mainly strategic but some clinical. The MSN organises joint education sessions and has a couple of annual meetings. It has a governance board, ensuring the MSN functions and delivers in an appropriate manner. However, the network that GG&C has with Grampian, is clinical. All patients in Scotland who require a stem cell transplant or a bone marrow transplant – it's a double name – come to Glasgow to have that done because there's a national bone marrow transplant service here. Edinburgh still do their own autografts which are stem cell transplants using the same person's cells, but Edinburgh send over their complicated transplants (allografts) which are transplants using donor stem cells. Any patient that requires intensive renal

support comes to Glasgow, as does any patient who requires cardiothoracic surgery or ECMO. There are very tightly defined pathways and clinical communication pathways across Scotland.

33. Across the British Isles we have the Children's Cancer and Leukaemia Group, (CCLG) which is an organisation that produces guidelines and policy, talks to government in England and Wales (but not directly in Scotland or Northern Ireland), and acts as an umbrella organisation for the UK and Irish children's cancer centres. Outwith the major treatment centres, what we call the PTCs, (Principal Treatment Centres) we have shared care units. These are district general hospitals or, in some cases, large teaching hospitals that don't have paediatric oncology as part of their portfolio but will look after children who are being treated for cancer, who have things like infection. Some of them we'll give push chemotherapy but only a few give infusional chemotherapy, illustrating the different levels of shared care. Again, that's all networked up.

34. Then within Europe we have an organisation called SIOP, which is Société Internationale D'oncologie Pédiatrique, the International Society of Paediatric Oncology, which is our major trial organisation now. When children's cancer first became a recognised speciality, about 35 years ago, in the UK we could do the kind of clinical trials we needed to do to improve outcomes. On a population of 50-70 million, you could do that, because at that time, the outcomes were so poor, to demonstrate an improvement, you didn't need a big population. Because we have got much better at treating children with cancer, you now need much bigger numbers in each trial arm to be able to prove something. We can't do that within the United Kingdom, so we do that mainly on a European basis.

35. There is a similar organisation in the United States called the COG, the Children's Oncology Group, and they are a trial-based organisation producing guidelines. For instance, every child who has a diagnosis of a more common children's cancer, such as Hodgkin's lymphoma, neuroblastoma, or Wilm's tumour, they will be treated the same in Glasgow as they will in Ghent or Gdansk. There is a European approach to that, but we now work very closely

with our American colleagues so that our trials interdigitate. For example, the Americans will answer a set of questions that the Europeans aren't asking, and then the next European trial will answer questions that are either brought up by that American trial or that American trial hasn't addressed. You are not in competition with one another, you're building on one another to move forward. Those two organisations work very closely together. The Americans have become much more integrated into SIOP, so COG and SIOP work most closely together and that gives you a much bigger international network with whom you can discuss clinical questions. There are some trials that open in both the USA and Europe but that is rare.

36. Though these groups meet regularly, with SIOP, for instance, meeting every year, very rarely do you go and see someone else's facility. If the meeting was in Glasgow, we may offer that delegates can come and have a look at the RHC, but frankly it's not a great use of your time. You're there to network and to learn. While seeing a children's hospital is interesting, and you can go "Oh, look at that, they do that better than us," you don't learn very much. Also, you don't want loads of people traipsing through your children's cancer unit for many reasons, such as infection or privacy. In fact, I've been a consultant for almost 20 years now, going to these meetings for about 25-30 years, but I can only ever remember visiting a facility once, and that was a children's hospice, not a children's cancer unit, just to see what they had set up in Vancouver.

37. If I'm across meeting colleagues in Aberdeen or in Edinburgh and they have a patient on the ward with a diagnosis I have a particular interest in, and they say, "Oh, whilst you're here can we just go, and can you just give some advice on that?" I may say, "Let's go and see the child or their family" and that way I get to see their unit, but again, most of the time, we would either be sitting in their education suite or sitting in their office – we wouldn't necessarily be going onto the ward.

Involvement in Design of RHC

38. In the journey to being a consultant it is very rare that you only work in one hospital. I've lost count of the number of hospitals I've worked in, so you take all that with you, and if you visit a colleague for a clinical meeting or any other reason, you might be asked to go and see a patient that they've got because it's a particular interest of yours, so you get to know what other Children's Hospitals look like.

39. My experience has therefore helped me compare different provision of facilities. When the process of building the New Children's Hospital started, we were told that not only would the old services be replicated, the new facility would enable us to improve our services. So, the bare minimum was that what we had in Yorkhill would be replicated or improved upon, from the number of beds, the type of bed, (for instance the number of bone marrow transplant specific beds) and an improvement would be a molecular radiotherapy suite. We would have pharmacy in the same place, we would have same amount of children's play areas, same amount of parents' accommodation. It didn't turn out to be that way, but that was our starting point.

40. Lots of design is actually dictated by either UK Government or Scottish Government policy, so there'll be a document that says "A room for a child in a hospital has to be a minimum size. It has to have a bathroom. It has to have x, y and z". There are Health Technical Manuals and outside of those, there are also other manuals that define what these facilities should be. The Facilities team will be able to comment on design and technical issues.

41. For instance, we couldn't have said, "For that particular group of patients, they don't need that much space." Things like minimum space requirements were laid down. Aspects that we could control or try to control were things like the number of beds that we had, what those beds would be used for, and we thought we were in control of things like playroom space, parental and kitchen space.

42. I can't recall precisely when we were told that the Children's Hospital was going to be built and that our input would be required. It was maybe four or five years before the opening and probably three years before construction started.

43. Before the Children's Hospital was built, there was a Clinical Director of the new Children's Hospital who was the ex-Clinical Director of Yorkhill. He had a design team underneath him of architects, architectural technicians – I'm not sure of the background for a lot of these folk – and they would sit with you and say, "Okay, tell us what you want, and we will go away and design your unit for you." Then they'd come back and they'd say, "What do you think about this? So that level of discussion was being had and, in some ways, we got lost in the minutia and did not focus as well as we should that vital colleagues were not to be housed in the new unit: pharmacy, the CLIC Sergeant social workers, the outreach nurses. I think we failed to provide medical leadership and the voice of the department was not heard.

44. On how we input to the design: there were meetings of the Yorkhill Medical Staff Association, YMSA, which was the consultant body, to get their input into the design of the Children's Hospital as a whole. That's where things like, "Why are we building next to sewage works?", were brought up. Total number of beds how was the out-patients going to work – all those kinds of things. Then, each individual department was assigned a design team and you had departmental meetings with that team. I'm sure that my nursing and managerial colleagues would have had similar YMSA-type meetings for their staff groups, but what they were, I don't know. Within the department, we had the architect design team come and visit us, so we would have meetings in our seminar room – which wasn't replicated in the new hospital- and in attendance would be nursing colleagues, Allied Health Professionals (AHPs) and junior colleagues, discussing what was important. I think we might also have had some form of parental involvement. I can't remember how we engaged with them, but we had input from past parents into what they would like from the ward.

45. I can remember sitting in a planning group very early on and looking at bed numbers and, having a training in epidemiology, I thought that the size of proposed Children's Hospital was not going to be big enough. There was that kind of very early engagement on big-picture issues. How many beds are we going to need, how many out-patients, etc. Then there was some consultation on design, which was about how many beds do we need on the unit and physically where would they be and where would our office space be, etc. We had input into that but within a prescribed envelope. For instance, the shape of the building, we had no input into. The racetrack design, that was an architectural feature, we had no input into that.

46. We did have input into what's called adjacencies, so where the nursing station should be in relationship to the high-risk patients. We had input into soft facilities, so patients' kitchens, bedrooms, play areas and things like that. We had input into where the pharmacy should be.

47. However, having input and being listened to – having our input reflected in the outcomes – were two different things. For instance, we had a pharmacy on the ward in the old Yorkhill, where they did prep and made medicines up. There was a pharmacist's office there and we clearly said, "This is actually vital to what we do because we work so very closely with our pharmacy colleagues," We were very clearly told, "Well, that's just not going to happen." so what we could ask for – bearing in mind that that initial premise of, "You will get, as a base minimum, what you have in Yorkhill,"- and what was provided were certainly not the same thing.

48. In terms of input into design of the RHC, I would summarise by saying that while we had input, our input was listened to but not acted upon. Others may take a different view.

49. What we wanted, very clearly, was to have at least the same facilities we had in Yorkhill. That included the size and accessibility for the children's playroom, which we thought was really important. A classroom – it was called a school but essentially a classroom - we thought that was really important too. We thought

that having the pharmacists on the ward was really important, we thought it important to have the CLIC Sargent, (now called Young Lives V Cancer) social work department within the fabric of the unit. There was a separate parent bedroom in the old facility at Yorkhill – we thought that was important and it was really liked by families. The other thing we thought was really, really important was to have a meeting room/education room where we would go do all those various meetings that I described earlier, a single focal point that we could go to and use. We had that in Yorkhill, where it was called the Schiehallion seminar room. We thought that was vital for the functioning of the unit, it provided central physical hub, but more importantly it made for easy communication between staff and was vital for cohesive team working.

50. We did have some internal disagreements about design, which is to be expected: some of my colleagues thought it was important to keep our office space on the ward. Personally, I thought it was important that we didn't have our office space on the ward because I thought we were too accessible, and anybody could knock on your door any time. However, while there would have been differences of opinion about design elements there was unanimity of opinion, about what was vital, which are the things I have described.

51. In terms of services like water and ventilation, etc, which were to become problems, we had no discussion outwith our clinical expertise. This was the domain of technical experts. Having clean water and safe and effective ventilation is a given in any children's hospital and would not even have been thought an issue by clinicians.

52. With regard to the QEUH, I had no dealings at all with the adult hospital, at least in terms in terms of design and build. When we first moved onto the site, our only engagement was that we had shared office space and we had shared laboratory facilities The two hospitals are physically linked, so we walk through the adult hospital to get to the Children's Hospital, but in terms of design or room layout, or what we would be given, we had absolutely no idea. The only thing that we were insistent on was that we didn't move into the Children's Hospital until the adult hospital was finished, because whenever there's building work,

you throw up fungi into the air. For immuno-compromised patients, there was very well-established literature that, once you started building around immunocompromised patients, there was an increase in the number of fungal infections these patients get, whether they were children or adults. We were clear that we couldn't move into the site until the majority of the build, if not all the build, had been done, because that would increase the risk of what's called aspergillosis, particularly in our population. That's the only input we had regarding the adult hospital site.

Proximity to Sewage Works and Odour

53. One thing that everybody was concerned about was the proximity to the sewage works and we were very, very disappointed that the Southern General site was chosen over the Gartnavel site, partly because of the huge sewage works there. You still get the smell of sewage coming into the building, but we were told not to worry and that it would all be sorted. I think that remains a concern for lots of people. This is where your specialism can only take you so far. We certainly asked the question because it seems very obvious, very axiomatic, that you shouldn't build a major hospital next to a sewage works. We were told, that although our concerns were valid the advice was that, from an infection perspective, it was not an issue. Furthermore, we were reassured that the whole thing was to be made smell-proof. To be frank, the Southern General was on the site, and no one was jumping up and down saying there's a huge increase in infections in the Southern General compared with the Victoria or with the Royal or Western or anywhere else.

54. Would I have chosen to have put Europe's biggest hospital next to a sewage work? No, not in the slightest. Do I still think it's a crazy idea? Yes, I do, but that's not about increase in infection. I don't believe the sewage works has any bearing on any infections in the Southern site or the QE site. Am I qualified to say that? Absolutely not, but I suspect that that's the case. But, from a comfort/worker/visitor/patient perspective, do you really want to go to a hospital that smells of sewage? No, of course you don't. It would have been nice if that wasn't the case. Nobody ever thought that we would run up against the

problems that were to follow, and therefore no clinicians thought we needed to have a mitigation strategy for sewage-based infection. You just assume that when you have a team building a hospital, they know all this stuff and they do it right.

55. The earlier concerns about the smell proved well founded after the new building opened. It couldn't be ignored. However, I would say that the smell impacted comfort rather than safety. It is certainly unpleasant and although the smell wasn't as bad in the hospital because you can't open the windows, getting out of your car and going into the building, or walking across from the office blocks into the hospital was, and remains, horrible.

56. I can certainly recall patients and their parents complaining about the smell. I cannot specifically recall patients and families raising safety concerns about the smells, but I suspect that some of them would have asked questions. I would have felt safe reassuring them because that's very clearly that the whole of the campus was being given. It wasn't something that was exclusive to us and the smell covered the whole campus. When we started getting a higher number of gut-associated infections, so Gram-negative infections, certainly we were asking, "Is this anything to do with the smell from the sewage works?" It seemed an obvious question. But the windows didn't open and we would naturally have assumed that the ventilation spec did not allow infections to be brought in. Additionally, we were reassured by our infectious diseases and control of infection colleagues that these were not the kind of infections that you would see as a direct consequence of being close to a sewage works. I would have no reason to disbelieve them.

Sign Off Process for New Schiehallion Unit

57. Formally, I think it fell to Prof Gibson, as the "link clinician"- to sign off that we were content with the building plans for the new Schiehallion in the new Children's Hospital, but I don't think there were clear terms of reference about who could and who could not sign off the plans. It would have been a very

powerful thing for managerial colleagues if they had managed to get a consultant to sign it off, regardless of which consultant it was, and they would have regarded the sign-off as being on behalf of the department. In my view, only Prof Gibson would have been able to sign off for the whole department.

58. In terms of the sign off process, we were approached by one of the "Design Assistants" in the new Children's Hospital development team, who I think had a senior role in the managerial structure. I can't recall her name. She had been talking to us about what was possible and what wasn't possible. She would have gone to Prof Gibson first to say "Here's the completed plan. Can you sign this off?" and Prof Gibson quite correctly said "No." We would have had discussion about that informally amongst ourselves.

59. This was while we were still in the old Yorkhill, so my office was about two metres from Prof Gibson's office and the totality of the consultants' offices were all next to one another in a row and opposite one another. There would have been an informal discussion among us in one of those offices and we also had formal discussions about it within our governance group.

60. I would say there was a degree of pressure from the New Children's Hospital team to sign this off. I can't recall specifically who was pushing, and I wouldn't say it was undue pressure, (it didn't come with any threats or anything like that if the things weren't signed off) but there was clearly a strong desire from them to get sign-off.

61. I can recall long meetings very early on Friday mornings, with plans, 3D models etc. I was doing up my house at the time, so I was used to looking at plans, but it had taken me a long time to get familiar with building plans and it was clear that lots of colleagues were on a similar learning curve. There were debates like, "Isn't the room laid out this way or that way? I don't think there was a formal constitution to those meetings. What I do know is that those thoughts were taken away, distilled, and brought back to us, and as a group of clinicians it was very clear that we weren't getting what we asked for, and it was very clear to us that we weren't getting at least as good as we were leaving.

62. There were some very obvious improvements like the size of the rooms, the fact that most of them were single cubicles, so the “hotel facilities”, if you like, were a vast improvement on what we had in Yorkhill. What was not as good was the play space there was for children, the education space there was for children, the ability for our outreach nursing colleagues to have office space, the ability for our pharmacy colleagues to be sitting with us on the ward. The absence of any space for social work colleagues was also a mis-step. The lack of a seminar room was dreadful for us. Simple things like not having enough toilets meant that you had to leave the ward to go use the facilities. There were many, many design features about the unit that we were not happy with. What we were completely unaware of, and never, ever thought that we needed be aware of, was the integral build quality and safety of the thing that was being handed over to us. We thought, I think not unreasonably, that it would be a very safe environment to work in, and to be frank, probably a better environment than a crumbling 1970s hospital.

63. Did these things impact on patient care or safety? That’s a difficult one. Take the toilet issue. Does that impact on patient care? I think it probably does. Could you demonstrate that? No. Does it impact on morale? Absolutely, yes, it does. Does that impact on patient care? Yes, very probably it does. I think not having pharmacy on the ward has a big impact on patient care. I think not having a seminar room that we can all go to – that, actually, in terms of ward cohesion, has a very clear impact on patient care. Not having a nurse’s common room where you can go and have a cup of tea and have the safe space to offload frustrations very clearly has an impact on cohesion. Now, if you were to say, has that changed our survival rate for children with cancer in Scotland? No, it hasn’t. Has it changed the decision-making process or the outcomes of decision-making process? No, it probably hasn’t. But health is not all about “Are you cured or are you not cured?” health is about how do you feel whilst you are being cured, otherwise we wouldn’t have moved off the Yorkhill site; we’d all still be there now. Do I think it impacted on our families? Hugely. Do I think it impacted on our staff? Hugely. Did it impact on our ability to cure patients with cancer? No, probably not.

64. When we were told what we were going to get, I think by the liaison person for the new Children's Hospital, we made clear that we were not happy, but we were told: "That's what you're getting." There was obviously an awful lot of toing and froing and promises of further discussion but the bottom line was you'll get what you're given, and this is what you're being given – which is why none of us would sign off on it at the end because none of us wanted to accept responsibility for the compromise that was given to us. Every single one of us thought that we were getting less than we had been promised and less than we had negotiated for.

65. Perhaps, if you were on the other side of the table, there would have been thoughts like "These guys are asking for way too much and they're asking for stuff they know we can't deliver, and so we're just going to have to tell them." But we didn't feel we were asking for too much or anything extraordinary compared with either what we had or what we knew was in place in other hospitals. So, when we ended up with what was very clearly, on a plan, not what we had in Yorkhill, no one was going to sign that plan off. We were still in Yorkhill at the time, so omissions, like the playroom or the seminar room, were obvious.

66. Very clearly, we were being offered a building that would allow us to maintain our same cure rates, but that's very different from what we hoped we would be getting, which was a 21st century environment for children and young people who have got cancer, and for the people who are looking after them. Those are two very different things.

67. Why did we not get what we wanted? Clearly there was a cost element. We looked at other facilities in the new hospital, like the Emergency Room, or the Intensive Care Unit, for instance, and they had facilities for them: so staff rooms and seminar rooms for their exclusive use that were not replicated in in the paediatric haemato-oncology department. We've no idea why different departments got different infrastructure. So, we may be looking very jealously at the team in ITU or colleagues in emergency medicine thinking, "Well, how come

they got that and we didn't?" and there may be very, very good planning reasons and ergonomic reasons for them to have those things and for us not having them. But when you haven't got them, it's difficult to believe it's anything other than cost.

68. There was a lot of rigid thinking going on. There was no ability to see that anything deemed non-clinical should be within the fabric of the department. It's difficult to argue that a children's playroom is a clinical space. So, we were very clearly told, "No, you can't have that." In my estimation, it shows a paucity of thinking, but that's me as a clinician, not as an accountant or a hospital builder.

69. In terms of priorities, it's impossible to say what was top of our wish list; it's like choosing between your children. They're all different, but all really important. If you're a pharmacist, you'd campaign to have the pharmacy in the ward environment. If you're an outreach nurse, you'd ask to get your office in the ward environment. And rightly so, because (a) you value your own profession, and (b) you value your proximity to your other professionals. But if you had to stand outside and say which of these is the most important, it's impossible; as they're all vital.

70. I have a very holistic view of the management of children with cancer, and I would have loved to have had the CLIC Sargent social workers in the same as us, as they had at Yorkhill because it meant that the parents could just literally walk from their child's bedside and go and see their social worker. This meant that all the worries about finances, because having children with cancer is an extremely expensive business –and emotional concerns could be allayed, and the parents could then focus on their child again. One can also take the view that, for example from a neurodevelopmental perspective, it's important that we have a play space so that the children who've had brain tumours and operations can get down on their knees and wander around, and they're doing their own physio just by rolling around in the play space. It is a false dichotomy to have to choose between these two things.

71. I can't recall whether, at the time, I thought any one particular thing or all these things were going to have a massive clinical impact. It comes back to how you define "clinical impact." Had I thought that any of the changes might have affected the ultimate cure rate or our ability to safely deliver anti-cancer therapy, I would have been jumping up and down. I would have been making representations to my line management; I would have been demanding to see the Board; I would have been going to Board meetings in open forum and saying that this was a terrible thing. So, I would conclude that I have no concerns that my ability to safely cure children with cancer was going to be compromised by moving to the new Children's Hospital. However, I had grave concerns that the physical and emotional well-being of my patients and their families was being very negatively impacted by a move away from the old Schiehallion. I also had grave concerns that the camaraderie of the team was going to take a huge hit.

72. When it came to signing off the plan, none of the clinicians would sign it off – not because we thought that the air changes or the air conditioning or the water were going to cause problems, but we didn't think that it was what we'd been promised.

73. The bottom line is that no-one in my department signed it off – neither Prof Gibson, nor me or any of my colleagues. To this day, I don't think any of us know who signed off on the Schiehallion part of the new Children's Hospital. I am absolutely clear that none our clinicians signed it off.

Period 2015 – 2018

74. Moving to the new hospital in 2015, the wards were called 2A and 2B. They were where the unit was based. We were told we weren't allowed to call it Schiehallion, but everybody did. Schiehallion ward, Schiehallion day care and the Schiehallion unit, and they are now officially called those things.

75. My early impressions of the new RHC were that we had a bigger footprint, though smaller number of beds, and better hotel accommodation for patients

and children. That was everything from the size of the rooms to the en-suites to wi-fi accessibility to having access to TV and things like that. All those things were better from a patient perspective. From a design perspective, what we discovered immediately was that the sight lines were terrible and that meant that you couldn't actually see who was on the ward. For instance, if I wanted to find a registrar colleague, I couldn't look down the ward and see where he/she was, or any other member of staff for that matter, so you spent a long time tracking backwards and forwards trying to find folk. An inevitable consequence of having more private rooms is that even if you were in the right area of the ward, you still didn't know where colleagues were because they would be in patients' rooms. So, it was a more challenging place to work.

76. We were given what we call "deg" phones, which are like mobile phones, because it was easier to phone someone on the ward to ask them where they were than it was to track them down. That was unexpected. I know it is easy in retrospect, but if you had actually mocked up a floor in a hangar somewhere and got people to physically move around and model looking after some patients, you might realise that your design doesn't work. The immediate impression was that while it felt great for the families, it was very difficult for professionals to work in. Nursing colleagues can't see one another so, again, they needed deg phones so that one end of the ward could talk to the other end of the ward and the middle of the ward.

77. The lack of a playroom was immediately obvious. I used to say that one of the unintended consequences of having the rooms so comfortable and lack of a playroom was that rehab seemed to be taking longer. For instance, if you're very comfy in bed and you're in a really nice room, you don't get out of bed. Whereas if you're marginally uncomfortable in bed in a small room and there's a playroom you go into the playroom. On the old Schiehallion, we had tractors and trucks and all kinds of pedal cars, and you were forever having your ankles bashed into by a small child on one of those things. Their parents would be behind them, pushing a drip stand, but they were going up and down the ward. That didn't happen anymore. There was nowhere for the patients to go, so I felt that patients were taking longer to rehab. One of the things I thought

about until all the subsequent problems took occurred was that we were actually going to look at lengths of stay in hospital to see if this impression could be verified.

78. The other immediate impression we had was that trying to get hold of pharmacy colleagues was much more difficult. We weren't sure where they were; as a group they were scattered. We were no longer making medications up on the ward, so that meant that our flexibility around delivery of chemotherapy was much, much tighter. Previously, if a parent came up and said, "Listen, it would be easier for us if we could start the chemotherapy a day earlier or a day later," I could very easily go into pharmacy, find somebody and ask, "Is that technically possible?" This was no longer possible.

79. Another thing that was really obvious from the start was an absence of natural light. It may strike you as a bit odd, but Yorkhill had big windows, light came in, it was built in a different way, a different shape, so we had much more natural light and that made it a much more pleasant place to be.

80. There were some upsides. Very clearly, the patients preferred it – no question about that – because the room was bigger, the parental pull-down bed was better, the en-suite bathroom, all of that was so much better. But it was a much more difficult place to work.

81. There were the other first impressions. We were acutely aware that we would lose the adjacency benefits. So not having POONS (Paediatric Oncology Outreach Nurse Specialists) immediately to hand, not having CLIC Sargent to hand, that was very clear. Our offices are a seven/eight-minute walk away from the ward, so that was new. Not necessarily a bad thing, but it very much changed the dynamic of the way that we worked. It sounds crazy but, for instance, when I was in the old Schiehallion, my office was between the ward and day care. Nursing colleagues would very often phone me to say, "Can you just pop across because this parent wants to see you?" I'd go across and actually what the child wanted to do was give you a thank you card, or the parents just had a very brief question about something minor. You were

thirty seconds from their bed. If you've walked seven minutes to get there and then you're walking seven minutes back, that's 15 minutes of your day. It's always nice getting thanks or being able to confirm that a concern was minor, but if it's a 15 minutes round trip and it happens three or four or five times a day, which it does, then that's a significant chunk of your day where you're just walking back and forth.

82. New ways of working needed to be learnt, that's not necessarily a bad thing but it is not always easy. The culture of being instantly available to families still hasn't disappeared entirely. Even if you're not on service – which I described earlier – you still get lots and lots of phone calls from families who would like to see you. Though colleagues know that you're not physically going to be immediately available, they don't know where you are because you could be on the ward next door. In fact, you could be on the same ward, and they just can't see you, so they'll phone you to say, "Can you come?" That then puts the onus on you to say, "Well, no, I can't come, or do I need to come?" which is a very negative way of responding to a phone call. All that kind of soft interaction was immediately obviously much more difficult.

83. The line-of-sight issues were challenging, both because of the curved corridors and also as a result of the single room design. You can see about two doors along before the ward curves. On the old ward, even if colleagues were in a patient's room, the note trolley would be outside the door and you could see the note trolley, so you would know that they would be there. But you can't see the note trolley, so there's no visual cue to you to say that's where they are. Again, is that going to materially affect your likelihood of curing a child with cancer? No, of course it's not. Is it an inconvenience? Absolutely, yes, it is.

84. While sightlines are unchangeable, some things were able to be improved upon. I've already described purchasing deg phones so that we could phone one another rather than see one another. My ability to go and stick my head around a pharmacy colleague's door is not there anymore, but since we've moved back on this final refurbishment, some of those issues have been addressed, although at the cost of decreasing the total amount of rooms available. We now

have pharmacy colleagues on the ward, for instance, which we didn't have before and there is now a play area for younger children, which we didn't have before. That was replicating stuff we had previously, though we have nothing for toddlers and the under sixes. But, again, that has come at the cost of the clinical space. The knock-on of that will be that, in winter, we will have more patients (what we call outliers) on other wards around the hospital because we've given up physical clinical space to have those staff groups on the ward. Those things are ongoing. There is now a ward staff room which is just off the ward, interestingly in a seminar room that we were told we couldn't have as a seminar room because it was a shared space.

Protocols and Ways of Working in New Schiehallion

85. The move to the new hospital meant infrastructure change, along with more incremental behavioural and culture change and there have been workarounds that improve things to some degree. There has been some much more prosaic change with our final move back a few months ago. I suspect that that was done because colleagues in the managerial chain couldn't have parents or staff groups openly complaining about the move back. After the millions that had been invested on that ward, the last thing they needed was the Daily Record talking about disgruntled Schiehallion staff. So, spaces became available that we were previously told was impossible, but we still don't have what we had in Yorkhill.

86. In terms of the Schiehallion protocols, "protocol" means something very specific to someone who works in paediatric haematology oncology. A protocol for us is normally a treatment plan. If you have leukaemia, there will be a protocol that dictates how your leukaemia should be treated. Those are either clinical trial protocols, which is where the name comes from, or they're clinical guidelines, which are derived from the protocol from the last open clinical trial. That's unchanged.

87. The way those protocols are stored is different because it's much more electronic now and we don't have space to keep paper copies. That's a direct

consequence of the move, so there's no space in our research nurses' offices for as many paper copies. I used to have a paper copy of every protocol that I was using in my office. There is no space in my office for that, so they're now all online, which makes the ability to flip through them more difficult than, for example flipping through a 300/400-page document, which is much easier to do with a physical copy than digitally.

88. Protocols are tailored for each individual diagnosis. Within each diagnosis, you will have potentially a different way of being treated. For instance, in a rhabdomyosarcoma protocol – that's another type of children's cancer – there will be nine or ten different subdivisions with different treatment plans going along there depending on how big your primary is, where it is, is it metastatic, where is it metastatic to? All of those things change the way that you look after the patient. Other protocols will have only one or two different ways of treating the patient because there's much less variance in the way that those particular diseases present. They can be very, very complicated or they can be much less complicated. If the move had imperilled the way that we deliver the protocol, we would have just been saying, "We're not going. You're putting us in an impossible position," because these are nationally or internationally derived ways of treating children's cancer, they're evidentially based. These are what are considered best practice.

89. We also have Standard Operating Procedures (SOPs), a lot of which will have been changed because they're dependent on the physical environment. Those are all kept online on a system called Q-Pulse that's looked after by Prof Gibson's PA. Those kinds of things changed as we moved across, and nursing colleagues in particular had a huge amount of work to do to change them to reflect the new environment we were working in.

90. I can't remember quite how the SOPs changed for the move to the new hospital. I can remember us all having to input hugely into SOP writing, and if we weren't writing, then reading them and signing them off because each SOP would need a nurse sign-off, a doctor sign-off, and then going through the

governance group. Children's cancer wasn't alone in that every paediatric subspeciality would have been doing exactly the same thing as they moved across. If you change your physical environment then that might change the way that you go from, for example, an operating theatre back to the ward. In Yorkhill, theatres were on the same level as our ward, so we didn't have to have anything in your SOP about what to do to get into the lift or if the lift doesn't work when you get in there. All that needs to be reviewed and adjusted when you move your physical environment.

Initial Impressions of New Hospital Environment

91. It is fair to say the new ward environment impacted on the amount of time it took to do our job. It took longer to do what we needed to do. We did feed this back, but we had to make it work. The feedback mechanism would have been a formal one through our own governance procedures, a less formal one through the Medical Staff Association and a quite informal one of meeting managerial colleagues or nurse managing colleagues in the in the lunch queue.

92. I am aware that, at that time, the building was obviously heralded as a state-of-the-art facility. In my view it was certainly very glossy. It was very shiny, very big – again, not in terms of bed numbers, but in terms of space. So, there were some definite advantages. Yorkhill stack had eight storeys to it, and I have many, many colleagues who could not walk up the stairs with me, so they were getting the rickety old lifts. So only going up to the second floor in the new hospital was good.

93. I think that some of the challenges were because of the physical and built environment of the new Children's Hospital. In my view, there is no question that the new Children's Hospital was built on the cheap. We spent £150 million on a new Children's Hospital and I'm not even sure how that was costed, but if you compare that to the new Children's Hospital in Dublin, for instance, that's now costing billions of euros, you can begin to understand the differences.

94. Whether the new Glasgow Children's hospital was "state-of-the-art" is subjective, but it was absolutely fit for purpose. Could it have been more fit for purpose or differently fit for purpose? I believe so, but I certainly had no concerns that it was an unsafe environment that wasn't allowing me to deliver the kind of care that I want to deliver. It wasn't always as easy as Yorkhill, but it was doable.

95. I was aware of some of the issues raised by families at last year's hearings, such as the temperature of the rooms, the blinds, TVs not working, the wi-fi dropping and plug point positions. Having just done a huge building project myself, I was probably a bit more tolerant of those kinds of issues. There are always things you maybe didn't think through beforehand, such as locations of plugs, that you then need to retrofit, and I can understand the families' frustrations. At the same time, many of the families hadn't experienced the old Yorkhill, where not everyone had TVs and those tellies that were there were pretty ancient anyway. Wi-fi in the old Yorkhill was grindingly slow and very, very intermittent, which impacted the staff more than families, given that most of our communication was done through wi-fi enabled deg phones. The phone signal was appalling so keeping in touch was not always easy at Yorkhill either.

96. In terms of the rooms, there were toilet leaks and sink overflow in those early days, but these might have been just seen as part of the snagging. Whether they actually occurred during the formal snagging period or not, I can't recall but it was obvious from fairly early on that water was backing up on the floors, for instance, from the showers.

97. There were a number of things that weren't ideal in the new RHC but it's difficult to say how they impacted on the relationship between clinicians and patients. We certainly had positive feedback from many patients from the old Yorkhill who'd come across with us because they had a comparator. I think that, at the time, everybody wanted the new building to succeed; no one wanted it to fail even if they would prefer to have stayed in the old Yorkhill.

98. With regard to leaks in the bathrooms and some flooding in the en-suites, I did not see that in the realms of safety concerns at that early stage. Whenever you move into a new build, you expect there to be snagging issues, whether that's leaky sinks or lights that don't come on. That's what we had when we started, and it wasn't ringing alarm bells at that point.

99. Generally, I was coming from a perspective where these kinds of things were not as good as they should be and weren't as good in the Children's Hospital as they were in my own home, but they were better than they were in the old Yorkhill. It sometimes felt like the building was designed by people who grew up in the 1960s, where things like downloading movies or internet speeds were not an issue, whereas our young patients were understandably expecting the kind of environment they were used to at home.

100. The parents were bringing to our attention things that could be better. Patient would tell staff nurse, staff nurse would tell nurse in charge for the day, he or she would say to the nurse manager of the ward who would then funnel it up the nursing hierarchy. These kinds of things would have been discussed in the governance meeting. We would have managerial representation at the governance meeting, so that would have been directly heard there or would be raised there on our behalf. Coral Brady, was I think the managerial link, or at least the person with direct managerial responsibility for the unit. With the initial snagging, we were very keen to get that done because there was a handover period within which all the snagging needed to be collated and acted upon.

Feeding Back Regarding New Environment

101. The formal mechanism to air these kinds of issues was through the governance procedures. We have a staff governance group, so we had endless discussions in there about going back to managerial colleagues saying, "We've tried this, and we've put this solution in place, that solution is in place, and this is still not working." We would then push that up the managerial tree either on the nursing side or on the medical side or on the allied health professionals' side because each professional group had a different management hierarchy. For a nurses'

common room, for instance, it's pointless going to medical management saying, "We need space for our nurses to eat," because they say, "I've got no control over that. You need to go to the nursing hierarchy, or you need to go through Jamie Redfern because he's got control over building use." That was the way it was fed back. I think that the YMSA might have met two or three times as well but it's hard to recall and a lot of those regular meetings have disappeared since Covid.

102. There was a definite push from managerial colleagues to highlight snagging issues in those early days. Once that was done, the building was handed over and GGC became responsible then for the fabric of the building. After that, there seemed to be much less interest in what might have been regarded as snagging issues and it felt that there was a difference in approach depending on the time that the issues were raised up.

Staff Governance Group

103. The staff governance group was carried over from Yorkhill. For a while Prof Gibson chaired it as the clinical lead. Dr Jairam Sastry currently chairs it as Prof Gibson has delegated that to him. That's the process now. If neither of them is there, then they will depute one of us. I've chaired it, other colleagues have chaired it. There is a standing agenda and you run through the items.

104. The function of the governance group is ultimately to ensure patient safety and that we're delivering the best care that is possible to deliver. For instance, if we are told that without employing two more nurses, we can't safely deliver a therapy, we would then go to the nursing management group and say, "We need a couple more nurses." If our pharmacists are reporting "It's impossible for us to work because it's too noisy where we are," then the department needs to go and talk to their manager or representatives to say that the pharmacists' current accommodation is impacting on their ability to deliver safe pharmaceuticals. We would routinely discuss other safety considerations such as near-misses, drug errors and all patient complaints. The whole focus is on improving the experience of patients and their families.

105. Although ultimately, the group was all about patient safety, issues like staff morale were also considered, so part of the function the group was as a listener. I think individuals were aware that that group had a limited ability to deliver the solutions that they wanted. It is therefore a difficult balancing act to get to be an effective group because we, as physicians, for instance, could be saying, “Absolutely, nursing colleagues, we hear that you don't have enough toilets and you'd like somewhere to eat your lunch. We totally agree with you, and we think that's a fine and noble aim, but actually we can't deliver that, however we will go and talk to nursing managerial colleagues again and support you”. Colleagues were aware that they were able to offload, but not necessarily that, by offloading, anything concrete would occur from that. We were all aware how little power resided within the department to change what the department was given.

106. Building or room issues were normally escalated to Estates through their attendance at the staff governance group. Either we would ask them to come, or we would feed back to them and then ask them to come to meeting the following time, or for them to feed back to their managerial colleague who would feed back to us. Part of the staff governance group function was to engage with Estates.

107. Nursing colleagues would have taken much more of the brunt of problems on the wards because they're in the room as it happens, and patients are frustrated. It's really difficult to unpick whether that impinged then on the greater clinician-patient relationship, whether that's a doctor, nurse, or pharmacist, because if a patient is unhappy about something it taints the whole of the clinical relationship. However, we are professional communicators, and we are trained to try overcome these things. On a daily basis we have to have the very worst conversations you can imagine, because I'm telling parents that their child has got a life-threatening disease or unfortunately, I can't cure their child. That is obviously going to be difficult. But are those conversations easier if the physical environment is to everybody's liking? Of course, they are. They're never, ever

easy, but they are easier. If a family is already annoyed with the team because they feel their concerns about leaking showers or malfunctioning Wi-Fi are not being listened to, quite naturally they are concerned that their worries about their child's health are also not being listened to.

The Water Supply

108. My initial concerns, fairly early on, about the water supply were because we were getting environmental Gram-negative infections that are waterborne. If that happens, you automatically think, "Are they in the water?" I can't remember whether because we had a rise in environmental infections we said, "You need to look at the environment," or because of that the microbiology team and the infection control team said, "We'd better look at your environment for you" I don't know. It might have been organic, for example: sitting down, having a conversation with our microbiology colleagues saying, "We've got another pseudomonas, we've got another stenotrophomonas. It's a bit odd, isn't it?" Who is then responsible for saying, "We've got to check the water"? It's the outcome of a conversation rather than an individual.

109. We had weekly meetings with the infection control colleagues. They used to come to our big Friday lunchtime handover and also to our daily lunchtime handover. Our concerns would have fed into those discussions and evolved over time, and then that would have led into a more formal process which generated the IMTs. These regular daily and weekly clinical meetings would have allowed conversations to occur, and they would have built over time.

110. We all understood that these were environmental Gram-negative infections. There were different theories was about how they were getting into the patients for instance, the cleaning staff came under scrutiny for the order and manner of their technique. There were other theories, such as poor hand hygiene implying that the staff were transferring the infections from the environment into the patients.

111. Of course, all those possibilities and more need to be looked at whenever you have an infection outbreak. You need to look at how lines are handled, how drugs are drawn up, because no one should be exempt from scrutiny. We do know that in many cases of line infection, staff are involved in some way and it's about staff practice rather than about the environment. It's not unfounded, but it did seem to be that the focus outwith the clinical teams was that there was a rise in environmental infections, and this was a human problem rather than a building problem.

112. The worrying rates of infection seemed to be contained within the haemato-oncology patient group, mainly seen in wards 2A/2B. We did also have patients who were nursed in other areas of the RHC, and I don't know what the infection patterns in those other areas of the hospital were or are. But a phrase that I used to use a lot, was that our patients are like the canaries in the mine, so they will tell you if you've got a problem with your building. You or I won't because we have an immune system. If there's a level of infection within the water that is dangerous for people who are immunocompromised, it won't show for us because we're not immunocompromised. You need to put an immunocompromised patient in that environment for that knowledge to become obvious.

113. I can't comment really on the build safety of other areas of the hospital because our patients weren't there very often. However, what I can say is that some of our patients will have got their infections when they were not necessarily on our wards. They may well have come in over winter, for instance, been put on a general paediatric ward and they may have got an infection or shown signs of their infection at that point. That doesn't mean they got their infection from that ward environment. They could have got it from being on our day care the day before or the fact that they were discharged from our ward 48 hours earlier where they picked up the infection.

114. This does make trying to localise where the issue is very difficult because patients are not all seen in the same place at the same time. They might also

have gone home and one of the issues we had a lot was where colleagues would say, “Well, they were at home when they spiked their fever, so it can’t be that they got their infection in the hospital. They got their infection at home.” But if you looked at where the patient had been for the past two months, they’ve maybe spent 50 days of the last 60 in the hospital environment, so it’s impossible to be definitive about that if the patient is not in the same place the whole time.

115. What we were seeing, from a clinician’s perspective, was an increasing number of very unusual infections. We became used to hearing things like stenotrophomonas and Elizabethkingia and mycobacterium chelonae. But if you were to talk to my colleagues around the UK and you said, “Have you ever treated Elizabethkingia?” they would think you were talking about a patient, not about a bacterium. What is common for us now and we don’t even think about, anybody else would be saying, “What?” You’ve got to remember that we were at that, “What?” stage in 2015, so it was a combination of organisms we’d never heard of or had only ever heard of in post-graduate exams, an increasing number of them, coupled with what was going beyond snagging. So you saw a leak in the shower and then to get to the pipework you had to take a panel down and behind the panel there was a whole heap of fungus growing there, when you saw the chilled beam is dripping water onto you as you do your ward round, all of those things combined make you think, “There’s something going on here.”

116. I would repeat though, that our training is not about buildings or even infection control. There are experts who specialise in that. We did focus a lot on the chilled beam, and we did think that the whole hospital had been shoddily built, but we didn’t at that point put the two and two together. We were anxious that this was contributing, but we were certainly searching our souls to make sure that we were washing our own hands, that we were accessing the lines in the prescribed way, that we were using the correct connectors and that our practice was beyond reproach. Many things were happening at the same time, so no one was saying, “It’s definitely all the hospital and it’s nothing to do with our

approach to lines." It was, "We've got to try everything to get our infection rates down."

117. As clinicians, we weren't at the start saying, "This must, must, be the hospital." That evolved as the number of infections evolved, as the type of infections continued to be very unusual and then added to the mix were the things like chilled beams dripping on you and fungus growing in the shower. Some of it seemed basic. For example, we were absolutely reassured that the contractors had followed what was in their plans in using stuff like water-proof plasterboard behind showers for instance, yet we found out it was not waterproofed. We knew that because the workers doing remediation would say to us, "That's just standard plasterboard they've put in there. It's the wrong thing." Then you think, "Well, if it's the wrong thing in that bathroom, what about the one next door? Is it a single room issue, or is it systemic? Is every panel like that?"

118. We as clinicians were asking questions about the water, whether the problems stemmed from the water quality coming into the hospital itself or the infrastructure that brought it into the wards. I know that the water coming into the campus was checked and I know that the water supply to 2A/2B was able to be isolated, which is why we were able to have contained water management within the department without shutting out the water to the whole of the hospital. We did ask the question, "Is it the water coming into the estate? Is there contamination happening at that the point of supply to the department. Is it because of the fixtures and fittings? If it is because of the fixtures and fittings, which one of the fixtures and fittings?"

119. At one point, after they'd done two or three flushes to the pipes, they changed something in the base units of the sink. Then there was the installation of the point-of-use filters on the taps in the sinks and I think we changed the shower heads too at some point, although I think that was much later on. All of these were raising questions and understandable concerns about the water.

120. In terms of communicating the issues about the water supply, there would generally be agreement at the end of IMT meetings about the messaging to go to staff. Understandably, patients and families would ask questions when they saw filters on taps or when they were asked to use bottled water instead of that from the taps. I can't recall specific instructions to staff but clearly the actions being taken were mainly to tackle the infections and minimise the risk to patients. Staff handover meetings would cover any measures that were in place to ensure consistent messaging to patients and families. Staff were as much in the dark as everyone else about the causes of the infections that resulted in the precautions being taken with the water, but they would have been clear on why the steps were being taken.

121. I believe that there would have been information about the precautions given in writing to patients and families though I am not sure who would have drafted these, but I believe that clinicians would have been consulted about the wording. As far as I recall, there was not an individual signatory on these communications. I know that people like Jamie Redfern and Jen Rodgers would often walk the wards to answer questions from patients and families and to try to offer reassurance. I know that the hospital's Facebook channel would also be used to communicate the information.

122. I would not support any claims that staff concealed or withheld information from patients and families. The reality is that we simply didn't know the answers to some of the questions that they were asking, hence the need to move patients from ward 2A. Nursing colleagues, who were the initial point of contact for most patients did a fantastic job communicating with families and they involved other clinical or managerial colleagues if there were questions, they could not answer.

123. Clearly the issues with the water posed a potential infection risk to our patients. As I suggested earlier, children in the cancer ward were like the canaries in the coal mine. They were susceptible to infections that others would not be. We knew that some of the infections that had been reported were water borne, so the concerns were real. The work involved in moving patients to another ward in

the hospital could not be over-estimated and the fact that there were moves to CDU as well as the move to 6A and 4B highlights the level of concern that existed.

124. I believe there was a problem with the water supply. Or to be more accurate, I believe there was a problem with the water and the water distribution. I don't know whether it was the componentry in the taps, the water, the pipes the water was going in. That, I don't know.

125. Do I believe that we had water-borne infections as a consequence of our built environment? Yes, I do. I should emphasise I am not an engineer nor a control of infection professional and this is not an absolute rigidly held belief. I'm a doctor who spends a lot of time evaluating evidence and so if someone can come up with an alternate hypothesis that explains what we saw, then I would be prepared to listen to that and to change my view. I have yet to hear one that convinces me.

Incident Management Team Meetings Relating to Water

Incident Management Meeting Minute, dated 6 March 2018, relating to Water Contamination in Ward 2A **(A36690471 – 06.03.2018, IMT Minutes Water Incident Ward 2A RHC, Bundle 1, page 56)**

126. I attended an IMT on 6 March 2018 where there was a discussion about aspergillus cases that had been found. Aspergillus is potentially an airborne invasive fungal infection. The IMT minute describes Prof Gibson and me querying whether the aspergillus cases may have been acquired as a result of fungi in the outlets. We had documented aspergillus infections and needed to know where it was coming from and if there was potential for these aspergillus infections to be environmental.

127. There are direct and indirect measures of aspergillus infection. You can do a blood test that will tell you that it is likely that you have an aspergillus. It's

actually really, really difficult to isolate aspergillus from patients who you are almost a hundred percent sure that they've got an aspergillus infection.

128. I believe it is this inherent difficulty that explains why Teresa Inkster is saying what is recorded in the minute. She's saying it's impossible to answer because it's yet to be identified. That's very common. We can have blood tests that tell you it's really likely, but you never actually grow it in the blood culture. Teresa wasn't actually disagreeing with us, she was just saying that she couldn't be 100 per cent categoric. She was very supportive of this question being asked and in essence saying “You are completely correct to bring this up, we need to find the source of this because if its environmental we need to stop other patients from getting infected”.

129. Aspergillus classically is associated with building work. For example, if you dig soil up you get spore formation. There was a concern that if those organisms are confirmed and they are in your patients, then are they present in the environment?

130. On the Cupriavidus references, Dr Inkster would have a much more detailed knowledge of disease epidemiology than I would. It’s a very rare infection and not one that my training would equip me to talk about in detail. I had no concerns about Dr Inkster’s reasoning.

131. The minute reports Prof Gibson and me querying if the concerns of the clinical teams relating to the environmental risks in 2A had been communicated higher. We wanted the formal minute to reflect that the questions had been asked, of whom they had been asked and what the response to the concerns about environmental risk were.

132. In terms of clinicians being encouraged to raise concerns with the Senior Management team, my recollection was that we initially tried to raise them locally, with RHC senior colleagues, as is appropriate, rather than with GGC senior colleagues.

133. The minute also notes Prof Gibson and my concerns that senior management and the Board were made aware of the serious implications of fungus as well as Gram-negative bacteria being present in the water system. Our main concern was that we were unaware of what the Board were being told and what the response was. We thought it was important that we put on record that we had seen life-threatening infections in our population with two very different bugs and that made us concerned that there may be major problems with the infrastructure within the children's hospital. Gram negative infections and fungal infections make clinicians working with immunocompromised patients very concerned. It is important that the GGC Board were made aware of these clinical concerns.

134. We were talking about aspergillus at this point, which is a potentially life-threatening fungus. What we're raising there is that we are seeing unusual things that are dangerous at the same time, in the same patient group. That was concerning and uncommon.

135. We genuinely didn't know if the bacteria or fungi were connected to the infrastructure. What we were raising was the concern that there may be major problems with the infrastructure, but we don't know that, and we felt it needed to be investigated.

136. The minute goes on to note my querying if there was any activity on social media amongst parents. I raised this because we knew that the parents had a Facebook group. We knew that that was a toxic environment and so we wanted to know what the current state of that environment was.

Incident Management Meeting Minute, dated 12 March 2018, relating to Water Contamination in Ward 2A **(A36690457 – 12.03.2018, IMT Minutes Water Incident Ward 2A RHC, Bundle 1, page 63)**

137. I attended the IMT on 12 March 2018, which included reference to Stenotrophomonas being a significant pathogen particularly within the patient group in Ward 2A. The word significant was used because stenotrophomonas is a potentially fatal, environmental Gram-negative infection.

138. There was also a discussion about the source of transmission of organisms. We suspected, strongly, that we had waterborne infections. Absolutely, it was correct for Teresa to be concerned that handwashing or room cleaning was not what it should be.

139. I wasn't concerned that Teresa was saying this could be transmitted by human touch and not the water supply. My concern was we've got infections here that are living in the water; how are we going to make sure that we get rid of those infections? The concern was: are these bugs in the water supply? If so, how did they get there, how do we get rid of them and how are we going to stop them getting there in the future.

140. I was not surprised that people low down in the hierarchy were being targeted because that's exactly what one would expect. They were talking about the hygiene of the cleaners. The reason I was dubious about that was hand hygiene varies from unit to unit, but it doesn't vary that much. To have such a disproportionate number of Gram-negative infections in our patient population would mean we were monumentally poor at hand hygiene. I hadn't seen any evidence that we were better than, or worse than, any other unit that I've worked in.

141. Of course, you have to investigate and ask, are we using cleaning techniques that are unique to our department, but there was nothing immediately obvious to a non-Infection Control person that we were any better or any worse in terms of our line technique or our hand washing than any other unit I've worked in. I understood that those things needed to be ruled out, but I was sceptical that we would eventually find out that those were the cause of the issue.

Incident Management Meeting Minute, dated 16 March 2018, relating to Water Contamination in Ward 2A **(A36690507 – 16.03.2018, IMT Minutes Water Incident Ward 2A RHC, Bundle 1, page 66)**

142. I attended the IMT meeting on 16 March 2018 where there was a discussion about the use of Ciprofloxacin prophylaxis as a precautionary measure. Various questions were discussed, including why was this brought in as a control measure at this point, what would the impact be on patients and how it would be communicated to patients? The minute at records that there was a formal process to address the questions The piece that says, “If any patient inquires about receiving ciprofloxacin they are to say it's just a precaution due to issues with the water supply,” I think is probably clumsy drafting of the minute as “just a precaution” implies damping down the situation, but I can assure you that if any of our Management or Infectious Diseases colleagues had suggested to us that we ought to pooh-pooh this and damp it all down, I would have objected strongly and probably left the meeting at that point. We routinely told the parents what bug their child had, how we were going to treat that, what the implications were for their child, in terms of how well or unwell were they likely to be, and then invite the parents to come back with questions at that point.

Ventilation

143. If you are at risk of infection, you want your room to have a positive pressure within it, so you are not sucking dirty air in from the outside into your patient. Conversely, if you have a contagious virus you want to have negative pressure ventilation because you don't want them pushing that virus back out into the main ward. So, air flow works both ways. The pressure in the room depends on whether you are infectious or you are at risk of an infection.

144. There are two distinct populations on ward 2A: transplant patients and haemato-oncology patients. The transplant patients are the ones who are most at risk and the ones for whom you need to have really rigorous air filtration methodologies. There are, as far as I'm aware, no technical guidelines for a standard haemato-oncology room in terms of ventilation, but there are very clear

guidelines for the transplant population. I don't know the details, but the Technical and Estates teams should be able to tell you about the specification you need to have for transplantation rooms.

Specialist Ventilation

145. In paediatric oncology units, we do have special ventilation for bone marrow transplant patients, and we were very clear that that needed to be encompassed within the new Children's Hospital. We were told that of course that would happen because there are the technical manuals about what a bone marrow transplant cubicle has to have. So, if a patient needs a transplant room, I would know that there is something laid down that defines what the transplant room minimum specification is, including the air pressures and number of air changes that go on in terms of room ventilation. But if you had said to me or indeed said to many of my colleagues around the UK, what's the internal pressure of a bone marrow transplant unit ward compared to the outside, how many air circulations should there be, I doubt that would be common knowledge. The important thing is a clinician knows that there is a specification for a transplant cubicle and that the Health Board has a team that can build and maintain the cubicle to that specification.

146. In terms of the internal air supply to the unit, there'll be a transplant patient in that room for which there are specific technical manuals. That's the only thing we would have insisted on. For the non-transplant patients, there are – as far as I'm aware – no technical manuals with a minimum standard for rooms. That's why, for instance, in winter, when we have too many patients for our beds, we can put them into beds in the rest of the hospital because they can safely go into a standard hospital ward.

HEPA Filters

147. There were considerations about HEPA filtration. The purpose of the HEPA filtration system is to remove airborne organisms and viruses that may give an

unpleasant or life-threatening respiratory infection in patients who are massively immunocompromised.

148. Aside from the transplant patients, my patients weren't at risk of that kind of respiratory infection and, as I've alluded to earlier, if you go into other paediatric oncology units elsewhere in Scotland or indeed Europe or the rest of the world, you have oncology patients who are not in HEPA filtered rooms. In that sense I didn't see the need for HEPA filtration across the whole ward. I wasn't convinced that if we had a problem a ventilatory system that wasn't actually working in the ward, that portable HEPA filters were actually going to make much difference. However, there were no medical downsides to trying them and I am not an expert in ventilation systems.

149. I can't remember when or why the portable HEPA filters were put into ward 6A after the temporary move there. It's well documented we had an awful lot of infections up on 6A and we had an awful lot of environmental issues on 6A. As a ward, it was probably fine for standard adult patients. As soon as you put our very at-risk population in there, then you started to discover what the problems were within the built environment.

150. We do know that the day before we were due to move into Ward 2A when the hospital was opening, there were no HEPA filters in place, and we had to fly them over from Ireland. It was only because Prof Gibson walked around with Alanna McVeigh, one of the Transplant Department's Administrators, on the day before that that was recognized. I mention this because I think it highlights the level of knowledge of the builders who were fitting out the hospital and the approach to detail that was being taken when it was built.

151. When my colleagues from the UK or from Europe come to me and say, "We're just refurbishing our ward, we're moving on to a new ward, we know you've got a new children's hospital, what were the lessons you learnt?", I say to them, "Well, one of the lessons I learnt was, make sure you've got HEPA filters in your

HEPA filtration suites." They look at you as if you are joking. I would have had the same reaction, but that was the level of build quality.

152. In addition, there were the portable HEPA filters that were put into every patient's room in ward 6A and I think in some ward 2A rooms too before we moved. At that point, I think that the only bits of the ward 2A that were HEPA filtered were the BMT rooms. Angela Howat, the Day Care sister, would be able to confirm that. The rationale for that was that if you only put the filters into transplant patients' rooms, and then another patient got a respiratory infection, then the question, quite rightly, would be asked, "Why did you not HEPA filter the whole of the unit if you were concerned about a bit of the unit?" Quite why they were put in and whose decision it was, I have no idea, but I presume that this information would be in an IMT minute. The portable units were not popular with patients because they were noisy.

153. Our current environment in ward 2A is completely HEPA filtered, that is over requirement but shows the level of concern that the refurbished 2A/B was going to provide an environment that was beyond reproach.

154. I can remember when we were looking at the specifications for what's called the molecular radiotherapy room, I was directly asked, "Does that room need to be HEPA filtered?" and I said, "No, it does not need to be HEPA filtered" but a decision was taken to make it a filtered space. I mention this because it shows you the reflection of senior colleagues in the build side of the hospital and senior managerial colleagues that they were trying to ensure the refitted unit was as highly specified as possible.

155. If you were to ask me, do I think that patients who are non-transplant patients need to be in a HEPA filtered room, I'd say no, because the vast majority of the patients in the United Kingdom aren't in a HEPA filtered room. Does it bother me that my patients are? No, not in the slightest. It's nice to have, but not necessarily needed.

156. In essence, the original spec caused concern because there were no filters in the HEPA filtration system. Hepa filtration is a pre-requisite for the transplant patients, but in my view, it is not necessarily needed beyond that.

157. I can't remember if there was a single thing that raised questions about the ventilation. I can certainly say we did not have an increased number of unusual respiratory infections. We did see cryptococcus and atypical mycobacterium chelonae, but it is impossible to say that this represents an increase in infections outwith normality for a paediatric haemato-oncology ward. For example, in the transplant unit and for the patients in the rest of the unit who were at risk, we weren't seeing huge numbers of unexpected pneumonias in those who were in the non-HEPA-filtered rooms. I don't know if it was a single trigger or number of variables all combined that made us start to look at the ventilation. It could well have been, for instance, a spore count, so we'd put plates down to see how affected the ventilation was. Again, I can't remember whether we started to do that because we were concerned that we had problems with the ventilation or if that was the thing that highlighted the fact that the ventilation wasn't doing all we thought it should be doing. It's a bit chicken and egg and I just can't recall.

158. Teresa Inkster was our initial infection control lead, but I don't think I realised at the time that there was a difference between microbiology and infection control. If you had asked at the time, "Do you have a link microbiologist?" we would have said, "Yes, we do," and there are a couple of medical microbiologists who took a particular interest in children's cancer. We also had a couple of very highly trained (PhD level) lab scientists, who would come to our lunchtime and Friday handover meetings. So, we knew who our microbiology colleagues were. I didn't realise there was a separation between infection control and microbiology until much later down the track.

159. In terms of communication about the ventilation issues, it was pretty similar to what I have said about the water issues. It began to evolve through informal discussion, so at the daily catchups and Friday meetings but eventually it escalated to the IMT process. But even at the start of that process, although there was some formality around it, there was no clarity around which clinician

would attend IMTs that from a haemato-oncology perspective. There was very clear requirement for attendance from the unit and, for instance, from Infection Control and Estates but there was much less clarity about who from our unit should attend an IMT.

160. The concept of chilled beams isn't something that would necessarily have caused me to have any concerns because if you went to any medical or nursing professional outside of RHC Glasgow and said, "What's a chilled beam?" they would have no idea. Nobody learns about chilled beams and alternative climate technology in medical school or nursing school. That was part of the difficulty that we had, that we were being asked to comment on things that we had absolutely no idea about. "Is that condensation or a leak?" and "Is that important?" and "What's a chilled beam?" – how would we know? We do not have the training to be able to answer those questions, so we would need to refer back to colleagues in Estates and question if water coming off the beam was really how it was designed to work. The introductions of chilled beams I presumed was simply a technical innovation. It was not in any way connected to the types of patients we were looking after.

161. All we were told was that the unit would be air conditioned or would have temperature controlled in a modern way in keeping with this brand-new building. We were given lots of assurances and there was no reason to have any concerns.

162. I couldn't tell you when we first raised concerns about the chilled beams, but it was towards the beginning of the process because the chilled beams were removed after we had moved.

163. We highlighted that there was water coming down from the chilled beams. Workers would come and put trays underneath to collect the water that was dripping down. Again, there were all kinds of questions about, "Is the water condensing on the outside of these beams and dripping down or are the beams themselves leaking?" I can certainly remember similar questions being

discussed at IMT meetings. We were becoming concerned about the chilled beam as a potential vector of infection.

164. There were concerns from day one that it was an ineffective way of maintaining the temperature in the ward because it just didn't work. It was sold to us as a brand-new piece of kit that was a green way of temperature control, avoiding the more traditional air conditioning units that might have been used, but there were rooms that we knew were hot and the parents always used to complain about, asking not to be put in those rooms.

165. Had a chilled beam simply been dripping water down onto the floor, there would have been a concern that there was a water leak and just like in your house, if you've got a water leak, that's a vehicle for infection. But it is a more significant concern when the environment is the one in which I work, an environment in which we are placing patients.

166. We knew that some patients experienced water dripping on them. This would be reported. I'm not sure what would have been said, but we would have reported the fact that there was water coming off the chilled beam. It would be addressed quickly, so it's not the case that puddles were forming. There were trays I mentioned placed under the beams to collect the drips. I am not aware whether the water being collected was simply to avoid puddles or if it was the infection control saying that they needed the water to be collected so that they could check for infection. The IMT minutes might give answers on that point.

167. For staff who are sitting there, and the water is dripping down in front of them as they're working, it is clear that you have this piece of kit that isn't right. I think that was the genesis of the concerns. We were not necessarily thinking that it was going to have an effect on the number of environmental infections we would get but that kind concern gained momentum over time.

168. Mitigations around airborne infections are a bit more difficult to introduce. If you have problems with the air that's coming in, the only way of sorting that out is to filter it in some way. If what you have put in for your temperature control, for

example a chilled beam, is making the problem worse rather than better, then you're in trouble.

169. I'm not aware that it was ever established whether the water coming from those beams, was leaking from inside the beam or from condensation outside. From my perspective, the net effect was the same in terms of increasing the infection risk to my patients, as well as practical issues such as having to close off beds because of leaks onto them.

170. I don't know if Schiehallion was the only bit of the children's hospital that had chilled beam technology in it, so I think the chilled beams are in place all across the children's hospital. I don't know what they did in the adult hospital. This would be easy to discover from Estates.

171. With the chilled beams now removed, our temperature is controlled by a massive air conditioning systems. The chilled beam does remain in ward 2B.

172. I attended the IMT meeting on 6 September 2019, Incident Management Meeting Minute, dated 6 September 2019, relating to Gram-Negative Bacteraemia **(A36591637 – 06.09.2019, IMT Gram Negative Blood Ward 6A, Bundle 1, page 354)** during which there was a discussion about chilled beams. By this time, Teresa Inkster was no longer chairing the meetings. The atmosphere was not good. The new chair took a stance that was in many ways diametrically opposite to the previous chair. She did not appear to believe there was an outbreak of any sort. The pressure from the chair was to close the incident down and move on. That didn't make for a very effective meeting.

173. The minute gives you a flavour. The Chair's view was that chilled beams were acceptable, and this was in Scottish Government guidelines. I am noted as saying that the guidance was not explicit that they were acceptable in areas treating neutropenic patients. Tom Steele is noted as supporting that view.

174. On the discussion about chilled beams, my recollection was that Tom Steele initially found it difficult to accept there was a problem, but this may be because he was not presented the information in a timely fashion. He must have changed his view because the chill beams were removed from the ward.

175. The “Patient report” that is summarised in the minute reflects my concern that the type of organisms and the mixture of organisms we were seeing in individual patients were unusual. Normally, even with these unusual infections, there would be one only one organism grown in, for example, a stenotrophomonas septicaemia or an Elizabethkingia septicaemia.

176. Very occasionally you would see maybe a Gram-positive or a Gram-negative in the same bottle and then you might have a conversation about did the Gram-positive come from the hand of the person who took the blood or from the person who was plating it out in the lab? You would think about all possibilities. It's not particularly unusual to see two bugs in a blood culture, but it would always raise further questions. To see three organisms in the same culture is highly unusual. To see five, is a once in a working lifetime event.

177. There were suggestions that because patients had been in and out of hospital, at home some of the time, it couldn’t be said that these were all hospital acquired infections. I accept that there is the potential for getting infections outside the hospital. Indeed, most infections in immunocompromised children are endogenous, this means they are organisms that normally live on the skin or in the gut and escape into the blood stream. However, these are not environmental organisms. What I find difficult to accept is that a single patient can grow 5 organisms, some of which are known environmental organisms and these all come from the family environment. In my view, it defies credibility that this wasn’t a hospital acquired infection.

Closure of Wards 2A and 2B

178. The sequence of moves, out of 2A and 2B, to CDU, 6A and 4B is difficult for me to be precise about without seeing a timeline. I don't recall issues in 4B or environmental concerns for the paediatric transplant patients there; I had very little to do with 4B because I just don't interact that much with the transplant patients but I'm sure that my transplant colleagues would be able to give you much better detail about numbers of patients transplanted over that time that and if they had any infections that were unusual in that patient cohort.

179. The specifics of the temporary closure of Ward 2A in 2018 I can't remember; beyond the fact we moved and attempts at remediation were made.

180. By the point when we were decanted from 6A to CDU, I'm sure that I had concerns about the CDU environment too. By this time, which I understand is January 2019, I would have concerns about anywhere on the QE site because every clinical area we had been in was proved to have defective build issues.

181. I really can't recall the timelines around the longer-term closure of wards 2A and 2B, but I know that the dates will be well documented. What I do remember is that we had sustained and continued unusual infections in our patient population despite remedial measures being put in place and despite the categorical reassurances that these remedial efforts were going to be effective. There came a point where there was a loss of confidence in the physical environment.

182. My understanding is that the moves out of ward 2A and 2B was in part because of our concern about the rate of infections and the possible link with the water supply to the ward, rather than because of specific concerns about the rate of respiratory infections. There were growing concerns about the water supply was because we had an increase in unusual Gram-negative infections. Some of these we knew were environmental infections that could be spread in a water supply.

183. There was unanimity of opinion amongst the clinical staff that we wanted to be off the unit. Prof Gibson, as our link with managerial colleagues, may be better

aware of what was going on and I'd have thought it would be documented at IMTs.

184. I had remarked to managerial colleagues, "I have friends who are military physicians, and they could build you a hospital literally right underneath where we are by that back door within a week. You would have a separate water supply. You would have filtered air. They would do that for you in 24 hours. Why don't you do that?" I understand what the media impact of that would have been and can understand that this would have been seen as a solution of last resort.

185. I do understand that getting the military involved would have been politically contentious. However, I think it shows the anxiety I had at the time and my willingness to embrace any solution.

186. I think there was a period where we knew that we were not going to be on 2A, 2B, possibly in the next week or so, and it was not yet decided where the decant would be to, nor whether that was going to be a stepping stone to somewhere else or a permanent solution.

187. The transplant team would have stipulated that the transplant patients needed to be in a transplant environment, so that was 4B. We were very clear that if the transplants were to stay in Scotland, they would have to go to the Adult Transplant Unit. There was a very clear decision to take: do they decide that Scottish children requiring transplants should be transplanted out with Scotland or are they going to transplant them in Scotland? If they're going to transplant them in Scotland, there is only one place that that can happen and that's ward 4B because that's the national transplant centre for adults in Scotland. We had that degree of input into decision-making about decant locations, but we had, as far as I'm aware, no input into whether we were going to be in another ward in the children's hospital or moving to the adult hospital.

Experience in Ward 6A

188. Again, I can't recall when the move to 6A happened, but I think that the fact that it was available was probably the most attractive thing about it. There needed to be a minimum number of beds. It would have to have had a minimum number of rooms for the doctors, nurses and pharmacists and everybody else to go into. Clearly, we had far less accommodation than we had on 2A, so it was a minimum requirement as opposed to what you actually need to run a functioning unit. Those kinds of factors would have limited the options and, once the transplant patients were removed, then, standard haemato-oncology patients could generally be in any hospital environment.

189. Once in ward 6A, we would notice things that we didn't have in 2A/B both good and for bad. Much of the built environment was exactly the same, so the bedrooms were the same size, the huge bathrooms were the same size and all of that was standard. In fact, the layout of 6A was better because it wasn't on a racetrack curve so you could actually see where people were. Where our day care went was not great for the day care staff because the facilities were much worse than 2B and there was little divide between day care and the ward, but it was a spectacular glass-fronted room that gave you views over the hills and allowed natural light to flood into that part of the unit.

190. In retrospect it is not surprising, but we rapidly found similar problems on 6A with build quality. We had fungus growing behind the walls in the showers as plaster board rather than water-resistant board had been used. Such fundamental flaws were disappointing to say the least, in what was supposed to be Scotland's flagship hospital. Furthermore, physically being away from the children's hospital meant that there was perceived difficulty with being away from support. That wasn't just us, it was for those who were providing support. For instance, we were physically further away from the Intensive Care Unit, so if our children became unwell rapidly, we were physically, further away on 6A than we were on 2A. The reality was that no child was put at excess risk because you were further away from a PICU. But that was of no reassurance at all to particularly my nursing colleagues or my clinical colleagues, nor was it reassuring to my ITU colleagues who felt that they were being pulled out to a part of the hospital they didn't know.

191. Concerns began to rise in 6A because infections were continuing, the rates weren't going down and then you just saw rotations of rooms being blocked off and put out of use. You'd ask what was going on and the nurse in charge would say, "Oh yes, there was a problem with the filters overnight" or "The sink burst open" or "The toilet fell off the wall", and these things just became endemic. We were becoming concerned that the physical environment we were in was probably no better than the physical environment we had moved out of.

192. There was a very real disconnect, emotional and physical, from the children's hospital. Again, that contributed to staff turnover, and it contributed to a degree of staff absenteeism, so there were some very major downsides to being physically separate from the children's hospital and some that you wouldn't have thought of. For example, in a children's hospital you bump into paediatricians the whole time, so you can have a corridor conversation, just routine chats but opportunities to talk about cases or pick colleagues' brains. All of that stops when we lose the integration with the children's hospital and, while that can't necessarily be quantified in an outcome's metric, I'm in no doubt that it directly impinges upon day-to-day working.

193. Overall, I think it probably took longer to get our jobs done in ward 6A. It was about the physical space that staff had, so trying to find room for pharmacy colleagues, trying to find a treatment room that could take the right number of nurses, trying to find a doctor's office that allowed staff to just not get in one another's way, trying to find a room where you could take parents to break bad news. You would be waiting for rooms to become available so that you could then go on and do your task. It was a more inefficient way of working.

194. I don't recall being told anything specific about the likely duration of the decant. I don't actually know how long we ended out for, but it was a lot longer that we had imagined. As far as I can remember, what we were told was pretty much along the lines of "You'll be up on 6A until we fix the problems on 2A and that shouldn't take too long." I don't remember anything specific in terms of number

of weeks and I doubt that any manager would have enough information to commit to a time frame. The underlying feeling was we will be off the ward for as long as it takes to fix the problem, but it shouldn't take huge amounts of time.

195. Had we known at the outset that had we would be out of ward 2A as long as we were then I suspect I'd have been knocking on Jane Grant's door saying: "You need to build us a new Children's Cancer Unit," That's what we said to her in a face to face meeting when she came over to the Children's Hospital, to talk to senior clinical staff in our area. I believe it would have taken a much shorter time to build a new unit from scratch than it would have been to complete what they retrofitted.

196. There would have been the softer concerns around a decant to the adult hospital too. It would have been nice to stay in a children's hospital for instance. Logistically, getting adult staff who may be coming through the ward to be Disclosure Scotland trained would have mitigated against going into the adult hospital. But we acknowledged that those considerations were obviously outweighed by the availability of space.

197. As clinicians, our main concern was to get off Ward 2A/B and into anywhere our patients would be safe. That is why there were huge amounts of frustrations when 6A had all the problems that it did, but honestly, I think whatever ward we went to, there would have been similar issues If you put a vulnerable group into a building, you will stress that building and you'll find out whether it's fit for purpose or not.

198. In terms of the Schiehallion protocols for the more vulnerable patients, we were confident that they could be implemented in a new environment. While we had very little input to the choice of new location, we were very clear that the environment that we went into had to be safe for our patient population. There had to be an understanding that where they were being moved to was clinically safe and clinically appropriate, but beyond that, there were no specific stipulations.

Concerns about Infections

199. The concern was not only that there were environmental Gram-negative line infections, because some Gram-negative infections are inevitable when you are dealing with the patient population that I deal with, but it was the number of them and their various types and then we were informed that the new, unusual organisms were associated with water. I should emphasise that saw gram negative infections in the old Yorkhill, but not in such high numbers nor with such a preponderance of environmental organisms. The concerns were arising within months of moving into the new hospital in 2015. One organism that's associated with water doesn't immediately make you think, “I've got a contaminated water supply,” but when you get numerous organisms that are associated with water, that you have not heard of previously, then you start to get concerned.

200. There was a reflection that we had environmental Gram-negative infection rates that were unusual even by our standards and you’ve got to remember we are used to dealing with unusual bugs, so if we don't recognise them then they are pretty unusual. They increased in number, and they increased in either rarity or complexity and when you face that situation you will always be asking, “Where is that coming from?” That's not just you as an individual or you as a clinical group. There will be a discussion amongst the wider multidisciplinary team as to why are we getting so many infections and what can we do about it.

201. The kind of organisms we were coming across and were causing us concerns were things like Elizabeth Kingia, the stenotrophomonas, so the wider pseudomonas family. Our concerns were echoed and possibly by microbiology colleagues who joined us weekly.

202. We obviously saw cryptococcus in 2018, and one infection is one too many, but we weren’t seeing the kind of high numbers of unpleasant respiratory infections that we were seeing compared with the high numbers of environmental Gram-negatives. We were certainly seeing an increase in counts, (mainly fungal counts) that the Infection Control team were doing. The number of

environmental Gram-negative infections in our patient population was greater than was being seen anywhere else, with organisms that we, as individual clinicians, had never previously heard of but got to know incredibly well. That, combined with known problems with the water and the fixtures and fittings on 2A, I think led to the move.

203. It is difficult to unpick the sequence of that or whether one issue was more important than the other. For us as clinicians, the overriding priority was infection. We were seeing a huge number of environmental Gram-negative infections which we didn't understand. We didn't have the skill set to determine if the problems were as a result of a tap or a shower or a drain or from air conditioning. That's not a clinicians' job. What is for us to highlight is that we're seeing these very unusual infections and to seek assurances that the environment is safe. For us to carry on doing what we do, we have to have absolute confidence that our environment is safe, so the move was a response to all these concerns.

204. You cannot underestimate the potential lethality and the very real increase in hospital in-patient days, ITU inpatient days, that these gram-negative infections potentially had (and were having) in our patients. Our patients were at high risk because they were getting these infections. So, as clinicians, doctors, nurses, microbiologists, our duty of care was to our patients and to ask, "Why are our patients getting these very unusual infections? Is it something we're doing? We need to look at our own practice," which we did.

205. Once you've taken that out of the equation, then you've got to say to yourself, "Well, if it's not practice, where is it coming from?" That's when you start to question if it is coming from the environment and colleagues from Infection Control and microbiology were also becoming very anxious about the number of infections being detected. They would have been escalating it up their managerial chains. From our perspective, it was the environmental Gram-negative infections, things like stenotrophomonas, all the pseudomonas and the other unusual water borne infections that caused concern about the environment.

206. All the patients in whom we isolated those environmental infections would have been admitted as inpatients. It wasn't the case that the patients were coming to day care, we were taking blood from them and two days later you got a result that says they've got a Gram-negative infection. These are children who are on the ward because they have either been admitted with fever or they develop fever on the ward and you are taking blood cultures, urine cultures, stool cultures from them.

207. Part of the difficulty was trying to explore whether these were hospital-acquired infections or possibly water infections from another environment, for example from the patient's home or their school. Clearly, water is everywhere, so a lot of reflection we were getting from Infection Control and senior managerial colleagues was, "Well, these patients were outside hospital before they came in with fever, so you can't say that they picked up their bug in hospital." That's very true, obviously. If you've come in from outside, there's always the possibility that the water-borne infection can come from outside and therefore that's absolutely a reasonable line to take. I think the concern was that these bugs were so unusual in our population, so if they were being picked up at home, why had we not seen that five years ago and 10 years ago? These bugs weren't suddenly appearing in the wider Glasgow water supply. Or if they were suddenly appearing in the Glasgow water supply, why were they not being seen in other people?

208. When we asked our colleagues around the rest of the United Kingdom, "Are you having problems with these kinds of organisms?" They weren't, so it was very obviously a problem with the area within which our population lived. On the one hand you can say, "Well, they were out of hospital for some of these infections, therefore you can't say it's in hospital." On the other hand, the only commonality you have between a child who, say, lives in Mull, one who lives in Glasgow and one who lives in Dumfries and Galloway, is that they've all been in our hospital. There are two sides to the coin and the longer it went on, the more you get concerned that it's the commonality that's the issue here, not the patient's water supply in their own home or their own school.

209. Though the issues were specific to Ward 2A the vast majority of the time, it is fair to recognise that potentially some of these children would have been admitted to other wards in the hospital. Much like it could be argued that the children could have picked up the organisms from outside the hospital, you could say they picked up infections from other wards in the hospital. However, my understanding was that there was extensive work done and no other source of infection was found in any other ward in the hospital and no other children who were immunocompromised, say for instance because they have a congenital problem that caused them to be immunocompromised or they had, for example, HIV were seeing the infections.

210. Within our hospital there are many children who are prone to infections for all kinds of reasons and as far as I'm aware they weren't seeing an increase in infection in those populations. Our concern at that point was that the problems seemed to be specific to the area of ward 2A.

211. Our concerns were discussed at our Friday lunchtime meetings, at our weekly grand round, attended by the microbiologists, and we would discuss the infections seen in our current inpatient population, whether they were on 2A or wherever they were in the hospital. The discussion at that stage was recognising that a child had an unusual infection and that we had seen a similar infection previously in a different child. We would discuss possible sources of infection. Initially the discussions were not particularly formal, but the Infection Control teams certainly became involved, and I think the mechanism for that was the microbiologists going to them, though I would say that the distinction between the microbiologists and Infection Control wasn't clear at the start of all of this.

212. We had colleagues from the hospital Facilities team coming along doing things like purges on the pipes and other kinds of physical interventions.

213. I can’t recall when they began to fit tap filters, but we were told that these were ways of trying to minimise transmission and that if there were organisms in the water supply then these things would help filter them out. I was not privy to the decision-making process that led to their installation.

214. With the passage of time, it is difficult to remember the other steps that were being taken but there was a major focus on hand hygiene and line technique at the same time. The shower heads, I think, were also changed and I can't remember at that point if we were having a look behind the walls to look at fungus. There were the tap filters and taps put out of use at times and bottled water used but without a timeline I can't remember the order in which these things happened.

215. I think it is fair to say that while it may not have been confirmed that the water was the issue, the genuine concern at that stage was that it could be the water, hence the precautions and the measures being taken.

216. I’m not sure what was going on behind the scenes in those early stages but, as far as I can recall, I wasn't involved in any formal processes to escalate the concerns. I was certainly involved in clinical discussions. I remember wondering if it might be to do with the delivery of water to the hospital, whether it was to do with the local sewage farm, whether it was to do with the componentry in the taps, or the componentry of the sinks. I think that all mainly evolved rather than there being a clear distinction between one to the other.

Potential Causes of Infections

217. In terms of the nature of the infections that were being seen, we believed that they pointed towards water potentially being the issue. There were plenty of other postulates knocking around, ranging from “This is nothing to do with the hospital, this is all to do with water supply” to, “The families are exposed outwith the hospital.” There were the theories that questioned the personal hygiene of patients and there were the theories that questioned the personal hygiene of

staff. Once all these things had been looked at and addressed and infection rates weren't changing, then in a way you just whittle away all the other possibilities and what you're left with is the likely cause. It was probably a couple of years in that the issues were being addressed more formally, probably at the stage where they became matters that were being discussed at the IMT meetings. We did become aware of formal meetings when they were purging the pipes.

HAIs

218. I'm not sure of the textbook definition of the terms "hospital-acquired infections" and "healthcare-associated infections," or their differences. I'd say "hospital-acquired" means very clearly that you acquired it within the hospital. "Healthcare-associated" means an infection that is seen in patients who have had a wider healthcare connection. There may well be a clear difference between those two things but, as a clinician, I don't have the training to answer that question.

Communications about Early Infections and Actions

219. I certainly think the communication increased and probably improved over time. There was a process where the on-call consultant and the on-call senior manager of the hospital, usually Jen Rodgers and Jamie Redfern went round and spoke to the staff who were present on the ward, went and knocked on the doors of every individual patient and parent who was there and made themselves available to families who wanted to come along and have further conversations and there was a very clearly defined procedure on how you gave information out to staff colleagues who weren't on duty at that time. That evolved over time. I think there was a realisation that communication needed to improve.

220. What we were being told as clinicians probably came from our discussions in the department. Again, the Friday meeting is the big clinical meeting of the week. It planned for anything that was happening over the weekend. For

instance, a lot of the attempts to clean out the water supply happened at the weekend, so that was always very clearly detailed because you had to know when the water was going to be turned on, turned off and what we would be saying to families whilst that was happening. That would have been a formal process, but there would also have been discussions at the lunchtime handovers every day and it's perfectly possible that Prof Gibson, or whoever had been at the last IMT, would have at that point said, “At the last IMT they said if we get another one of these infections the following things are going to happen, so we need to get back to them to say we've had another infection.”

221. At the start, it was all pretty informal and there was no communication strategy of which I was aware. By the end, communication around what was happening and when it was happening was much more formalised, so a strategy was in place. A lot of that was driven by the clinicians, prompted by the families, or prompted by the knowledge that if we didn't have a communication strategy with the families, then it was going to make the ward round the following day much more difficult because you would be explaining to every parent what was going on and potentially between gaining knowledge and imparting knowledge patients would have gone home. We were therefore very keen to get a clear communication strategy, but that's probably because we'd learned from experience that what we thought was not important to communicate, actually turned out to be very important to communicate.

222. In terms of the communication strategy that was present at the end, there was agreement within the IMT about what we were going to tell external agencies. Earlier in the process the ward-based clinicians had a clearly stated desire for a more robust communication strategy. The importance of this became clearer to other colleagues within the IMT later and the standard of communication improved dramatically over time.

223. We had a formal process around external press releases, and we had a formal process around agreeing what our position was and how we were going to communicate that with the families and what that communication would say. I

think that we even rehearsed questions: “If someone asks this question, what's the response to that going to be?” and so we pre-empted those kinds of concerns. So, yes, very much at the end, there was a formal communication strategy, but that was certainly not the case at the beginning.

224. In terms of internal communications, I don’t believe that there was a different strategy when communicating with staff than when communicating with patients and families. From a clinical perspective, there was no hiding the information we were getting from Infection Control or managerial colleagues and there was no hiding the information that we would then relay to the families. Individual infections were discussed with individual families, along with information about what was being done to tackle the infection and to stop it recurring. We had no evidence as to the causes of the environmental infections, so it would have been unhelpful to speculate, but we were clear when talking to families about why measures were being taken, for example bottled water being used as a precaution because that there was at least a possibility that the reported infections were as a result of the water supply. The core content of the messaging would have been common, but how we conveyed that would obviously be adjusted to meet the needs of individual families. As with the external communications, the process to develop the messaging evolved over time. At the beginning, it would not have been clear that we needed to develop a process, so it was quite informal. However, as the problems continued, the need for effective and consistent communication with the families about what was going on became increasingly important.

225. We also set up an “official” Schiehallion Facebook group. We were aware that the families had their own closed Facebook pages, and we had concerns that it was not always accurate or helpful. We also knew that some staff had been named and criticised in some postings. Rather than trying to get involved in that conversation, it was decided that the best thing to do was to set up a separate Facebook group where you could put, essentially, an agreed line of communication, an agreed strategy, without it descending into the kind of unpleasantness that social media can descend into.

226. I was not involved with the hospital's Facebook pages or any of its content, but it was intended to provide a more factual discourse of what was going on.

227. To sum up my views on communications, it was poor at the beginning, with no strategy. It evolved as a strategy, and by the end of the outbreak communication was well thought out and robust. It was well delivered to individual patients by senior clinical and managerial teams. However, that strategy should have been in place much earlier.

Views on IMT Process

228. To this day I'm still not clear what my role was within the IMTs and whether I was there as an individual or to represent Prof Gibson or to represent my department. There didn't seem to be any formal process about which of the Haemato-Oncology clinicians were to be at the IMT. It evolved into the consultant of the week who was on call going to the IMT. The consultant of the week title refers to the individual who is on call for the ward during the week, so the consultant who is on for seven days on the trot, covering any patient who comes under the service of ward 2A, 2B, regardless of where the patient is in the hospital or even outside the hospital.

229. At the start of the process, we all assumed that Prof Gibson was representing us, but I don't know how many she attended. I have no idea what the terms of reference were for the IMTs, for example if it was quorate if there wasn't a member of the Haemato-Oncology team present and I don't know what proportion of the IMTs had a member of our team present.

230. When I did attend, my understanding was that I was there as the consultant of the week and my views were the views of a member of the Haemato-Oncology team. It was never made clear that I was representing the team as a whole. I'm not sure who issued invites to the IMT or how they were conveyed. It was a bit like, "Are you going to the IMT today? Who's going to the IMT today? Is there an IMT today?" All the standard meeting stuff that you might expect to have,

like minutes and agenda prior to meeting, quite often that was given to me when I arrived.

231. I was concerned about the IMT process, or lack thereof. When was I going to be invited? When should I be invited? Who was I representing? What group was I representing? Where's the minutes of the previous meetings? Why is there no constant narrative? In other words, if I'm brought in every four months or every six weeks, what's happened in the intervening period? Why am I not involved in that process? Maybe the greater IMT thought so long as there was representation from a clinical group that that then meant that the whole of the narrative arc was known to the whole of the clinical group. I can't recall the frequency or how I was invited. Certainly, by the end, the IMTs were convened if there was another environmental Gram-negative infection, but early on, when they were trying to work out whether there was an outbreak and if so, what the cause the outbreak was, they were certainly more frequent than that, but I don't know precisely how frequent they were.

232. I don't recall any specific incidents at IMTs that I would raise as particularly noteworthy. Very clearly, when Teresa Inkster was removed from the chair and she was replaced the tenor of the meeting changed from, "Let's try and find out why this outbreak is occurring," to "We do not have an outbreak and we need to stop all this talk of there being an outbreak." It felt like the new chair was trying to shut the process down. That is why we asked at the final but one IMT, "Please be clear with us. Do you believe that there is an outbreak of environmental Gram-negative infections in this hospital?" This was when it was being described as a pseudo-outbreak.

233. The response was obfuscation. We pushed the point and I'm sure that the minutes will confirm that, but there was no clear message that, "Yes we have an outbreak here and we need to do something to fix it." The result of this obfuscation was frustration on all sides.

Infection

234. Infection, whether endogenous or arising from the environment, in or out of hospital, is always a risk for children with cancer. There is a limit to what can be done to prevent it because some of these infections are endogenous, so the bulk of infections that our children get, they get it from either their own gut or their own skin. The rest of them, if they're in a safe environment, they will get from contacts, for instance friends, parents, or staff.

235. For instance, in the 1970s children with cancer were isolated, they were placed in very sterile environments and there was no decrease the number of hospitalisations they had, or the number of ITU admissions or deaths compared with children who were not rigidly isolated. What that shows us is that immunocompromised children are at risk from their own organisms and at risk from infections, such as respiratory viruses that all contacts have. There is only so much you can do to mitigate those things.

Central Lines

236. There are essentially two different types of tunnelled line. There's an implanted line which is called a port-a-cath, so the whole of the line is implanted and there is a different type of line, where the bit where you take blood or give fluid is externalised. That’s called a Hickman Line or a Broviac. PICC Lines are similar but not tunnelled.

237. There's either a line that is completely covered by skin and you access that by pressing a needle through into a reservoir or a chamber that you've implanted into the child, or there is a line without a reservoir and externalised access.

238. The advantage of the one that's wholly underneath the skin, called a port-a-cath, is that they're easier to look after, the child can swim and bath and wash with much less problem. They're obviously much less easy to pull out. The disadvantage to them is that every time you access them you have to go

through skin. For the child that means a potentially painful procedure, but you numb the skin first.

239. Conversely, with a Hickman Line, which has the lines actually coming out of the child, the advantage to those is from the child's perspective in that it's not painful when you access the line. The disadvantage to them is they are much easier to pull out, they're more of a pain to dress and cover and they potentially hurt if you are having childhood rough-and-tumble, and someone bashes into them. They have a very slightly higher infection rate.

240. So, the big distinction is your line is either completely internalised or it has an externalised component.

241. We have very clear SOPs around how you access the different types of line about how often they are flushed. Again, there are different SOPs on how they're dressed. So, there are very clearly documented ways of how you look after both the line itself and the child in whom the line is placed.

242. The Hickman Line has a little spongy-type surround that encourages the skin to heal up over the line. Obviously with a port-a-cath it's below the skin, so the risk from infection on the port-a-cath is as you puncture through the skin to get into the line itself. The risk from a Hickman type line is that you have an opening in the skin where the line goes into the patient.

243. Any line has potential to cause an infection because it's foreign to the body and its plastic. Your body will naturally try and reject it. It also acts as what's called a portal of entry, because you have broken down skin where that line is, so you try and minimise that. Most line infections will be what are called Gram-positive bacterial infections because those are the kind of organisms that live on your skin and therefore either crawl in through the potential gap with a Hickman or are pushed in when you when you insert a needle into a port. They can also enter the blood stream directly through dry, broken skin and secondarily infect the line.

244. You can also get Gram-negative infections and those are mainly gut associated. You can get those because the gut is leaking and the organisms get from the gut into the bloodstream, and then from the bloodstream into the line, and then from the line back into the bloodstream. Or you can get them because children are children, and they have their hands down their trousers or nappy and then they take their hands off and play with their lines. Adults are adults too. They might have a quick toilet visit and forget to wash their hands.

245. The majority of line infections are Gram-positives, most commonly Staphs and streps. They tend to make the child unwell, and we treat all fever as if they've got a line infection. Though they tend to make the child unwell, they generally don't make them really, really unwell. In contrast, Gram-negative infections have the ability to make you really, really unwell. Not all of them do. In fact, the vast majority of them don't, but if you were to leave a Gram-negative infection, that would be very, very serious. For instance, if you are going to ITU or you die from a line infection, it's much more likely to be a Gram-negative line infection than a Gram-positive line infection.

246. You can also have fungal infections in your bloodstream. It is most likely that the fungus has got in from their gut (from their mouth down to their anus) and then got into the bloodstream and then got into the line, as opposed to the fungus being on the skin and getting into the line, but we never know.

Monitoring of Infections

247. All positive infections are notified to us by microbiology colleagues and automated systems. I've no idea how Microbiology and Infection Control communicate between themselves, but I know that they do and I know that's changed as a result of the whole process that led up to what we're talking about. For instance, we have what's called a run-through chart where we look at our number of infections over time. We have our own internal audit processes. We have a line database, but the institutional control is with Microbiology and Infection Control.

248. We had very real concerns about the number and type, particularly of Gram-negative infections, we were seeing. At the time, we didn't know what the aetiology of this increased number of Gram-negative infections were. As I mentioned earlier, knowing what I know now, I believe that, on the balance of probability, they were environmentally driven.

249. Infection Control is different now to how it was when we first moved across in 2015, or at least it feels different. We always had a very good working relationship with our Microbiology department. We probably had limited awareness of the difference between Microbiology and Infection Control. We certainly knew there was an infection control nurse colleague, but in terms of the kind of separation of powers within the microbiologist world, we weren't aware of that. We were just aware that we told our colleagues in Microbiology and they would take whatever infection control actions were needed.

250. Our early concerns about infections in the Schiehallion unit were echoed by our Microbiology colleagues, so Teresa Inkster, for instance, who at the time was Infection Control lead, I think. Had you have asked me at the time how Infection Control operated, I would have acknowledged that, frankly, I didn't even know we had an Infection Control lead.

251. I had had regular dealings with Teresa Inkster for many years. I saw her as a microbiologist, which was simply a reflection on my own limited understanding of the difference between Infection Control and Microbiology. I certainly knew that there was an entity of Infection Control because we used to talk about the Infection Control police coming to the ward, to make sure you wash your hands and take your rings and watch off and that kind of thing. That was very much at a practical level. I never needed to give thought to a systemic Infection Control overview or a strategic Infection Control body. It was obviously there, but if you don't have a problem, you don't notice it.

252. I had very little involvement in any investigations in relation to the origin of infection or infection risk. Our job as clinicians was to highlight if we had

concerns, which we did, and it was to attend the IMT when invited. There were a couple of occasions where you went because you were concerned that things weren't necessarily highlighted to colleagues on an IMT and you wanted them highlighted. That was our input into the process.

253. We saw very much our job was to recognise the unusual within our patient population and reflect that to our colleagues in Infection Control and Microbiology. After that it is for them then to work out why these things are happening. Our job is to present the issue to them for them to do the investigative work behind it.

254. Having said that, we were very clear that we were concerned that there was an environmental component to the bacterial infections being reported and it was very clear that that was not a message that people wanted to hear. There will be minutes of IMTs very late on in the process, where we ask very clearly, “Do you believe that there is an environmental problem within the children's hospital, because the message we're getting is you think this is a pseudo-outbreak.” I don't think we ever got a straight answer from the new IMT chair if they believed that this was a true outbreak or a true environmental problem and that was frustrating.

255. Sometimes there was pushback was from Estates colleagues. It's understandable that they know far more about boilers and air conditioning circuits and chilled beams than I do, so many of the questions that I would have been asking, or statements that I might have been making, may well have been nonsensical to someone who was a professional in those areas. They might have been a bit put out by that. I was aware that Infection Control colleagues were very concerned that the infections that we were seeing were linked to the hospital environment. I don’t think they were eager to prove they were. I think they were as eager to prove they were not. What they were eager to do was to say, “These infections that we are seeing in this population may be directly attributable to the environment in which they are looked after, and we need to exclude that.” That was their starting point.

Medical Safeguards to Mitigate Infection Risks

256. In terms of clinical measures to try to reduce the infections, we looked at the way we approached accessing our lines, from the second they were put in in the operating theatre all the way through to how colleagues accessed those lines to either take blood or give drugs and the whole of that process was reviewed. We did also institute prophylactic measures to try and decrease the number of infections at the request of our colleagues in Infection Control.

257. Those were the two big areas. One was looking at lines and how they were placed right from the decision to place a line through to how did that then physically happen in the operating theatre. Then what happened to them after they had left the operating theatre? What happened to the child when they came back onto the ward? Then how did we routinely access the lines? The technique of accessing and flushing lines was looked at in minute detail.

258. The green caps were introduced as a direct consequence of the infection concerns. It was an easy step to take, and it is an additional safeguard. I think there were changes in the way the lines were organised, in terms of trying to get them all done on a single list rather than being done out of hours on an emergency list. Whether there were changes to the skin prep, in other words, the chemical used to wash the skin down prior, I don't know. It was certainly looked at. Nursing colleagues would be able to tell you much more about that than I can.

259. What I would say about all these things is that what we have seen is a huge diminution in our number of environmentally associated infections. Our difficulty is that we don't know which of the many, many changes that we instituted have made that effect. Whether it's some of them or the sequencing of some of them. It's just impossible to unpick multiple changes.

260. Most of the measures, such as the green caps, are still in use. They wouldn’t do any harm as additional precautions but there are also cost implication. There was also a downside to using oral prophylaxis with quinolones and that's why

we stopped doing that and swapped over to a different approach to prophylaxis. Again, you can argue whether there's any evidence base to prophylaxis being effective, but it's very difficult to stop doing something when the whole of your process has produced a massive change that results in world beating low numbers of infections, as we have now.

261. Advice was given to clinicians around the management of infection or infection risk. This was always the case and we worked very closely with our Microbiology colleagues about that. We also have Wednesday afternoon educational meetings where we would have regular discussions, say, of a paper around management of infection in children who are immunocompromised. The education sessions are unit based and staff from all disciplines attend. We will either have an Infection Control person there as a guest speaker or we will get them along to comment on something that's being presented by a member of the team. Microbiology and infection control colleagues attend every day at our lunchtime handover, and they have an expanded role on the Friday handover. We now collect weekly data on how many line infections we have had in the previous week, and that is presented and recorded: a bit like on a building site, “It's 10 days since there was an accident on this site” I think we did that after Mike Stevens’ review. We also have a review of our run charts every three months. So now there is a lot more formalised approach to looking at our line infection rates, this has been good for staff moral as we can now see how well we compare with other units across the world. It is a source of pride we now have world beating low incidence of infections.

262. Overall, I would certainly say that I and my clinical colleagues have a very positive relationship with Infection Control colleagues and the kind of education and the advice process that flows between us.

Infections and Environment

263. There are certainly cases where, in my view, there is a link between patient infections and the hospital environment, and those infections had a significant

impact. For example, we certainly put patients into the Intensive Care Unit with environmental Gram-negative infections. They were very seriously unwell and needed to be ventilated. I could not say precise numbers, but those details will be recorded somewhere.

264. A caveat I'd add is that a proportion of patients with Gram-negative infections will go to the Intensive Care Unit. A significant proportion of those will require ventilation or pressors, which are drugs to maintain your blood pressure, on an Intensive Care Unit and, very rarely, some of those patients will die. There is, therefore, an accepted risk of overwhelming Gram-negative sepsis with chemotherapy (to the point that the latest CRUK consent forms for chemotherapy explicitly state a risk of going into the Intensive Care Unit and dying) The likelihood of that risk is very, very low. However, in our population we saw a high number of Gram-negative infections and we saw a proportion of those patients go to the Intensive Care Unit and we saw a proportion of those patients in the Intensive Care Unit get very unwell.

265. As I mentioned before, it's very difficult on an individual basis to directly ascribe their particular infection to the environment. But what you certainly can do is step back and look at the number of unusual infections we saw in our patient population, and I was very concerned that we had a problem related to our environment

266. I can only talk about solid and brain tumours, because I discuss those every week with my solid and brain tumour colleagues. I can remember that there were patients who got overwhelming infections, in this group. Some had their treatment delayed as a direct result of infection. Among these were patients where the infection meant we had to put a longer gap than you would normally have between chemotherapy agents.

267. I can't remember any patient's treatment being changed but I'd have to have a look at each individual patient. The reason I'm being slightly cautious here is because there are many, many patients who, towards the end of their chemotherapy regimens, you would stop earlier than the protocol might say

because they would just get so many infections. That's because essentially their body has taken a very large hit from the chemotherapy. Therefore, it's very difficult, in relation to an individual patient, to say whether the frequency of the infections they are getting is as a result of the treatment protocol they are on, or if it is as a direct effect of the environment that they are within. Certainly, when we tried prophylaxing with what we call the quinolone antibiotics, we saw side effects from that, that impacted our ability to deliver therapy, but then we stopped the quinolone antibiotic rather than stopped the therapy.

Source Isolation

268. Absolutely more patients were isolated. Isolation meant that they wouldn't have been allowed out of their rooms and the people coming into their rooms would have to adopt certain behaviours. That might include increased hand washing, whether that's putting on a pinny, washing more times as you leave, the direction of flow on their HEPA filter, all of those kinds of things. All of that would have come into their isolation status. Whether there was more source isolation or not, I don't know, but there was certainly more isolation and I'm sure that there will be figures recorded somewhere that back this up.

Cleanliness and Hygiene

269. When we first moved over in 2015, obviously it was brand new building and it gleamed. However, it very quickly became clear that Royal Hospital for Children was a very difficult place to keep clean. If you think about all those pods that stick out, how are you going to clean those roof surfaces? There were roof spaces that you could see off the corridors and they were literally thick with dust.

270. In the first year or two after we moved across, I would routinely get hold of my senior manager or colleagues and say, "This is a mess." I would send them photos of the dust, and they would agree to send someone to clean it off. To me, it illustrates that when architects design hospitals, bizarrely, they don't think about cleaning them. They think about the statement they're trying to make,

they think about the underlying ethos, they may well think about the environment, but surprisingly little attention seems to be given to how we're going to physically keep this infrastructure clean.

271. It was therefore very obvious that there were difficulties with keeping the hospital clean of dust. I used to regularly point out to colleagues that dust contained human cells. There seemed to be little investment in cleaning. In areas like back stairs, that were very rarely used by patients but frequently used by clinicians, you would see discarded sweet wrappers or chewing gum and it was there for months.

272. Each individual cleaner worked really, really hard, but the question was whether there was enough of them, were they were given the right kit to do the job, and were they sent to the right places to do the job? Was anyone overseeing their efforts?

Incident Management Team Meetings Regarding Infections

Incident Management Meeting Minute, dated 28 January 2019, relating to Cryptococcus in Ward 6A **(A36690584 – 28.01.2019, IMT Cryptococcus, Bundle 1, page 295)**

273. I attended the IMT meeting on 28 January at which cryptococcus was discussed and I made reference to the challenging work environment with patients being cared for over 3 separate areas. The situation was that we had day care on one site, bone marrow transplant on another site and inpatients on another site. For instance if you've got a patient coming in for chemotherapy on the Day Care Unit and then they've got to go across to a different place to come into a different hospital to come for their inpatient therapy, in terms of Nursing colleagues, it's a really inefficient way of nursing a unit because you've got to have a minimum number of nurses for each of those patients in those areas and if you split those areas up then you increase the number of nurses you're going to need in total.

274. Similarly, for the medics. For instance, when the transplant patients are on the Paediatric Ward, if the transplant patients aren't acutely unwell then the transplant doctors don't need to be physically present on the ward and they can see patients in day care or they can go and see their haematology patients, as well as their transplant patients. Because these were children being treated in an adult environment, the adult colleagues, not surprisingly, insisted on there being paediatric nurses always present and a paediatric doctor being present at all times. Again, that's just an inefficient use of staff.

275. There's also a knock-on because it means if you're there, you are not in other places doing work. So those other doctors and nurses in those other places must work harder to cover. It was a challenging environment.

Incident Management Meeting Minute, dated 14 August 2019, relating to Gram-negative Bacteraemia in Ward 6A **(A36591626 – 14.08.2019, IMT Gram Negative Blood Ward 6A, Bundle 1, page 343)**

276. I attended the IMT on 14 August 2019. I cannot recall the specific meeting and my attendance was pretty ad-hoc, but I think it was the last to be chaired by Teresa Inkster. I am not sure what other IMTs I may have attended around this period, but that information should be recorded somewhere.

277. The minute indicates that it was called because of another Gram-negative infection. I think we had IMTs every time there was another infection.

278. The case definition referred to in the minute is about determining the type of infection, for example a bacterial infection and, if so, whether Gram-negative or Gram-positive infection, if Gram-negative infection, is it environmental Gram-negative, that kind of thing. The IMTs were around Gram-negative bacteraemia.

279. There were sometimes differences in views on what would be encompassed as case definition. Sometimes, some of the microbiologists were querying whether things like E. coli, so that's a Gram-negative infection but not one that's thought to be environmental, should be reported into the IMT. Differences of view were

actually fairly amicably resolved. It was around, “Let's all be very clear about what we're discussing: environmental Gram-negative infections, does it either help us or hinder us if we include other Gram-negative infections that none of us think are going to be related to the building.” On the one hand you might say, “Well, it's helpful to include them” because if it is, for instance, poor hand hygiene, you'll see lots of other infections other than environmental Gram-negative infections, because soap doesn't just pick off environmental Gram-negatives. In that case we ought to be looking at the total burden of infection on the ward. Or you could argue, “No, we absolutely just want to focus on things that may point us towards an environmental problem with the hospital and everything else is extraneous.” Both of those are perfectly reasonable positions to take.

280. My perspective on all of this is that if you are sitting as the Chair, you are responsible for chairing that meeting. If there is a discussion around case definition or anything else, the chair ultimately has to decide what that meeting has agreed. Then at the following meeting when you go through the minutes if you disagree about what the case definition is, that's where you say, “I disagree with that. I never agreed that should be the case definition.” I guess that there would have been an escalation route if differences could not be resolved, but I’m not aware if that was ever tested.

281. The minute notes discussion about the numbers of bacteraemia having not increased. My concern at that time was not that infections were increasing; I was concerned that they weren't decreasing. The fact that they weren't going away was enough to continue to cause concern, because they are atypical infections, not standard run-of-the-mill Gram-negative infections.

282. I can't remember who Chris Deighan is, who is quoted in the discussion. I do remember Ian Kennedy. Ian is an epidemiologist. Epidemiologists are very focused and who are rigid, correctly rigid, about things like case definition because that allows comparison of like with like. Their focus is what's called “population health”, for example how do we get rid of malaria in a country, how do we reduce the numbers of COVID infections in a country? They're not

interested in, “How do I cure this individual of his malaria?” it's, “How do I decrease the amount of malaria in this patient’s population” They have a different remit to clinicians, so when Ian Kennedy puts together an epidemiology report, he will have been given a task and he will have completed his task in the way his task was defined. It's how you interpret those numbers that is important and that's where you might have differences of opinion.

283. On the difference of opinion about the infections, I wasn’t taking issue with the fact that Dr Deighan said that they were not increasing. My point was that it was ignoring not only were we sitting on very high number of infections, the nature of the infections themselves was extremely unusual and potentially very serious.

Incident Management Meeting Minute, dated 5 November 2019, relating to Gram-Negative Bacteraemia in Ward 6A **(A36591709 – 05.11.2019 - IMT Gram Negative Blood Ward 6A, Bundle 1, page 392)**

284. I attended the IMT meeting on 5 November 2019, which included the presentation by Prof Alistair Leanord about the sequencing results of the Enterobacter blood stream infections from the RHC. including the 3 samples from 2019.

285. Prof Leonard had been asked to do a piece of work and I think he did what was asked of him. I just think he was wrong in the generalisation of his results to the wider paediatric oncology population in Glasgow. I agree with Professor Steven’s report in this regard.

Prophylaxis

286. There is a standard prophylaxis of some haemato-oncology patients against something called pneumocystis carinii or pneumocystis pneumonia. The short form of that is PCP though it’s now got a new name, Pneumocystis Jirovecii, but everyone still calls it PCP. It is commonly known because it is the lung infection that people with HIV died of when we were unable to treat AIDS. I mention that

because it shows how potentially devastating getting a PCP infection is. Again, for context, pretty much all of us carry PCP within our lung. It's not that you are getting it from somebody else, it's that you already have it.

287. There are certain chemotherapy regimens, especially those which are called lympho-depleting, which increase your risk of pneumocystis pneumonia. For instance, all the leukaemia patients get prophylaxed against PCP. Some of the solid tumour patients get prophylaxed against PCP and that depends on the type of the chemotherapy regimen they're getting. The choice of whether to prophylax or not is normally dictated by the protocol they're on. Usually, they will say either patients should have pneumocystis prophylaxis, or they will say pneumocystis prophylaxis is at the discretion of the treating institution or they'll say pneumocystis prophylaxis is not required. So, the concept of prophylaxis in paediatric haemato-oncology is standard. It's not something that is alien to us and many, many of our patients will be standardly prophylaxed because of this organism that we carry in our lungs.

288. There are variants of the prophylaxis, but the vast majority of patients get something called septrin.

289. For some of our patients, the prophylaxis is 100 per cent planned. For others, for instance where there are chemotherapy regimens that are intermediate risk, that you might have a slightly increased risk of pneumocystis on, the protocol may say, “at institutional discretion.” You might therefore choose not to use prophylaxis in those cases, but if they then subsequently went on to get pneumocystis pneumonia, you would very likely then prophylax them at the end of that.

290. PCP prophylaxis tends to be prescribed for the duration of therapy, plus about 100 days, three months, from the end of therapy. For children who are going to require prophylaxis, most of those children will either have lymphoma or leukaemia, so the duration of therapy could be anything from six months to three years.

291. PCP prophylaxis isn't contentious. It is used because you are trying to prevent a very unpleasant lung infection that could be life-threatening. As I said, we have some very well-defined subgroups in whom it's absolutely mandatory. There are others in whom the evidence base is less robust and others in whom you just wouldn't do it. That can reflect the different way the chemotherapy agents work and so therefore the different side effects that they have.

292. Like any drug, there is a risk. There is no such thing as a risk-free drug, but the risk-benefit in patients with a likelihood of pneumocystis pneumonia is huge because if you get PCP, you may well end up in the Intensive Care Unit. It may kill you. Having to take a tablet two or three times a week that tastes vaguely unpleasant is therefore a relatively inconsequential.

293. Where prophylaxis is being administered, this should be communicated to patients and families. For those patients who are going onto PCP prophylaxis, we would tell the families that that was occurring. We have a very clear consent form for the chemotherapy agents. We didn't used to have a pre-printed consent form for pneumocystis prophylaxis, however we do now. We need to be aware that we're telling parents about prophylaxis at the same time we're telling them their child's got cancer and they're going to get surgery and chemotherapy and potentially radiotherapy. Many families cannot take in any of that conversation apart from, "Your child's got cancer." It therefore would not be a surprise to me at all if a family said that they were not told about prophylaxis because they're just not in a state to be able to remember that.

Use of Prophylaxis in RHC

294. I am aware that ciprofloxacin has been administered in the RCH, as well as septrin. There are also routine prophylaxes for some of the patients against fungus. These would be either fluconazole or AmBisome and the choice between the two would depend on their drug-drug interactions. For instance, we've got a chemotherapy drug called vincristine that interacts with the azole group, which is present in many antifungal agents. If you're getting a vincristine-

heavy protocol, it makes no sense to give an azole as fungal prophylaxis, therefore those patients, well get AmBisome. For the patients who are at risk of fungus this is well-recognised, is well-defined, and that's non-controversial.

295. Posaconazole may be used as a prophylaxis rather than fluconazole, depending on the fungus being prophylaxed.

296. When septrin and the azoles are used in the RHC, they are effective and I have no doubts that they achieved their purpose, which was to prevent the PCP and fungal infections.

297. It is fair to say that the degree of concern about invasive fungal infection throughout the whole of the QE campus at one point was extremely high and so we certainly did look at whether should we be prophylaxing patients, and if so, which patients should we be prophylaxing. I cannot remember which patient groups we ended up prophylaxing with azoles.

298. We did use prophylaxis against environmental gram-negative infections, using ciprofloxacin. It was given to all patients, which was very, very unusual and no one else did that. That was a direct suggestion of Teresa Inkster and on the understanding that there was absolutely no evidence base to it, that there were theoretical reasons why it may work and theoretical reasons why it may not work. Therefore, we did have a time when we used ciprofloxacin prophylaxis against Gram-negative infections in our patients, but we had a lot of what were called “drug-drug interactions.” These interactions became too big a burden and we moved to a physical prophylaxis using a line lock (TauroLock)

299. The blanket administering of ciprofloxacin was linked to concerns about the number of what seemed to be environmentally driven Gram-negative infections, particularly water borne infections.

300. For an individual patient, the writing of the prescription would have been at the instigation of the consultant in charge of the case and that prescription may well

have been written by the day care staff or what we pejoratively call our junior colleagues, our speciality colleagues, However, the decision to institute that prophylactic policy was taken by our Infection Control colleagues, by Teresa Inkster and her team (presumably through the IMT process) Although we would have had input into that discussion, the ultimate responsibility for that lies with Infection Control colleagues.

301. The ultimate responsibility for the totality of the management of the patient lies with that patient's consultant, but if, for instance, I've got a patient who requires chemotherapy, radiotherapy and surgery, I will be responsible for them overall and the chemotherapy bit. I am responsible for saying, “You need surgery” and for organising surgery, but the responsibility for the surgery itself and doing the surgery lies with the consultant surgeon.

302. Similarly, the radiotherapy and the consequences of the radiotherapy lies with the consultant radiotherapist. With regard to a decision about something like prophylaxis of your individual patient or prophylaxis of a group of patients, that is a decision taken by Infection Control colleagues. As the patient's individual consultant, you could choose to ignore that advice, but that would be highly unusual, and you would have to have good reason to do so.

303. While Teresa Inkster and the Infection Control team drove the decision about using ciprofloxacin for all patients, I would not wish to give the impression that this was imposed on us. There was discussion with clinicians, but we were very clearly told, “We think this is the best way to try and ensure your patients don't get infection” and this was at a time when none of us knew what the aetiology, or the underlying cause of those infections were.

304. We instigated that policy and when we saw that it was interacting with an awful lot of drugs and medicines, we stopped it and we introduced the TauroLock prophylaxis, which is a bit like a disinfectant that you leave in the line. It's bactericidal. In other words, it kills bacteria. It doesn't enter the patient. The whole point is it sits in the line. We introduced that as an alternative to the ciprofloxacin.

305. With the ciprofloxacin prophylaxis there was much discussion about dosages. That was because there is no established use of that medicine in a prophylactic situation. If you look at septrin, you can go to one of our standard drug books called the BNF and it says, “prophylactic dose” and that's what you give. If you go to the same book and you look at ciprofloxacin, there is no prophylactic dose. So there would have been a discussion about how much should we give and how often, but once that was formulated, then everybody got what was agreed.

306. The concern we were trying to mitigate was that the patients were at increased risk of environmental Gram-negative infection, so we were doing everything we could to try and minimise that risk. I don’t recall a particular spike at that stage, it was more that the worryingly high rates of infection were continuing, despite the water flushes, the changes of shower heads and all the other steps that had been taken. We still had the problem – what else could we do?

307. Once the decision had been taken to administer the ciprofloxacin it became routine, but against a backdrop that it was a highly unusual step and certainly not the kind of approach I had ever seen taken elsewhere in the UK.

308. Ciprofloxacin prophylaxis may be seen as controversial, if it's not done in any other paediatric centre. But if you've taken every single physical measure, you can to your environment and your infection rates aren't going down and you don't do something else, that's equally controversial. Was it a recognised approach to the management of environmental Gram-negative infections? No, but there is no standard approach because this was such an unusual situation and there was no literature to guide us.

309. In terms side effects of prescribing the ciprofloxacin across the board, the first thing to think about is actually the whole of the hospital. These are the drugs that you really want to restrict the use of because they're very good at killing resistant infections, but they're also very, very good at breeding out resistant bugs. The potential problem that you have is that you are breeding out a whole

bunch of organisms you will then have difficulty treating in the future. Essentially, if you have widespread use of antibiotics then you will potentially grow organisms that are resistant to standard antibiotics. These quinolone antibiotics, of which this is one, are very well-known for inducing resistance in Gram-negatives. That's why, in this country, you can only get it on prescription.

310. These are drugs that you therefore really do not want to be prescribing without a lot of forethought. It was not a decision taken lightly.

311. Then the second issue is the side effects that individual patients get. Quinolones have an awful lot of side effects. They're all there in the books to read about. The major one we saw was that it increased what's called the QT interval on the ECG, which is a way of saying your heart becomes more at risk of having an abnormal rhythm. It doesn't mean that the child will have an abnormal rhythm, it means that they're more at risk of that.

312. We saw prolonged QT syndrome in many of our patients. We would then stop their antibiotics, which then of course meant they were potentially unprotected because they weren't getting prophylaxis. We also saw an increase in interactions with other medicines, so you had to put the doses of the other medicines up or down. We had so much of that going on that we just said we couldn’t continue. Quinolone prophylaxis was a reasonable idea, but what we had managed to prove was quinolone prophylaxis was not possible in our patient population.

313. I can't remember any of our patients physically coming to harm from their prophylaxis, but we did have to play around with their other medicines because of those drug-drug interactions and we did see changes in their ECG which, if we hadn't stopped the medicine, may then have precipitated problems with their heart rhythms.

314. There may have been some who had an allergic reaction because anybody can have an allergic reaction to a drug. They could have said, “I felt sick with it,” but then they were getting chemotherapy at the same time, so I can't categorically say that no one had a side effect from the quinolone prophylaxis, what I don't remember is anybody within my patient cohort having a serious side effect or serious allergic reaction from that.

Communications about Prophylaxes

315. In terms of communication about the ciprofloxacin, we would have told every single member of staff because the nurses would have to give this information to the patients. I can't remember precisely what we said to the patients. As a bare minimum we would have told them that we were giving the patients this medicine because of all the concerns around the Gram-negative infections and said something like “You know we've moved to 6A and this is part of the process of moving to 6A which is about trying to reduce all of the infections, and this is another way of trying to do that.” That was the kind of broad framework that we'd have used.

316. I guess that ultimate responsibility for the communication strategy would have sat with managerial colleagues. Certainly, the ward nursing staff would have been at the forefront of giving the information out, but they wouldn't have been part of the process of making the information up. They would have been very clear and very vocal that they needed to have some form of communication to talk to families. I honestly can't remember whether it was all verbal or whether we had a written communication to families around the decision to give the children cipro.

317. I suspect that at the time the decision was made, there may well have been a written communication to the families on the ward at the time. Then subsequently when families came in, they would have been told that, “Just like we moved to 6A, this is part of trying to reduce the Gram-negative infections.” Those patients may not have been given written communication. I can see that having possibly been the case.

318. One thing I am sure of is that parents were certainly informed of the cipro decision. I'm confident about this because I've been dealing with parents and children for over 30 years as a paediatrician. You cannot give a child a drug without the parent what is it for. It just doesn't happen. If a family was to say, "We never had a discussion about this," my reflection on that would be, that I was sorry that I had not communicated effectively, there was a discussion about this, but I had not done that in a way that was understandable. It's axiomatic to the way we work. You can't give drugs to children without explaining why you're giving a drug to a child. All parents ask questions whenever there is new medication, and quite rightly too.

319. I would refute any suggestion that information about the prescription or use of prophylactic medication was withheld from parents. That is the antithesis of what we do. There were occasions where we simply didn't know the answers to questions that were asked, but this is very different from withholding information.

Communication about Ward Closures and Moves

320. In terms of communication in relation to the closure of 2A and 2B and the move to 6A and 4B I'd describe communication between management and clinical staff as okay. I think it's tricky in retrospect. I think at the time they did as good a job as they could. I think they do it differently now. I'd say likewise in terms of instructions from management to clinical staff about what patients and their families should be told. Do I think whatever formal approach there was could have been done better? Yes, I do. It evolved into something that was satisfactory, but it took a lot of time to get there.

Communication and Whistleblowing

321. The duty to communicate effectively with patients generally and with paediatric haemato-oncology patients specifically can be explained quite simply. It is all

about honesty and openness, which are the absolute foundation of what we do. The reason for that is the parents do not trust you if you are not really honest and open with them. We say to them at the start, “We are going to be really honest with you and we're going to be open with you and that means you may well hear things you would rather not hear, but the reason for that is that if we're going to have conversations about life changing decisions, you need to be sure that you can trust me and the only way you can trust me is if I tell you everything that is happening to your child.” That's the way we work.

322. It's a professional norm. In terms of codification, I think the duty of candour is probably the only legal framework around that and I believe that Scotland is ahead of England and Wales in that respect.

323. Certainly, within your professional approach, if you weren't open and honest with your patients, for instance if you were to lie to your patients, you would get struck off for that. The GMC governs professional norms over which you can't step and those are very clearly defined.

324. When communicating with adult haemato-oncology patients, if they say to you out loud, “I do not want you to tell me about my chance of being cured” or “I don't want you to use the word ‘cancer’,” you have to respect that. So there is a difference of approach: adult patients may well not be as verbally obvious as that, but if you start talking to them and they immediately pick up their paper or put their headphones on or say, “Oh, excuse me, doctor, I've got to go to the toilet,” it suddenly becomes very clear that every time you broach a subject, it's not to be discussed. Then it would be remiss of you to pursue that area of conversation when it's very clearly not one that adult wishes to have.

325. In paediatrics, it's slightly inverted because there's a duty of care to the child and a duty of care to the adults. We cannot treat children unless we have got a totally open approach to looking after them because you're coming at them with a big needle or you're giving them medicine that's going to make them sick. They will just refuse to have investigations done or to take medicines, unless they completely trust the team and, they can only trust us if their parents

trust us. The only way that their parents are going to trust us is if we are clear and honest with them from the start.

326. We frequently have conversations with parents where they say, “Please don't tell my child they've got cancer because that will destroy them mentally,” which is understandable, and we say “Well I absolutely get where you're coming from, but the thing is that they're on the Schiehallion Ward and on every single notice board there's something from the Teenage Cancer Trust or the Leukaemia Foundation or the Children's Cancer Scotland Award and if you don't tell them they're going to rapidly work it out.”

327. If you don't tell them, they're going to be really frightened because if you're not telling them that, what else are you not telling them? If you don't tell them, you can be absolutely sure all of their pals at school are going to be telling them and they're going to go on to Google and if they put in “Schiehallion Ward, Glasgow Children's Hospital” the first thing that's going to come up is that it is a children’s cancer ward.

Communication about Infections

328. I would say it is a very similar approach, possibly with a slightly different emphasis, when communicating to patients about infections. If a child comes in and they've got RSV or flu, or even if they've got COVID, you’ll be very clear about why they are in hospital, where they will be treated and what with. For example, you may say: You have a fever, we don’t know what’s causing it yet, but we are investigating that. In the meantime, we are going to commence antibiotics because that’s the safe thing to do. You are going to go into a side room and we're not going to give you chemotherapy until you've recovered from your infection” or when it comes to COVID, when the COVID meds came in, “You've fulfilled the criteria for this particular COVID medicine, you're going to get that.” That's the approach one would take. You wouldn't say, “You've got an RSV infection, that's a really common paediatric infection, but a proportion of children with this go to the Intensive Care Units, some of them need a chest drain, some of them go on and die.” You must be proportionate.

329. Of course, I might have a different view of risk than the parent does. But you absolutely have a duty of candour to say, “You've got an infection.” You've got a duty of candour if you then grow the infection to tell the family that you've grown that infection. All of that absolutely needs to be told. If a patient has an infection, no one is going to say, “Don't tell them that, they don't need to know.”

330. The same principle applies where something has gone wrong during care or treatment, you need to go and tell the child and the family that something has gone wrong, why it's gone wrong, what are you doing about it to fix it, and to make sure it doesn't happen to somebody else. That then needs to be very clearly documented in the notes.

331. The overriding principle of the duty of candour is that you are fully open and honest about what is happening to a patient, either in terms of their disease process or what you are going to do to ameliorate their disease process or what has happened as a consequence of their stay under your care.

332. I am aware that there is a process to facilitate disclosure of wrongdoing, failure, or inadequacy. There is a process in any hospital for escalation of that kind of concern and I would be very surprised if anybody who worked in any major institution didn't understand how to escalate a concern. That in itself would be concerning.

333. Whether such disclosure is encouraged is a different question, but I don't believe the culture in any hospital in the United Kingdom is as good as it should be. I don't believe whistleblowing is seen to be a positive thing. Individual clinicians or managers may truly believe that, but organisations are Darwinian and will look to protect themselves by targeting the weakest individuals. That's the way of the world.

334. Communication regarding concern about infections and links to the hospital environment, improved at all levels at the end of the process but perhaps

because we were having to also address a very negative or concerning counter narrative. It evolved into something which I thought was effective, but from a slow start, particularly in terms of external communications.

335. In relation to communications to patients from management and from clinical staff, the clinical staff, I think, communicated clearly to the patients and their parents what they knew. Professor Stevens in his report was critical of the way we communicated to families in terms of the degree of description that we would give of the infections that they had. I would disagree with Mike on that. I'd agree with him on pretty much everything apart from his desire that there was more detailed communication with families about the particular type of infections that they got. I think we did that as well as any other Paediatric Oncology Unit in the United Kingdom. I think that there is a huge danger in, essentially, giving unexpurgated versions of a clinical story to a family without an explanation. You're going to burden them with information they don't understand. It is a judgement call, which is why Mike was right to make the point, but I would disagree with him on that minor issue.

336. I don't recall instructions from management to clinical staff regarding what and how to communicate with patients, but I contend that we are well able to manage such conversations, given the nature of our roles. I think that it is incumbent upon managerial colleagues to give me any information that families should know. It's not up to the management to tell clinicians how communication is to be done.

337. By the end, the IMT was the major vehicle that drove a communication strategy. Obviously, the Friday meetings were still happening, and lunchtime handovers were still happening. Jamie Redfern and Jen Rodgers with clinical colleagues were doing rounds to speak to families, and we would exchange views. I'm sure that something must have been given to the parents leading up to the move, but others may be better placed to comment on that.

338. In terms of communication from management to patients, my knowledge of that would be from the night-time walk around after an IMT with managerial

colleagues. Jamie Redfern would do this with a senior nursing colleague. Jamie is not a clinician, but he saw this as his responsibility, despite opening himself up to criticism. Whenever I accompanied management colleagues on the ward, they were open and honest with the families. When that formal, post IMT round started, I thought their communication was good.

339. On GGC's communication with the media, I think that it was appalling, in contrast with the direct communication with families on the ward, which I think was pretty good. I was surprised at how GGC thought they could manage the media and that they didn't seem to think forward about scenario planning. What are we going to say if X happens, what are we going to say if Y happens? How are we going to respond? The GGC interaction with the media, to me, was always reactive.

340. At the time of the BBC Disclosure programme, at that point there was so much press about the hospital, it all merged into one, as far as I was concerned. Colleagues might say, "Oh, did you see the news last night?" and, "We're on the front page of The Sun today" or "It's The Record tomorrow." I don't recall any particular lines going to staff about the Disclosure programme, but that's not to say that it didn't happen. It might just have been lost in the noise.

341. On communication between management and external bodies, we had no idea, officially, what conversations were going on. There was no obvious communication strategy with external agencies. Even when the Scottish Government was put GG&C into level four measures.

342. Could all of the communication have been improved? Absolutely, but I come from a background where I think whenever you have communicated with someone, if you reflect on what you've done, you can always think of ways you could have done it better.

Impact on Patients and Families

343. In terms of children and their families, we certainly had children who had more inpatient stays, we had children who became very unwell with Gram-negative infections, and we had children who went to the Intensive Care Unit with Gram-negative infections.

344. Could it be said for an individual child that their individual Gram-negative infection was directly as a result of the water supply? I think that would be very tricky if you were to apply a level of evidence that would be required in a criminal court. Do I think for an individual that you could do it in a civil court? I haven't done the kind of detailed case review that would be required to give an opinion. But do I think on the balance of probabilities, for the whole group affected that there was a problem with the water supply to the ward? Yes, in my view, that burden of proof is reached and breached for the population. For an individual patient, you'd have to look at each individual case and do a root cause analysis.

345. You cannot overestimate the negative impact of all that went on. No matter how much the families trusted the individual nurse or the doctor, porter or cleaner in front of them, if those professionals are working in an environment that has been closed for safety reasons and it's all over the press, you are not going to be saying to yourself, “I'm really glad I'm being treated here.” It sows distrust amongst the parental community. For all those reasons it just made life very tricky. And when you have those kinds of impacts on the patients and families, it’s only natural that that makes the jobs of the clinicians and nursing staff all the more challenging.

Impact on Staff

346. The various measures impacted on the nursing staff, who took the brunt of this because they're the coalface workers. They are in with the families, face-to-face, 24 hours a day. They could see the impact of the water supply issues on children and on their families and the families were not shy in sharing that impact. So, we had a huge amount of distress, we had a huge amount of staff

turnover and we had a huge amount of staff sickness. Nursing colleagues certainly had the most obvious hit.

347. The medical staff, partly because of training and partly because they are further devolved away from coalface working and partly because they see themselves in a leadership position, would have not been so open about the impact it was having on them, but it certainly had an impact on medical staff. It had an impact on morale, it had an impact on the way that we work, and we are still dealing with that now. Interpersonal relationships fell apart, working styles changed, so there was undoubtedly an impact on the Haemato-Oncology medical staff. There was a huge impact on Microbiology and Infection Control colleagues and I'm sure that's very well documented.

348. Part of the frustration was that there was no end date in sight and there seemed to be lots of delays. We were as enlightened, or unenlightened, as the families but like any build process, you do understand that as you start to rip things apart you'll find stuff that you weren't expecting to find, but you were thinking, "It will just be another couple of months, it'll just be another couple of months, it'll just be another couple of months"; that was the kind of iterative process that went on. I think the parental reflection was probably impacted by what they were being told by staff because that's what the staff themselves were being told. Clearly, the nursing staff would be exposed to the frustrations of the families and I'm sure that this would have been reported at IMT meetings.

349. So, the impact on staff was enormous. I think that does affect the way that you can deliver care to patients because if you've got a stressed, anxious, concerned workforce that has got a high degree of sickness and staff turnover, that's not a model one would posit for the best care of children with cancer.

350. It was a difficult time. Attendance at IMTs did take me away from core business, no question about that. And attendance at things that spun out of IMTs also took me away from core business, no question about that either.

351. It had a huge impact on my service, an enormous impact on my service and I don't think you can walk away from that. My day-to-day job was just way, way, more difficult than it needed to be. The interaction with colleagues was irrevocably damaged. There was an awful lot of stress when the press reporting was at its peak. Even if you weren't yourself directly mentioned, or it was not personally intrusive, colleagues may well have been easy to identify and that was burdensome. We certainly talked about it an awful lot, so it had a huge, huge impact on our department and the way our colleagues interact with us across the hospital. The personal cost to me has been large. The whole process has been enormously stressful, and I have deliberately altered my lifestyle to cope with the stress, but I have not become unwell. That I have not become unwell should not diminish the real and tangible stress I felt and the impact that has had on me. The personal cost to lots of my colleagues has been enormous and we are professionals, who by definition, have one of the most stressful careers in medicine.

Views on Various External Proceedings

352. There is no doubt that all the different external investigations had an impact on everyone, both in terms of time taken to be involved and in the publicity around them, which affected morale. It was difficult keeping up with which Inquiry was which, whether the Mike Stevens review, the independent Review, the HSE investigations, the Public Inquiry and police proceedings too. We would say, “Which inquiry is this one? Who are you talking to today?”

353. The Stevens inquiry was interesting. We were very glad that Mike came to review what was going on but very disappointed when he reported the difficulties, he had getting information from GGC and, to a degree, from the Scottish Government. The bulk of his report I thought was incredibly fair. He did criticise us for not disclosing well enough around infections that our patients had. I would just disagree with him on that particular very small area of his report, but everything else I think he got pretty much spot on.

354. But we were peeved, and I was peeved, that we were told by Professor Stevens, and the GGC Board, that individual clinician decision-making wasn't going to be investigated, whereas in fact it was. We said at the beginning, “If you pick up rocks you will find creepy-crawlies” and, of course, he picked up rocks and found creepy-crawlies, as was inevitable. You can't do an investigation without doing a lot of digging and digging, by definition, creates an awful lot of damage, even if it’s unintentional and not the focus of the investigation.

355. I am aware of the SBAR that was conducted in late 2019 by Andrew Murray, who I believe was appointed as a result of GGC being put into Level 4 special measures. When he came in, he would have been seeing all the work that had already been undertaken so I would not disagree with his conclusions that the water and environment were safe by that time and I have no issue with his other recommendations.

356. I would say that the recommendations in the Murray SBAR were in fact already in hand or about to be put in place. For example. at the time of the SBAR, we had already taken steps to replace ciprofloxacin with Taurolock, or T-lock he refers to it, as a prophylaxis. It is bactericidal and doesn't enter the patient, so it was being used as an additional safeguard and not because we had any ongoing concerns. While the T-lock was originally introduced to try to minimise the impact of any exogenous infections and to bring down the CLABSI line infection rate, the reason we kept going with T-lock was because of the huge success we have had in bringing down the infection rate. It was a one of several measures that had been taken and it was impossible to isolate the individual interventions that made most difference. It therefore made sense to continue the T-lock, which is still used in the RHC today. While its use is not widespread in other hospitals, our infection rates in the RHC are now so low that other paediatric oncology units in the UK are now asking to see our Taurolock protocol. We have demonstrated that, with the many other changes we have made, Taurolock has contributed to our line infection rates dramatically decreasing. We now have line infection rates even lower than the rates at a Cincinnati hospital that is seen as the gold standard in this field.

357. The exchange recorded in the **Minutes of Clinical Review Group, 17th February 2020 (A36591648 - Bundle 8, page TBC)** relates the Standard Operating Procedure being devised for TauroLock. The exchanges refer to a combination of myself and Pharmacy and Nursing confirming that the SOP has been finalised and that we would implement it on 24 July, that we needed to have training to be able to roll this service out and we also had some documentation to show “What are the outcomes?” We were very clear we wanted this. If we're going to implement something new, we need to document (a) what we're doing and (b) has it changed anything? That's what that QI documentation is all about. It was about replacing the ciprofloxacin with TauroLock.

358. On the Public Inquiry, I remain of the view that it could have been better sequenced. The decision to allow patients and families to have their say without any immediate right of reply from those on the nursing and clinical side in order to provide balance was short sighted and extremely damaging for the staff involved. I appreciate that families will have their perspectives but some of the allegations that I understand were made were inaccurate, unfair and have had a significant impact on the hospital staff who work hard to help patients.

Events 2019 to date

359. I am content with the reconstructed the Schiehallion Unit and I think it's now a very safe place to be. I wouldn't say I was content with the process of getting the reconstruction done and I think it could have been done cheaper and more efficiently, but from an institutional or managerial chain perspective, I can see why decisions were taken at the time. However, as a safe place to treat patients, I don't think there's anywhere safer in the UK than the newly refurbished wards 2A and 2B. I still don't like the ward layout and we could have done with more space, but that's not really the issue. I have absolutely no concerns about the water or ventilation or overall safety in the refurbished wards.

360. I would describe the infection rates at the new Schiehallion as world class, a description that is supported by the run charts that we maintain. I think that we possibly have the lowest rates of line infections of any hospital that publishes its data, anywhere in the world. I have no concerns about the environment in the wards now, from an infection perspective.

361. Point of use filters are still present on taps and, as I explained earlier, we have a protocol for using T-lock prophylaxis, but these measures are additional safeguards and not in response to particular problems or concerns.

SBAR Dated 14 Nov 2019 by Jamie Redfern (A38694861 – SBAR,14/11/2019, Ward 6A, Gram Negative Bacteria, Bundle 4, page 202)

362. By the time of this SBAR in 2019, I was as content as I could be that there was no reason not to return to ward 2A. When you have been raising concerns for a very long time and has taken so long for them to be listened to and acted upon, it is only natural to have some scepticism when you are told that things are safe. But I was clear that major building works had taken place in wards 2A and 2B, there were downsides being situated in ward 6A so it seemed as good a time as any to move back. Jamie's has subsequently been proven to be correct that it was a safe environment to return to.

363. I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.