SCOTTISH HOSPITALS INQUIRY

CLOSING STATEMENT BY COUNSEL TO THE INQUIRY

HEARING DIET: 12 JUNE 2023 TO 23 JUNE 2023

Introduction

The Glasgow 1 and Glasgow 2 hearings

1. In the autumn of 2021, the Inquiry heard evidence from patients and families affected by the issues under investigation by the Inquiry in relation to the Glasgow and Edinburgh hospitals ("the Glasgow 1 hearing"). In June 2023, the Inquiry heard oral evidence from clinical and managerial staff from the QEUH/RHC ("the Glasgow 2 hearing")[1].

2. As discussed at the Procedural Hearing on 20 March 2023, the Glasgow 2 hearing was intended to achieve two broad purposes: the identification of evidence that might provide a basis for findings in fact by the Chair; and the identification of further lines of inquiry. In what follows, these two purposes ought to be kept in mind.

3. It is to be acknowledged that the focus of the oral witness evidence provided to the Glasgow 2 hearing was around the paediatric haemato-oncology group of patients within the RHC. Statement evidence covered other areas of the RHC and the QEUH, to some extent at least. In what follows, an attempt has been made to keep in mind that the Inquiry's investigation is not limited to the RHC, far less to the patient cohort just mentioned. Additional areas for investigation are flagged. However, Core Participants ("CPs") will no doubt wish to consider for themselves whether particular parts of the hospital give rise to any of the concerns or issues discussed in the Glasgow 1 and 2 evidence.

The content of the closing statement

[1] A complete list of the witnesses who provided statement and oral evidence for the purposes of the Glasgow 2 hearing is contained at Appendix 1.

4. Given the length of this closing statement, consideration has been given to providing an executive summary. However, each of the chapters is quite discrete, and an overall summarised narrative is therefore unlikely to be of assistance. It may be of more assistance simply to set out what will be covered in each chapter.

5. The individual chapters address the following matters:

(1) *The QEUH and RHC.* This chapter sets out the broad impressions of the Glasgow 2 witnesses in relation to the QEUH and RHC. It deals with that witness group's perspective on a number of matters touched on by the Glasgow 1 witnesses, for example, concerns about the proximity of the new hospital to the Shieldhall waste water treatment plant. Although, in addition, it sets out a narrative of the evidence of the Glasgow 2 witnesses about their involvement in and understanding of the process that ultimately led to construction of the hospital, this aspect of the discussion should very much be seen as being an indication of matters for further investigation. It is not offered as a comprehensive discussion of the events over that period, but only as a summary of what the Glasgow 2 witnesses said.

(2) *The Cancer Journey.* This chapter takes its title from a term that was used in the Glasgow 1 hearing. The purpose of the chapter is to capture a very important part of the context to the concerns that have arisen in relation to the RHC since patients first arrived in 2015. One thing emphasised repeatedly in the Glasgow 1 and Glasgow 2 evidence is the particular vulnerability of children undergoing treatment for blood and solid cancers. This chapter attempts to provide the clinical staff perspective on this and on the treatment of childhood malignancy in a hospital setting.

(3) *Infections and mitigation of infection risk.* This chapter continues the contextual discussion by focussing on a particular aspect of patient vulnerability: the risk of infection. The fact that a risk of infection is inherent in the treatment of malignancy was emphasised in both the Glasgow 1 and 2 hearings. It is therefore obviously important that the Inquiry has an understanding of this in order that it can go on in due course and consider

the extent to which that risk was or was not increased by the suggested concerns about the built hospital environment.

(4) *The History of Concern.* This chapter falls to be read alongside the timeline provided as Appendix 2 to this closing statement. The timeline is based upon the documents comprising Bundles 1-8 produced for the purposes of the Glasgow 2 hearing. It is intended to set out a chronology of what are understood to be the more prominent concerns about the built hospital environment. Specifically, evidence of reported concerns that features of the built environment presented an additional risk of avoidable infections or may be linked to such infections. Chapter (4) focuses on the parts of that chronology spoken to by the Glasgow 2 witnesses. It must be emphasised that the discussion and the timeline are only intended to set out what people said or understood about concerns at the time. The question of whether those concerns were objectively valid requires further investigation. This chapter should therefore be seen as being focused on the identification of questions for the Inquiry's consideration and also for CPs' comment.

(5) *Impacts.* This chapter summarises the evidence provided by the Glasgow 2 witnesses in relation to the impacts of the aforesaid concerns upon patients, families and staff. It should therefore be seen as setting out the staff perspective on the Glasgow 1 evidence on this matter. The focus of this chapter, it is hoped, will mainly be upon evidence that might be capable of forming findings in fact as opposed to matters for further investigation.

(6) *Communication.* This chapter provides the perspective of the Glasgow 2 witnesses on the various issues about communication raised by the patients and families who provided evidence to the Glasgow 1 hearing. The Glasgow 2 hearing had the benefit of access to a large amount of documentation in the various bundles, and so regard is had to that too. The purpose of the chapter is to try and identify areas where findings in fact might be made where that is possible on the present evidence. The discussion recognises that final evaluation of the content of communications against requisite standards will require further investigation. Therefore this chapter attempts

to capture the questions that might arise, and it looks for assistance from CPs as regards that.

(7) *The present-day Schiehallion Unit.* This chapter captures the evidence of the Glasgow 2 witnesses about the refurbished Schiehallion Unit. No doubt, more detailed evidence will be heard on this matter at future hearings.

Questions for CPs

6. As regards chapters 1-3, 5 & 7, and without wishing to be prescriptive, it may be useful if CPs directed themselves to the following questions under reference to each of these chapters:

(1) Do CPs accept that that the account of the evidence is accurate?

(2) Do CPs accept that the evidence itself is accurate (in material respects)?

(3) If the answer to (1) and/or (2) is in the negative, what is the reason for disagreement and what is the CP's position on the matter at issue (with references to any supporting evidence)?

7. Different and more detailed questions are suggested as regards chapters 4 and 6, and those are contained within the body of each of these chapters.

Assessment of witnesses

8. It has not proved necessary for the purposes of drafting this closing statement to undertake an assessment of the credibility and reliability of the witness evidence, the way one might in a court context. That is partly because so much of the evidence discussed is set out in contemporaneous documentation (much of which was accepted as accurate by witnesses). As was said at the conclusion of the recent Edinburgh hearing, it is in the contemporary record rather than in the later recollection of people that one should look in the first instance for the most accurate version of events.

9. But the other reason that it has not proved necessary to set out any detailed assessment of the witness evidence is that it seemed obvious that those witnesses who provided oral evidence did so honestly and were ultimately doing their best to assist the Inquiry.

10. In order that the point is not lost, it may be appropriate to deal with witness expertise at this point. All witnesses were careful to qualify their evidence where they considered they were being asked to address matters on which they were not expert.

11. The clinical consultants, in particular, who gave oral evidence were all very careful to emphasise the limits of their expertise when it came to matters in which microbiological or epidemiological expertise might be required in order to opine authoritatively on the subject.

12. One subject covered with them was whether the patterns of infection experienced by their patients was unusual and whether that led them to support any particular hypothesis. Dr Murphy cogently explained why he considered that he and colleagues could competently offer opinions on these questions. No challenge to this was made. It is suggested that Dr Murphy's evidence on this ought therefore to be accepted, and that the Inquiry should see his evidence, and that of his colleagues (Professor Gibson, Dr Chaudhury and Dr Sastry in particular) on infection patterns and links to the environment, as being evidence that it ought to take into account. Each of these witnesses was careful to explain how far their evidence might take the Inquiry in its investigations.

CHAPTER 1: The QEUH and RHC

13. As noted above, this chapter captures the evidence of the Glasgow 2 witnesses on matters relating to the QEUH/RHC project. Although some of this evidence may be relevant to the Inquiry's future investigations, the inclusion of evidence in this chapter should not be taken as an indication that it is necessarily directly relevant to the Inquiry's Terms. Some of the evidence referenced might be thought to have a more indirect or contextual relevance.

Development strategy

14. The Inquiry's future investigations will consider the strategy behind, and arrangements for, the QEUH project. Although the Glasgow 2 hearing was focussed on events post-migration of patients, some evidence touched upon these matters. In order that there is a record of this evidence, a summary of it is set out as follows.

15. Dr Jonathan Coutts, then neo-natal Clinical Director, provided evidence about the benefits of triple co-locating adult, maternity and paediatric services. Although the Inquiry anticipates that further evidence will be heard on this topic, Dr Coutts's evidence provided useful context for the decision to relocate the children's hospital from Yorkhill.

16. Dr Coutts recounted the initial GGC policy decision to reconfigure its maternity services[2]. The original intention was to move only the maternity service away from Yorkhill Hospital ("Yorkhill"); paediatric services would remain pending construction of a new children's hospital some 10 to 20 years down the line. Concerns were raised that the separation of maternity and neo-natal services would result in the separation of families if mother and baby required care at the same time. Triple co-location of adult, maternity and paediatric services was thought to provide the best model of care for families. GGC was persuaded to adopt this policy, resulting in the decision to build the RHC alongside the new QEUH and the relocated maternity and neo-natal units.

Whether the retained estate falls within the Inquiry's remit

17. The neonatal and maternity units are located in a building which formed part of the retained estate on the former Southern General Hospital ("SGH") site, albeit the building underwent significant refurbishment. As Dr Coutts explained, the building in which these units are situated, is connected via a corridor to the new RHC[3]. (For future determination is whether concerns arising in parts of the retained estate fall within the scope of the Inquiry's Remit and Terms of Reference.)

[2] Witness statement of Dr Jonathan Coutts, para. 12.
[3] Witness statement of Dr Jonathan Coutts, para. 18.

Choice of Site

18. Term 10 requires the Inquiry to examine the choice of site for the QEUH campus. Close attention should be paid to the wording of Term 10. In keeping with the Inquiry's remit overall, the focus is upon whether the choice of site increased the risk of infection to patients. Evidence provided by Glasgow 2 witnesses may be relevant to examination of that question.

19. The QEUH campus is constructed on the site of the former SGH, in close proximity to the Shieldhall Waste Water Treatment Works (the "sewage works"). Although the unpleasant odour from the sewage works undoubtedly impacted upon patients and families and staff (see below), some Glasgow 2 witnesses had a more serious initial concern: that the proximity of the sewage works might pose a risk of infection.

20. The clinicians and nurses who spoke to this acknowledged the limitations of their expertise; they are not microbiologists or infection and prevention control experts. Nevertheless, some questioned the wisdom of building one of Europe's largest hospitals in that location[4]. To one senior clinician, it appeared "*axiomatic*" that a major new hospital should not be built next to a sewage works[5].

21. Dr Jairam Sastry recalled that concerns about infection risk were voiced prior to building work commencing. Although he and his colleagues were told that their concerns would be investigated, he did not recall receiving a response[6]. Dr Dermot Murphy felt it was fair to assume "*that when you have a team building a hospital, they know all this stuff and they do it right"*[7]*.*

22. Other witnesses recounted an understanding that the question of whether any risk of infection arose from proximity to the hospital had been investigated and

[4] Witness statement of Professor Brenda Gibson, para. 89; witness statement of Dr Dermot Murphy, paras. 44; 54.
[5] Witness statement of Dr Dermot Murphy, para. 53.
[6] See, for example, witness statement of Dr Jairam Sastry, paras. 85-86.
[7] Witness statement of Dr Dermot Murphy, para. 54.

that there was found to be no risk[8]. The nature and outcome of those investigations might usefully be examined.

23. Witnesses acknowledged there had been a hospital on the same site (the SGH) for many years without any obvious adverse clinical outcomes[9].

24. At least one clinician understood that it was the choice of site and associated odour that led to the adoption of a system of closed, sealed windows throughout the new hospital buildings[10]. As will be seen, attempts to prevent the odour from entering the hospital were unsuccessful.

The Schiehallion Unit at Yorkhill

25. Prior to 2015, paediatric haemato-oncology and benign-haematology patients were treated at Yorkhill. In 1996, the "Schiehallion Unit" was established to deliver this highly specialised service. Under Professor Gibson's leadership, the service developed from a small consultant base to a large multi-disciplinary team[11] delivering a range of treatments and clinical trials in an holistic setting.

26. The Schiehallion Unit was also the home of the national paediatric Haematopoietic Stem Cell Transplantation service ("HSCT")[12]. For ease, the HSCT service is referred to as the Bone Marrow Transplant service ("BMT") in this statement.

27. Many of the clinical and nurse witnesses who provided evidence for the purposes of the Glasgow 2 hearing have had long careers in paediatric haemato-oncology, and worked in the Schiehallion Unit at Yorkhill. Although the Inquiry's investigations are focussed on the new QEUH campus, evidence relating to Yorkhill provides context for the evidence of witnesses about their experience at the new RHC and Schiehallion Unit. It is also relevant to their assessment of infection patterns in the new hospital.

[8] See, for example, witness statements of Dr Shahzya Chaudhury, para. 36; Kathleen Thomson, para. 147; Dr Dermot Murphy, para. 53.
[9] See, for example, the witness statement of Angela Howat, para. 41; evidence of Dr Dermot Murphy, transcript, p.13.
[10] Witness statement of Dr Jairam Sastry, para. 115.
[11] Witness statement of Professor Brenda Gibson, para. 71.
[12] Witness statement of Professor Brenda Gibson, para. 4.

28. The evidence provided to the Inquiry indicated that the Schiehallion Unit at Yorkhill functioned well. It accommodated, in close proximity, medical and nursing staff, pharmacy, social work, outreach nursing, data management and teachers. It provided good facilities for parents. Overall, this created a cohesive team and a culture where all members of the team were valued equally[13].

29. The inpatient and day care areas were distinct but located side by side. The day care / office area was separated from the inpatient ward by a set of double doors with an air lock system[14]. The inpatient ward was of a traditional design: a long straight open ward with patient bays to the side. Individual BMT cubicles were semi-separated from the rest of the unit, located at the far end of the ward[15].

30. Professor Gibson's understanding was that the Schiehallion Unit moved to the new RHC because the whole children's hospital was moving; there were no issue with the delivery of the service at Yorkhill. It is perhaps for this reason that witnesses described a strong desire to achieve at least a "like for like" in the Schiehallion Unit's new home.

The Schiehallion Unit at the RHC

31. The Inquiry has already heard evidence about the design of the Schiehallion Unit within the RHC[16]. The Glasgow 2 witnesses added to this by identifying a number of advantages and disadvantages of the new RHC and Schiehallion Unit in particular.

Advantages of the new RHC and Schiehallion Unit

32. First impressions of the new RHC were favourable. The central atrium was described by one witness as being like nothing she had seen in a hospital before. The outpatient area resembled a science centre more than it did a hospital. It was large, new, modern and appeared very child friendly[17].

[13] Witness statement of Professor Brenda Gibson, para. 70.
[14] Witness statement of Angela Howat, para. 26.
[15] Witness statement of Professor Brenda Gibson at para. 65.
[16] Closing Statement for Glasgow 1.
[17] Witness statement of Melanie Hutton, paras. 42-43.

33. The Schiehallion Unit comprised all single en-suite bedrooms. This was seen by most as a step-up from Yorkhill. Patients and families had more privacy and more space. Each bedroom had its own individual gases, suction and oxygen facilities[18]. The use of single rooms was thought (in theory at least) to provide better protection from infection, particularly from viruses[19]. At the far end of the Unit was the Teenage Cancer Trust Unit ("TCT") which was by all accounts an excellent facility for teenage patients. One clinician also noted the advantage of co-location with the paediatric Neurosurgery department which was based at the old SGH site[20].

A "like for like" facility?

34. The clear and consistent evidence was of an understanding by GGC staff that the new RHC would provide them with (at least) a "*like for like*" facility to that which existed at Yorkhill. They were to be disappointed; staff did not consider the facilities to be like for like[21]. In some respects, the disparities were inconvenient or inefficient[22]; in others they were more fundamental.

35. Almost all of the Glasgow 2 witnesses criticised the layout of Ward 2A. Unlike the traditional design of the wards at Yorkhill, the RHC is shaped like a racetrack. The racetrack design was understood to be an architectural feature; clinicians did not have input to that aspect of the design and did not point to any operational rationale[23]. The location of Ward 2A on the curve of the racetrack resulted in restricted sightlines which were a particular challenge from a nursing perspective[24]. It was more difficult to see where staff were located or which patients might require help. The visibility of alarms and buzzers was reduced. Operational adjustments were required to meet these challenges[25].

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[18] Witness statement of Melanie Hutton, para. 47.
[19] Witness statement of Professor Brenda Gibson, para. 41.
[20] Witness statement of Dr Milind Ronghe, para. 34.
[21] See, for example, the witness statement of Sarah-Jane McMillan, para. 28; the supplementary witness statement of Dr Anna Maria Ewins, para. 13; evidence of Professor Brenda Gibson, transcript p.42.
[22] Witness statement of Dr Dermot Murphy, para. 79.
[23] Witness statement of Dr Dermot Murphy, para. 45.
[24] Witness statement of Emma Sommerville, para. 29.
[25] See, for example, the witness statement of Angela Howat, para. 135.

36. A major concern for nurses and clinicians alike was the lack of space on Wards 2A and 2B. Office space for clinicians was located a 10-15 minute walk away[26]. There was limited space for nurses to meet. This was significant because, unlike consultants, nurses work on the wards full time. There was, initially, no provision at all for pharmacy staff who are critical to the provision of care for Schiehallion patients[27]. Professor Gibson had to push against resistance for the provision of a parents' kitchen; a space considered vitally important to the wellbeing of parents on the ward[28].

37. Professor Gibson's concerns were such that she was reluctant to approve the layout plan[29]. Professor Gibson recalled some consultation with senior clinicians and nurses but it was limited and "*extremely unpleasant*"[30]. They were told there was no scope to increase the footprint of the unit, even although they considered it inadequate. A difficult decision was made to maximise the space for patient cubicles, but that came at the cost of a number of facilities which had been present in the Schiehallion Unit at Yorkhill and which enabled the efficient delivery of holistic care[31].

38. Dr Murphy's recollection of the consultation process was that input from clinical staff was asked for but not listened to or acted upon. His view was that although the shortcomings in the layout of the did not negatively impact the ability to cure paediatric cancer, they did affect the patient experience and the ability to provide holistic care. As Dr Murphy explained, the 21st century paediatric cancer journey is not just about cure or not cure; it is about the experience of the patient whilst undergoing treatment[32].

<u>Provision of a safe environment and ventilation on Ward 2A</u>

39. Witnesses understood that the specialist ventilation provision on Ward 2A was not like for like that provided for inpatients at Yorkhill[33]. Dr Ewins understood

[26] Witness statement of Dr Milind Ronghe, para. 31.
[27] Evidence of Professor Brenda Gibson, transcript, p.40.
[28] As discussed in the Closing Statement for Glasgow 1.
[29] Evidence of Professor Brenda Gibson, transcript, p.41.
[30] Witness statement of Professor Brenda Gibson, para. 81.
[31] Evidence of Professor Brenda Gibson, transcript, pp.35-39.
[32] Witness statement of Dr Dermot Murphy at para. 63; transcript, pp.18; 48.
[33] More is said about the ventilation provision in Ward 2A elsewhere in this statement.

that at Yorkhill the whole inpatient ward was positively pressured[34]. Professor Gibson recalled that it benefitted from HEPA filtration[35]. Both recalled an air lock door system to minimise the transfer of air from the rest of the hospital to the ward. In addition, Yorkhill had a handful of cubicles with ventilation specially designed to provide a protective environment for BMT patients.

40. In contrast, Ward 2A within the RHC had eight dedicated BMT rooms, which were understood, prior to the move in June 2015, to have positive pressure and HEPA filtration. The increase in the number of BMT rooms should have been a step up from the provision in Yorkhill. However, that perceived benefit was seen as being offset by the fact that the remainder of Ward 2A was not positively pressured to the rest of the hospital, was not HEPA filtered and had no air lock door system.

41. As only the BMT rooms had a ventilation system designed to create a protective environment, clinicians had to think carefully about the priority given to those rooms. Prioritisation depended on each patient's particular vulnerability to infection and the stage they were at in their treatment (see below). Whilst this balancing exercise was always required with vulnerable patients (and limited resources), it was less of a concern at Yorkhill where the whole inpatient ward benefitted from "*some degree of protective environment*"[36]. That was not the case in Ward 2A.

Standalone issues

42. Patients and families who provided evidence to the Glasgow 1 hearing spoke of a variety of problems within the Schiehallion Unit which are not connected to key building systems. Whilst they may not fall directly within the Inquiry's Terms of Reference, these issues caused patients and families to doubt the build quality of the Unit. In some respects they had a disproportionately significant effect on the patient and family experience. That may be because issues such as these need to be viewed in light of the evidence that, for many of the families

[34] Supplementary witness statement of Dr Anna Maria Ewins, para. 13.
[35] Witness statement of Professor Brenda Gibson, para. 101.
[36] Supplementary witness statement of Dr Anna Maria Ewins, para 24.

on the Schiehallion Unit, "hospital is home" for a period of months or even years.

43. The evidence of patients and families on these issues and their impacts is summarised in the Closing Statement for Glasgow 1. The issues spoken to by families were acknowledged by the Glasgow 2 witnesses[37]: temperature of rooms, broken blinds, malfunctioning TVs, unreliable Wi-Fi, inadequacy of plug points and battery packs, problems with the ward entry system and unavailability of the playpark. As one former senior staff nurse noted, these issues suggested that the hospital was not state of the art; in fact, it was not even as good as the facility left behind at Yorkhill[38].

44. Other issues reported by the Glasgow 1 witnesses were of greater concern from a patient safety perspective. Flooding in the en suite bathrooms was an issue[39] and, in Professor Gibson's view, had an associated risk of infection[40].

45. Witnesses also recalled issues with the exterior of the building: a glass panel falling to the ground and replacement of cladding. The safety concerns associated with a large glass panel falling from height are obvious. The impact of this issue and GGC's response to it, are set out in the Closing Statement for the Glasgow 1 hearing and are considered in detail in the evidence of Professor John Cuddihy.

46. The replacement of cladding gave rise to concerns about the risk of infection. Removal of the cladding from the exterior of the building could create spores in the external environment, creating a risk of exposure in the case of patients vulnerable to infection. A decision was made to prescribe anti-fungal prophylactic medication to at-risk patients who were not already on these medications as part of their treatment protocols[41]. Professor Gibson explained

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[37] See, for example, the witness statements of: Professor Brenda Gibson, para. 108; Dr Anna Maria Ewins, para. 149; Melanie Hutton, para. 236; Kathleen Thomson, paras. 134 – 136; 146; Sarah-Jane McMillan, paras. 86-89.
[38] Witness statement of Sarah-Jane McMillan, para. 86.
[39] Witness statement of Sarah-Jane McMillan, para. 113.
[40] Witness statement of Professor Gibson, para. 115.
[41] See, for example, the witness statements of: Kathleen Thomson, para. 194; Professor Brenda Gibson, para. 111.

that the use of prophylactic medication is common practice during building works in the healthcare setting. The use of prophylactics is a topic returned to below.

Odour from the sewage works

47. Whilst Glasgow 2 witnesses were uncertain about the risk of infection posed by the proximity to the sewage works, there was consistent evidence of an unpleasant odour on site. Some witnesses recalled that the odour was present only outside the hospital buildings; others were certain that at times it was present inside[42]. One witness described concern from nurses and medics that the odour was present in theatre suites, despite the mechanical ventilation system[43].

48. For staff working at the QEUH campus, the odour was unpleasant. However, staff recognised that for patients and families, the impact was more severe. Nurses in particular recalled reports that patients who were already experiencing nausea as a result of chemotherapy treatment, felt worse as a result of the sewage smell[44]. Senior Charge Nurse, Emma Sommerville, escalated these concerns to Estates. Although the issue was investigated, it was not resolved. Ms Sommerville reported that the smell of sewage is still present in the newly refurbished Ward 2A and is particularly noticeable over the summer months[45].

49. Dr Murphy observed another impact of building a supra-regional cancer centre on a site next to a sewage works. For many families, it will be the first time they have been to the QEUH campus. For obvious reasons, they will be anxious and nervous. They need to be able to trust the professionals in front of them. Being met with the smell of sewage on exiting their cars was "*not a great start*"[46] to

[42] Witness statements of: Kathleen Thomson, para. 142; Emma Sommerville, para 48; Dr Jairam Sastry, para. 89.
[43] Witness statement of Kathleen Thomson, para. 148.
[44] Witness statements of: Sarah-Jane McMillan, para.102; Emma Sommerville, para. 48.
[45] Witness statement of Emma Sommerville, para. 48; transcript, p.28.
[46] Evidence of Dr Dermot Murphy, transcript, p14.

the cancer journey. Dr Murphy observed that just because something has been tolerated for 100 years, it does not follow that it is a good idea to continue it[47].

CHAPTER 2: The Cancer Journey - diagnosis and treatment of paediatric cancer

50. The Glasgow 2 hearing benefitted from the evidence of six consultants who work on the Schiehallion Unit. These witnesses are experienced oncologists and haemato-oncologists, some of whom have particular bone marrow transplant expertise. For the sake of brevity, their respective expertise is not repeated here, and reference is instead made to the witness statements.

51. Most witnesses provided evidence about the care of children with cancer. For detailed evidence on these matters, reference should be made to the witness statements. On the clinical aspects of care, the witness statements of Professor Brenda Gibson, Dr Anna Maria Ewins and Dr Chaudhury are of particular assistance, as is the evidence of Dr Dermot Murphy, particularly as regards solid cancers.

52. It is hoped that this chapter of evidence will not be controversial, being in the nature of background context. However, the importance of this context to the issues before the Inquiry should not be overlooked. It is that very context – specifically, the vulnerability of the patient group at the centre of the events under consideration – that underpins the concerns that led to the Inquiry being set up. Accordingly, Core Participants are invited to consider carefully the following discussion, and to flag up to the Inquiry anything they consider to be in the nature of a material error or oversight. It is anticipated that the evidence so far provided on this topic may form the basis of findings in fact in due course.

Conditions treated in the Schiehallion Unit

53. The Schiehallion Unit cares for children and young people with a range of conditions: benign haematological conditions, malignant haematological conditions and solid tumours. Patients range in age from babies to teenagers.

[47] Evidence of Dr Dermot Murphy, transcript, p.13.

The age range of patients treated is a significant feature of the type of care provided by the Schiehallion Unit[48].

54. Benign (non-malignant) conditions include haemoglobinopathies such as sickle cell disease, thalassemia (a red cell disorder), and clotting disorders (such as haemophilia). Although these are non-malignant conditions, they can have serious consequences and may result in the need for a bone marrow transplant. Ward 2A also treats children whose bone marrow does not function as it should (although they do not have leukaemia) and patients with immune deficiency for other reasons[49].

55. Malignant conditions in children are divided into three categories: solid tumours, leukaemias and lymphomas[50]. The two most common cancers in children are leukaemia and brain tumours[51].

56. Solid tumours were defined by one senior paediatric oncologist as being anything that is not a leukaemia or lymphoma[52]. Solid tumours are found in the bones, organs (including the brain) and central nervous system[53].

57. In contrast, leukaemia and lymphoma are both cancers of the blood or immune systems, albeit leukaemia is a liquid disease and lymphoma is a solid disease[54]. The most commonly encountered type of leukaemia in children is Acute Lymphoblastic Leukaemia ("ALL"); less common is Acute Myeloid Leukaemia ("AML").

<u>Treatment of children with cancer: overarching points</u>

58. Before considering treatment more specifically, some points regarding the overarching nature of paediatric cancer care bear notice.

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[48] Evidence of Dr Dermot Murphy, transcript, p.8.
[49] Witness statement of Dr Anna Maria Ewins, para. 13.
[50] Witness statement of Professor Brenda Gibson, para. 17.
[51] Witness statement of Professor Brenda Gibson, para. 17.
[52] Witness statement of Dr Dermot Murphy, paras. 16; 23.
[53] Witness statement of Dr Anna Maria Ewins, paras. 13 - 16.
[54] Witness statement of Dr Shahzya Chaudhury, para. 21.

59. The first point is that paediatric oncology is a relatively recent subspeciality, having emerged only over the past 35-40 years or so[55]. The conditions treated are rare and unusual. Dr Murphy described a supra-regionalised approach designed to generate a large enough patient base for learning. Both Professor Gibson and Dr Murphy described collaboration with a network of other paediatric-oncology centres and clinicians in Scotland, the British Isles and internationally. Discussion with colleagues, locally and at other centres, is a regular feature of the discipline. Dr Ewins described a culture of reflection and learning around patient outcomes[56]. In this particular field, pride cannot be allowed to get in the way of delivery of care; the consequences are too terrible[57].

60. The second point is the emphasis placed on evidence-based care. In her statement, Professor Gibson explained the prominence given to clinical trials. Professor Gibson has herself served as Chief Investigator and Principal Investigator for a number of early phase trials. She sits on national and international committees representing Scotland or the UK[58]. Dr Murphy too observed that, in comparison to other areas of healthcare, paediatric oncology is driven by evidence and in particular the results of clinical trials[59]. In Dr Murphy's view, this desire for evidence informed the concerns expressed by him and his colleagues about the pattern of infections in 2018 and 2019. He said that "*paediatric haemato-oncologists are unusual beasts in that we like everything to be evidentially based, so the absence of evidence, we find disturbing*"[60].

61. The third point is that the care of children with cancer is truly multidisciplinary. The treatment itself often requires input from multiple clinical disciplines, for example, oncology, surgery, neurology, radiology. But the multidisciplinary team caring for any individual child could be much wider than that and include input from psychology, occupational therapy, physiotherapy, out-reach nursing,

[55] Evidence of Dr Dermot Murphy, transcript, p.3.
[56] Witness statement of Dr Anna Maria Ewins, para. 36.
[57] Evidence of Dr Dermot Murphy, transcript, p.6.
[58] Witness statement of Professor Brenda Gibson, para. 10.
[59] Evidence of Dr Dermot Murphy, transcript, p.7.
[60] Evidence of Dr Dermot Murphy, transcript, p.81.

play therapists (to help children cope with procedures) and dieticians to name but a few[61].

62. The third point connects to a fourth: modern care of children with cancer is holistic[62]. Professor Gibson explained that the aim of the Schiehallion Unit is to provide patient centred, holistic care to children and their families. This extends beyond medical care to psychosocial care and support. Dr Murphy echoed this sentiment when, as touched on in the previous chapter, he said that cancer care for children is about much more than cure. It is about rehabilitation and pre-habilitation. It is about things which form part of a normal childhood – education and play[63]. As Dr Murphy said, children and their families in the West of Scotland, deserve a world class environment in which to receive care[64].

63. Finally, Dr Murphy explained the particular challenges of treating children with cancer. The cancers found in children are often biologically different from those found in adults. The treatments offered (chemotherapy, surgery, radiotherapy and immunotherapy) are similar but the approach to treatment is more nuanced. Children and young people are still growing when they are treated. They range in age from new-born babies to young adults. Clinicians must take account of the potential consequences of a particular therapy on a particular growing individual. A unique challenge is that, because most paediatric cancer patients are cured or curable, clinicians have to factor in the long term consequences of a treatment to the individual patient (for example, the potential impact on the heart, kidneys, hearing and so on)[65].

Nature of treatment

64. The nature and duration of treatment varies depending on a variety of factors. Some patients require only surgery or a few months of chemotherapy. Others may require a combination of radiotherapy, chemotherapy, immunotherapy and/or a bone marrow transplant over a period of years.

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[61] See, for example, the evidence of Professor Brenda Gibson, transcript, p.73.
[62] See, for example, the evidence of Professor Gibson, transcript, p.37; Dr Shahzya Chaudhury, transcript, p.33; evidence of Dr Dermot Murphy, transcript, p.49.
[63] Evidence of Dr Dermot Murphy, transcript, p.11.
[64] Evidence of Dr Dermot Murphy, transcript, p.48.
[65] Evidence of Dr Dermot Murphy, transcript, p.8.

65. Most patients will have a combination of treatment as inpatients on Ward 2A and as day care patients on Ward 2B (where they might receive, for example, administration of lower risk chemotherapy infusions)[66]. Children with ALL, the most common type of leukaemia, receive treatment for between two to three years during which time they will be inpatients and day care patients. Some treatments can be administered at home with the assistance of outreach nurses. Where a patient needs treatment from a different paediatric discipline, for example, surgery, that child may be treated for a time on another ward within the RHC.

Protocols

66. Professor Gibson explained that at the point of diagnosis, each family has a detailed discussion with their consultant about the proposed treatment plan, its duration, side effects and outcome. Often this will be based on a standardised national protocol. Written information is provided, usually in the form of a Parent and Patient Information Sheet which will include information about clinical trials (which are commonplace in this type of treatment)[67]. In the event of a change in the treatment plan, or of relapse, a similar process is followed. Information about treatment is also provided on an ongoing basis by nursing staff[68] and by outreach nurses visiting families at home. Professor Gibson's evidence was that families were well educated in their child's treatment and the medications prescribed[69].

67. Haematology and oncology practice is protocol driven[70]. Clinical trial protocols standardise the treatment of certain conditions across the country. Clinical guidelines may develop from those protocols[71]. In addition, the Schiehallion Unit has its own local protocols and clinical guidelines dealing with specific aspects of care, for example, for neutropenic patients showing signs of fever[72].

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[66] Evidence of Emma Sommerville and Angela Howatt.
[67] Witness statement of Professor Brenda Gibson, para. 263.
[68] See, for example, the evidence of Emma Sommerville.
[69] Witness statement of Professor Brenda Gibson, para. 262.
[70] Witness statement of Dr Anna Maria Ewins, para. 90.
[71] Witness statement of Dr Dermot Murphy, para. 86.
[72] Witness statement of Dr Ewins, para. 92.

Although treatment is protocol-driven, it is also tailored to each individual diagnosis; some protocols will have more scope for variance than others[73].

Chemotherapy

68. In children, leukaemia and lymphoma are usually aggressive cancers that require an intense chemotherapy response[74]. Chemotherapy treatment is given in phases. The initial induction phase, which might last four to five weeks, aims to eradicate the disease and achieve remission. This is followed by the consolidation phase, aimed at consolidating remission and an intensification phase in which treatment is intensified. The final phase is maintenance in which less intensive treatment is given to the patient as an outpatient[75].

69. Professor Gibson explained that the most significant prognosticator of outcome is the response to induction therapy. Children who respond less well to induction chemotherapy have a higher rate of relapse[76]. If remission is not achieved, treatment with further chemotherapy and targeted agents will be considered followed by the possibility of a bone marrow transplant[77].

Bone marrow transplants

70. Haemopoietic stem cell transplantation (also commonly known as bone marrow transplantation) is a procedure in which a patient's bone marrow is replaced with healthy stem cells. In an autologous transplant, cells are replaced with the patient's own healthy cells (harvested at a prior stage). In an allogenic transplant, healthy cells are obtained from a donor. The Schiehallion Unit is the only centre in Scotland that carries out allogenic transplants, which are a more complex procedure[78].

[73] Witness statement of Dr Dermot Murphy, para. 88.
[74] Witness statement of Dr Shahzya Chaudhury, para. 21.
[75] Witness statement of Dr Anna Maria Ewins, paras. 74-75.
[76] Witness statement of Professor Brenda Gibson, paras. 22-23.
[77] Supplementary witness statement of Dr Anna Maria Ewins, para. 3.
[78] Witness statement of Dr Dermot Murphy, para. 32; witness statement of Jennifer Rodgers, para. 302.

71. Bone marrow transplants are risky treatments with a significant mortality rate[79]. The clinical decision to transplant is not taken lightly[80]. Dr Ewins explained the two primary routes to transplant for patients with ALL or AML[81]. Genetic analysis may help predict the risk of relapse and, in turn, the likelihood that a transplant will be required in the future. In such cases consideration may be given to an early transplant to avoid the need for multiple rounds of chemotherapy and other treatments, with their associated damage and risk. The more common route is in the event of relapse. An early post-treatment relapse indicates a high chance that a transplant will be required. Later relapses which respond poorly to chemotherapy treatment may also lead to transplant.

72. Professor Gibson and Dr Ewins provided evidence of the careful planning and challenging logistics involved in transplant procedures. Planning may involve not only the patient's own circumstances but those of a donor in the case of an allogenic transplant.

73. In order to receive a transplant, a patient needs to be in remission. Patients who require transplants are already likely to be resistant to chemotherapy; once achieved, it cannot be known how long remission will hold in any given case. It is important to be able to move quickly to transplant[82]. Patients must also be infection free and have passed a series of tests demonstrating that they are likely to stand up to the challenge of a transplant.[83]

74. Where donor cells are required, clinicians work with colleagues at the tissue typing lab to find the best well-matched donor[84]. The window of opportunity for a transplant also depends on the availability of a donor, once identified. Anything that jeopardises the window of opportunity, could jeopardise the availability of the best matched donor and could in turn jeopardise the transplant. It is a carefully co-ordinated exercise.

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[79] Witness statement of Professor Brenda Gibson, para. 23; evidence of Professor Brenda Gibson, transcript, p.15.
[80] Witness statement of Dr Anna Maria Ewins, para. 17.
[81] Supplementary witness statement of Dr Anna Maria Ewins, para. 4.
[82] Supplementary witness statement of Dr Anna Maria Ewins, para. 7.
[83] Witness statement of Dr Anna Maria Ewins, para. 18.
[84] Witness statement of Dr Anna Maria Ewins, para. 19.

Vulnerability to infection

75. The evidence of many witnesses at Glasgow 1 was that they lived in fear of infection throughout the duration of their child's treatment. Although they were aware of the many gruelling and dangerous side effects of cancer treatment, it was drilled into them at diagnosis that infection was the single biggest risk to their child's life.

76. Similar evidence was heard from the Glasgow 2 witnesses: infection is one of the most significant risks to paediatric cancer patients. To put this in context, Professor Gibson explained that the mortality rate evidence for ALL patients indicates that the chance of dying from infection or sepsis is almost as great as the chance of dying from the disease itself. For patients with AML treated with chemotherapy alone, the treatment-related mortality rate is around 6%, and is driven by infection[85].

77. Professor Gibson explained that susceptibility to infection in paediatric patients arises from three main sources[86]: (i) weakened immune response arising from the underlying disease or from treatment; (ii) other side effects of treatment and (iii) the use of central venous access devices, shunts and gastronomy tubes[87].

Weakened immune response

78. When a person lacks important components of the body's immune response, not only are they more susceptible to infection but the resulting infection-related illness may be more severe and prolonged than would otherwise be the case[88].

79. Many of the patients treated in the Schiehallion Unit are immunocompromised or immunosuppressed[89]. At a general level, when a patient is immunocompromised, their immune system does not provide adequate protection from infection. More specifically, Schiehallion patients might suffer from "neutropenia" or "lymphopenia", denoting an absence of different types of cells found in the immune system.

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[85] Witness statement of Professor Gibson, paras. 22 and 23.
[86] Evidence of Professor Gibson, transcript, p.21.
[87] See also the witness statement of Dr Jairam Sastry, para. 37.
[88] Witness statement of Dr Anna Maria Ewins, paras. 48 and 49.
[89] For present purposes, no meaningful difference is drawn between the two terms.

80. The body's main defence against infection is having an adequate neutrophil count to deal with infection. Neutrophils are a type of white blood cell, made in the bone marrow, that protect against fungal and, in particular, bacterial infections. Dr Ewins described neutrophils as the immune system's first line of defence. As the "*foot soldiers of the immune system; they are the first to appear at the site of the infection and do battle with the invading organism*"[90]. Neutrophils also send signals to the rest of the immune system to summon it to the site of a problem. If the bone marrow is not making an adequate number of neutrophils, the body's defence to infection is lowered. Bacteria can multiply rapidly in the blood stream and make a patient very unwell. "Neutropenia" is a word used to described the reduced presence of neutrophil cells[91].

81. Lymphocytes are another type of white blood cell. They are important in making antibodies and fighting viruses. They co-ordinate the response to viral infections and maintain the functioning of the immune system[92]. "Lymphopenia" is the reduced presence of lymphocytes in the blood.

82. Red blood cells and platelets are also important in the immune response. Platelets not only help to stop bleeding but they play a role in destroying bacteria.

83. Patients might become susceptible to infection due to the mode of their underlying disease, the effect of treatment or a combination of both. Taking leukaemia as an example. Leukaemia itself involves the bone marrow and affects the body's ability to make healthy neutrophils. Patients are neutropenic until the disease goes into remission[93]. However, treatment for leukaemia involves the use of potent steroid/immunosuppressant therapy[94]. Children with leukaemia may face profound neutropenia for 4 to 6 weeks after diagnosis,

[90] Witness statement of Dr Anna Maria Ewins, para. 50; supplementary witness statement of Dr Anna Maria Ewins, para. 8.
[91] Witness statement of Professor Brenda Gibson, para. 18.
[92] Witness statement of Dr Anna Maria Ewins, para. 52; witness statement of Dr Alistair Hart, para. 9.
[93] Witness statement of Professor Gibson, para. 18.
[94] Witness statement of Professor Gibson, para. 19.

followed by periods of chemotherapy-related neutropenia throughout the remainder of their treatment[95].

84. Levels of immunosuppression vary over the course of treatment. Chemotherapy, steroid therapy and the bone marrow transplant process all result in suppression of the immune system to some degree. The phased treatment of cancer means that a patient's immune system can go through multiple phases of suppression and recovery[96].

85. The clinician evidence was consistent that patients attending Wards 2A or 2B could sit at any point on the scale of immunosuppression depending on the nature of their disease, the stage of their treatment and other individual factors. In planning a patient's care, clinicians are constantly thinking about the levels of vulnerability associated with each stage of treatment[97].

86. There is a hierarchy of vulnerability to infection, based on both the outcomes of trials and experience[98]. Children with solid tumours generally experience shorter periods of neutropenia than children with leukaemia and are, generally, less at risk. Some low grade lymphomas and leukaemias may require no or little chemotherapy; these diseases have a low association with the risk of infection[99].

87. Those at higher risk of infection are: ALL patients with particular patient specific indicators (for example, infants and patients with Downs Syndrome); relapsed ALL patients, AML patients, relapsed AML patients and BMT patients. Relapsed patients are towards the higher risk end of the scale because of the toll taken by previous rounds of treatment. Relapsed disease is treated with a higher intensity of treatment than that which failed[100].

88. Allogenic bone marrow transplant patients sit at the extreme end of the susceptibility scale. Dr Ewins described them as "*exquisitely vulnerable to*

[95] Witness statement of Professor Brenda Gibson, para. 18.
[96] Supplementary witness statement of Dr Anna Maria Ewins, para. 8.
[97] Supplementary witness statement of Dr Anna Maria Ewins, para. 6.
[98] Witness statement of Professor Brenda Gibson, para. 35.
[99] Witness statement of Dr Shahzya Chaudhury, para. 23.
[100] Evidence of Professor Brenda Gibson, transcript, p.23.

infection"[101]. This is due in part to the treatment required immediately before and after transplant and in part to the treatment already endured in the battle against cancer.

89. Prior to transplant, these patients receive conditioning treatment to wipe out their immune system so that it does not reject the donor's cells. After transplant, the immune system that has come from the donor has to be suppressed so that it does not attack the recipient's cells. This results in a prolonged period of immunosuppression during which the patient has no white blood cells and is dependent upon blood and platelet transfusions. In the first month post-transplant, the patient is particularly vulnerable to bacterial infections. After that, infection risk tends to be viral and fungal. Transplant patients must be nursed in a protective environment until neutrophils begin to come through[102].

Vulnerability to infection caused by other side effects of treatment

90. Treatment for cancer creates vulnerability to infection in other ways. Chemotherapy affects the integrity of the body's mucosal linings. A breakdown of this protective lining in the mouth or gut allows bacteria which colonise the body naturally to enter the blood stream[103].

Use of lines and other devices which breach the skin

91. Any device which breaches the skin is a potential entry point for bacteria[104]. Central venous access devices ("CVADs") are long term devices used to deliver chemotherapy and support patients through treatment[105]. There are two types of CVAD: (i) central venous lines ("CVLs")[106]; (ii) port-a-caths. Peripherally Inserted Central Catheters ("PICC lines") are inserted peripherally but serve a similar function.

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[101] Supplementary witness statement of Dr Anna Maria Ewins, para. 11.
[102] See witness statement of Dr Anna Maria Ewins, paras. 20-38 for a detailed account of the transplant process.
[103] Witness statement of Dr Anna Maria Ewins, para. 255.
[104] Witness statement of Emma Sommerville, para. 59.
[105] Witness statement of Professor Gibson, para. 20. See, witness statement of Dr Jairam Sastry, paras. 44-60 for a detailed explanation of line types; see also the witness statement of Emma Sommerville, paras. 52-62.
[106] Sometimes referred to as Hickman lines.

92. CVLs and port-a-caths are inserted surgically under general anaesthetic. PICC lines are usually also inserted surgically. A CVL generally has two lumens (access points): one which allows blood to be removed and another for administering blood products and chemotherapy. It also facilitates the rapid delivery of drugs or fluids in the event of acute deterioration. Port-a-caths serve a similar function. However, whereas a CVL protrudes from the skin, a port-a-cath is situated under the skin and is accessed via a gripper needle. It allows a patient to bathe without the port becoming wet. PICC lines are less invasive but are the least preferred option; they are less effective and require more frequent replacement [107].

93. Most Schiehallion patients will have a CVL or a port-a-cath to facilitate chemotherapy. The choice of CVAD is dependent on a number of factors including the nature of the disease and the treatment. Where possible patient-centred factors are considered and a choice offered[108].

94. Although extremely valuable for the purposes of administering treatment to paediatric patients, these devices provide a pathway for bacteria to enter the bloodstream. The plastic line itself can provide a nidus for bacteria. Port-a-caths and single lumen lines are associated with a lower risk of infection, but the risk remains. Most commonly, line related infections are associated with gram-positive organisms present on the skin. However, when line infections are caused by gram-negative organisms it becomes very difficult to clear the infection. Some gram-negative organisms create a biofilm in the line which prevents the effective use of antibiotics. Lines infected with gram-negative organisms often require removal[109].

Consequences of infections

95. The impact of infection on patients and families was considered in depth at the Glasgow 1 hearing. The Inquiry heard from two patients who described vividly the impact that infections had on them personally. Parents also described the

[107] Witness statement of Dr Jairam Sastry, para. 48.
[108] See, for example, witness statement of Emma Sommerville, para. 60; witness statement of Dr Jairam Sastry, para. 52.
[109] Witness statement of Professor Brenda Gibson, para. 26.

terror and lack of control they felt when watching their children deteriorate rapidly at the hands of an infection.

96. That evidence is not repeated here. Suffice to say that the evidence of clinicians and nurses aligned with that of the patients and families. Infections can result in[110]:

- Septicaemia, sepsis and septic showers (where bacterial infection spreads to the bloodstream)[111].
- Fever, rigor, sudden and distressing deterioration.
- Prescription of antibiotics.
- Additional surgeries (to remove and reinstate lines).
- Chemotherapy being paused, delayed or prevented altogether.
- Delays to bone marrow transplants (and the potential loss of a donor).
- Time in the PICU.
- Extended inpatient stays.
- Long term side effects and toxicities.
- Death.

Other side effects of treatment

97. Professor Gibson summarised other side effects of treatment at paragraphs 20 to 24 of her statement. In addition to the most serious generic side effects/risks just discussed (i.e. infection or sepsis), other generic side effects of chemotherapy include anorexia, nausea, vomiting, mucositis and hair loss. Generally speaking, teenagers suffer a greater toll from chemotherapy toxicity than younger children. Older children may find it particularly difficult to lose their hair.

98. Children may also have to undergo a variety of medical procedures as part of their treatment, including: cannula insertion, lumbar punctures, trephine biopsies and insertion of nasogastric tubes. Most procedures are carried out

[110] See, for example, the evidence of Professor Brenda Gibson, transcript, p.31; the evidence of Dr Dermot Murphy, transcript, p.112; witness statement of Dr Anna Maria Ewins, paras. 60-62.
[111] Witness statement of Dr Anna Maria Ewins, para. 54.

under general anaesthetic. The exception to this is cannula insertion which can be a distressing procedure for children.

99. Side effects can also be psychosocial. Holidays and family events are restricted. Patients are separated from siblings and close family members for prolonged periods. Hospitalisation results in a lack of contact with peers and an inability to attend school. These impacts are keenly felt by teenagers.

The cancer journey: overall impacts

100. At the Glasgow 1 hearing, the Inquiry heard directly from patients and families about their experiences of the cancer journey. During the Glasgow 2 hearing, clinicians and nurses gave evidence from their own perspectives, having cared for patients and families on that journey for many years.

101. Professor Gibson's evidence about the cancer journey echoed that of the patients and families. She observed that "*there is nothing more devasting for parents than the diagnosis of cancer in their child*"[112]. Initially, the fear of the diagnosis overrides everything. The devastation to normal family life and time spent in hospital may at first be of little consequence but gain importance over time. Professor Gibson explained, "*This diagnosis will change their child's life, their lives and that of siblings and other family members*".

102. As explained by Professor Gibson, every cancer is associated with a different relapse risk, treatment-related mortality and long-term outcome. These variables will affect the amount of time spent in hospital and, in turn, the overall impact on normal family life[113]. Rates of cure are high[114]. However, as Professor Gibson observed, the overriding fear for parents is that their child will not respond to treatment or will respond and then relapse with an unsuccessful outcome. Throughout treatment, the risk of infection looms large; parents are, quite intentionally, taught to fear it.

[112] Witness statement of Professor Brenda Gibson, paras. 13-16.
[113] Witness statement of Professor Brenda Gibson, p.14.
[114] Witness statement of Professor Brenda Gibson, para. 22.

103. Another theme echoed from the Glasgow 1 evidence was the central importance of trust in the relationship between clinicians and families. Dr Murphy described honesty and openness as "*the absolute foundation of what we do*"[115]. Trust is the essential ingredient in communication about life-changing decisions[116].

CHAPTER 3: Infections and mitigation of infection risk

104. The intention of this chapter is to summarise the evidence of the Glasgow 2 witnesses in relation to the nature of infections encountered by paediatric cancer patients and the associated efforts to mitigate the risk of infection. Taken together with chapters 1 and 2, this chapter provides important context for the remainder of this closing statement.

105. At a future date, the Inquiry will hear evidence from those with expertise in microbiology, epidemiology and infection prevention and control ("IPC"). The Glasgow 2 witnesses acknowledged the limitations of their expertise in these matters. Nevertheless, management of infection is a significant part of the clinical and nursing care provided to paediatric cancer patients. Many of the witnesses heard from have worked in paediatric cancer care for decades; some exclusively with the Schiehallion patient cohort. Consultants and nurses described close working relationships with microbiology and IPC colleagues[117]. Particularly where witnesses were careful not to stray beyond the bounds of their knowledge, it is submitted that weight attaches to their evidence of these matters.

Types of infection

106. The evidence presented to the Glasgow 1 and 2 hearings indicates that, of the different classes of infection, it is fungal and bacterial infections that give rise to the greatest concern in relation to paediatric haemato-oncology patients. While a precise understanding of the various ways in which such infections are classified may need to await evidence from IPC and microbiologist witnesses,

[115] Witness statement of Dr Dermot Murphy, para. 321.
[116] Witness statement of Dr Dermot Murphy, paras. 321 to 325.
[117] See, for example, the evidence of Dr Dermot Murphy, transcript, p.111.

it may be useful to offer a tentative understanding of things based on the evidence presented thus far. Apart from anything else, the discussion that follows may help direct attention to where greater understanding is required.

Endogenous and exogenous

107. Infections – and it is assumed that this aspect of classification applies both to bacterial and to fungal infections – can be endogenous or exogenous. Endogenous infections are caused when bacteria, that may be present in the patient themselves, enter the bloodstream. Typically, the bacteria may be present in the nose, mouth, intestine or urinary system[118].

108. The opposite of endogenous infections are those that are exogenous in origin: i.e. coming from a source external to the patient.

Hospital Acquired and Healthcare Associated Infections

109. For present purposes it may be useful to divide exogenous infections into two categories. The first are those that have some connection (being deliberately imprecise at this point) to healthcare provision context.

110. While evidence was offered by the Glasgow 2 witnesses about the classification of infections as Hospital Acquired Infections or as Healthcare Associated Infections, the precise difference between these terms and the related acronyms (HAI and HCAI) was not always stated with precision. That is not a criticism of the witnesses. Dr Murphy noted that the definition of these two categories is difficult and can vary depending on the material consulted[119]. Moreover, those witnesses with whom these issues were canvassed properly and fairly emphasised that they may not have the expertise required to answer authoritatively.

111. Witnesses broadly understood that if a patient develops an infection having been in hospital for 48 hours or more, the infection will be categorised as a hospital acquired infection ("HAI"); a similar categorisation might be made if a

[118] Witness statement of Dr Jairam Sastry, paras. 39-41.
[119] Evidence of Dr Dermot Murphy, transcript, p.68.

patient has been at home but has had contact with the hospital in the previous 48 hours (for example, by attendance at day care)[120].

112. It is important to emphasise, as was explored with Dr Murphy, that the term "HAI" is not to be seen as indicating the hypothesised source of an infection. Rather, "HAI" may simply denote a temporal correlation between an infection and a healthcare setting. It does not indicate that the source of an infection is the built hospital environment, although that may remain a possibility. Establishing the source of an infection is a different and altogether more complex exercise.

Community Acquired Infections

113. Exogenous infections acquired in a healthcare setting may fall to be distinguished from those acquired in the community or at home. In the evidence presently before the Inquiry, the latter appear sometimes to be referred to as community acquired infections[121]. That said, this approach might be thought to depend upon causal considerations, which considerations are not, according to the foregoing discussion, thought to be part of the process of analysing an infection as an HAI/HCAI. It may be, therefore, that to distinguish between HAI/HCAI and community acquired is not to compare like with like. This may simply underline the suggestion made above that the terms HAI/HCAI have no application to questions of causation.

Gram-positive infections

114. Bacterial infections can be further classified as gram-positive and gram-negative. Professor Gibson explained that, most commonly, line infections are caused by gram-positive bacteria. Some gram-positive organisms naturally inhabit the skin. They may make their way from the skin into the bloodstream during line insertion procedures. Good hand hygiene and line care can help to reduce the risk of these infections but will not eradicate that risk entirely[122]. If a line infection is caused by a gram-positive bacteria, a patient may become

[120] Witness statement of Professor Brenda Gibson, para. 32.
[121] Witness statement of Dr Jairam Sastry, paras. 39-41.
[122] Witness statement of Professor Brenda Gibson, para. 26; witness statement of Dr Shahzya Chaudhury, paras. 133 – 134.

unwell but treatment with antibiotics is often successful. It may not be necessary to remove the central line[123].

Gram-negative infections

115. Typically, line infections caused by gram-negative bacteria are less common. Gram-negative infections can be endogenous or exogenous. In the material before the Inquiry, some gram-negative infections are described as being "environmental" in nature. It is not altogether clear what if any particular significance that term has in the present context. But the evidence certainly suggests that a number of gram-negative infections are frequently associated with water and with soil[124].

116. The consistent evidence was that gram-negative infections may not only be more difficult to eradicate but that they may also pose a greater danger to patients than gram-positive infections. Some gram-negative bacteria produce a biofilm that "sticks" to the line and prevents the penetration of intravenous antibiotics[125]. Flushing the line risks flushing the bacteria through the patient's body (described as a "septic shower")[126]. The bacteria themselves can be resistant to antibiotics. Often, the line has to be removed.

117. Gram-negative infections have the potential to make patients suddenly and severely unwell. They can cause rapid and unpredictable deterioration, requiring resuscitation and intensive care intervention[127]. An endotoxin producing gram-negative bacteria can cause the blood pressure to drop catastrophically, resulting in cardiac arrest[128]. Dr Murphy vividly described how, when on call, his fear is that a child will develop gram-negative sepsis.

Fungal Infections

[123] Witness statement of Dr Anna Maria Ewins, para. 244.
[124] See, for example, the evidence of Dr Dermot Murphy, transcript p.73.
[125] Witness statement of Professor Brenda Gibson, para. 26. Witness statement of Dr Anna Maria Ewins, para. 246.
[126] Witness statement of Angela Howatt, para. 25.
[127] Evidence of Dr Murphy, transcript, p.112.
[128] Witness statement of Dr Anna Maria Ewins, para. 245.

118. Less evidence was heard about the nature of fungal infections. Professor Gibson explained that fungal infections are difficult to diagnose, with treatment often being empirical in nature[129]. However, the evidence was clear that airborne fungal infections, particularly Aspergillus, present a significant risk to immunosuppressed patients. For this reason, a range of mitigations are put in place to reduce the risk of these infections.

119. Dr Murphy explained that fungal infections tend not to result in acute deterioration but the consequences for a patient can still be devastating. Professor Gibson noted that fungal infections in particular may significantly interrupt treatment because of the need to maintain a neutrophil count[130].

Monitoring, investigating and treating infection

120. Dr Sastry explained that when a patient becomes unwell with an infection, there is a responsibility to establish what the infection is, its cause and what treatment is required[131]. Professor Gibson described the division of responsibility between clinicians and IPC. Clinicians have responsibility for treating an infection. IPC colleagues on the other hand have responsibility for monitoring, investigating and reporting infections[132].

121. Blood samples are taken and analysed in the microbiology laboratory. If positive cultures are detected, microbiologists identify the virus, bacteria or fungus causing the infection and work with clinicians to identify the most appropriate treatment. If the infection is thought to be endogenous further investigation of a source is not usually required[133]. If the infection is unusual, or caused by a rare organism, IPC may decide that further investigation is required. The first stage of investigation is the formation of a Problem Assessment Group ("PAG"), comprising a small multidisciplinary team who will discuss the likely source of the infection. This may be escalated to an Incident Management Team ("IMT"), if, for example, further infections occur or if there is a matter of particular

[129] Witness statement of Professor Brenda Gibson, para. 177.
[130] Witness statement of Professor Brenda Gibson, para. 31.
[131] Witness statement of Dr Jairam Sastry, paras. 70 to 74.
[132] Witness statement of Professor Brenda Gibson, para 32.
[133] Witness statement of Dr Jairam Sastry, para. 72.

concern[134]. Dr Sastry's view was that, ideally, every gram-negative infection should lead to a PAG[135].

122. An IMT will have representation from a number of departments including, IPC, Estates and Facilities, clinicians and microbiologists. The objective of the IMT is to establish the source of the infection (or infections) and to put in place appropriate measures to remove the source of the infection or mitigate the risk. Clinical interventions may be informed by the discussions at the IMT.

123. The Inquiry's present understanding is that the IMT and its Chair benefit from an amount of delegated authority to make decisions and recommendations relating to the incident under investigation[136]. However, some matters would be escalated to wider GGC management. The functioning of the IMT is closely linked with the provisions of the National Infection Prevention Control Manual and instructions given by the Chief Nursing Officer. These are matters for the Inquiry's future investigations.

124. Minutes are taken of all PAG and IMT meetings. The minutes thought to be relevant to the Inquiry's investigations are contained in Bundles 1 and 2. As will be seen, IMTs over the period 2018 to 2019 generated a large volume of documentation.

125. As was made clear during the hearings, the Inquiry does not presently seek to rely on the record of the IMTs to establish the underlying facts; rather the IMT minutes are taken to indicate a record of concerns raised and responses thereto. On most occasions when IMT minutes were put to witnesses, witnesses agreed that the minutes were accurate. A note of caution was, however, sounded by Professor Gibson who thought that the minutes did not always capture discussions exactly as they happened[137].

<u>Mitigation of risk</u>

[134] Witness statement of Professor Brenda Gibson, para. 249; witness statement of Emma Sommerville, paras. 27-28.
[135] Witness statement of Dr Jairam Sastry, para. 73.
[136] Witness statement of Jennifer Rodgers, para. 384.
[137] Evidence of Professor Brenda Gibson, transcript, p.80.

126. Clinician witnesses emphasised that, as a consequence of the nature of the health conditions concerned and the resulting treatment, infections are unfortunately to be expected in the paediatric haemato-oncology patient cohort. Steps are taken to mitigate the risk of infection, but that risk can never be completely eliminated. A risk of infection is, simply put, an inherent feature of the paediatric cancer experience.

127. Managing the risk of infection is a seam which runs through the care of paediatric cancer patients. All clinician and nurse witnesses spoke to this to some extent. The evidence contained in the statements is detailed and is not repeated at length in this statement.

128. Those providing care in the Schiehallion Unit are specially trained in the requirements for looking after this vulnerable patient group. Nurses play an important role in managing infection and work closely with IPC colleagues. The development of expertise in safe line care is a prime example of this[138]. Thus there is programme of ongoing staff education, monitoring and audit of infection control practices[139].

129. Much of the care provided on the Schiehallion Unit is driven by Standard Operating Procedures ("SOPs"). Some SOPs are hospital-wide, others are local, tailored specifically for Schiehallion patients. Many of these SOPs are tailored towards the prevention and management of infection in this patient group.

130. In some circumstances, patients may require to be housed outwith the Schiehallion Unit, perhaps because of admission route, treatment needs or because of restricted capacity. Staff on other wards will not carry out specialised treatment such as delivering chemotherapy; when required, the Schiehallion medical team travels to these patients wherever they are located. However, SOPs are available to staff on these other wards to help maintain the same standards of care and infection management as these patients would

[138] See, for example, the witness statement of Emma Sommerville, paras. 63 to 65; evidence of Emma Sommerville, transcript, p.15.
[139] Witness statement of Emma Sommerville, paras. 20-25.

receive within the Schiehallion Unit[140]. Although some families perceived that specialised SOPs and care did not always follow them to other wards, the Glasgow 2 witnesses were unaware of such instances.

Prophylactic medication

131. Prophylactic medication (prophylaxis) is intended to provide patients with a degree of protection against infection. There was clear and consistent evidence that the prescription of prophylaxis to paediatric cancer patients is standard practice, whether mandated by treatment protocols or in response to perceived risk[141].

132. Professor Gibson explains the use of prophylaxis in paragraphs 34 to 38 of her statement. Prophylaxis can be primary or secondary. Primary prophylaxis is given to prevent infection because the risk of infection for a group of patients is considered high. Secondary prophylaxis is given to patients who have already had an infection, in order to prevent recurrence.

133. Prophylaxis can be antibiotic or antifungal depending on the risk being mitigated. Use of either type of prophylaxis may be specified in national and international treatment protocols and guidelines. Protocols specify use either when the patient group is particularly vulnerable or where a treatment protocol is particularly intensive and associated with a high risk of infection.

134. Anti-fungal prophylaxis prescribed in accordance with standard protocols includes AmBisome, Caspofugin or Posaconazole. A drug called Septrin is routinely prescribed as prophylaxis against PCP (a type of pneumonia) to all leukaemia patients during and after treatment. It is also prescribed to post-transplant patients.

135. Patients who are thought to be at particular risk of gram-negative infections because of poor immunity may be prescribed Ciprofloxacin prophylaxis. One clinician indicated that, although there is only limited evidence supporting the use of prophylaxis to prevent gram-negative infections, there is evidence

[140] Witness statement of Professor Brenda Gibson, paras. 68-69.
[141] Witness statement of Professor Gibson, para. 36.

supporting the use of Ciprofloxacin in the context of allogenic HSCT and other high risk patients[142].

136. Prophylaxis is also used in response to specific perceived risks as and when they arise. Examples include infection outbreaks or risks posed by building works. In Professor Gibson's view, the use of prophylaxis in either of these circumstances is not unusual or controversial. (In Chapter 5, Impacts, consideration is given to evidence of additional prophylaxis prescribed as a result of the concerns about the hospital environment under consideration by the Inquiry.)

137. As with any medication, prophylactic medication comes with possible side effects. Septrin is associated with myelosuppression. AmBisome can cause anaphylaxis and renal impairment. Caspofungin and Posaconazole may cause hepatic (liver) toxicity. Ciprofloxacin can cause gastro-intestinal symptoms. All drugs may upset hepatic or renal functions[143]. However, a common theme in relation to the treatment of children with paediatric cancer is that risks have to be weighed in the balance. The use of prophylactic medication is one such example.

<u>The importance of the hospital environment</u>

138. Glasgow 2 witnesses gave cogent evidence about the importance of the built hospital environment in managing the risk of infection. The Inquiry's future hearings will involve more detailed, technical and expert evidence on this theme. However, it is submitted that evidence of clinicians, especially those who are bone marrow transplant specialists[144], is of value in understanding the rationale for the provision of a protective environment.

139. Patients who are particularly vulnerable to infection may require protection beyond that offered by good infection control practices and prophylaxis. Creation of a protective environment helps to shield against infection. One method of creating this environment is by controlling its air quality. This is

[142] Witness statement of Dr Shahzya Chaudhury, para. 151.
[143] Witness statement of Professor Gibson, para. 38.
[144] Professor Brenda Gibson, Dr Anna Maria Ewins and Dr Shahzya Chaudhury.

achieved through use of a specialist ventilation system and associated measures.

140. Glasgow 2 witnesses were aware of the existence of technical guidelines for ventilation in hospital buildings but were uncertain if they applied to patients outwith the BMT-cohort. Clinicians were, however, consistent in their understanding that BMT patients should be cared for in rooms which provided specialist ventilation in at least two respects: (i) High Efficiency Particulate Air (HEPA) filtration; and (ii) positive pressure[145]. HEPA filtration provides a high degree of filtration to air entering the filtered area. A positive pressure cascade is intended to allow air to exit a patient room but not to enter it. These two features together were understood to be intended to reduce the risk of microbes entering the patient's environment.

141. Professor Gibson explained that quite apart from national technical guidelines, transplant units must also adhere to the standards set by the Joint Accreditation Committee ISCT-Europe ("JACIE") and be accredited by JACIE[146]. All of Europe adheres to the JACIE standards; the USA operates a similar accreditation system. The standards set by JACIE are not overly prescriptive to enable compliance by low and middle income countries. The standard set by JACIE is that transplant units should be designed to "*minimise microbial contamination*"[147]. Professor Gibson recalled that when the Schiehallion Unit moved to the RHC, clinicians were told that the HEPA filtration that had been installed in the BMT rooms met the JACIE standards of protection against microbial infection[148].

142. Under reference to the SBAR titled "SBAR: 2A Patient Accommodation and Risk of Invasive Fungal Disease" dated 30 October 2017[149], Dr Ewins confirmed that the building requirements listed therein for "Neutropenic/BMT patients" broadly accorded with her understanding of the specialist ventilation required by such patients: 10 air changes per hour, positive pressure at 10pa

[145] See, for example, the witness statement of Professor Brenda Gibson, para. 39.
[146] Witness statement of Professor Brenda Gibson, paras. 39; 62-64.
[147] Witness statement of Professor Brenda Gibson, para. 62.
[148] Witness statement of Professor Brenda Gibson, paras. 63.
[149] Bundle 4, p.113.

to the corridor, all air entering the room should be HEPA filtered and alarms should be present to monitor for failure[150]. Dr Ewins noted an important caveat that not all neutropenic patients require this level of protection at all stages of their treatment.[151]. A highly specialised environment is required for BMT and SCIDS (severe combined immune deficiency) patients. Other high risk patients may benefit from this protective environment at particular stages of their treatment but do not require it as a matter of course.

143. As explained in chapter 1, Ward 2A had no specialist ventilation arrangements aside from in the BMT rooms. Clinicians had to think carefully about which patients would benefit from the protective environment in those rooms (as it was then thought to be) depending on the stage of their treatment. However, as Dr Ewins also explained, fundamental problems with ventilation systems in the BMT rooms meant that even more fraught decisions had to be made about access to those rooms and the ability to carry out transplants[152].

CHAPTER 4: The history of concern

Introduction

144. Earlier this year, the Inquiry issued as PPP5 the document entitled the History of Infection Concern ("HOIC"). As was explained at the time, the purpose of the HOIC was to set out in draft form the Inquiry's then understanding of the concerns that people have had about the history of patient infections within the QEUH/RHC and concerns about the possibility that these were in turn linked to concerns about the built environment. A number of CPs provided useful responses to the HOIC. These have been considered.

145. Since that time, a substantial amount of further documentation has been considered. That documentation casts further light on the concerns that arose about the built environment and about the possibility of an associated risk of,

[150] Supplementary witness statement of Dr Anna Maria Ewins, para. 21-22.
[151] Supplementary witness statement of Dr Anna Maria Ewins, paras. 21 to 25.
[152] Supplementary witness statement of Dr Anna Maria Ewins, para. 26.

or link to, patient infections. A timeline setting out what appear to be the more significant elements of this can be found at Appendix 2.

146. Presently the timeline should perhaps not be seen as wholly superseding the HOIC. While it is hoped that the most prominent issues referred to in the HOIC are present within the timeline, CPs may wish to make up their own minds about that. In the meantime, the timeline should be seen as the Inquiry's updated understanding of the principal known concerns about the built environment and the associated concerns about the risk of or links to infections.

147. The elements of the building focused upon in the timeline and in this chapter are water, drainage and ventilation (as well as certain other issues such as the Ward 6A shower rooms where it appears to have been thought that there was a risk of infection). For future consideration perhaps is whether elements such as cladding ought to be included. Subject to considerations such as that, it is hoped that the timeline provides an indication of the events to focus upon in the investigation of the Inquiry's Key and Ancillary Questions[153].

148. As indicated in the Introduction to this closing statement, the present chapter focuses on the parts of the timeline spoken to by the Glasgow 2 witnesses. As a result, the focus of the discussion is towards the RHC, and the Schiehallion Unit cohort of patients in particular.

149. It must be emphasised that Chapter 4 and the timeline are principally intended to set out what people said or understood about concerns (and the related responses to concerns) at the time. That said, a clear and largely consistent story emerges from the witness and documentary evidence made available for the Glasgow 2 hearing. In this situation, one might fairly ask why the evidence set out below in relation to the existence of concerns (and their related responses) cannot simply be accepted in order that the Inquiry can move forward to asking CPs which parts of the history of concern are accepted as being objectively valid.

[153] Appendix 3.

150. But in thinking about the prospect of that further investigation, it is hard not to be struck by the sheer size of the history of concern. The list of concerns is long. It stretches back to 2015. These thoughts tend to underline the need to find a means of completing the investigation as efficiently and expeditiously as possible. Perhaps in the Chair's repeated desire that the Inquiry and CPs work collaboratively, and perhaps also in the values that ought to guide any public sector body or process – transparency, openness, candour, accountability – the means for doing this might be found.

151. One way of doing it would be to repeat the exercise of having CPs set out their position on the objective validity of the various concerns. To do that for every one of the concerns discussed below would produce a document too lengthy to serve a useful purpose, and would risk imposing an unreasonable burden upon CPs. A better way to proceed may simply be to focus on overarching questions along with a few individual examples.

Questions for CPs

152. In total, the questions asked in relation to Chapter (4) are as follows. It is acknowledged that not every CP will be able to answer these questions. It is also acknowledged that time may not permit an answer to every question prior to the date for initial exchange of drafts. But CPs may nevertheless wish to keep in mind the observations just made.

Questions aimed at establishing the history of concern

(1) *Is it accepted that the narrative set out below provides a materially accurate summary of the evidence provided to the Inquiry – whether that evidence be in witness or in documentary form – about the history of concern?*

(2) *Does the narrative provide, for the period it covers, a materially accurate account of contemporaneous expressions or examples of concern about the hospital environment and about infection link or risk?*

(3) *Insofar as any aspect of the narrative is said not to have been part of the history of concern at the time what is the basis for that challenge?*

(4) *What if any additional expressions or examples of concerns ought to be included in the narrative and considered for further investigation?*

Responses to concern

(5) *Does the narrative and the timeline set out a reasonably comprehensive history of the response by GGC and other organisations to concerns that the built hospital environment gave rise to a risk of infection on the part of vulnerable patients?*

(6) *Should consideration be given to other measures; and if so which ones?*

Objective validity for concerns

(7) *At any point since patients arrived in the QEUH/RHC, has the water system given rise to an increased avoidable risk of patients being exposed to infections?*

(a) *Is it accepted that the 2015 DMA Report identified deficiencies in the water system that without remediation had the potential to give rise to such a risk?*

(b) *Were these deficiencies addressed prior to the report being "discovered" around June/July 2018?*

(c) *Did the events of March/April 2018 identify widespread contamination of the water supply throughout the RHC and QEUH per the evidence of Professor Gibson and the Full IMT Report of 13 April 2018?*

(d) *Did that contamination have the potential to be harmful to vulnerable patients coming into contact with untreated or unfiltered water?*

(8) *At any point since patients arrived in the QEUH/RHC, has the ventilation system given rise to an increased avoidable risk of patients being exposed to infections?*

(a) *Does the Innovated Designs Report of 24 October 2018 identify any features of the ventilation system on Ward 2A that could have increased the risk of infection to patients?*

(b) *Did the features of the ventilation system discussed in the SBAR of 12 November 2018 present an increased risk of infection to patients?*

(9) *Finally, for GGC, NSS and the Scottish Government specifically: which if any of the infections identified in the history of concern, are accepted as having been caused by an aspect of the built hospital environment; which aspect of the environment?*

(a) *To what extent does the answer to this question depend upon the availability and use of genomic investigation*?

(b) *Insofar as it is being relied upon, is genomic investigation being used as a means for excluding or for confirming causal links to the environment?*

(c) *Does the utility of genomic investigation depend upon the availability of suitable environmental testing?*

(d) *In what way and over what period did water testing within the QEUH and RHC evolve (as regards regularity, location and nature of pathogens considered)?*

(e) *Who sat on the Cryptococcus sub-group and did it come to an agreed view on each of the hypotheses under consideration?*

Notes on history of concern

153. Where some context is required, reference has been made to elements within the timeline not spoken to by the Glasgow 2 witnesses. As part of that, reference has been made to events that pre-date patient migration.

154. As indicated at the Procedural Hearing, the narrative is divided into (a) the identification of concerns and (b) the response to these concerns.

(i) Year: 2014

Concern: Taps / flow straighteners

155. In April 2014, HPS prepared an SBAR[154] responding to a request from GGC for advice about the use of flow straighteners in the taps procured for the new QEUH campus. HPS, in its SBAR, drew attention to recent guidance which identified a risk of biofilm developing in flow straighteners, and which recommended removal of flow straighteners from taps. The SBAR recommended to GGC that it did not install taps with flow straighteners in high-risk units.

156. GGC, in its response to the HOIC[155], says that at a meeting on 5 June 2014 (at which HPS was represented), it was agreed that "*there was no need*" to do this and that "*any residual perceived or potential risks would form part of the routine management process*." The response from Currie & Brown indicates that it agrees with this understanding of what was said at the meeting. NSS, for its part, has said[156] that it was "*unaware that the advice in its SBAR had been contravened until March 2018*." It is not known what steps were taken by GGC to address the risks referred to in the SBAR.

157. Glasgow 2 witnesses did not indicate knowledge in 2014 of concern about the use of flow straighteners in taps. However, Professor Gibson recalled that at an IMT meeting on 9 March 2018[157], the existence of the 2014 SBAR was

[154] Bundle 3, p.5.
[155] HOIC, para. 51.
[156] NSS Supplementary Response to the HOIC, para. 1.3.4.
[157] Bundle 1, p.60.

discussed[158]. She recalled from that discussion that the SBAR was noted to have advised against the use of flow straighteners in taps in high-risk areas; she understood that to mean areas where immunocompromised patients were present. Professor Gibson's understanding of the discussion was that the use of flow straighteners was thought to encourage the growth of biofilm which can in turn encourage infection; and that "*bugs*" can "*seed out*" from the biofilm and be difficult to eradicate.

Response: Taps / flow straighteners

158. Professor Gibson did not have direct knowledge of the response to this concern in 2014 but she did recall a discussion at the IMT that the tap specification had not been changed because of cost implications and practicalities[159]. Professor Gibson's recollection is that the IMT minute records the discussion accurately.

159. Then Chief Nurse, Jennifer Rodgers, also recalled the discussion about flow straighteners. Like Professor Gibson, she was careful not to stray into matters that were outwith her expertise (for example, in relation to the guidance relating to the use of flow straighteners). Ms Rodgers did not recall a discussion about cost at the 9 March 2018 IMT. She volunteered that, in her experience, cost was generally not a limiting factor in GGC's response to the concerns that arose in the post-September 2015 period. She accepted that she could not speak to the period before then[160].

(ii) Year: 2015

Concern: water safety / DMA Canyon report

160. DMA Canyon Limited are understood to be consultants with expertise in aspects of water system safety. They are understood to have been commissioned by GGC to provide a report on the water system within the QEUH/RHC. The Inquiry has been provided with a report dated 29 April/1 May

[158] Evidence of Professor Brenda Gibson, transcript, p.93.
[159] Evidence of Professor Brenda Gibson, transcript, p.93.
[160] Evidence of Jennifer Rodgers, transcript, p.58.

2015[161] ("the DMA Report"). In its report of March 2019[162], HFS assessed the DMA Report as highlighting "*various risks associated with the water system at handover, with a significant number to be dealt with either immediately, as soon as reasonably practicable or within three months*."

161. In the HOIC, between paragraphs 1.5.1-1.5.6, the Inquiry set out its then understanding of what had happened to the DMA Report following GGC's receipt of it. In their response to the HOIC, the Cuddihys and the Mackays drew attention to correspondence that might be thought to cast light upon this question.

162. The Inquiry has since had sight of two SBARs that provide some assistance. The first, dated 5 July 2018, refers to reports relating to the commissioning of the water system having been "*identified in recent days*"[163]. The second, dated 8 August 2018[164], suggests that identification of the said reports took place in June 2018. The matter was considered by the Oversight Board in its final report. Rather laconically perhaps, the DMA Report is described as having "*surfaced*" in the context of providing information to HPS/HFS for the purposes of their review of issues in March 2018.

163. In its response to the HOIC[165], GGC says that the DMA Report was received in 2015 by the former Estates manager; that it gave rise to the creation of an action plan by that person; and that the delivery of this was delegated to two members of the Estates team. GGC says that the report's existence and contents were made known to senior management in July 2018, at which point it was shared with external bodies and with the then Lead ICD. GGC says no more than this. It does not make any comment upon the significance or otherwise of the concerns about the water system identified in the DMA Report.

<u>Response: water safety / DMA Report</u>

[161] Report entitled "Legionella L8 Risk Assessment 2015 (pre-occupancy)" dated 1 May 2015; Bundle 6, p.122.
[162] Bundle 7, p.111.
[163] Bundle 4, p.126.
[164] Bundle 4, p.128.
[165] GGC Response to HOIC, at para. 53.

164. None of the Glasgow 2 witnesses recalled having direct contemporaneous knowledge of any concerns about the safety of the water system in late-2014 and early-2015. In particular, none recalled being aware, at the time it was provided to GGC, of the DMA Report. None was able to assist the Inquiry with its understanding of GGC's response to the DMA Report (whether in 2015 or subsequently).

165. Where witnesses were aware of the existence of the DMA Report, that knowledge was gained at a much later stage than 2015. Professor Gibson thought it might have been referred to in the 2018 IMTs but had no clear understanding of who within GGC saw it and when.

166. Mr Redfern did not recall being told "*formally*" about the existence of the DMA Report at any point between 2015 and the present day. His awareness of its existence had been gleaned from the media and the Inquiry[166]. Despite the senior roles he held in relation to the patient cohort most affected by concerns about the water system from 2018 onwards, he was not, on his evidence, made aware of concerns connected to the "discovery" of the DMA report that year or of any concerns about the water system that the report may have highlighted. Whether his apparent ignorance of these matters raises questions about information sharing and governance is something that might be considered in the future.

Concern: absence of HEPA filters in Ward 2A

167. During the course of 2015, certain concerns emerged about the safety of the ventilation system on Ward 2A and, in particular, whether it provided a safe environment for BMT patients[167].

168. Professor Gibson recalled being informed that Ward 2A as a whole was built to the standards required for a haemato-oncology unit, such that the rooms for treating BMT patients would have positive pressure and HEPA filtration[168]. Both

[166] Evidence of James Redfern, transcript, p.79; p.239.
[167] See, primarily, the evidence of Professor Brenda Gibson; the witness statement of Dr Anna Maria Ewins.
[168] Evidence of Professor Brenda Gibson, transcript, p.48.

Professor Gibson and Dr Ewins considered these to be vital elements of a protective environment suitable for treating BMT patients.

169. Prior to the migration of paediatric patients to the RHC, Professor Gibson sought, and was given, assurance from the then Lead IPC doctor that it would be safe to begin transplant procedures on moving to the new ward[169].

170. However, Professor Gibson[170] recalled that at a visit to Ward 2A shortly before the move it was discovered that HEPA filters were not in fact installed in the BMT rooms on Ward 2A; casings were present but the filters themselves were not. Discovery of the omission of filters at such a late stage, was a matter of concern to Professor Gibson. She was surprised that the omission of filters had not been detected during the commissioning process. She had been told the specification of the ward was to the required standard and trusted what she had been told. Professor Gibson expected Management, Estates and IPC to provide a safe environment in which to treat children; prior to this discovery she had no reason to doubt that that would be provided[171].

171. In the absence of HEPA filters, transplants would not have been able to take place. Professor Gibson's evidence was that had the issue not been resolved, migration to the RHC would have been delayed[172]. In an email dated 5 June 2015 to the then Clinical Service Manager[173], Professor Gibson noted the likelihood that a transplant planned for 20 June would have to be delayed as a result of the missing HEPA filters. Professor Gibson wrote:

"*It is inconceivable that a transplant unit was built without hepafiltration. Truly shows the priorities all show and no substance."*

172. Reference might also be made to the evidence of Dr Murphy as regards the missing HEPA filters[174]. Whether, as he indicates and as the email from

[169] Evidence of Professor Brenda Gibson, transcript, p.48.
[170] Who is herself an inspector for JACIE and has inspected most transplant Units in the UK (statement, para. 101).
[171] Witness statement of Professor Brenda Gibson, para. 98.
[172] Evidence of Professor Brenda Gibson, transcript, p.50.
[173] Bundle 8, p.125.
[174] Witness statement of Dr Murphy, paras. 150-151.

Professor Gibson just quoted might be thought to suggest, the absence of the HEPA filters speaks to broader concerns about the quality of the built environment may be a question for future consideration.

Response: absence of HEPA filters in Ward 2A

173. Swift action was taken to source and install the missing HEPA filters. Migration to the RHC was not delayed. However, further concerns about the safety of the BMT rooms emerged following migration.

Concern: air quality on Ward 2A

174. Professor Gibson recalled that although the first two transplants proceeded without incident, concerns about air quality on Ward 2A emerged in around July 2015 and continued into August and September. Air sampling on Ward 2A indicated high particle counts in the ward corridor. On raising this with the then Lead IPC Doctor[175], Dr Ewins recalled being informed that some 'noise' in the air sampling results was to be expected; the corridor was not pressurised and the unit not sealed from the rest of the hospital[176].

175. Of more immediate concern was the discovery of raised particle counts in the BMT rooms themselves[177]. Further investigation using smoke tests revealed that the BMT rooms were not properly sealed; air could enter the room through unsealed areas (for example, light fittings). Professor Gibson recalls that at one point, Aspergillus was found in the air sampling in BMT rooms[178]. Despite these air sampling results, Professor Gibson recalls some debate about whether the rooms were in fact safe[179]. There was doubt about interpreting the air sampling results. Professor Gibson recalled that the new Lead Infection Control Doctor ("ICD")[180] was not satisfied that transplants could proceed safely[181]. Dr Ewins recalled a similar view being expressed[182].

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[175] Professor Craig Williams.
[176] Supplementary Witness statement of Dr Anna Maria Ewins, paras. 15-16.
[177] Supplementary Witness statement of Dr Anna Maria Ewins, paras. 18-20.
[178] Evidence of Professor Brenda Gibson, transcript p.54.
[179] Evidence of Professor Brenda Gibson, transcript, p.57; see also the emails at Bundle 8, pp.128 - 129.
[180] Specifically, Dr Theresa Inkster.
[181] Evidence of Professor Brenda Gibson, transcript, p.54.
[182] Supplementary witness statement of Dr Anna Maria Ewins, para. 19.

176. These concerns arose at a time when the unit had an extremely vulnerable patient awaiting transplant. For the reasons identified above, transplant patients do not have the luxury of time; there is a narrow window in which a transplant can proceed. Clinicians were in the unenviable position of potentially having to balance the risks of treating and not treating a desperately sick child.

177. An exchange of emails between 6 August and 4 September 2015, captures the clinicians' growing sense of frustration about the unanswered questions about the safety of the BMT rooms and the fact that the unit had been allowed to move when the safety of the environment may not have been assured[183]. In her email dated 4 September 2015, Professor Gibson escalated her concerns to the board's Medical Director, Dr Jennifer Armstrong[184]. She explained that the concerns about the BMT rooms had been unresolved for two months. Deadlines for resolution had been breached. Families in the anxious position of knowing their child needed a transplant, were in an uncertain position. Clinicians had lost faith. She said:

"*We have no feeling that the appropriate sense of urgency is in place…the transplant programme has been severely compromised*".

Response: air quality on Ward 2A

178. Professor Gibson recalls that Dr Armstrong attended a meeting three days after the email was sent. Dr Armstrong gave the instruction that transplants could move forward. Professor Gibson did not recall receiving an explanation for why the problem arose in the first place.

179. Dr Ewins recalled remedial work being done to seal the BMT rooms. There came a point where air sampling showed that two of the BMT rooms had air sampling results of a tolerable level so that transplants could proceed[185].

180. Although there was clearly a period of frustration on the part of clinicians in 2015, Professor Gibson was satisfied at the time that the response to the

[183] Bundle 8, pp.128-133. See, p.132.
[184] Bundle 8, p.133.
[185] Supplementary witness statement of Dr Anna Maria Ewins, para. 19.

(known) issues was adequate. The problems with filters were resolved quickly enough to allow migration as planned. “Snagging” problems with the BMT cubicles were not entirely unexpected. Remedial works were carried out. More generally, Professor Gibson understood that plans were put in place in 2015 to begin a programme of upgrading the Ward 2A BMT rooms to a higher specification. Although frustrated that there were problems, there appeared to be a plan to address these problems[186].

Concern: Ventilation system in Ward 4B (adult BMT ward)

181. Ward 4B is the adult BMT Unit and is located within the QEUH building. Adult BMT patients moved from the Beatson Oncology Centre (the “Beatson”) to Ward 4B in the summer of 2015. Shortly after they migrated, significant concerns were raised about the whether the Ward 4B ventilation system provided a safe environment for BMT patients[187]. Further evidence will be heard about this concern at future hearings.

Response: Ventilation system in Ward 4B (adult BMT ward)

182. Adult BMT patients were moved back to the Beatson a matter of weeks after arrival at Ward 4B, in around July 2015. They did not return until June 2018.

183. Despite the parallel concerns arising in 2015 about the provision of safe environments for adult and paediatric BMT patients, Professor Gibson did not recall being provided with information about the Ward 4B events; she recalls only being peripherally aware of a concern. There were “*rumours*” that problems with the ventilation system rendered Ward 4B unsafe for transplanting. There remains a question about whether this is something that clinicians should have been made aware of. However, the bigger question might be whether concerns about the adult BMT unit, allied to the issues experienced on 2A in 2015, ought to have indicated the need for further investigation. In particular, is it possible that there would have been earlier discovery of the issues identified in late 2018 (and discussed below)?

[186] Evidence of Professor Gibson, transcript, p.62.
[187] See, for example, the witness statement of Dr Alistair Hart, paras. 88-90; the SBAR at Bundle 4, p.11; the email at Bundle 5, p.18 and the HPS SBAR at Bundle 3, p.36.

(iii) Year: 2016

The NICU: a concern?

184. In his statement, Dr Coutts highlights concerns about infections within the neonatal intensive care unit ("NICU")[188]. We have also included reference to the NICU within the timeline. For future consideration is whether, against the background of its being housed in a pre-existing building on the hospital campus, the NICU falls within the scope of the Inquiry's remit.

Concern: Cupriavidus infection in early 2016

185. In early 2016, a (it is assumed) paediatric patient experienced an infection; the blood culture tested positive for Cupriavidus. A subsequent investigation linked the infection to a sink within the Aseptic Pharmacy Unit[189]. The Inquiry understands GGC to accept that this infection was linked to the hospital environment. Evidence from the Glasgow 2 witnesses indicated that Cupriavidus is a very rare gram-negative organism associated with the environment[190]. In her long career, Professor Gibson had not come across a Cupriavidus infection before[191].

Response: Cupriavidus infection in early 2016

186. Glasgow 2 witnesses did not have detailed knowledge of the response to the Cupriavidus infection. Documents available to the Inquiry indicate that a PAG meeting took place on 17 June 2016[192]. The minute of the PAG appears to record a decision to hold an IMT. It is understood that no IMT took place. Information available to the Inquiry suggests that the sink in the Aseptic Pharmacy was removed.

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[188] Witness statement of Dr Jonathan Coutts, para. 25 et seq.
[189] Witness statement of Dr Jairam Sastry, para. 145. See also article by Inkster et al, at Bundle 6, p.1236; PAG meeting minute dated 17.6.16, Bundle 2, p.10. Indicates Cupriavidus infection within RHC.
[190] See, for example, the evidence of Professor Branda Gibson, transcript, p.81; evidence of Emma Sommerville, transcript, p.35; witness statement of Dr Alistair Hart, para. 61; witness statement of Dr Milind Ronghe, para. 55; witness statement of Dr Dermot Murphy, para. 130.
[191] Evidence of Professor Brenda Gibson, transcript, p.81.
[192] Bundle 2, p.10.

Concern: increase in line infections on Ward 2A in 2016

187. Witnesses were aware of a general increase in positive central line infections in paediatric haemato-oncology patients from around mid-2016[193]. Professor Gibson recalled that clinicians began to suspect an unusual pattern of infections. Ms Rodgers recalled that the Lead Nurse for Infection Control brought to her attention a spike in line infections. At that time, IPC believed the increase in infections might be linked to the type of line being used[194].

188. Professor Gibson recalled that later, in 2018, when concerns about gram-negative infections with a possible gram-negative source arose, she had a concern that in fact that pattern of infection had begun on 2016/2017. She instructed a look back at gram-negative infections which occurred in 2016/2017[195]. However, as at 2016/17 there was no suggestion of an environmental cause.

189. In addition to concerns about line infections, Professor Gibson recalled an increase in Aspergillus cases. This concern was discussed at an IMT meeting on 5 August 2016[196].

Response: increase in line infections on Ward 2A in 2016

190. As indicated, the hypothesis in 2016 was that a change in type of central line from Bard to Vygon accounted for the increase in line infections. Additional education was implemented, and witness evidence indicates that the issue was thought to resolve[197].

(iv) Year: 2017

Concern: increase in line infections on Ward 2A in 2017

[193] See, for example, the evidence of Dr Shahzya Chaudhury, transcript, p.77; Melanie Hutton, transcript p.19.
[194] Evidence of Jennifer Rodgers, transcript, p.23; 26.
[195] Witness statement of Dr Shahzya Chaudhury, paras. 53-56.
[196] Bundle 1, p.22.
[197] Witness statement of Jennifer Rodgers, para. 90.

191. In her statement, and as amplified in oral evidence, Jennifer Rodgers provided detailed evidence regarding an increase in line infections in 2017 and the associated response, in which, as Chief Nurse, she was heavily involved. Although the concern about increased line infections on Ward 2A had appeared to resolve in late 2016, the rate appeared to increase again in early 2017[198].

192. A PAG was convened on 3 March 2017 to discuss a general upward trend in positive blood cultures in paediatric haemato-oncology patients in the RHC[199]. It was recorded that there had been 13 positive cases in January 2017 and 11 cases in February 2017.

Response: increase in line infections on Ward 2A in 2017

193. Ms Rodgers described the response to the increase in line infections as a "*quality improvement approach*". This project is described variably in evidence as the quality improvement project, QI Group and CLABSI (central line associated blood stream infection)[200] Improvement Project. It is referred to hereinafter as the "QI Group". Together with Mr Bradnock, a surgeon, Ms Rodgers led the QI Group which comprised a multi-disciplinary team. Ms Rodgers explained that a quality improvement approach does not target one specific problem. The aim is to achieve an objective; in this instance, reduced CLABSI rates by improving overall quality. It is not an hypothesis-based approach; there is no specific hypothesis and response[201].

194. The QI Group's work began in earnest in May 2017[202]. It included all paediatric haemato-oncology patients with central lines in the RHC. The first challenge facing the QI Group was the lack of available and reliable data from other centres against which the RHC's line infection rates could be benchmarked[203]. In an approach which might be thought redolent of the co-operative, evidence-based approach to paediatric cancer care described by Dr Murphy, the QI Group engaged with Cincinnati Children's Hospital. Ms Rodgers described

[198] Witness statement of Jennifer Rodgers, para. 91.
[199] Bundle 2, p.22.
[200] Definition of "CLABSI" contained in witness statement of Jennifer Rodgers, para. 97.
[201] Evidence of Jennifer Rodgers, transcript, p.43.
[202] Witness statement of Jennifer Rodgers, para. 94.
[203] Evidence of Jennifer Rodgers, transcript, p.36.

Cincinnati as being recognised as the safest children's hospital in the world. The QI Group modelled its approach on a similar project undertaken in Cincinnati.

195. The QI Group's aim was to reduce the CLABSI rate to Cincinnati's "*best in class*" rate of less than 1 per thousand line days. Reference should be made to Ms Rodgers' statement for details of the various improvement steps put in place. In summary, work included: training in aseptic non-touch technique for line care, training about reduced line contact, staff education, patient and family engagement sessions and daily Actichlor cleaning. Changes also included the introduction of alcohol impregnated port protector caps in August 2017 (also referred to as "Curos caps"). Ms Rodgers confirmed that these caps are the "green caps" referred to in the Glasgow 1 evidence. The green caps were introduced as a line care improvement measure; not in response to concerns about the water supply[204].

196. It was at this time that enhanced supervision was introduced; a practice which continued in the years following (although it may have been stepped up and down at times). As the name suggests, enhanced supervision is a means of monitoring and improving infection control practices on a ward. A team including the lead nurse from IPC, lead nurse from paediatrics, and Estates and Facilities visit the ward and apply a "*magnifying glass*" on the unit and its practices[205]. In Professor Gibson's view, line care on the Schiehallion Unit was to an extremely high standard; she had no reason to think that nurses were not applying best line care practice[206].

197. Ms Rodgers explained that in Yorkhill, the median CLABSI rate had been 3.25 cases per thousand line days. In May 2017, the rate was above that level. The concern about the rate was such that Ms Rodgers described a desire to put in place actions rapidly to improve it[207].

[204] Evidence of Jennifer Rodgers, p.41.
[205] Evidence of Jennifer Rodgers, p.34.
[206] Evidence of Professor Gibson, transcript, p.68.
[207] Evidence of Jennifer Rodgers, p.37.

198. By the end of 2017, the CLABSI rate had started to drop. Ms Rodgers recalled that the rates had come down to around 4 per thousand line days; whilst this was a reduction, it was not to the level hoped for, despite all of the measures put in place[208]. Since the end of 2019, the median rate has been less than 1 per 1000 line days (meeting the aim of the QI Group).

Concern: Increase in fungal infections in 2017

199. On 3 March 2017, a PAG was convened in response to a concern about an increase in fungal infections within the RHC[209]. Jennifer Rodgers confirmed that the concern about an increase in fungal infections was distinct from concerns about the CLABSI rate[210]. Professor Gibson explained[211] that the fungal infection in question – Candida spp. – tends to be endogenous (whereas Aspergillus "*comes from the atmosphere*"). She also indicated that, on further investigation, there had not been an increase of Candida cases. It may be, then, that an increase in Candida infections at this point is not something for the Inquiry to consider further. However, it should be noted that at an IMT of 7 March 2017[212] concern about Aspergillus cases was also expressed.

Response: Increase in fungal infections in 2017

200. For completeness, the nature of the response to the increase in fungal infections in 2017 is currently unknown beyond what is indicated in the PAG minute. The PAG records that prophylaxis may have been instigated in response to this concern. Professor Gibson indicated that colleagues in Edinburgh may have been asked about their own experiences of this infection[213]. The IMT minute of 7 March 2017 appears to support this, albeit it might be thought to indicate that the discussion concerned Aspergillus.

Concern: unusual infections in 2017

[208] Evidence of Jennifer Rodgers, p.45.
[209] Bundle 2, p.19.
[210] Evidence of Jennifer Rodgers, p.30.
[211] Evidence of Brenda Gibson, p.66.
[212] Bundle 1, p.35.
[213] Evidence of Professor Brenda Gibson, transcript, p.66.

201. A second Cupriavidus infection was discovered in September 2017[214]. This was thought by at least one clinician to be similarly linked to a sink on Ward 2A, albeit a hand hygiene sink[215]. The Inquiry understands that GGC does not accept a link between the patient infection and the environment.

202. Clinicians described a growing unease about the pattern of gram-negative infections on Ward 2A in 2017. There was, however, no advice from IPC or microbiology at that time which indicated a possible link to the environment[216].

203. When concerns about the safety of the water supply emerged in 2018, it caused Professor Gibson and Dr Ewins to query with IPC whether certain infections seen in the Ward 2A patient cohort in 2017 might have been linked to the water supply. Professor Gibson was concerned in particular about a number of Stenotrophomonas infections in 2017, but emphasised that, from her perspective, this was a concern which arose only with the benefit of hindsight[217].

Response: unusual infections in 2017

204. Aside from the evidence heard about the work being done by the QI Group to address the CLABSI rate, Glasgow 2 witnesses did not indicate knowledge of other investigations or steps taken in response to the unusual infections in 2017. The Inquiry anticipates that evidence will be provided on this topic by IPC, Estates and Microbiology witnesses in due course.

205. The case of Cupriavidus in September 2017 may deserve particular attention in future investigations. It is unclear what if any investigation was made at the time. Subsequent PAG/IMT discussions would indicate that no links had been made – i.e. as at September 2017 – to the 2016 case or to the aseptic pharmacy. Later investigations do appear to have confirmed that the September 2017 patient had received chemotherapy medication which had

[214] See, for example, the witness statement of Dr Jairam Sastry, para. 145; IMT dated 6 March 2018; Bundle 1, p.56.
[215] Witness statement of Dr Jairam Sastry, para. 145.
[216] See, for example, the evidence of Professor Brenda Gibson, transcript, p.65.
[217] Witness statement of Professor Brenda Gibson, paras. 123-124.

been prepared there[218]. In their report of August 2018, HPS reported that they understood no contemporaneous environmental or water sampling to have been done relative to the September 2017 case[219].

206. It may be helpful to understand the basis upon which a link is not accepted by GGC (and whether other CPs have a position on that). In that regard, it may be important to understand what investigations including water sampling and testing was done at the time and upon which reliance is placed. A similar investigation may be appropriate in relation to other infections from this time, for example Stenotrophomonas (particularly as regards the question of whether testing was done contemporaneously with or soon after infections emerged).

Concern: issues about the safety of the environment raised in October 2017 SBARs

207. On 3 October 2017, an SBAR was prepared by three consultant microbiologists. It raised concerns about the risk to patients arising from infection control issues[220]. The SBAR was submitted to the board Medical Director. None of the Glasgow 2 witnesses was in a position to provide direct evidence about the SBAR and the matters raised therein. It is anticipated these matters will be spoken to by other witnesses at a future stage of the Inquiry's hearings.

208. The issues raised are varied. They include concerns about: the adequacy of the ventilation provision for certain patient groups (including immunocompromised patients), cleaning, water quality and testing and the resourcing and structure of the IPC service. The SBAR also identifies the dates on which each concern was raised and escalated. Many of the concerns were first raised in 2015, including those about air quality on Ward 2A which was said to represent a continuing risk.

209. A further SBAR dated 30 October 2017 considered the risk of invasive fungal disease within ward 2A[221]. It said that a recent probable case of invasive fungal

[218] Bundle 2, p.82.
[219] Bundle 3, p.87.
[220] SBAR re Infection Control and Patient Safety at QEUH dated 3 October 2017; Bundle 4, p.104.
[221] Bundle 4, p.113.

infection raised concern "*regarding the ongoing issues on the unit*." The SBAR drew attention among other things to the fact that the patient was understood not to have been housed in a HEPA filtered room.

Response: issues about the safety of the environment raised in October 2017 SBARs

210. GGC's response to these concerns was not discussed at Glasgow 2 hearing. However, evidence was heard about the awareness of clinicians and managers of the first of the aforementioned SBARs and the concerns raised within it. Professor Gibson indicated that she was not aware of the existence of the SBAR prior to her preparation for giving evidence to the Inquiry. She was aware that microbiologists and IPC had concerns and that those concerns had been escalated in the hope of action on the part of senior management[222].

211. Ms Rodgers, who was the Chief Nurse at that time, was also unaware of the existence of the 3 October SBAR in 2017[223] although she too was aware of some of the issues identified, for example, the high rates of line related infections on Ward 2A and some concerns about patient placement[224]. Whether the concerns raised by the microbiologists – particularly against the background of whistleblowing procedures having been instigated around this time – ought to have been made more widely known may be something that the Inquiry will wish to consider at future hearings. This investigation will no doubt also wish to consider the issues raised within the SBAR of 30 October 2017.

(v) Year: 2018

212. The Inquiry has before it a significant amount of documentary and witness evidence about infection concerns raised in 2018 and 2019. What follows is not intended as a comprehensive narrative of the totality of all relevant concerns over this period. Rather, the narrative is principally concerned with the events that were focused upon in the Glasgow 2 evidence, and must therefore be read alongside the timeline and supporting documentation.

[222] Evidence of Professor Gibson, transcript, p.79.
[223] Evidence of Jennifer Rodgers, transcript, p.17.
[224] Evidence of Jennifer Rodgers, transcript, p.18.

Concern: initial concerns about the safety of the water system around March 2018

213. Around the end of January 2018, Cupriavidus was isolated from the blood of a Ward 2A patient who was receiving IV therapy prepared in the aseptic pharmacy[225]. Against the background of the two previous cases of Cupriavidus linked to the aseptic pharmacy (in 2016 and in 2017), Professor Gibson recalled Dr Inkster, an experienced microbiologist, being greatly concerned[226]. A PAG was convened on 5 February 2018[227].

214. On 1 March 2018, Dr Inkster contacted Ms Rodgers to inform her that water testing had isolated Cupriavidus[228]. The Inquiry understands that water testing, at this time, was less comprehensive than it would subsequently become[229]; and that testing specifically for Cupriavidus was not something that was done as a matter of course[230]. The Inquiry's understanding is that GGC nevertheless does not accept that the Cupriavidus infection in early 2018 was linked to the water supply. Similar investigations as those mentioned above in relation to the 2017 Cupriavidus case might be indicated, therefore.

Response: initial concerns about the safety of the water system around March 2018

215. Whatever the position within GGC may be now, at the time, the test results caused sufficient concern about the safety of the water to mandate an urgent and dramatic response. Witnesses recalled water testing being increased around this time in response to concern about infections[231]. A clear explanation of the nature and development over time in the water testing regimes is bound to be of benefit to the Inquiry in its further investigations.

216. IPC staff issued an immediate instruction that immunocompromised patients must not be exposed to the water on Ward 2A. Due to the urgency of the instruction, action was required before an IMT could be convened. Ms Rodgers

[225] Bundle 2, p82; Bundle 1, p.54.
[226] Evidence of Professor Brenda Gibson, transcript, p.81.
[227] Bundle 2, p.82.
[228] Witness statement of Jennifer Rodgers, para.119.
[229] See e.g. comments of Professor Leanord: Bundle 6 at p.1230.
[230] Bundle 1, p.66 at p.67.
[231] Evidence of Jennifer Rodgers and Emma Sommerville.

and Dr Inkster formulated a plan which is recorded in an email timed [13:55] on 1 March 2018 from the former to the latter. The email is not held by the Inquiry but is understood to be recounted in Ms Rodgers's witness statement[232]. Immediate steps included restricting patient access to showers, staff/family use of hand gel, bottled water for washing and teeth brushing. In the meantime, Estates liaised with DMA Canyon to arrange silver hydrogen peroxide dosing. Further testing was underway.

Concern: concerns about water system arising during Water Incident IMT in March 2018

217. An IMT was convened on 2 March 2018. It met regularly between then and 27 March 2018.

218. At the first IMT meeting on 2 March 2018[233], it was recorded that multiple outlets on Ward 2A had tested positive for Cupriavidus. Testing had also revealed Pseudomonas and other gram-negative organisms[234]. Professor Gibson recalled that water testing subsequently revealed the presence of fungal pathogens[235]. The IMT's initial hypothesis was that water outlets were the source of the bacteria; and that the presence of flow straighteners – identified as being "high risk" – may have encouraged biofilm formation. The water was to be dosed that day and that was to be followed by resampling.

219. At an IMT on 6 March 2018[236], Professor Gibson and Dr Murphy asked whether the concerns of the clinical teams regarding the safety of the environment had been escalated higher. Dr Inkster informed them that these concerns had been "*reported to the highest level in GGC and HPS over 2 years ago*". By way of context, it is understood that two microbiologists had by now instigated stage 2 whistleblowing procedures as a result of what they saw as a failure to address concerns raised in the autumn of 2017[237].

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[232] Witness statement of Jennifer Rodgers, para. 122.
[233] Bundle 1, p.54.
[234] Evidence of Professor Brenda Gibson, transcript, p.81.
[235] See the IMT minute dated 6 March 2018; Bundle 1, p.56 at p.57; IMT minute dated 21 March 2018, Bundle 1, p.75; evidence of Professor Brenda Gibson, transcript, p.82.
[236] Bundle 1, p.57.
[237] HOIC, para 5.5.1.

220. Professor Gibson and Dr Murphy each confirmed in their evidence that they had been dissatisfied with the apparent lack of response from senior management within GGC and those external to GGC to whom the concerns had been reported.[238] To Professor Gibson's mind, the presence of a combination of fungus and environmental gram-negative bacteria suggested something fundamentally wrong with the infrastructure[239].

221. The clear indication at that time was that Ward 2A patients were at risk of infection from the water system. The driving concern for Professor Gibson at this stage was the presence of Pseudomonas and Stenotrophomonas. Exposure to these organisms presented potentially life-threatening consequences for the Ward 2A patient group[240]. During this time, the IMT reported a number of gram-negative infections within Ward 2A, and also in the PICU and renal ward (3C)[241]. The Inquiry understand GGC's position to be that none of these infections was linked to the water system. Again, it will be useful to understand why that is so and the nature of the contemporaneous investigations upon which the view of GGC is based.

222. The understanding of Glasgow 2 witnesses was that the IMT's hypothesis evolved as its investigations progressed. Testing indicated that the problem with the water supply extended beyond Ward 2A; gram-negative organisms were discovered in other areas within both the RHC and QEUH, including a finding of Cupriavidus in Ward 4B. This pointed away from a hypothesis linked to specific outlets towards one of widespread contamination of the water system[242].

223. The IMT closed at the end of March 2018. The IMT's findings are recorded in a "Full IMT Report" dated 13 April 2018[243]. Mr Redfern confirmed that the conclusions set out in that report accorded with his understanding of the

[238] Evidence of Professor Gibson, transcript p.90; evidence of Dr Murphy, transcript p.33.
[239] Evidence of Professor Brenda Gibson, transcript p.86.
[240] Evidence of Professor Gibson, transcript p.91; IMT minutes dated 12 March 2018, Bundle 1, p.63.
[241] Evidence of Professor Brenda Gibson, transcript p.84.
[242] Evidence of Professor Brenda Gibson, transcript p.84.
[243] Bundle 8, p.53.

situation in March/April 2018[244]. The IMT's final hypothesis was that the water supply throughout the QEUH and the RHC was contaminated and that contamination took place during installation, leading to development of a thick biofilm. It was noted that temperature control and maintenance may have been factors.

224. It was thought possible that infections were linked to the water as they were linked by "time/place/person". However, testing was continuing in order to establish if a more definite link could be proven. As at the date of the report, there had been no further bacteraemias, and so it was thought that control measures had been successful.

Response: concerns about water system arising during Water Incident IMT in March 2018

225. The evidence indicates that a range of steps were taken both to investigate and control risks thought to be posed by the water system.

226. Immediate steps were taken to restrict access to water. Immunocompromised patients were not to wash using water from sinks or showers. They were to drink only bottled water. Bottled water was to be used for brushing teeth. BMT patients were to use sterile (not bottled) water. Parents and staff could use sinks but had to use hand gel thereafter.

227. All rooms in the RHC housing immunocompromised patients were to receive twice daily Actichlor cleans. Nursing staff had to use additional hand hygiene before performing line care.

228. The water supply was dosed with silver hydrogen peroxide at least four times but this did not eradicate the gram-negative organisms[245]. The water supply to Ward 2A had to be shut off completely to facilitate dosing. Portable handwash basins were provided at these times.

[244] Evidence of James Redfern, transcript, p.43.
[245] IMT minute dated 21 March 2018, Bundle 1, pp.76-78.

229. Point of use filters ("POUF"s) were installed to tap and shower outlets. Filters were installed initially on Ward 2A but their use was extended to other areas of the RHC and to Ward 4B in the QEUH.

230. A decision was made to prescribe prophylaxis (Ciprofloxacin) to high risk patients on Wards 2A and 2B[246]. The IMT minute dated 16 March 2018 indicated that if families asked about Ciprofloxacin, staff were to tell them "*it's just a precaution due to issues with the water supply*" [247]. The clear evidence of Professor Gibson and of Dr Murphy is that this language did not capture what required to be said to patients and families about the use of prophylaxis. Professor Gibson's clear understanding was that prophylaxis was being used in direct response to a risk of infection; the word "*precaution*" would have underplayed the situation[248]. To be clear, there is no evidence that clinical staff (or anyone else), in their explanation to patients, did anything other than try to fully and candidly explain the use of prophylaxis to patients and families at this time.

231. Post filter water testing indicated that filters were successful in controlling organisms. However, filters were not considered to be a long term solution. Filters were a control measure; they did not tackle the source of the organisms. They also required regular replacement. Mr Redfern's understanding was that if the water system was successfully treated, filters would not be required in the long term[249].

232. That filters alone were not a complete solution to the problem was acknowledged in the IMT final report. Long term measures were considered, including: Chlorine Dioxide dosing, replacement of taps containing flow straighteners in high risk areas, maintenance of taps with flow straighteners in other areas and longer term use of filters in high risk areas[250]. A separate group, the Technical Water Group, was established to investigate solutions.

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[246] Evidence of Angela Howatt, transcript, p.21.
[247] Bundle 1, p.66 at p.68.
[248] Evidence of Professor Brenda Gibson, transcript, p.96; witness statement of Dr Dermot Murphy, para. 142.
[249] Evidence of James Redfern, transcript, p.49.
[250] Bundle 8, p.53.

233. In the meantime, the IMT agreed that the success of the filters meant that other control measures could be stepped down[251]. Post-filtered water could be used for washing. Ciprofloxacin use ceased. However, the use of bottled water continued.

234. During this IMT, assistance was requested from a number of sources including HPS/HFS and external consultants. For example, the Inquiry has a copy of what bears to be a draft of a report prepared by Dr Susanne Lee[252]. Some of her findings are referred to in the timeline appended to this closing statement. The nature of her investigations and conclusions and those of others like Dr Tom Makin will no doubt be the subject of future hearings.

235. The Inquiry understands that a Chlorine Dioxide dosing system was eventually instigated to treat the water supply. Continuous dosing of the RHC is understood to have begun at some point in November 2018 and in the QEUH at some point in December 2018. The Inquiry understands that dosing continues and is intended as a long term solution to the problems encountered with contamination of the water supply.

Concern: gram-negative infections in May and June 2018

236. Witnesses recalled a further period of concern about infections in May and June 2018. Concerns began with a cluster of Enterobacter Cloacae infections in patients on Wards 2A and 2B. A PAG was convened on 18 May[253], followed by an IMT on 29 May 2018[254]. The IMT's initial hypothesis was that infections could be linked to the drains. Black grime had been observed by nursing staff and reported to IPC[255].

237. The drains were swabbed and, on 4 June 2018, it was reported that various gram-negative organisms had been identified, including: Enterobacter Cloacae, Pseudomonas, Sphingomonas, Cupriavidus, Acinetobacter and Klebsiella.

[251] IMT minute dated 27 March 2018; Bundle 1, p.86.
[252] Bundle 8, p.134.
[253] Bundle 2, p.102.
[254] Bundle 1, p.91.
[255] Witness statement of Angela Howatt, para. 61; witness statement of Emma Sommerville, para. 94; 130.

Pseudomonas, Stenotrophomonas and Acinetobacter had also been grown in patient blood cultures[256].

238. The number of gram-negative infections on Wards 2A and 2B increased over the course of June. As at 15 June, there was thought to have been some 17 patients infected with gram-negative organisms, some of whom were infected with multiple organisms[257]. Another patient had been infected with an atypical mycobacteria (Mycobacterium Chelonae)[258]. (There is also a suggestion of a further patient, with a connection to the Beatson, having this infection at the time.) The case of Mycobacterium Chelonae within the Schiehallion Unit, including the question of what water testing was done at the time, will be discussed later in this narrative (and in the chapter on communication).

239. The advice from IPC was that at least some of these infections (the gram-negative ones) were associated with contaminated drains[259]. The Inquiry's understanding is that GGC does not accept that any of the infections over this period was linked to the built environment. Again, it would be useful to understand the contemporaneous evidence upon which that view is based.

240. The IMT's hypothesis on the source of the contamination was that, although water coming out of the filters was clean, the flow of dirty water into drains after handwashing could cause a biofilm to build up (as could disposing of other liquids into clinical hand wash basins). The biofilm could be dispersed and aerosolised, causing a risk of infection[260]. Professor Gibson and Dr Murphy recalled advice that this was likely to be a site-wide problem[261]. Whether emerging at this time or later, a hypothesis (discussed below) would develop in which the proximity of the point of use filters to the sinks was considered a factor in causing contamination of water/drains.

241. By way of context it should be noted that by this stage the DMA Report(s) had been "*identified*". Reference is made to two SBARs prepared by a GGC

[256] Bundle 1, p.94.
[257] IMT minute dated 15 June 2018, Bundle 1, p.128.
[258] Bundle 1, p.128.
[259] Evidence of Professor Gibson transcript, p.109.
[260] Bundle 1, p.99.
[261] Evidence of Dr Dermot Murphy, transcript, p.35.

infection control manager on 5 July[262] and 8 August 2018[263]. The first of these SBARs records that investigation into increased rates of infection within ward 2A RHC had revealed "…*higher than normal levels of bacterial counts in the water supply…Further testing in other clinical areas [had] yielded similar results*."

242. By way of further context, by this stage GGC also had available to it a report prepared by a company called Intertek dated 22 June 2018[264]. This report set out findings following an investigation of flow straighteners and other features of the water system. The report prepared by Intertek and the two SBARs are referred to in the appended timeline.

Response: gram-negative infections in May and June 2018

243. The IMT once again put in place a range of control measures; this time, they were designed to minimise the risk of infection from contaminated drains, rather than from the water supply itself. A programme of works to address the concern was commenced. These included drain cleaning and replacement of waste pipes. Hydrogen Peroxide Vapour cleaning ("HPV") was instigated.

244. Hand hygiene measures for staff were stepped up. IPC peer audits were instigated. Education was given to staff and patients about good infection control practices. Signs were put up warning families and staff not to put liquids (tea, coffee etc) down clinical hand wash basins.

245. The use of additional prophylaxis (Ciprofloxacin) was restarted in early June and continued until around 21 June.

246. By this stage, clinicians were so concerned about the safety of the environment that they queried whether it was safe to continue to admit patients to the ward. Professor Gibson recalled that clinicians were not confident that IPC and, ultimately, the board, had the environment under control[265]. Attempts to resolve

[262] Bundle 4, p.126.
[263] Bundle 4, p.128.
[264] Bundle 6, p.632.
[265] Bundle 1, p.109 at p.112.

the numerous issues on Ward 2A since opening had not resulted in a safe environment [266].

247. Professor Gibson informed the IMT meeting on 4 June 2018[267] that she and her fellow clinicians were not comfortable admitting new patients to Ward 2A. Admissions were restricted as a result. Patients would be assessed on a case-by-case basis. If patients were well enough, they would be admitted to wards other than Ward 2A. Ward 2B was thought to be just as high risk as Ward 2B; chemotherapy was not to be administered on Ward 2B until after drain cleaning and HPV cleaning had been completed.

248. The final IMT meeting took place on 21 June 2018, at a point when control measures appeared to have prevented further infections.

Concern: gram-negative infections in August and September 2018

249. The reprieve was brief. August and early September 2018 saw a further rise in gram-negative infections on Ward 2A. Black and yellow grime was reported in the drains. Drain swabs confirmed that the presence of gram-negative bacteria some of which were the same as organisms as isolated in patient blood[268].

250. The IMT was reconvened on 5 September 2018. The IMT's hypothesis was that contaminated drains were again the source of infections[269]. By 13 September, the IMT considered that duty of candour discussions were mandated in relation to some patients[270].

251. Mr Redfern understood that by this stage filters were suspected as having caused an unintended risk of infection; the proximity between the sink and the filter caused a splashing effect[271]. Support for Mr Redfern's recollection is to be

[266] Evidence of Professor Gibson, transcript, p.111; IMT minute dated 8 June 2018, Bundle 1, p.112.
[267] Bundle 1, p.94.
[268] IMT minute dated 5 September 2018, Bundle 1, p.149.
[269] IMT meeting 5 September 2018, Bundle 1, p.149.
[270] Bundle 1, p.160.
[271] Evidence of Mr Redfern, transcript, pp.57-58.

found in the SBAR of 17 August 2018 prepared by HPS[272]. They understood the IMT's agreed hypothesis to be as Mr Redfern described[273].

252. Mr Redfern went further than this, however. He said that his understanding was that a combination of contaminated drains and splashing gave rise to a risk of infection[274]. He understood that a requirement to replace the sinks arose from this. Other possible causes were considered, for example, dripping water from chilled beams[275]. Both clinicians and IPC expressed concerns that the IMT was no closer to identifying a source of the problem or a resolution for it[276].

253. Concern among nursing staff by this stage had reached the point that they had contacted their union for advice on continuing to treat patients in an environment considered to be unsafe[277].

254. It is understood that GGC does not accept that there was a link between the environment and infections in September 2018 or indeed that the environment presented any risk. Once again, the basis upon which this view is taken, particularly as regards contemporaneous investigations, could usefully be explored.

255. Around this time the IMT began to consider the possibility of decanting patients out of Wards 2A and 2B. Whatever view GGC may now have about the risk to patients, the evidence given by Glasgow 2 witnesses about the rationale for the proposed decant was clear: the ward environment was thought to present a risk of infection to patients. The source of the problem had not been identified, control measures had been unsuccessful and there was a need to get to the bottom of the problem[278].

256. Professor Gibson had an additional concern at this point: that the IMT did not have the expertise to resolve a problem of this complexity; no-one had seen a

[272] Bundle 3, p.79.
[273] And see Bundle 1, p.164 at p.165.
[274] Evidence of Mr Redfern, transcript, p.59.
[275] Evidence of Professor Gibson, transcript, p.123.
[276] IMT meeting 10 September 2018, Bundle 1, p.156.
[277] Bundle 1, p.169 at p.173.
[278] Evidence of Professor Gibson, transcript, p.125.

problem like this before[279]. Clinicians were unanimous in their evidence that, as at September 2018 they were so concerned that the unit did not provide a safe environment for their patients, they wanted to leave it.

Response: gram-negative infections in August and September 2018

257. Mr Redfern provided evidence about the circumstances of the decision to decant and the decision to move to Wards 4B and 6A[280]. Mr Redfern explained that in September 2018, there was a continuing concern about the risk of infection and an appreciation that the work required to investigate and resolve it required the removal of patients from the ward[281]. Evidence suggested the Inquiry does not yet have a full set of documentation relating to the decision making around the decant, including as regards any risk assessments that were undertaken.

258. At an IMT meeting on 14 September 2018, a two-phase contingency plan was discussed[282]. Phase one involved immediate restrictions on admission to Ward 2A, with patients being diverted, on a risk assessed basis, either to district hospitals or to the haemato-oncology unit in Edinburgh. Phase two was a decant of the patients in Wards 2A and 2B. Mr Redfern, as General Manager, had responsibility for operational aspects of the decant. He said that his two objectives were to maintain the service for (i) the general paediatric haemato-oncology and day care service and (ii) the BMT national service for Scotland.

259. On 17 September 2018, Mr Redfern prepared an options paper for the decant[283]. Options under consideration were: an alternative ward within the RHC, an adult ward in the QEUH, a mobile-unit constructed on the QEUH campus, a ward in the Beatson, transfer/diversion of patients to an alternative paediatric service within Scotland, and a transfer/diversion to an alternative paediatric service outwith Scotland.

[279] Evidence of Professor Gibson, transcript, p.128.
[280] Further detail is contained in his witnesses statement beginning at para. 87.
[281] Evidence of James Redfern, transcript, p.89.
[282] Bundle 1, p.165.
[283] See witness statement at paras. 88-90; options appraisal is at Bundle 6, p.38.

260. Various criteria were applied to the decision making. A move to the Beatson was ruled out on the basis that it would involve separating paediatric patients from other paediatric services within the RHC (PICU, theatres, hospital at night service). A move to another site was not deemed practical. A modular build was ruled out as a result of an estimated construction time of 12 weeks (at a time when it was thought the decant would be short term) and concerns about patient pathways.[284]

261. A move to a ward within the RHC was discounted due to concerns about the safety of the environment within the RHC for vulnerable patients. Mr Redfern's evidence was that the QEUH and RHC shared a single water supply. The reason the environment in the RHC was thought unsafe was because of the risk of splashing from the sinks. The sinks in the QEUH were of a different type; it was therefore thought the QEUH would provide a safer environment[285]. Mr Redfern had no recollection of patients and families being told that the QEUH had a separate water supply. Nevertheless, it is clear that a significant number of people did have this – apparently erroneous – understanding. Its source is unclear.

262. It was agreed that the preferred option was to decant BMT patients to Ward 4B; the adult BMT service would free up a number of rooms. The remainder of Ward 2A and 2B patients would be moved to an adult ward in the QEUH. By 19 September 2018, Ward 6A in the QEUH had been identified as the ward to which patients would move. Ward 6A was a general ward; its patients were moved to Gartnavel General Hospital [286]. Ward 6A was not designed for haemato-oncology patients and did not benefit from any form of specialist ventilation.

263. The decant itself required considerable planning; it was a huge logistical operation. Ms Rodgers and Mr Redfern (and others) provided detailed evidence about this in their witness statements and oral evidence. In summary, witnesses understood that a number of steps were taken to prepare Ward 6A to receive

[284] Evidence of James Redfern, transcript, p.108.
[285] Evidence of James Redfern, transcript, p.106.
[286] IMT minute dated 19 September 2018, Bundle 1, p.182.

Ward 2A/2B patients. Witnesses recalled being assured that following preparatory works done by IPC and Estates, Ward 6A would be a safe environment for the decanted patients. Preparations included a deep clean and fitting of POUFs. The move took place on 26 September 2018.

Concern: ventilation system in Wards 2A and 2B in 2018

264. At a point not yet identified, attention started to be directed towards the ventilation system within Wards 2A and 2B[287]. Investigations can been seen as having taken place after the decant. Exactly what prompted these investigations will no doubt be considered by the Inquiry. Certainly, by 11 October, the IMT understood that a report into the ventilation system had been commissioned and was awaited[288].

265. Mr Redfern recalled that, in the course of an IMT discussion about the length of the decant to Ward 6A, he was told by the Director of Estates and Facilities to prepare for a longer period because the ventilation system on Wards 2A/2B was going to be replaced[289].

266. Mr Redfern did not have a good recollection of being made aware of the reason for the replacement[290]. He initially indicated that his impression had been that the system was being upgraded. On closer questioning, it transpired that Mr Redfern had not seen, or at least did not recall seeing, the SBAR dated 12 November 2018 relating to ventilation on Ward 2A/2B[291]. On reviewing it, Mr Redfern accepted that he would construe its contents as indicating that the ventilation system posed a potential risk to patients and that such a risk, once identified, requires to be addressed[292]. Melanie Hutton, who was at that time a Clinical Service Manager, and who was involved in the capital project board for the refurbishment of Ward 2A and 2B gave clear evidence on this issue: there

[287] Cf. Bundle 2, p.105; and Bundle 1, p.165.
[288] Bundle 1, p.204.
[289] Tom Steele.
[290] Evidence of James Redfern, transcript, p.120.
[291] Bundle 4, p.132.
[292] Evidence of James Redfern, transcript, p.127.

was a requirement to replace the ventilation system because it presented a risk to patients[293].

Response: ventilation system in Wards 2A and 2B in 2018

267. By way of context, the Inquiry has had sight of reports prepared in October 2018 by Innovated Design Solutions in relation to Wards 2A and 2B[294]. These reports are referred to in the appended timeline. The Inquiry will hear evidence about the works done to the ventilation system in due course. The evidence indicates that the ventilation system on Wards 2A and 2B was completely replaced as part of a substantial refurbishment of both wards costing in the region of £11 – 12 million. Witnesses spoke to an understanding that the ventilation system is now one of the safest ventilation systems in the world[295].

268. In the weeks following the decant, nurses and consultants adjusted to the new way of life on Wards 6A and 4B (more on that below). In December 2018, they were informed that the decant was being extended, likely for 12 months, to allow for the works to the ventilation system on Wards 2A and 2B. During that period, there were no significant concerns about infection on Ward 6A. That period of relative calm proved to be short lived.

(vi) Year: 2019

Concern: Cryptococcus neoformans infections December 2018/January 2019

269. From mid-December 2018 to early January 2019, concern about the safety of the environment escalated again with the identification of two rare fungal infections: Cryptococcus neoformans. An IMT was established on 20 December 2018[296].

270. The IMT considered a number of hypotheses. The IMT's working hypothesis in early 2019 was that the infections were likely contracted while the patients were

[293] Evidence of Melanie Hutton, transcript p.60.
[294] Bundle 6 at pp.674 & p.656 respectively.
[295] See, for example, the evidence of: Professor Brenda Gibson, transcript, p.192; Dr Dermot Murphy, transcript p.133.
[296] Bundle 1, p.245.

in hospital, even if the precise mode of that transmission was not known. One early hypothesis in particular was that the fungus could have entered the building as a result of pigeon droppings. Dormancy of the infections within the patients was considered by the IMT. It appears to have been considered very unlikely[297].

271. As Professor Gibson noted in her evidence, air sampling within the QEUH campus, and then on Ward 6A, identified the presence of Cryptococcus albidus, but not Cryptococcus neoformans[298]. Cryptococcus albidus was also associated with pigeons and was considered to pose a risk to immunocompromised patients[299].

272. Investigation of the hypothesis was eventually delegated to a dedicated expert advisory sub-group. The sub-group's investigation continued for a number of years. The final version of its report is dated 5 April 2022[300]. The sub-group's assessment of a number of hypotheses is likely to form part of the Inquiry's future investigations and is discussed below.

273. One thing that could be usefully clarified at this point is the question of who sat on the sub-group and whether the sub-group was able to reach an agreed conclusion: see the timeline.

Response: Cryptococcus neoformans infections December 2018/January 2019

274. IMT minutes in December and January 2019 indicate a high degree of concern about the risk posed to immunocompromised patients. Steps were taken to clean an air handling plant room where pigeon faeces were discovered. Air sampling of Wards 6A, 4C and the PICU was commenced. Samples of pigeon faeces were taken and sent for testing.

275. In December 2018, it was agreed that haemato-oncology patients would receive an anti-fungal prophylaxis, AmBisome, a policy which continued into

[297] Bundle 1, p.250 at p.252.
[298] Evidence of Professor Brenda Gibson, transcript, p.146.
[299] Bundle 1, p.261.
[300] Bundle 6, p.1115.

2019. AmBisome was prescribed to both inpatients and some outpatients[301]. Some patients had a reaction to AmBisome; the alternative was a medication from the "-azole" family (such as Posaconazole)[302].

276. Portable HEPA filters were supplied to Ward 6A. The points at which this occurred are not clear, and various references to the ordering and arrival of HEPA filters are to be found within IMTs over this period. Ms Rodgers recalled that a first batch of portable HEPA filters were installed in Ward 6A on 10 January 2019, followed by additional units on 30 January[303]. Ward 6A has no specialist ventilation; it was hoped that the portable HEPA filters would improve air quality.

277. In an email to Dr Armstrong dated 8 January 2019[304], Professor Gibson escalated the concerns of consultants that issues relating to the safety of the hospital environment remained unresolved (see below) and that there remained a requirement for additional prophylaxis as a result.

Concern: high particle counts on Ward 6A

278. The concern about Cryptococcus dovetailed with another concern which emerged in January 2019. Air sampling on Ward 6A revealed the presence of higher than expected fungal counts, even with portable HEPA filters in place[305].

279. An hypothesis emerged following a report by Senior Charge Nurse, Angela Howatt, that the seal between the wall and floor in some ensuite shower rooms was breached. An IMT from the time appears to confirm that it was nursing staff who detected this issue[306]. The issue was reported to Estates and then to an IPC nurse who also escalated it to Estates

280. Estates had difficulty accessing the patient room to resolve the issue. Ms Howatt escalated the issue direct to the IPC doctor when she came to carry out

[301] IMT minute dated 7 January 2019, Bundle 1, p.256.
[302] Evidence of Professor Brenda Gibson, transcript, p.150.
[303] Evidence of Jennifer Rodgers, transcript, p.101.
[304] Bundle 6, p.43.
[305] IMT minute dated 17 January 2019, Bundle 1, p.266.
[306] IMT minute dated 17 January 2019, Bundle 1, p.266.

air sampling[307]. This prompted investigations which revealed the presence of mould in around 80% of ensuite bathrooms on Ward 6A[308]. The IMT's hypothesis was that the presence of mould accounted for the concerning air sampling results.

Response: high particle counts on Ward 6A

281. Substantial remedial works were required to resolve the problems with the ensuite shower rooms. A full HPV clean of the ward was also planned. At an IMT on 21 January 2019, it was agreed that the extent and duration of the works indicated that patients should be decanted from Ward 6A[309].

282. The arrangements for the decant were complex[310]. BMT patients could remain on Ward 4B. Ward 6A inpatients would be decanted to the Clinical Decisions Unit ("CDU") within the RHC. This displaced CDU patients who were relocated to Ward 2A, which was at that time empty; significant works had not yet commenced. Space on CDU was insufficient to house day care patients, who were relocated to Ward 1B, the day surgery unit, also within the RHC. Ward 1B had enough space to house their own patients in addition to the decanted day care patients. Schiehallion patients were at this time split over three locations[311].

283. Professor Gibson recalled that a return to the RHC was the only viable option at the time despite the fact it was previously considered to be an unsafe environment. Professor Gibson's understanding was that IPC took steps to make the environment as safe as possible[312].

284. The decant lasted from 22 January to 8 February 2019, when patients returned to Ward 6A[313].

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[307] Evidence of Angela Howatt, transcript, p.51.
[308] Evidence of James Redfern, transcript, p.148.
[309] IMT minute dated 21 January 2018, Bundle 1, p.279.
[310] See, for example, the evidence of Emma Sommerville and Angela Howatt.
[311] Evidence of Angela Howatt, transcript, p.54; evidence of Emma Sommerville, transcript, p.69.
[312] Evidence of Professor Brenda Gibson, transcript, p.168.
[313] Evidence of Professor Brenda Gibson, transcript, p.163.

Concern: a further case of atypical mycobacteria (Mycobacterium Chelonae)

285. In June 2019, Mycobacterium Chelonae was isolated in blood cultures taken from a patient in Ward 6A. This was the second such infection in the Schiehallion Unit patient group within 12 months.

Response: a further case of atypical mycobacteria (Mycobacterium Chelonae)

286. Mycobacterium Chelonae was identified in water sampling on Ward 6A[314]. The IMT minute indicates that samples taken from "patients" and from water were sent for whole genome sequencing to establish if there was a match. The Inquiry understands GGC to accept that the second Mycobacterium Chelonae infection (2019) was caused by exposure to unfiltered water within the hospital campus. Its position in relation to the infection in 2018 is unclear. More is said about this in the chapter on communication.

Concern: gram-negative infections on Ward 6A in the summer of 2019

287. The consistent evidence of clinicians is that they had a concern about a pattern of gram-negative infections which began around June 2019 and continued into the Autumn. That concern was shared by IPC: an IMT was established on 19 June 2019 and continued into November 2019.

288. At the IMT on 19 June 2019[315], the cases of Mycobacterium Chelonae were discussed along with a number of gram-negative infections. Mycobacterium Chelonae had been isolated from recent water sampling on Ward 6A. Contact with unfiltered water was the hypothesised source. The IMT minute does not identify a clear hypothesis in relation to the gram-negative infections[316]. However, at points as the IMT meetings continued, an environmental source was hypothesised[317]. At other times, the hypothesis was said to be unexplained[318]. IPC recorded that, despite dosing of the system, clinical wash hand basins in parts of the hospital had a thick biofilm present. This was not

[314] IMT minute dated 19 June 2018, Bundle 1, p.320.
[315] Bundle 1, p.320.
[316] Bundle 1, p.323.
[317] Bundle 1, p.328.
[318] Bundle 1, p.336.

present in Ward 6A, possibly as a result of drain cleaning. Sampling of unfiltered water revealed the growth of fungi growth and other organisms[319].

289. As at 8 August, the number of what were thought to be unusual gram-negative infections had increased again, bringing the total to 10 [320]. Exposure to water leaking or dripping from chilled beams or exposure to unfiltered water were the hypotheses[321].

Response: gram-negative infections on Ward 6A in the summer of 2019

290. Point of use filters were reported as being fitted in all areas of the campus where Ward 6A patients might have contact with unfiltered water[322]. Increased dosing of Chlorine Dioxide was considered. Drains were cleaned in theatres and CDU (both areas in the Ward 6A patient pathway). Water samples were to be taken from chilled beams. The programme for cleaning chilled beams was stepped up from every 3 months to every 6 weeks[323].

291. On being asked if she recalled discussions with families about it being safer to be treated at home, Professor Gibson indicated that she had a recollection of the discussion(s) to which reference was being made. While not expressly indicating agreement with the proposition, she did say, as regards some families who lived outwith Glasgow and who could have care locally, that she (and colleagues) "*thought it might be better that that's what happened*" [324].

292. Among clinicians, concern grew about the absence of an explanation for the observed pattern of gram-negative infections[325]. Professor Gibson recalled that she and her colleagues had a concern about the pattern and nature of infections rather than only the number of infections. The infections were caused by rare, environmental organisms. Dr Chaudhury had a similar recollection. Concern arose from a combination of the amount, nature and clustering of gram-

[319] See also, IMT minute dated 25 June 2018, Bundle 1, p.327.
[320] Bundle 1, p.334.
[321] Bundle 1, p.341.
[322] IMT minute dated 23 July 2019, Bundle 1, p.332.
[323] IMT minute dated 1 August 2019, Bundle 1, p.334.
[324] Evidence of Professor Brenda Gibson, transcript, p.174.
[325] IMT minute dated 1 August 2019, Bundle 1, p.334.

negative infections[326]. Clinicians were in little doubt that they were seeing something unusual that called for investigation of the source. Given the events of the previous 18 months, the suspicion was of a link to the environment; there was no evidence to indicate otherwise[327].

293. Around late July/early August 2019, a decision was made to close Ward 6A to new admissions and patients requiring higher risk chemotherapy[328]. The pattern of infections was unexplained. The IMT had not identified a solution. Patients were diverted to other centres, including Aberdeen and Edinburgh[329]. Some were sent further afield[330].

294. Additional prophylaxis designed to protect against gram-negative infections (Ciprofloxacin) was reinstated during this period.

295. Clinicians recalled a change in the Chair of the IMT on 23 August 2019, an event which signalled a change in the IMT's methodological approach. The consistent impression of the clinical witnesses was that the emphasis of the IMT's investigation switched. Prior to the change in Chair, the IMT had sought an explanation for the unusual pattern of infections. After the change in Chair, clinicians felt the emphasis was on disproving the validity of the underlying suspicion about infection; that an unusual pattern had to be positively proved before it could be investigated[331].

296. The minute of the IMT meeting of 23 August 2019 nevertheless records agreement that a peer review in relation to Ward 6A ought to be carried out by someone external to GGC who worked in a similar ward[332].

297. By way of context, it should be noted that, shortly after this, two microbiologists wrote an SBAR in which they set out their concerns about the situation on Ward 6A. They said that Ward 6A *"should be considered to have significant*

[326] Evidence of Dr Shahzya Chaudhury, transcript, p.46.
[327] Evidence of Dr Shahzya Chaudhury, transcript, p.47.
[328] Bundle 1, p.336.
[329] Witness statement of James Redfern, para. 118.
[330] For example, to Newcastle. Witness statement of Dr Jairam Sastry, para. 127.
[331] Evidence of Dr Murphy, transcript, p.82; evidence of Dr Chaudhury, transcript, p.53.
[332] Bundle 1, p.348 at p.353.

unacceptable levels of infection risk for the immune compromised patients due to the built environment."[333]

298. The evidence suggested that in August and September 2019, clinicians felt under pressure to support lifting the re-opening of Ward 6A to new admissions. Not only did they feel that was not the responsibility of clinicians, but they remained unsatisfied about the safety of the ward[334]. Dr Chaudhury recalled expressing her discomfort about being put in that position at IMT meetings.

299. On 30 August 2019, Professor Gibson and her clinician colleagues wrote to the Chief Executive, Jane Grant and board Medical Director, Jennifer Armstrong[335]. They expressed their concerns about infection and environmental issues affecting immunocompromised patients for the preceding 18 months and the ongoing uncertainty about the safety of the environment. Clinicians sought a review from a recognised expert in paediatric infection control from outwith Scotland.

300. As the letter makes clear, the concern of clinicians had reached the stage that they had contacted their medial defence unions. Based on advice provided by their defence unions, clinicians emphasised to the board their understanding of the respective responsibilities for provision of medical treatment and for provision of a safe environment: clinicians had responsibility for treatment; GGC led by the Chief Executive had responsibility for provision of a safe environment in which to provide treatment; IPC had responsibility for advising on the safety of the environment; the IMT had responsibility for acting on the advice given by IPC[336].

301. This letter is understood to have been followed by meetings with Jonathan Best, the Chief Operating Officer and Dr Scott Davidson, Deputy Medical Director on 2 September 2019. The outcome of that meeting is not presently clear. In a written response to the clinicians dated 4 September 2019, Jane Grant and Jennifer Armstrong indicated that as a result of that meeting, efforts were

[333] Bundle 4, p.165 at p.167.
[334] Witness statement of Dr Shahzya Chaudhury, para. 92.
[335] Bundle 6, p.1416.
[336] Bundle 6, p.1417.

underway to source an "*appropriate colleague to provide the external advice agreed at the IMT and suggested within your letter*…"[337] and that a meeting would be arranged with clinicians in the near future. It is understood that clinicians met with Dr Jennifer Armstrong on 9 September 2019[338].

302. As far as clinicians were aware there was no fully independent external review[339]. Clinicians were led to understand that a suitable expert could not be identified, or that at least none was willing to assist[340]. Ms Rodgers had a slightly different recollection; that it was for the haemato-oncology consultants to identify an expert together with the Deputy Medical Director, and that they were unable to do so[341].

303. At an IMT meeting on 13 September 2019, Professors Jones and Leanord are recorded as having said that Ward 6A was "*microbiologically safe*"[342]. The minute of the IMT meeting of 18 September 2019, recorded that not everyone was in agreement with that statement[343]. Dr Chaudhury recalled another push for the ward to be re-opened. She objected to the proposed green HIIAT score and the recommendation that the ward be re-opened[344].

304. Dr Chaudhury felt that she was in a difficult position. She was the only consultant treating clinician present and knew that her concerns about the safety of the ward were shared by her colleagues. Dr Chaudhury requested a meeting with the whole consultant group before a decision was taken about reopening the ward.

305. Ms Rodgers recalled that on 20 September 2019 there was a teleconference at which it was agreed that the IMT would recommend reopening Ward 6A to new

[337] Bundle 8, p.65.
[338] Evidence of Jennifer Rodgers, transcript, p.115.
[339] Evidence of Professor Gibson, transcript, p.180.
[340] Evidence of Dr Dermot Murphy, p.83.
[341] Evidence of Jennifer Rodgers, transcript, p.116.
[342] Bundle 1, p.360 at p.362.
[343] Bundle 1, p.365 at p.367.
[344] Evidence of Dr Shahzya Chaudhury, transcript, p.60.

admissions[345]. Those present at the teleconference do not appear to have included a representative of the consultant group[346].

306. As for the concerns expressed by Dr Chaudhury on behalf of her clinician colleagues, she recalls that a meeting did take place with consultants and that the ward remained closed due to their concern about its safety[347]. For completeness, Dr Chaudhury did not accept that the HPS SBAR referred to in the IMT minute of 18 September 2019 had been discussed at the meeting[348].

307. The minute of the IMT meeting of 8 October 2019[349] records that there were possibly three additional cases by this stage; and that a decision to reopen the ward had been postponed following the CEO's agreement to pursue a peer review of microbiological data. That is followed by a note that HPS had been commissioned to undertake an "independent review". The IMT minute records Professor Leanord as having indicated that the infection situation on Ward 6A was "*not a typical outbreak and in his opinion was like a pseudo-outbreak – possibly the first described in the world*".

308. Dr Murphy harboured doubts about this explanation. In his view, there would have to be a great deal of certainty, including exclusion of all other possibilities, before arriving at an hypothesis described as the first in the world[350]. Witnesses also recalled the IMT being provided with a presentation about the use of whole genome sequencing to exclude links between a certain group of infections.

309. Whilst accepting the limitations of their expertise, clinicians were not satisfied that this testing excluded a link between infections and the environment (rather than each other) or that it was generalisable[351].

310. An issue with the kitchen was identified. Dr Sastry observed that there had been "*numerous incidents every week since moving to Ward 6A*".

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[345] Bundle 1, p.370.
[346] Witness statement of Jennifer Rodgers, paras. 299-300.
[347] Witness statement of Dr Shahzya Chaudhury, paras. 92 to 107.
[348] Witness statement of Dr Shahzya Chaudhury, para. 109.
[349] Bundle 1, p.373.
[350] Evidence of Dr Dermot Murphy transcript, p92.
[351] See, for example, the evidence of Dr Dermot Murphy, transcript, p99.

311. The reopening of the ward was recommended by an SBAR dated 10 October 2019[352]. The IMT of 5 November 2019 indicated that it would be the Chief Nursing Officer ("CNO") who would have ultimate responsibility for this question[353]. At a meeting of 11 November 2019[354], Dr Murphy pressed for acknowledgement that there had been an infection control problem on the ward. Dr Murphy also requested that confirmation be sought from HPS on the question of lifting the restrictions on Ward 6A[355].

312. The IMT on 14 November 2019 noted[356] that a final report from HPS was now available, and that it concluded that there was no evidence from available data to support continuation of the restrictions. Dr Murphy continued to express his concerns that an explanation for the infections had not been found. On the same date, Mr Redfern prepared an SBAR recommending that restrictions be lifted[357].

313. Mr Redfern's SBAR set out the rationale for his recommendation. The SBAR indicted that there was no hypothesis which linked the series of infections to the environment. Works had been done by Estates to improve the environment, the water supply had been assessed as "*pristine*", and infection control on the ward was exemplary. The SBAR also noted the pressure being put on other centres by the closure.

314. With the input of the clinical team, a "re-opening bundle" had been prepared which put in place measures to provide additional assurance about infections[358]. In particular, real time root cause analysis ("RCA") would be implemented[359]. A clinical management group would be established to review infections and other matters.

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[352] Bundle 4, p.193.
[353] Bundle 1, p.392 at p.393.
[354] Bundle 4, p.209, at p.210.
[355] Bundle 4, p.212.
[356] Bundle 1, p.402 at p.403.
[357] SBAR dated 14 November 2019, Bundle 4, p.202 at p.204; evidence of Mr Redfern, transcript, p.237.
[358] Bundle 4, p.206.
[359] Witness statement of Dr Shahzya Chaudhury, para. 110; evidence, transcript, p.51.

315. Although Mr Redfern's SBAR records clinicians' agreement with the proposal to reopen 6A, the evidence of clinicians was that their concern about infection and the safety of the environment remained. Clinicians remained anxious that infection concerns would return. As Dr Murphy explained, clinicians had, through the various IMTs, received repeated assurances about the safety of the environment and the effectiveness of mitigations. Dr Murphy did not doubt the good intention of those assurances, but, as he saw it, they had proved unfounded at least insofar as infections continued[360].

316. Clinician agreement to re-opening was based on a number of competing factors. Clinicians were conscious in particular of distress caused to families who were being displaced. Children were being deprived of the expert treatment they could receive on the Schiehallion Unit. Balancing that against the assurances provided and the provisions of the "re-opening bundle" clinicians were content to reopen. Following a decision by the CNO, the ward re-opened on 21 November 2019.

317. The routine use of additional Ciprofloxacin prophylaxis was stopped in November 2019[361]. A decision was made to use TauroLock which is a physical antimicrobial prophylaxis placed in the patient's central line; it is not a medication given to patients[362].

(vii) Years: 2020 - 2023

318. The Glasgow 2 witnesses did not recall having further concerns about the pattern of infection in the paediatric haemato-oncology cohort after 2019. The Covid-19 pandemic had a significant impact on the operation of the operation of Wards 6A and 4B.

319. The Schiehallion Unit moved back to the refurbished Wards 2A and 2B in March 2022.

(viii) Clinician evidence on infections

[360] Evidence of Dr Dermot Murphy, transcript, p.101.
[361] IMT minute dated 5 November 2019, Bundle 1, p.392.
[362] Witness statement of Dr Dermot Murphy, para. 298.

320. As indicated in the introduction to this closing statement, a number of the clinicians provided useful insights relevant to the question of whether infections might be linked to the built environment. That evidence might be divided into two parts: evidence of whether the infection patterns observed were unusual or concerning in some way; and discussion of the various hypotheses that have been suggested as explanations for these patterns.

321. The witnesses were careful to remind the Inquiry of the limits of their expertise as well as the limits of what might be taken from their evidence. The Inquiry and CPs will want to play close regard to the evidence of Professor Gibson, Dr Chaudhury and Dr Sastry on these matters. There is much of value to be taken from it. However, it was Dr Murphy who provided the most extensive oral evidence on these questions, and it may be useful therefore to focus on what he said for the moment.

322. Dr Murphy's evidence about the unusual pattern of infections was clear. When clinicians first recognised the unusual pattern of infections, they did not "*jump*" straight to the conclusion that there was some link to the built environment[363]; it is not their practise, as evidence-based specialists, to jump to conclusions. His views, and those of his colleagues, were based on years of observing infection patterns in their patients and discussion with colleagues looking after similar patients.

323. By March 2018, Dr Murphy understood there to be evidence of a contaminated water supply. He and his colleagues shared the concern of IPC that the infection pattern was linked to the built environment[364]. By September 2018, Dr Murphy found it difficult to escape the conclusion that there was a systematic problem with the built environment[365].

324. Dr Murphy said that, following careful reflection, he came to the view that there was a contribution from the built environment to the infection pattern seen in

[363] Evidence of Dr Dermot Murphy, transcript, p.24.
[364] Evidence of Dr Dermot Murphy, transcript, p.30.
[365] Evidence of Dr Dermot Murphy, transcript, p.58.

the Schiehallion patient population[366]. He was further of the view that some of the infections which were in his view linked to the environment caused patients to become very unwell, and in some cases resulted in the requirement for care in the PICU[367].

325. To repeat, all of this evidence was given by someone who acknowledged the boundaries of their discipline. Dr Murphy's explanation for why he considered himself qualified to offer the foregoing explanations should not simply be dismissed, therefore. In its assessment of the evidence offered by witnesses in other disciplines, the Inquiry will no doubt want to pay close attention to what Dr Murphy and his colleagues have said.

CHAPTER 5: Impacts

326. The evidence of Glasgow 2 witnesses was consistent: they had never before experienced a situation like that seen between March 2018 and November 2019. They described a period of 18 months in which intense waves of safety-related concerns emerged and, following IPC intervention, seemingly abated. Reprieve from concern was, however, short-lived. Every time a concern re-emerged, faith in the environment, and the ability of GGC to control it, diminished.

Overall impact on patients and families

327. At the Glasgow 1 hearing, patients and families provided powerful evidence of the practical, emotional and psychological toll of the events described in this Statement. It is submitted that the best evidence of those impacts comes from the Glasgow 1 witnesses themselves. However, it is also notable that, with very few exceptions, the impacts described found support in the evidence of the Glasgow 2 witnesses[368]. As Professor Gibson indicated, the evidence of patients and families about impacts speaks for itself[369]. It is not repeated here.

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[366] Evidence of Dr Dermot Murphy, transcript, p.130.
[367] Evidence of Dr Dermot Murphy, transcript, p.138.
[368] Where Glasgow 2 witnesses found themselves unable to assent completely to impacts described by Glasgow 1 witnesses, it was usually because of a lack of knowledge, rather than a direct contradiction.
[369] Evidence of Professor Brenda Gibson, transcript, p.187.

328. The Glasgow 2 witnesses emphasised one particular impact on families: they had to endure a heightened fear of infection over a prolonged period. Families already living with a fear of infection were subjected to daily reminders that the built hospital environment was thought to pose an increased risk to their children[370]. They witnessed sometimes drastic IPC measures, extensive remedial works and ward restrictions. They were forced to leave behind Ward 2A, which should have been the safest environment for vulnerable children within the campus. Their confidence in the Ward 6A 'safe haven' was shaken by further infection concerns, a decant and further ward restrictions. It is perhaps no wonder that they were taken to their breaking point[371].

329. The remainder of this chapter summarises specific impacts spoken to by Glasgow 2 witnesses.

Overall impact on staff

330. Although witnesses were careful to recognise that patients and families experienced the most significant impacts, the evidence indicates that the impact on clinical and nursing staff should not be overlooked. Professor Gibson had never seen anything like the toll taken on nursing staff; the strain was huge[372].

331. The impacts on nursing staff in particular were considerable. Nurses experienced increased scrutiny and workloads accompanied by intense periods of anxiety and low morale. However, one thing was clear; patient safety and care remained at the heart of their concerns. This can be seen most acutely in September 2018 when nurses approached their professional unions out of a concern that the environment in which they were treating patients was unsafe. As was explained by Ms Sommerville, nurses were not confident that patient safety was being adhered to or that, by September 2018, the safety concerns had been resolved[373].

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[370] See, for example, the evidence of Professor Brenda Gibson, transcript, p.187.
[371] See, for example, the evidence of: Professor Brenda Gibson, transcript, p.174; Dr Dermot Murphy, transcript, p.71.
[372] Evidence of Professor Brenda Gibson, transcript, p.189.
[373] Evidence of Emma Sommerville, transcript, p.52; p.58.

332. As can be seen from the repeated attempts to escalate safety concerns to senior management / board level, clinicians had a similar concern about treating patients in an environment believed to present a risk of infection to patients.

333. Ms Sommerville identified an impact that was particularly distressing for nurses working in this field. At the outset of her evidence, Ms Sommerville explained that nurses often choose to practise in paediatric haemato-oncology because of the opportunity to build relationships with patients and families as they progress through their journeys[374]. These events jeopardised those relationships. Nurses, patients and families were placed into a stressful and pressurised environment. Nurses were on the frontline not only of implementing many of the IPC measures but of attempting to explain them to families (often without clear answers to give them). The focus of discussions with families shifted from care and treatment to issuing warnings and instructions to families about infection control measures. Relationships and trust suffered as a result[375].

Disruption to treatment

334. There is clear evidence that patient treatment was disrupted as a result of ward restrictions and closures[376]. Chemotherapy plans were interrupted. Some delays were short and had little practical impact. However, the diversion of patients to other centres was a far more involved process, requiring considerable planning input from consultants, and others involved in a patient's treatment[377]. The Inquiry understands that GGC holds data relating to these delays[378].

335. The impact on patients and families who were diverted to other centres is obvious. Families who had just been hit with a diagnosis of cancer were told that they had to travel and 'set up' in an unfamiliar city, sometimes hundreds of miles away from home and family support.

[374] Evidence of Emma Sommerville, transcript, p.20.
[375] Evidence of Emma Sommerville, transcript, p.60.
[376] Evidence of Angela Howatt, transcript, p.35.
[377] See, for example, the witness statement of Angela Howatt, para. 67.
[378] Evidence of Angela Howatt, transcript, p.34.

336. The impact on the BMT programme was particularly acute. Witnesses explained the care with which a transplant is planned[379]. The transplant is planned around a short window of opportunity. If that window is missed, a donor may be lost, or a patient may no longer be in a position to receive the transplant. Dr Ewins recalled that the doubts about the safety of the BMT rooms in 2015 placed her in a position where she had to weigh up the risks of missing the opportunity to carry out a transplant on a very sick child against carrying out that transplant in a potentially unsafe environment. Clinicians felt that they should not have had to factor the safety of the built hospital environment into the already very finely balanced decision making surrounding a transplant; they expected that they would be provided with a safe environment in which to treat patients[380].

337. Families are well aware of the risks involved in transplants; they too were impacted by knowledge that a delay or disrupted plan could have dire consequences[381]. But while clinicians might know that a delay is reasonably safe in a particular case, that perspective does not translate easily to an anxious family[382].

Disruption to the experience on the ward

338. The restrictions placed on water use were particularly difficult for families and patients. Young and teen patients were distressed about the lack of washing facilities[383]. Washing with bottled water means washing with cold water[384]. BMT patients received sterile water to drink but the taste was unpleasant[385]. Perhaps most distressing was the uncertainty about whether it was safer to clean or not clean. Families were instructed about the importance of washing and showering every day to minimise the risk infection. As of March 2018, they understood that washing or showering might increase the risk of infection. Although filters were

[379] See the supplementary witness statement of Dr Anna Maria Ewins; see also the evidence of Emma Sommerville, transcript, p.51.
[380] Supplementary witness statement of Dr Anna Maria Ewins, paras. 20 and 26.
[381] Evidence of Professor Brenda Gibson, transcript, p.56.
[382] Evidence of Professor Brenda Gibson, transcript, p.59.
[383] Evidence of: Professor Brenda Gibson, transcript, p.85; Emma Sommerville, transcript p.31.
[384] Evidence of Emma Sommerville, transcript, p.39.
[385] Evidence of Emma Sommerville, transcript, p.37.

placed on taps and instructions given that showering could resume, concerns about the safety of the water endured, at least in the minds of patients and families. Statements made about the safety of the water supply did not succeed in allaying those concerns.

339. The restrictions on the use of water had an obvious impact on clinicians and nurses who had, throughout their careers, relied on a clean water supply for hygiene[386].

340. Disruption was caused by: the installation and regular changing of POUFs, drain cleaning, vent and chilled beam cleaning, replacement of pipes and taps. These processes involved a combination of external contractors and Estates personnel entering patient rooms.

341. Perhaps most disruptive was the introduction of HPV cleaning in June 2018. Rooms had to be emptied in advance of cleaning. Patients and families had to decant rooms which for some had, in effect, become their homes. Families did not return to their original rooms unless that was requested and could be accommodated[387].

342. Overall ward capacity was restricted by IPC measures and remedial works. Restricted capacity can result in Schiehallion patients being cared for on other wards[388].

343. Nursing, domestic and auxiliary staff were heavily involved in implementing the logistics of these measures on the ward[389]. Workloads increased and changed. Nurses were taken away from what should have been their focus: patient care[390]. There was consistent evidence that June 2018 was a particularly difficult time for staff, patients and a families. [391]

[386] See, for example, the witness statement of Emma Sommerville, para. 99.
[387] Evidence of Melanie Hutton, transcript, p.31.
[388] See, for example, witness statement of Professor Brenda Gibson, para. 28.
[389] See, for example, witness statements of: Kathleen Thomson, para. 210; Dr Shahzya Chaudhury, para. 39.
[390] See, for example, the evidence of Emma Sommerville, transcript, p.51.
[391] See, for example, the evidence of Melanie Hutton, Jennifer Rodgers and Professor Gibson.

Impact of enhanced IPC supervision / audit

344. Enhanced supervision was introduced by the QI Group in 2017 as part of the effort to reduce CLABSI rates. Its use was continued during 2018 and 2019 in response to concerns about infection, and was stepped up and down during this period. In addition to enhanced supervision, other forms of IPC scrutiny intensified, including more frequent peer audits, SICP audits (standard infection control precautions) and hand hygiene checks[392].

345. Nursing staff understood the need for these measures but they had a significant impact on morale. At times nurses (and domestic staff) felt under scrutiny, or worse, that they were being blamed for infections[393]. Concerns about the impact of these measures on staff are seen throughout the IMT minutes. In fact, audits demonstrated exemplary practice[394].

Workload

346. As was recognised by a number of witnesses, the events of 2018 and 2019 increased, and altered, the workload of GGC staff. Nursing, domestic and auxiliary staff were on the frontline of implementing IPC measures and dealing with operational matters on the wards. Senior nurses were involved in the operational planning of each ward move[395].

347. Senior nurses and consultants were required to attend frequent and increasingly lengthy IMT meetings. IMTs had not been a regular feature of staff workloads prior to March 2018[396]. During periods of concern, these meetings occurred every two or three days. Latterly, attendee numbers grew to between twenty and thirty individuals. Meetings could last for two to three hours at a time. Consultants and nurses were taken away from their core duties: patient treatment and care.

Impacts of decant to Ward 6A

[392] See, for example, the witness statement of Angela Howatt, paras. 69; 92.
[393] See, for example, witness statements of: Angela Howatt, para. 61; Kathleen Thomson, para. 210; Sarah-Jane McMillan, para. 141.
[394] Witness statement of Kathleen Thomson, para. 210.
[395] See, for example, the witness statement of Emma Sommerville, para. 161.
[396] See, for example, evidence of Emma Sommerville, transcript, p.33.

348. The Schiehallion Unit has relocated three times since September 2018: to Wards 6A and 4B, to CDU and the return to Wards 2A and 2B. Patients and families provided vivid evidence of the impact of the first two moves. The Glasgow 2 witnesses draw attention to particular impacts.

Suitability of Ward 6A

349. None of the Glasgow 2 witnesses suggested that Ward 6A was anything other than a sub-optimal solution for housing Schiehallion Unit patients. Rather, it was intended as a short-term solution to an urgent problem. As Professor Gibson indicated, the challenges presented by Ward 6A were considerable[397]. Inpatient and day care services were combined on a single ward. Available space was compromised. Rooms had to be used flexibly. The TCT Unit was lost. There was no dedicated playroom. Young patients had to share lifts with adult patients (until a dedicated lift was allocated).

Staffing on 6A/4B

350. Ms Rodgers spoke of a diseconomy of scale in the provision of nursing services[398] over Wards 6A and 4B. Schiehallion nurses providing care for transplant patients within an adult unit (Ward 4B) had to stay with their patients, meaning that they were not available to provide other care on Ward 6A[399]. Additional resource was put in place, drawing from the paediatric haemato-oncology nurse group or from other paediatrically trained nurses. Staffing had to be adjusted to enable the Hospital at Night team (a team of doctors and advanced nurse practitioners covering the night shift) to provide that service safely to Ward 6A patients[400]. Concern about this diseconomy of scale was significant enough that it was put on the ward risk register[401].

Adjacency to other paediatric services

[397] Evidence of Professor Brenda Gibson, p.137.
[398] Witness statement of Jennifer Rodgers, paras. 222 – 228; evidence, transcript, at p.88.
[399] Evidence of Dr Dermot Murphy, transcript, p.50. See also, the evidence of Professor Gibson, transcript, p.140.
[400] Evidence of Professor Brenda Gibson, transcript, p.139.
[401] Witness statement of Emma Sommerville, para. 22.

351. Patients and families were physically remote from the paediatric services located in the RHC building. The paediatric haemato-oncology service is a "user service"; it uses other services within the hospital as opposed to being a provider of services. When in Wards 6A and 4B, it was geographically removed from the other services it used frequently, for example, radiology, gastroenterology, nephrology and theatre. It was more time-consuming for clinicians from those disciplines to travel to the adult hospital.

352. On a linked point, Dr Murphy described another impact of the loss of adjacency to paediatric colleagues. An important benefit of location in the RHC had been the ability of Schiehallion clinicians to have short informal discussions with paediatric colleagues of other disciplines regarding patient care. Of particular importance was the ability to secure early involvement of PICU colleagues. Dr Murphy explained that modern PICU medicine promotes early involvement of ITU staff instituting measures designed to prevent patients from having to go to PICU. Whilst PICU staff could still travel to Ward 6A to perform that care, the ease with which Schiehallion staff could obtain informal 'check-ins' was reduced[402].

353. Professor Gibson and Dr Ewins expressed a nervousness about the patient pathway between Wards 6A and 4B and the PICU[403]. The physical distance to PICU was increased, as was the travel time. Mitigations were put in place to minimise this risk. A SOP was created[404]. The route was carefully planned and tested before the decant[405]. Directional signage was installed. Dr Murphy's view was that mitigations reduced the risk to an acceptable level; had the risk not been so reduced, the ward would not have moved[406]. This did not mean that anxiety was about this matter was also removed.

<u>The patient experience on Ward 6A</u>

[402] Evidence of Dr Dermot Murphy, transcript, p.52.
[403] Evidence of Professor Brenda Gibson, transcript, pp.138; 142; witness statement of Dr Anna Maria Ewins, para. 30.
[404] Witness statement of Jennifer Rodgers, paras. 189 - 191.
[405] See, for example, witness statement of Emma Sommerville, para. 173.
[406] Evidence of Dr Dermot Murphy, transcript, p.57.

354. The Glasgow 1 witnesses gave powerful evidence about the impacts on patients of being situated on Ward 6A. Patients described the experience as bleak; some felt institutionalised. Professor Gibson identified two factors that might have contributed to that feeling. The first is that due to the concern about infection, the flow of patient visitors was reduced. The second is that from early 2020, the COVD-19 pandemic resulted in restrictions on the ward[407]. Although unaware of the concerns at the time, Dr Murphy could understand why patients and families on Ward 6A might have felt isolated and alone[408]. Ms Sommerville recalled a patient telling her that she had struggled with her mental health while on Ward 6A but that improved after the return to Ward 2A.[409]

Overall impact on the service

355. A number of witnesses described a freezing effect caused not only by the events described above, but of the subsequent reviews and investigations (including the Inquiry). Increased workloads and co-operation with investigations hindered plans for the development and growth of the Unit[410]. Dr Ewins summed up the sentiment:

"…we've been in the hospital for seven years now and we haven't grown our service because we have not had the time…we should be moving forward, we should be innovating and adopting new treatments, but that has been impeded…it has felt like a bottomless pit of stress. We've been firefighting instead of trying to grow the service and that's been very harmful[411]".

Use of prophylactic medication

356. A matter of concern to some of the Glasgow 1 families was the use of prophylactic medication in response to the events of 2018 and 2019. The evidence of the Glasgow 2 witnesses leaves no room for doubt about two things regarding the use of prophylactic medication: (i) at numerous times during 2018

[407] Evidence of Professor Brenda Gibson, transcript, p.144.
[408] Evidence of Dr Dermot Murphy, transcript, p.64.
[409] Evidence of Emma Sommerville, transcript, p.62.
[410] See, for example, evidence of Emma Sommerville, transcript, p.84; witness statement of Dr Anna Maria Ewins, paras. 337-339.
[411] Witness statement of Dr Anna Maria Ewins, paras. 337-339.

and 2019, additional prophylactic medication was prescribed to paediatric haemato-oncology patients; (ii) the rationale for its use was that the environment posed a risk of infection to those patients[412]. Support for these propositions is found in the IMT minutes and communication documents.

357. As explained in chapter 3, the use of anti-fungal and anti-bacterial prophylactic medication is an inherent part of the treatment of paediatric haemato-oncology patients. It is used as part of standard treatment protocols and on an *ad hoc* basis in response to infection risks. The Inquiry has not yet heard from those responsible for decision making about prophylactic policy. Clinicians were consistent in their evidence: microbiologists/IPC make policy recommendations about prophylactic use in response to environmental risks; clinicians take those recommendations and apply them in a clinical context on a patient by patient basis.

358. For present purposes, it may be sufficient to notice the following decisions made regarding the use of additional prophylaxis in response to the risk of infection potentially posed by the environment (taken from the IMT minutes):

- **August 2016**: Prophylaxis (AmBisome or Posaconazole) use planned in response to concerns about increased cases of Aspergillus on Ward 2A[413].

- **March 2017**: Prophylaxis introduced as a control measure in response to concerns about increased fungal counts on Ward 2A[414].

- **March 2018**: Ciprofloxacin prescribed to patients in the Schiehallion Unit in direct response to concerns that the water supply posed a risk of infection[415].

- **End-March 2018**: Ciprofloxacin use was reviewed and stopped after the implementation of control measures at the end of March 2018.

[412] See, for example, the evidence of Professor Brenda Gibson, transcript, p.96.
[413] Bundle 1, p.25.
[414] Bundle 1, p.35.
[415] Bundle 1, p.68.

- **June 2018**: Use of Ciprofloxacin was restarted in June 2018, in direct response to a concern that drains posed a risk of infection[416].

- **June 2018**: Use of Ciprofloxacin was stopped following implementation of control measures[417].

- **September 2018**: Use of prophylaxis was considered in response to gram-negative infections thought to be associated with contaminated drains, but a decision was postponed pending the receipt of epidemiological data (and it is unclear if it was started in September) [418].

- **September 2018**: Anti-fungal prophylaxis prescribed in response to concerns about cladding works.

- **November 2018**: Use of anti-fungal prophylaxis associated with cladding works reviewed[419].

- **December 2018/January 2019**: Anti-fungal prophylaxis recommended for patients in Wards 6A and 4C (adult haemato-oncology patients) in response to concerns about Cryptococcus[420] .

- **February 2019**: Discussions about long-term use of additional prophylaxis[421]; prophylaxis remains in place for select group of patients.

- **August 2019**: Ciprofloxacin restarted in response to concerns about gram-negative infections potentially connected to the environment[422].

- **September 2019**: Use of additional prophylaxis is placed under review by an *ad hoc* group[423].

[416] Bundle 1, p.129.
[417] Bundle 1, p.132.
[418] Bundle 1, p.155.
[419] Bundle 1, p.229.
[420] Bundle 1, p.267.
[421] Bundle 1, p.307.
[422] Bundle 1, p.351.
[423] Bundle 1, p.360.

- **October 2019**: Use of additional prophylaxis is kept under review. Certain patients remain on Ciprofloxacin[424].

- **November 2019**: Anti-fungal prophylaxis continues. Agreement reached to stop routine use of Ciprofloxacin. TauroLock to be introduced[425].

- **July 2020**: Agreement that current prophylaxis regime should be retained[426].

359. Use of additional prophylaxis aligned with periods of concern about the built environment. Although the evidence indicates that witnesses believed the use of additional prophylaxis to be justified on a risk/benefit analysis, that is not to say they held no concerns about its continued use. Clinicians were concerned about the prolonged extension of prophylaxis and side effects experienced by patients. At the root of that concern was underlying frustration at the ongoing situation and doubt that GGC had control of the built environment[427].

360. Professor Gibson's frustration caused her to escalate the consultant group's concerns directly to the board Medical Director, Dr Jennifer Armstrong, in an email dated 8 January 2019[428]. The IMT had decided that additional anti-fungal prophylaxis should be used in response to concerns about Cryptococcus, but this resulted in particular treatment-related challenges. AmBisome was prescribed but patients experienced toxicities, including some with serious anaphylactic reactions. Ordinarily, patients who could not tolerate AmBisome would be given Caspofungin but it was not effective against Cryptococcus. The alternative was to use a drug from the "azole" family but those drugs cannot be given to patients receiving Vincristine as part of their chemotherapy treatment, including all ALL patients. Clinicians had been informed initially that this prophylaxis policy was short term. On discovering that it was to be extended, Professor Gibson sought assurance that someone at the most senior level was managing the situation. Consultants wanted assurances about the safety of the

[424] Bundle 1, pp.369; 389.
[425] Bundle 1, p.393.
[426] Bundle 1, p.435.
[427] See, for example, the evidence of Professor Brenda Gibson, transcript, p.151.
[428] Bundle 6, p.43.

environment and the long term prophylaxis policy. Professor Gibson did not have confidence that the "*gravity of this situation [was] really appreciated by those charged with resolving it*"[429]. This was a reference to the board and the senior management team[430].

361. Professor Gibson's email was followed by a meeting among Dr Armstrong and other managers on 9 January 2019 and by a meeting with clinicians on 11 January 2019[431] . Although Professor Gibson's email was followed by meetings at which these issues were discussed she did not feel that she received an adequate response to her concerns[432]. Specifically, she did not recall receiving a clear explanation from senior management about the steps that they were taking to resolve the situation; a theme which emerged more than once in Professor Gibson's evidence.

Communication about prophylaxis

362. At the Glasgow 1 hearing, a small number of witnesses raised concerns that they were not kept informed about the use of prophylactic medication. The Inquiry has said that it will not be investigating individual instances of communication between clinicians and patients on matters related to treatment and medication. Therefore, the question of whether in an individual communication there was some oversight by a clinician or some misunderstanding by a parent is not for the Inquiry to resolve, and no one should think that is being suggested here. That is not to diminish the importance of the patient and family evidence. To the contrary, it provides a basis to investigate the overall approach taken by the organisation as regards communication of this matter.

363. Clinicians were given an opportunity to provide evidence on this matter and to respond to the patient and family evidence. Their evidence was that families were informed about prophylaxis, both as part of a discussion at the outset of

[429] Bundle 6, p.43.
[430] Evidence of Professor Brenda Gibson, transcript, p.155.
[431] Minute of meeting dated 9 January 2019, Bundle 5, p.162; evidence of Jennifer Rodgers, transcript, p.104.
[432] Evidence of Professor Brenda Gibson, transcript, p.157.

treatment and as and when additional prophylaxis was prescribed. Clinicians recalled informing families that additional prophylaxis was being used to guard against infection and that, where they had information to give about the environment, it was given[433]. That families were told something about the use of additional prophylaxis for reasons connected to the environment finds support in the written communications issued to patients and families in which the use of prophylaxis is referenced[434].

Impacts of infection

364. The existence of a connection between infections and the built environment is a question currently under investigation. Regard should be had however to the evidence of the clinicians as described in chapter 4, keeping in mind the limits of the evidence as stated by the witnesses. The clinical impacts of infection are discussed in chapter 2.

CHAPTER 6: Communication

Introduction

365. A concern about communication with patients and families was a key theme of the evidence provided to the Inquiry during the Glasgow 1 hearing. That evidence was summarised in Counsel to the Inquiry's Closing Statement[435].

366. Patient and family witnesses criticised the way in which GGC as an organisation communicated with them in relation to the history of concerns set out in chapter 4 of this Statement. It may be useful to recall the nature of the criticisms. They might be said to cover two aspects of communication: first, the practical arrangements for communicating with patients and, second, the content of communications.

367. As regards the first aspect, reference was made by patients and families to the reliance placed by GGC upon clinical and nursing staff and to the timing of

[433] See, for example, evidence of Professor Brenda Gibson, transcript, p.152.
[434] See, for example, Bundle 5, pp.100; 142; 169; 331.
[435] Para 7, sub-paras (xvii) to (xxiii).

communications (including a perception by some that communication with the media rather than families appeared to be the priority).

368. As regards the second aspect, the overwhelming evidence of the patients and families was that the content of the communications with them was sub-optimal. For many witnesses it went further than that. A significant number of witnesses criticised what they saw as "spin" on the part of those directing GGC's communication strategy during the events of 2018 and 2019, and some questioned whether the organisation had communicated with them and with the media in good faith. One witness in particular questioned whether the organisation had fulfilled its obligation to communicate candidly.

369. The evidence of the patient and family witnesses on these matters engages Term of Reference 8. It provides that the Chair is to "*determine whether communication with patients and their families supported and respected their rights to be informed and to participate in respect of matters bearing on treatment*". The evidence of the Glasgow 1 and 2 witnesses is likely to provide much of the factual backdrop against which findings relative to Term 8 might be made in due course. But it does not seem likely that the communication question raised by Term 8 can be fairly determined at this point without hearing from those (both within and external to GGC) responsible for key decisions and policies relative to communication.

370. In moving forward towards completion of this aspect of its investigation, the Inquiry will no doubt also have in mind the following three considerations.

371. First, although Term 8 focuses upon communications with patients and families, the multi-faceted and inter-connected nature of the communication questions to be considered by the Inquiry needs to be kept in mind. A communication to a patient about the water system is – or, at least, ought to be – simply one part of an overall process of information exchange. The provision of a piece of information to a patient should not be disassociated from that broader process of information sharing within GGC and between GGC and other bodies.

372. This is recognised in the Inquiry's Remit and Terms of Reference, which require the Inquiry to consider a number of different aspects of communication connected to the matters set out in the history of concern. In this regard, reference might be made to:

- Term 3D: organisational culture.
- Term 4: disclosure and information sharing around matters of concern.
- Term 5: national governance and oversight.
- Term 6C: information and training provided to end users of key building systems.
- Term 9: HAI reporting.

373. The possibility of a link between these aspects of communication and the Term 8 communication obligations should be kept in mind. This connects to a second point, which was emphasised at the Procedural Hearing: that the Inquiry is not concerned with communication about clinical matters between clinical staff and patients. Its concern is about organisational communication of the issues identified in the history of concern. That broader focus is reflected in the discussion of the evidence that follows.

374. Finally, it will be necessary to identify and analyse in due course the patient rights and organisational obligations against which communications fall to be evaluated. To mention at this point one aspect of this framework of rights and duties: an organisational duty of candour applicable to the present context was put on a statutory footing on 1 April 2018 by Part 2 of the Health (Tobacco, Nicotine and Care)(Scotland) Act 2016 (the "2016 Act"). The Inquiry understands the Scottish Government to have promoted this legislation as part of "*an integrated programme of measures to facilitate cultural change to achieve openness and transparency without blame in the provision of NHS health and social care services*"[436]. This underlines the connections among the various facets of the Inquiry's communication investigations, notably the connections among candour, openness and organisational culture.

[436] The Organisational Duty of Candour Procedure – Review of First Year, Michelle Jamieson. https://hub.careinspectorate.com/media/4173/organisational-duty-of-candour-procedure-review-of-first-year.pdf

375. Accordingly, at the point it seeks to determine whether the evidence provided in Glasgow 1 and Glasgow 2 indicates satisfaction or breach of rights and obligations, it will be necessary to have a clear understanding not only of the key provisions of the 2016 Act (and any other engaged legal rights/duties) but also of the policy aspirations they were intended to meet. In that regard, the Inquiry will no doubt wish to understand what policies – whether internal to GGC or issued by government – were intended to encourage and underpin candid and transparent communication before and after the 2016 Act came into force.

376. In the meantime, the evidence from the Glasgow 2 witnesses bearing on these broader matters and upon the Term 8 communication question more specifically is summarised as follows. The evidence is discussed under three headings: (i) the practical arrangements for communication; (ii) evaluation of communication: its effectiveness; and (iii) evaluation of communication: adherence to standards.

(i) Practical arrangements for communication

Who was responsible for determining communication strategy during the events described in the history of concern?

377. Communication appears to have been a standing agenda item at IMT meetings. Although there was evidence that IMTs had delegated authority[437] and that the Chair of the IMT had decision making responsibility for communication decisions, there was also evidence to indicate that during the events of 2018 and 2019 the IMT Chair did not always have the final say as regards what was communicated. The IMT's recommendations were regularly escalated for input or approval to a corporate communications department, senior managers at executive level and, in some cases, the board[438]. The corporate communication team was represented at the IMTs and had a central role in formulating briefings and press releases, drawing input from other departments where necessary.

[437] Witness statement of Jennifer Rodgers, at para. 384.
[438] See, for example, the evidence of James Redfern, transcript, p.6.

378. These observations underline a point made above: that it is likely to be necessary to hear from senior decision makers to determine the Term 8 communication question. The evidence nevertheless indicates that the IMT played a central role in communication during 2018 and 2019[439] in relation to (i) staff communications; (ii) inpatient family communications and (iii) external communications[440].

379. Currently, the available evidence indicates a rather *ad hoc* approach to decision making in relation to communication at IMTs. When considering the effectiveness of that sort of approach, it is to be recalled that the events with which the IMTs in 2018 and 2019 were concerned were not narrowly focused upon individual cases. On the face of things, from the very start of the incident in early 2018, GGC appears to have been dealing with something that was perceived, at the time at least, to create a risk to – at least – the whole of the cohort of paediatric haemato-oncology inpatients and outpatients. The urgent steps taken regarding access to, and treatment of, water might be hard to explain on any other basis. One could also refer to the IMTs in which the widespread nature of the problem is mentioned[441].

380. The question arises, therefore, whether it should have sat with IMTs to determine on an *ad hoc* basis (if that is what the evidence shows) what to say to staff, to patients and to the media. Presently, it is not known whether the approach taken by the IMTs connected to some broader board-approved communication policy or strategy developed for the purposes of managing the events of 2018 and 2019. The evidence did not obviously suggest this, but it is something that might be worth exploring. Moreover, the evidence indicated that there is currently no written strategy for dealing with a similar situation should the need arise again[442]. This too might be usefully explored.

<u>Practical aspects of communication in 2018</u>

[439] See the witness statement of Jennifer Rodgers, beginning at para. 369.
[440] Witness statement of Jennifer Rodgers, para. 374.
[441] See, for example, IMT minutes dated 21 and 27 March 2018, Bundle 1, pp.76; 87; IMT Full Report dated 13 April 2018, Bundle 8, p.53.
[442] Evidence of Melanie Hutton, transcript, p.84.

381. The Glasgow 2 witnesses appeared to accept that, in 2018 at least, communication with patients and families following IMT meetings was mostly verbal[443]. This is consistent with the pattern of communication documents seen in Bundle 5. For example, during the water incident, only two or maybe three short written briefings appear to have been issued to families.

382. Glasgow 2 witnesses described a process of cascading information from the IMT to nursing staff who took the lead in communicating with inpatient families. Ms Sommerville explained that her role as senior charge nurse was to visit each family on Ward 2A to update them following IMT meetings. She was dependent upon instruction from the IMT as to what information she could relay[444]. Where written briefings were made available, she would hand them out. Families could, and did, ask questions of nursing staff throughout the day.

383. That the initial communication burden sat mainly with nursing staff in 2018 accorded with the evidence of Ms Rodgers and Mr Redfern. Ms Rodgers recalled a standing offer by the Chair of the IMT and Mr Redfern to meet with individual families should they request a discussion[445]. Mr Redfern described this as an "opt-in" approach. Families of children directly affected by infections would be spoken to by clinicians, but if other families on the ward wanted additional information about infections (more generally) or the ward environment, it was up to them to ask for it[446]. The IMT minutes indicate a desire for more information on the part of families[447].

384. There was no agreed process for communication with day care families at that time.[448] They were provided with information by nursing staff if and when they attended Ward 2B. They did not benefit from the same daily contact with nursing and clinical staff that inpatient families had[449].

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[443] See, for example, the witness statement of Jennifer Rodgers at para. 369.
[444] Witness statement of Emma Sommerville, para.126.
[445] Witness statement of Jennifer Rodgers, para. 412.
[446] Witness statement of James Redfern, para. 84; transcript, p.16.
[447] See, for example, IMT minute dated 6 March 2018, Bundle 1, p.58; IMT minute dated 21 March 2018, Bundle 1, p.80.
[448] Evidence of James Redfern, transcript, p.18.
[449] Evidence of Angela Howatt, transcript, p.66.

385. Communication with nursing staff was via a combination of verbal updates, cascading of information at daily 'huddles', meetings and, sometimes, written briefings and emails. Clinical staff were updated in a similar way. Information was cascaded by the consultant or consultants attending the IMT[450].

386. One criticism made of this process was of its time-consuming nature[451]. Inevitably, it diverted nurses away from their core responsibilities. Another was that, whilst they would answer parent questions to the best of their knowledge, nurses simply were not in a position to answer questions about the safety of the environment. Some witness felt that this led to suspicion on the part of families that they were not being told everything[452].

387. There was also evidence that a reliance on cascading information to nursing staff (and clinicians) was not always effective. Shift patterns, staff turnover, and high workloads meant that not everybody received the same information at the same time[453]. If the staff responsible for communicating with families did not themselves have a consistent level of awareness of events, it might be thought inevitable that information provided to families would vary in quality and in detail.

Core Briefs

388. Witnesses also recalled information about infection risk and the safety of the environment being contained in Core Briefs[454]. Core Briefs are newsletters used by the senior executive team/board to communicate with staff. They contain a range of staff updates, new initiatives and positive stories[455]. The good intent behind Core Briefs cannot be doubted, but witnesses indicated that they were not always an effective means of communicating important information about infections and the environment.

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[450] See, for example, the evidence of Professor Gibson and Dr Chaudhury.
[451] Witness statement of Angela Howatt, para. 94.
[452] Witness statement of Sarah-Jane McMillan, paras. 287-290.
[453] Witness statement of Sarah-Jane McMillan, paras. 294-295.
[454] See, for example, the witness statement of Emma Sommerville, para. 228; examples can be found in Bundle 5, for example at pp. 25, 105 and 114.
[455] Witness statement of Angela Howatt, para.160.

389. More than one witness indicated that staff simply do not have time to read the Core Brief on a daily basis. Emails containing Core Briefs are not always prioritised by staff (given its newsletter status)[456]. Nurses working on the ward do not necessarily have the opportunity to log in and check emails[457]. Some staff do not have email access at all and rely on other members of staff printing it out[458]. One witness suggested that as far as nurses are concerned a more effective means of communication might be text message or similar[459].

Practical aspects of communication in 2019

390. There was consistent evidence that the approach to communication with patients and families evolved over the course of the events described in the history of concern. Mr Redfern appeared to cite changes made to communication with outpatients in 2019 as an example of GGC's learning culture; having recognised a flaw in the approach, GGC sought to address it[460]. By 2019, there was increased reliance on written communication. Mr Redfern and Ms Rodgers attended the ward regularly to update staff and families and to answer questions, as far as they were able. Mr Redfern described the approach in 2019 as more proactive; it was no longer 'opt-in'[461]. Ms Rodgers and Mr Redfern were widely praised for their efforts during this time; nursing staff in particular found their support invaluable.

391. Ms Howat recalled further changes implemented in 2019. Letters were issued to day care families so that they were not so reliant on contact with the ward for updates. A GGC controlled Facebook group was established in September 2019 to enable a wider, more efficient, reach of information.

(ii) Evaluation of communication: its effectiveness

392. It is obviously not to be overlooked that, in November 2019, the Scottish Ministers intervened with the appointment first of Professor Craig White and

[456] See, for example, witness statement of Dr Shahzya Chaudhury, para.166.
[457] Evidence of Emma Sommerville, transcript, p.89.
[458] Evidence of Emma Sommerville, transcript, p.85.
[459] Evidence of Emma Sommerville, transcript, p.87.
[460] Evidence of James Redfern, transcript, p.19.
[461] Evidence of James Redfern, transcript, p.15.

then of an Oversight Board tasked with reviewing GGC's communication practices. No doubt the reflections of Professor White, and clarification of exactly what role the Scottish Government played in the process of communication in 2018/2019, will be important further investigations for the Inquiry. In the meantime, as regards the evidence presented in Glasgow 2, the discussion will focus on three things: timing, content and the approach to communication with the media.

Timing of updates and briefings

393. Updates to staff and families depended on the IMT's approved communications[462]. The evidence indicated that delay in communication following IMTs could arise pending receipt of approval from whichever senior levels of management might be involved. Delays ranged from a few hours after IMT meetings to over two weeks on one occasion[463].

394. It was suggested that even short delays caused anxiety[464]. Families were aware that nurses and consultants were attending IMT meetings. They knew IMT meetings indicated concern about infections. Understandably, they were anxious to receive updates as soon as IMT meetings concluded. When families were told that an official communication was awaited, and that they could be told nothing in the interim, some became concerned that there might be "*something else going on*".[465] Delays permitted social media to run ahead of the approved update[466].

395. The anxiety bred by a longer period of delay is clearly seen in the communication sequence relating to the cladding works[467]. It took close to three weeks for a written briefing to families to be approved. In the interim, alternative entrance arrangements were implemented and the prescription of prophylaxis commenced. The clear instruction given to nursing staff on 23

[462] See, for example, the witness statement of Jennifer Rodgers, paras. 371; 381; witness statement of Emma Sommerville; para.126; witness statement of Dr Anna Maria Ewins, para. 219.
[463] Evidence of James Redfern, transcript, p.85; Bundle 5, pp.91-99.
[464] Evidence of Emma Sommerville, transcript, p.87; witness statement of Dr Anna Maria Ewins, paras. 219-220.
[465] Evidence of Emma Sommerville, transcript, p.87.
[466] Witness statement of Sarah-Jane McMillan, para. 286.
[467] Witness statement of James Redfern, paras. 62 to 68.

August 2018 was that communication with families should await approved communication[468]. On 28 August 2018, GGC received a parent complaint about the situation[469]. A briefing to families was not approved until 7 September 2018[470]. In the meantime, it appears that a press release was issued on 27 August 2018[471].

396. A further area of concern about communication (as discussed by families in the Glasgow 1 hearing) arose in relation to the decision to close Wards 2A and 2B. It was acknowledged by Glasgow 2 witnesses that the sequencing of that communication did not proceed as had been planned. The closure of the wards was under discussion at meetings on 14 and 17 September 2018[472]. The formal decision bears to have been made following a "water group" meeting on the morning of 18 September 2018 by senior management and recorded at an IMT meeting at 13:00 that day[473]. It was agreed at that meeting that a statement would be prepared for staff, families and the press outwith the IMT group, led by the corporate communication team with input from others as necessary[474]. Ms Rodgers explained that the intention was to communicate the decision to families before anything was announced to the media. However, the story appeared on the six o'clock news, a short time before the approved written communication was provided to Ms Rodgers[475].

397. Exactly how the media received that information was not known by Glasgow 2 witnesses. The Inquiry has, however, been provided with a media briefing dated 17 September 2018[476] which might be thought a possible culprit.

398. Mr Redfern accepted there was a disconnect between communication with the media on the one hand and that with patients and families on the other. He

[468] Bundle 5, p.96.
[469] Bundle 5, p.97.
[470] Bundle 5, p.101.
[471] Bundle 5, p.100.
[472] IMT minute dated 17 September 2018, Bundle 1, p.169.
[473] Bundle 1, p.178.
[474] Evidence of Jennifer Rodgers, transcript, p.85.
[475] Evidence of Jennifer Rodgers, transcript, p.86.
[476] Bundle 5, p.148.

recalled the impact this had on families and indicated a wish that a proactive face to face approach had been possible[477].

399. There was no obvious strategy for informing day care families of the decision to close Wards 2A and 2B before the planned press release. Ms Rodgers explained that an update would be available to day care patients attending the ward. The information was to be posted on the Involving People Network ("IPN"), a service to which individuals can register to receive NHS updates[478]. A letter dated 25 September 2018 confirmed the arrangements for care on Wards 6A and 4B[479]. However, none of this would have addressed the shock experienced by day care families discovering the closure via the media on 18 and 19 September.

400. The foregoing observations connect to a broader concern raised by patient and family witnesses: that the media was given priority, both in terms of timing and content. Content is discussed below. The present focus is timing. The communication around the cladding replacement appears to be a further example of information reaching the media before it reached patients and families. It might also be noted that the first written briefing to families about a potential issue with the drains is dated 7 June 2018[480]. Proactive and reactive media statements were issued on 4 and 5 June 2018[481].

<u>The content of communications</u>

401. Before considering the evidence relating to the content of communications, a preliminary point should be made. It is recognised that in all spheres of professional life, the content of communication is driven by a number of sometimes competing considerations. It is accepted that communication in the healthcare setting will have its own context-specific considerations. Determination by the Inquiry of what these are, and of how they impact upon

[477] Evidence of James Redfern, transcript, p.104.
[478] Evidence of Jennifer Rodgers, transcript, p.87.
[479] Bundle 5, p.154.
[480] Bundle 5, p.142.
[481] Bundle 5, p.140.

assessment of organisational communication, must await consideration of the matters discussed in the introduction to this chapter.

402. But certain propositions are indisputable or self-evident (and were spoken to be witnesses in both hearings). Foremost of these, according to the evidence, is the requirement to create and maintain trust. Consider, for example, what Dr Murphy said: trust is the "*essential ingredient*" in communication with patients and families[482].

403. Transparency and candour might be thought the bedrock upon which trust sits. Given the importance of transparent and candid communication, it may be necessary in due course to look quite closely at whether less was said than was known, and whether that can be justified by an organisation's state of uncertainty or by a desire on the part of the organisation not to alarm patients[483] or by considerations of patient confidentiality. These questions are for the future. In the meantime, the following observations of the Glasgow 2 evidence relative to the content of communications are offered.

404. A consistent theme in the evidence was that clinicians and nurses wanted more information, both for their own knowledge and so they could relay it to anxious families. Concerns about a lack of information and transparency pepper the IMT minutes[484] and were acknowledged by Mr Redfern[485]. Mr Redfern was certain that the intention of those providing information at ward level was to tell families what they knew. However, he acknowledged that where a lack of information led to an inability to answer questions, families might have perceived that as a lack of transparency[486]. As Dr Ewins indicated, the fact that IPC steps were being taken led families to an assumption that "*there must be proof of a problem. As that was not something we could confirm or deny, it resulted in a lot of uncertainty and speculation*"[487].

[482] Witness statement of Dr Dermot Murphy, paras. 321 to 325.
[483] See, for example, the evidence of Professor Gibson, transcript, p.160.
[484] See, for example, Bundle 1, p.80.
[485] Evidence of James Redfern, transcript, p.34.
[486] Evidence of James Redfern, transcript, p.31.
[487] Witness statement of Dr Anna Maria Ewins, para. 220.

405. Professor Gibson shared the view that clinical and nursing staff would relay what they knew, and that there was no intent by them to conceal information[488], but, in a similar vein to Mr Redfern and Dr Ewins said: "*The trouble is, if you don't know what's going on, you can't tell people what's going on*"[489].

406. Although the IMT's written communications, as a generality, were thought to be a valuable communication aid, some lacked meaningful information[490].

407. Review of some of the briefings issued to patients and families in 2018 might indicate a focus on explaining IPC measures, rather than the reason for those measures. As an example, the briefing dated 13 June 2018[491] provides a reasonably full explanation of the HPV cleaning process. Nowhere does it mention infection concern. It goes on to say that "…*we will also be taking the opportunity to clean ceiling areas and sink drains, which can ordinarily be difficult to acces*s". In fact, drain cleaning was a direct consequence of an hypothesis that drains were implicated in the upsurge in gram-negative infections. This briefing did not fully acknowledge the level of concern about risks posed by the environment[492]. For those without additional information, it may have been unclear that the hypothesis had moved away from risks posed by the water supply to contaminated drains[493], or that there was any concern underlying the cleaning at all.

408. There are further examples where the true extent of concern was thought by some to have been downplayed. Dr Sastry's view was that communication from "*IPC and management*" about what was happening in the ward environment could have been better and that it "…*didn't say exactly what was decided at the IMT meetings. We felt that to some extent the environmental situation was underplayed to patients and parents*"[494]. The rationale for such an approach (if the criticism is justified) is unknown at present.

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[488] Evidence of Professor Brenda Gibson, transcript, p.161.
[489] Evidence of Professor Brenda Gibson, transcript, p.99.
[490] Evidence of Professor Brenda Gibson, transcript, p.103; evidence of Angela Howatt, transcript, p.66.
[491] Bundle 5, p.144.
[492] Evidence of Emma Sommerville, transcript, p.55.
[493] See, for example, the evidence of Emma Sommerville, p.56.
[494] Witness statement of Dr Jairam Sastry, para. 112.

409. Professor Gibson's discomfort at the instruction to describe the use of prophylaxis as "*just a precaution*" has already been considered but might be mentioned again. Caution is needed here: no one has said in evidence that there was a desire by anyone at the IMT to downplay the reasons why additional prophylaxis might be required. But whatever the intention, the evidence of Professor Gibson and of Dr Murphy[495] is that there would have been a risk of that happening had the suggested formulation been followed. Their evidence is a reminder of the need for care around language.

410. The briefing communicating the closure of Wards 2A and 2B was criticised by Glasgow 1 witnesses for what was said to be a positive spin on reality. It begins: "*We appreciate that you have been experiencing disruption whilst we have introduced an enhanced cleaning programme…*"[496]. Although the briefing mentions the existence of biofilm in the drains, it might be thought to create the impression that the closure was to enable cleaning and investigation. It does not acknowledge the occurrence of infections or that the ward was not considered a safe environment in which to treat Schiehallion patients. It might be hard to take issue with Glasgow 1 witnesses who saw shortcomings in this approach.

411. Glasgow 1 witnesses also expressed concern about the messaging around the remediation/replacement/upgrade to the ventilation system on Ward 2A. The GGC media statement dated 6 December 2018[497] refers to drainage works and investigations in Ward 2A before stating, "*Following this work we have decided to upgrade the ventilation system in this area"* and in a quote from Mr Kevin Hill *" …this provided a good opportunity to carry out this upgrading of the system*". The reason for the work required to the ventilation system is considered in chapter 4: issues with the ventilation system were thought, at the time at least, to present a possible risk to paediatric haemato-oncology patients. The media statement post-dated the ventilation SBAR of 11 November 2018 which appears to have identified that risk.

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[495] Evidence of Dr Dermot Murphy transcript, p.23.
[496] Bundle 5, p.149.
[497] Bundle 5, p.157.

412. Mr Redfern recalled being informed that the ventilation system was being modernised. He did not recall being informed that it posed a risk to patients although he accepted that such a risk was indicated by the SBAR. He eventually accepted in light of that risk that the media statement could have been more "*accurate*"[498].

413. Finally, reference might be made to the updates provided to patients and families at the time of the concerns affecting Ward 6A in the summer of 2019. The Inquiry has been provided with an information briefing understood to be dated 9 August 2019[499]. The following points might be made about it. Similar points arise in relation to the media briefings from this time (as discussed below).

- It says that "*Infection rates remain within expected levels for the patients treated on Ward 6A*." Although, to be fair it does then make reference to "*the occurrence of rarer infections*", the reassurance that rates were within expected levels might have risked missing the point that underpinned clinician and IPC concern at the time: that it was because of a clustering of unusual infections (rather than the rate of infection) that they felt that a restriction upon admissions to the ward was required.

- In contrast, the briefing goes on to suggest that it is to "*facilitate further investigations*" that new admissions are being diverted elsewhere.

- The briefing contains this statement: "*At this stage there still remains nothing to link the infections to the ward's infection control practices or the environment*." However, by the time of this briefing, it appears to have been accepted that the 2019 case of Mycobacterium Chelonae was caused by exposure to water within the hospital[500].

[498] Evidence of James Redfern, transcript, p.127.
[499] Bundle 8, p.65.
[500] Bundle 1, p.334 at p.336.

- Accordingly, for further consideration is whether the statements within the briefing can be squared with what was known at the time, and if not what the explanation for and assessment of that may be.

Content of media communication

414. In the Glasgow 1 hearing, a frequent concern expressed by witnesses was that information provided to the media did not always square with the lived experience of patients and families, and that it did not square with patient and family understanding, perception or suspicion of what GGC knew of the true situation on the ground.

415. The Glasgow 2 hearing had the benefit of access to a substantial bundle of communication and other documents relevant to this concern. As discussed in a moment, there do appear to be instances of media communication that were perhaps less aligned with the actual circumstances than they might have been. Whether that has an innocent explanation or was the product of "spin" is a question for another day.

416. In the meantime, attention is drawn to the following aspects of the evidence which might be thought to provide useful examples for consideration. The media statement dated 6 December 2018 discussed above was one example of positive spin offered by patient and family witnesses. Other examples where a question about this might be thought to arise can be seen in the following:

- *Media statement dated 7 July 2015* regarding the discovery of high particle counts in the adult BMT (Ward 4B). This states[501]: "*This issue relates only to the adult hospital. Bone Marrow Transplant services at the Royal Hospital for Children Glasgow are separate and unaffected*". Based on the history of concern outlined at chapter 4, there is at least a question as to whether this statement was wholly accurate standing known concerns about the Ward 2A environment for paediatric BMT patients in 2015.

[501] Bundle 5, p.21.

- *Media statement issued in 2019*[502] regarding infections on Ward 6A which stated: "*At no time have we instructed patients not to drink the tap water*". GGC is understood to accept that this communication was mistaken and that it caused considerable anxiety among families who had been supplied with bottled water since March 2018. The Inquiry understands that, after March 2018, there may have been practical, rather than safety-related, reasons for the use of bottled water[503]. Nevertheless, families with direct knowledge of the events in March 2018 might have perceived this statement as inaccurate. Others may not have appreciated the practical reasons for use of bottled water.

- *Media statement dated 21 June 2019*[504] regarding the Mycobacterium Chelonae infection on Ward 6A. In answer to the question "*Is this bacteria in the water supply to the kids cancer ward?"*, GGC (not really answering the question) said, "*Water filters remain in areas with immune-compromised patients and we are confident these measures continue to be effective*". Dr Sastry questioned the accuracy of that statement[505]. He understood children on Ward 6A to have showered in unfiltered water. Mycobacterium Chelonae had been isolated in water sampling [506].

- The same press release also said, "*This mycobacteria is ubiquitous in the environment generally and no link with the hospital has been established*." There is at least a question as to whether this statement and the one just mentioned can be squared with what was being said in IMTs at the time. On the suggested ubiquitous nature of the infection, the IMT minute of 19 June 2019[507] records a reference to a second a case in one year being "data exceedance", which might be thought to indicate something in the nature of relative rarity rather than ubiquity[508].

[502] Bundle 5, p.346. Date unknown but context indicates that it was issued in around mid-2019.
[503] Relating to the use of water in the ward kitchens on Ward 2A and then Ward 6A.
[504] Bundle 5, p.319.
[505] Supplementary witness statement of Dr Jairam Sastry, para. 26.
[506] IMT minute dated 19 June 2019, Bundle 1, p.321.
[507] Bundle 1, p.320.
[508] Of note perhaps is that the Chair of GGC understood it to be a rare infection: Bundle 6, p.53.

As to hypothesis, the thinking at the time is recorded as being exposure to "*unfiltered water somewhere on site*". By the IMT of 25 June[509], it appears to have been thought that the incubation period for the infection placed the patient in one of the RHC theatres at the material time, where the patient had had their line manipulated. The minutes of both IMTs record the presence of the bacterium in the water.

- *Media statements about Ward 6A summer 2019.* The Inquiry has before it a number of press briefings regarding the situation affecting Ward 6A in the summer of 2019[510]. Similar questions to those arising in relation to the patient briefing of 9 August 2019 discussed above might be thought to arise. As an example, reference might be made to a briefing dated 5 August[511]. It states that Ward 6A is safe; that infection rates are within "*expected levels*"; that there is nothing to link infections to the ward environment; and that "*in light of two rarer infections, we are taking the opportunity to review*" IPC practices, hand hygiene and the ward environment. Nothing is said about the restriction on admission to the ward. The comments made above about the patient briefing from this time fall to be repeated.

- In this context, regard should be had to the evidence of Dr Chaudhury that as at early August 2019 she and colleagues remained concerned that there was a potential problem on the ward or a problem the cause of which had not been identified. Dr Chaudhury referred in particular to a concern about the unusual nature of the infections that were presenting at the time. She was not aware of any evidence at that point that demonstrated there was no link between the infections and the built hospital environment[512]. The evidence of the other clinicians who provided evidence to the Glasgow 2 hearing is consistent with this. Professor Gibson is noted as having recorded their concerns at the IMT

[509] Bundle 1, p.325.
[510] See e.g. Bundle 5, pp.334, 335, 338; and Bundle 8, p.222.
[511] Bundle 5, p.335.
[512] Evidence of Dr Shahzya Chaudhury, transcript, pp.45-47.

of 1 August 2019[513]. When one recalls again that there appears by this stage to have been confirmation of a link between the environment and one patient infection, it can fairly be asked whether the media briefings at the time captured the situation on the ground.

- The *Media statement dated 16 September 2019*[514] gives rise to similar observations. In the context of addressing the continued closure of Ward 6A to new admissions, it stated that infection rates were low and that rates of bloodstream infections were comparable to Great Ormand Street Hospital. Dr Chaudhury explained her concern about the infection rate analysis in September 2019. She felt there was an over-reliance on CLABSI rates rather than the pattern of unusual gram-negative infections[515]. She was not confident that the data had been separated or that it had been demonstrated that gram-negative infections had reduced[516].

417. Finally, two further aspects of media statements might be mentioned. First, some might be thought to contain an apparent internal dissonance. An obvious and express example is the media statement dated 20 August 2018[517] which stated both that the water supply was "*wholesome*" and that an unusual infection had been linked to the water supply. But even where it is not express, dissonance might be detected in repeated assurances that the environment is "*safe*" and that the water is "*wholesome*" in statements that simultaneously reference control measures[518].

418. Second, there are also examples of the media seemingly being provided with more detailed information than patients and families. For example, the briefings issued to families on 7 and 13 June 2018[519] refer to IPC measures but not to the reason for those measures. That might be thought to stand in contrast to

[513] See also the comment of Professor Gibson at the IMT of 1 August 2019, Bundle 1 p.334 at p.337.
[514] Bundle 5, p.368.
[515] See IMT minute dated 19 September 2018, Bundle 1, p.367.
[516] Evidence of Dr Shahzya Chaudhury, transcript p.57.
[517] Bundle 5, p.342.
[518] See, for example, Bundle 5: pp.364; 388; 405.
[519] Bundle 5, pp.142 and 144.

the information given to the media on 4 June 2018[520] which references the presence of bacteria in the drains, the risk posed to immunocompromised patients and a possible connection back to a previous issue with taps.

419. Mr Redfern agreed with the proposition that the impression given by the patient briefing just mentioned was that the drain cleaning was connected to people putting substances down the sinks and that such an impression was quite different from the information given to the media[521].

420. In fairness to Mr Redfern, he emphasised that from his perspective he did not understand there to be any organisational intention to provide one narrative to the media and another to families. He emphasised that he received no instruction to that effect from the IMT[522], and in his discussions with patients and families (and staff) he told them what he knew. Although he could not speak to the communication decisions made by others, Mr Redfern's impression was that the organisation was always transparent[523]. As will be discussed in a moment, it is possible he qualified that statement later in his evidence.

(iii) Evaluation of communication: adherence to standards

Identifying communication standards

421. As touched upon at the outset, the Inquiry requires to go further than assessing effectiveness in its evaluation of communications. Insofar as the examples just discussed provide a basis in due course for finding that communication had been ineffective in some respect, it will be necessary to undertake a further evaluation. In particular, it will be necessary to ask whether there was a failure to meet necessary or appropriate standards.

422. As already discussed, a first step in this evaluative exercise will be identification and analysis of the communication obligations upon the organisations involved in the process of communicating with patients and families. One source of the

[520] Bundle 5, p.139.
[521] Evidence of James Redfern, transcript, p.64.
[522] Evidence of James Redfern, transcript, p.65-70.
[523] Evidence of James Redfern, transcript, p.32.

standards against which the evaluation might be made has already been mentioned: the statutory organisational duty of candour. But the search for standards will likely have to go further than that.

423. It is to be recalled that the focus in Term 8 is upon patient rights (rather than organisational obligations). This may immediately take the inquiry beyond a narrow focus upon the 2016 Act. In particular, it may be necessary to have in mind the various rights of autonomy as well as communication rights guaranteed to patients as regards being informed about and participating in matters bearing on treatment. To repeat, this does not mean that the Inquiry is concerned with assessing communications between clinicians and their patients. Rather, the investigation is about whether the organisations in question supported and enabled those communications to the extent to which patients are entitled.

424. But it was also pointed out above that it may be appropriate to see communication to patients as taking place within a framework of health board and national policy, and to see it as just one facet of the processes of information exchange. This may mean that the communication questions for the Inquiry are not confined to identifying and then making assessments relative to legal rights and obligations[524]. A broader evaluation, one that involves consideration of the hallmarks of open and efficient communication, and the values required to drive that, appears to be mandated by the Terms of Reference[525].

425. This will involve asking questions about organisational culture: in particular, what are the defining features of an organisational culture in which priority is given to open and effective communication; was that organisational culture present within the organisations with which the Inquiry is concerned?

<u>Infection and the duty of candour</u>

[524] Remembering also that it is not for the Inquiry to determine questions of legal liability: s.2 of the Inquiries Act 2005.
[525] Term 4, for example.

426. An important question about the organisational duty of candour arises in the context of infections possibly connected to the hospital environment: at what point is the duty engaged? In particular, is the duty engaged at the point at which an hypothesis is suspected or is it only engaged upon confirmation of the hypothesis to a level of scientific certainty?

427. Mr Redfern considered that the obligation to have (what for convenience will be referred to as) a duty of candour conversation was engaged at the point at which an hypothesis is accepted by an IMT[526]. He said that the family of a patient with an infection should be made fully aware of the circumstances of the infection and the likely cause. In addition, other families who might be affected by the situation should be made aware of the risk and "*what is happening*" generally[527]. Mr Redfern agreed with the proposition that the duty is to be candid about unintended or unexpected incidents which result in or could result in harm or additional treatment.

428. It is not known what guidance is available for GGC staff on this matter, and that is something that might usefully be explored. That matter as well as the question of what is required in terms of the 2016 Act remains to be considered. But putting all of that to one side, it is not difficult to see that working to a threshold that says the duty of candour is engaged at the point of there being a working hypothesis may be more likely to engender and capture the spirit of transparency and candour than working to a higher threshold that depends upon proof to a level of scientific certainty. Again, however, that is a question for another day. The following instances of communication about infections may be of interest in answering it, and some of them at least may give rise to further questions about whether communication was sufficiently candid in the circumstances.

<u>Candour and infection: discussion of evidence</u>

[526] Evidence of James Redfern, transcript, p.95.
[527] Evidence of James Redfern, transcript, p.94.

429. It may be instructive to look at the way that IMT minutes suggest that GGC has approached the question of when there requires to be a duty of candour conversation.

430. An IMT meeting took place on 13 September 2018[528]. There were understood by this point to be/have been some 22 cases of gram-negative infections associated with the issues on Wards 2A/B. Dr Inkster appears to have said (and no disagreement is recorded) that duty of candour discussions were required with some of the families involved[529]. Parents who gave evidence at the Glasgow 1 hearing recalled meetings around this time at which there was discussion of the possibility that their children had suffered infections caused by the hospital environment[530]. The IMT minute records, without specification, that typing results were not available for some patients.

431. Plainly, there is a limit to how far one can presently go with this evidence. But the question arises: does this indicate an approach not dissimilar to that discussed by Mr Redfern; does it indicate that the IMT considered that the duty of candour discussion should not have to await an answer to the question of whether a link was proved to a level of scientific certainty?

432. Duty of candour is next mentioned in an IMT minute of 2 November 2018[531]. The meeting appears to have agreed that no duty of candour discussion was mandated at that point in relation to one group of patient parents. Again, there is a limit to how far one can go at this point, but it may be that there was an absence of underlying hypothesis at this point together with an absence of evidence linking some of the cases to each other.

433. Duty of candour is next discussed in IMT minutes in the context of cases that are the subject of a restriction order. Accordingly, no more is said in this closing statement about that.

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[528] Bundle 1, p.160.
[529] Bundle 1, p.162.
[530] See the evidence of Cameron Gough, transcript, p.130; and Denise Gallagher, transcript, p.69.
[531] Bundle 1, p.216, at p.218.

434. Finally, mention should be made of discussions around duty of candour prompted by the occurrence in 2019 of a second case of Mycobacterium Chelonae among the Schiehallion Unit cohort of patients.

435. The Inquiry has the benefit of evidence in relation to GGC's handling of discussions with the family of the 2019 patient case and of its handling of the discussions with the family of the patient who contracted the infection in 2018. It is possible to make comparisons between the approaches taken in each case, and to see differences.

436. In this situation, it may be that it would be appropriate to use this evidence to frame a case study on duty of candour and infection. That is obviously a matter for the Inquiry to determine in due course. In the meantime, and for such assistance as it may be, the evidence might be summarised as follows.

Mycobacterium Chelonae and the organisational duty of candour

437. During the Glasgow 1 hearing, Professor Cuddihy said that he understood an instruction to have been issued by senior management that he and his family should be told something less than the truth about a very rare infection contracted by his daughter[532] in 2018. This was compounded, he said, by what he believed to be an inaccurate record of events and less than full investigation.

438. It must be acknowledged that the Inquiry may not yet have all of the documentation bearing on what are potentially serious allegations. It must also be acknowledged too that the Inquiry has not heard from all of the witnesses who may be involved in these events, particularly those at the most senior level of the organisation. Keeping these notes of caution in mind, the presently available evidence might be thought to indicate the following events.

- In May 2018, whilst a patient on Ward 2A, Professor Cuddihy's daughter contracted an extremely rare[533] Mycobacterium Chelonae infection, confirmed by blood cultures in June 2018. (The IMT from the time

[532] Closing Statement by Counsel to the Inquiry dated 3 December 2021, para. 242.
[533] Cf. the discussion within the IMT minute of 25 June 2019, Bundle 1, p.325 at p.326.

indicates that an adult patient who, though based in the Beatson, may have visited the QEUH also had "the same atypical mycobacteria"[534]. The CNR appears to indicate that three paediatric patients experienced this infection – unless the intention is to indicate that a single patient had it more than once[535].)

- Dr Sastry believed Ms Cuddihy's infection to have come from the hospital environment. He asked for the water on Ward 2A to be tested but was told it was not standard practice to test for Mycobacterium Chelonae. A request to test the water at the patient's home was similarly not taken forward[536].

- The Cuddihy family continued to press GGC management for answers about the source of the infection. At some point, Mr Redfern agreed to become the single point of contact on this for Professor Cuddihy[537]. Later in 2018, Professor Cuddihy told Mr Redfern that he harboured concerns that there remained the possibility of further cases of Mycobacterium Chelonae.

- Professor Cuddihy understood water testing on Ward 2A in April 2019 to have revealed the presence of Mycobacterium Chelonae including in the room in which his daughter had been present during 2018.

- In May 2019, blood cultures revealed a further Mycobacterium Chelonae infection in the same patient cohort (due to the incubation period, the infection was thought to have been contracted some weeks earlier).

- At an IMT on 19 June 2019[538], it was recorded that in light of the discovery of a second infection a review of the 2018 infection had been carried out[539]. It was agreed that the parents of the 2019 patient would be spoken to by the patient's consultant, Professor Gibson, on her return

[534] Bundle 1, p.128.
[535] CNR, p.69; Bundle 6; p.1044.
[536] Witness statement of Dr Jairam Sastry, paras. 207-211.
[537] Evidence of James Redfern, p.155.
[538] Bundle 1, p.320.
[539] Evidence of James Redfern, transcript, p.162.

from leave the following week. The IMT minute expressly referred to "Duty of Candour". The IMT was moving towards the view that a duty of candour discussion was required with the Cuddihy family[540].

- An email exchange following the IMT on 19 June 2019[541], indicates that the possibility of communication with Professor Cuddihy was escalated to the corporate communications team, Kevin Hill (then Director of the Woman and Children's Service), Jane Grant, (the Chief Executive) and Jonathan Best (the Chief Operating Officer). Mr Redfern indicated that the escalation of an individual infection case to senior members of the organisation was unusual[542].

- At an IMT meeting on 25 June 2019, the two Mycobacterium Chelonae infections were discussed[543]. Water testing in Ward 6A had revealed the presence of Mycobacterium Chelonae. The IMT minute appears to indicate an hypothesis for both patients of contact with unfiltered water[544]. It was agreed that the Cuddihy family would be informed and that Mr Redfern would be the nominated point of contact, albeit there was to be consideration of the communication "*process*". Dr Sastry understood there to be an agreement to phone the parents that day[545].

- An email exchange following the IMT on 25 June 2019[546] confirmed that the clinical team or senior management were to speak to the families of both affected patients the next day (26 June 2019).

- On 26 June 2019, the planned meeting took place with the family of the 2019 patient. The family were advised of the nature of the infection, its rarity and of the need to investigate treatment options. The evidence of the patient's mother indicated that discussion of possible cause took

[540] Evidence of James Redfern, transcript, p.164.
[541] Bundle 8, pp.67 – 69.
[542] Evidence of James Redfern, transcript, p.167.
[543] Bundle 1, p.325.
[544] Evidence of James Redfern, transcript, p.170.
[545] Witness statement of Dr Jairam Sastry, para. 217.
[546] Bundle 8, p.73.

place at a further meeting, as discussed below and in accordance with what appeared to be agreed at the IMT.

- In an email dated 26 June 2019 [18:02][547] to Mr Hill, Mr Redfern emphasised the need to contact the Cuddihy family urgently. He believed there to be a risk in allowing a delay between communication with the family of the 2019 patient and the Cuddihy family[548].

- Mr Redfern was instructed by a member of the senior management team (Mr Hill) not to speak to Professor Cuddihy. Mr Redfern departed on annual leave with the understanding that communication with the Cuddihy family was being "*managed through another route*"[549].

- At an IMT meeting on 3 July 2018[550], an hypothesis was recorded as follows (**emphasis** added): "M*. chelonae* ***cases:*** *the group is working on the assumption that it is due to* ***patients****/staff having access to unfiltered water throughout the hospital*." On Mr Redfern's understanding of the threshold for engagement of the organisational duty of candour discussed above, that point had now been reached.

- Under the heading "Duty of Candour", the minute recorded an agreement that Professor Gibson was to speak with the parents of the 2019 patient. Under the same heading, the minute said this in relation to the 2018 patient: "*The Chairman of NHS GG&C is in communication with the father of the first case*."

- Although not clear on dates, evidence from the 2019 patient's mother indicates that there was indeed a second conversation with Professor Gibson around this time in which it was said that the infection was understood to have come from the operating theatres within the RHC.

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[547] Bundle 8, p.80 at p.81.
[548] Evidence of James Redfern, transcript, p.178.
[549] Witness statement of James Redfern, para.161.
[550] IMT minute dated 3 July 2019, Bundle 1, p.330.

- There is no record or other evidence of an equivalent discussion with the Cuddihy family.

- On 4 July 2019, the Chairman of GGC wrote to Professor Cuddihy. The letter discussed his daughter's case. Although the letter expressed regret that Ms Cuddihy had contracted an infection, and also apologised for this, no explanation for the infection – or for the apology – was provided.

- Coincidentally, around this time, Dr Sastry met Mrs Cuddihy and her daughter at an appointment and informed them that Mycobacterium Chelonae had been found in the hospital water supply[551]. They were unaware of this development. On learning this, Professor Cuddihy resolved to allow GGC a reasonable time to make contact with him.

- On his return to business, Mr Redfern asked Mr Hill whether contact had been made with the Cuddihy family. He recalled being informed that the matter was "*sorted*", that it had been "*dealt with corporately*". More specifically, he recalled being told that there had been communication "*exchanged with Professor Cuddihy, and that [an] explanation had been given, and the action of the IMT was concluded*"[552].

- On 17 July 2019, subsequent to the reassurance provided by Mr Hill, Mr Redfern received an email from Professor Cuddihy expressing his anger at the failure of hospital management to contact his family[553] .

- By email dated 25 July 2019[554], Mr Redfern provided Professor Cuddihy with an explanation for the failure to contact him.

- On 8 August 2019 a meeting took place among Professor Cuddihy, Mr Redfern and Dr Inkster. Professor Cuddihy's account of events is contained in his witness statement. It was at this meeting that he formed

[551] Witness statement of Dr Jairam Sastry, para. 218.
[552] Evidence of James Redfern, transcript at pp.194, 198 and 197.
[553] See correspondence at Bundle 6, pp.53 – 69.
[554] Bundle 6, p.58.

an understanding that an instruction had been given by senior management to Mr Redfern and Dr Inkster to withhold information from him.

439. Mr Redfern's clear view was that the organisational duty of candour required communication with the Cuddihy family[555]. Fairly, Mr Redfern indicated that he could not say what happened while he was absent from business; he took Mr Hill's reassurance that the matter had been resolved at face value. On receiving the email from Professor Cuddihy, Mr Redfern contacted Mr Hill to express disappointment at the unfair situation in which he had been placed[556]. He recalled receiving no explanation from Mr Hill[557]. Mr Redfern was unable to assist the Inquiry in understanding (i) the basis on which he was given an assurance that the Cuddihy family would be contacted, (ii) why the Cuddihy family was not contacted following the IMTs on 26 June or 3 July 2019, or (iii) the basis for the reassurance given to him that the matter had been resolved.

440. In responding to Professor Cuddihy's email, Mr Redfern provided reasons for the failure to make contact: holiday absence, that GGC was awaiting typing results, patient confidentiality relating to the 2019 patient and a desire not to cut across communication with the Chairman[558]. In his evidence, Mr Redfern explained that those reasons came from his investigations with senior colleagues. He acknowledged that it was difficult to square the reasons with the decision taken at the IMT: duty of candour required a discussion with the Cuddihy family. At the time that decision was taken, it was not contraindicated by the need to wait for typing results or by patient confidentiality considerations. The only reference back to the discussion at the IMT was the reference to communication with the Chairman[559].

441. Mr Redfern described his recollection of the meeting on 8 August 2019. Whilst Mr Redfern was explaining the reasons for the delay, Dr Inkster informed Professor Cuddihy that they (she and Mr Redfern) had been instructed not to

[555] Evidence of James Redfern, transcript, p.175.
[556] Evidence of James Redfern, transcript, p.194.
[557] Evidence of James Redfern, transcript, p.195.
[558] Bundle 6, p.59.
[559] Evidence of James Redfern, para. 204.

speak to Professor Cuddihy. Professor Cuddihy ended the meeting and indicated that he would escalate his concerns to senior management[560].

442. Professor Cuddihy also criticised the investigation which followed these events. Mr Redfern had no detailed knowledge of that investigation, and the Inquiry itself has only a limited amount of material. The Inquiry does have before it a letter dated 27 September 2019[561] from the Chief Executive to Professor Cuddihy in which an apology is offered for a lack of clarity and an explanation provided for GGC's approach to communication around the incident.

443. Acknowledging that evidence has not yet been heard from the author of the letter, some observations might be made of the proffered explanation. It repeats two of the four reasons given in Mr Redfern's email date 25 July 2019 (typing and confidentiality). But it omits the explanation given about cutting across communication with the Chairman. Why that should be so is not presently clear. Overall, the explanations offered in the letter do not sit easily with Mr Redfern's evidence about the decision taken at the IMT that duty of candour required communication with the Cuddihy family.

444. At the conclusion of his evidence on this issue, Mr Redfern volunteered that his expectation was, based on experience of the organisation, that GGC would act transparently. On being asked to confirm whether he would characterise the events just described as transparent, he said that was not what he was trying to say; he was trying to make the point that the IMT process "*should*" be transparent[562]. He then said the question of whether or not the communications with Professor Cuddihy's family could be described as transparent was "*open to interpretation"*.[563] Eventually, on being asked again if the process of communication just discussed could be described as transparent, he said "*I think that the communication could have been better, yeah*."[564]

[560] Evidence of James Redfern, transcript, p.206.
[561] Bundle 6, p.75.
[562] Evidence of James Redfern, p.212.
[563] Evidence of James Redfern, transcript, p.212.
[564] Evidence of James Redfern, p.213.

445. In the Glasgow 1 Closing Statement, some prominence was given to the allegations made by Professor Cuddihy. The Closing Statement said that the request for answers appeared to be justified. Although Mr Redfern's evidence advanced the understanding of what took place a little, there remain a number of questions to be explored with other witnesses.

Gram-negative infections in 2019

446. The discussions in the summer of 2019 about cases of Mycobacterium Chelonae might usefully be compared with discussions around the same time in relation to a perceived issue with gram-negative infections on Ward 6A.

447. The IMT minute of 19 June 2019 records a decision not to tell patients and families of the concern surrounding gram-negative infections on Ward 6A because there was (**emphasis** added) "…***no conclusive evidence*** *that it is due to healthcare environment*"[565] . One has to be careful about placing too much emphasis on the words of an IMT minute. But the question does at least potentially arise as to whether this indicates a threshold for engaging the duty of candour that is higher than the one indicated by Mr Redfern in his evidence.

448. As against this, if reference is made to the IMT of 25 June 2019[566] and those following[567], it is possible that the view taken by the IMT was that there was no requirement to suggest a cause for infections to parents at this point because the IMT remained uncertain about this. Therefore, parents were to be told that their child had an infection that required treatment but not that there was any theory that the drains might be implicated.

449. By the time of the IMT on 1 August 2019[568], the hypothesis for the gram-negative infections remained unexplained. If, as seems to be the case, the IMT minute records that there would be no duty of candour discussion with parents, that may accord with the threshold Mr Redfern described. It may be worth

[565] See, for example, Bundle 1, pp.323 & p.328.
[566] See IMT 25 June 2019, Bundle 2, p.325 at p.328.
[567] Bundle 1, p.330 et seq.
[568] Bundle 1, p.334, at pp.336 & 337.

investigating the nature of the duty of candour meeting that was to happen on the following day.

Duty of candour: a need to communicate with patients other than those with the infection?

450. As mentioned already, Mr Redfern appeared to say that, where an IMT is working to an hypothesis that a patient may have contracted an infection from the hospital environment, it may be necessary to provide information to some extent about that to other patients and families who could be potentially affected (or even worried?) by this.

451. Whether, in appropriate circumstances, there would be a requirement to take this step as an aspect of the statutory duty of candour is not the present concern of this discussion. But to repeat something said above, it is not hard to see that the approach suggested by Mr Redfern is likely to accord more closely with principles of candour and transparency – and is likely to better support communication and autonomy rights – than not taking this step.

452. Events in January 2019 may provide an additional backdrop for developing this analysis in due course. At that time, there was an apparent delay in providing information to patients and families on Ward 6A about certain rare infections. On 8 January 2019, Professor Gibson escalated to senior management her concerns about, among other things, what ought to be communicated to patients and families[569]. Despite her efforts, on the face of the present evidence, it was only after families approached the Scottish Ministers that a written briefing was produced on 13 January 2019[570].

453. On 11 February 2019, the Chief Nursing Officer wrote to health boards reminding them of the requirements for communication with patients and families in the event of an infection incident, including a requirement to: "*Communicate with all other patients and where appropriate families who may be affected or concerned e.g. those in the same ward/unit as patient(s)*

[569] Bundle 6, p.43.
[570] Bundle 5, p.172.

affected"[571]. It is not yet known if the CNO letter was prompted by events within GGC. Her view appears to align with that of Mr Redfern.

Other events that might engage questions around information sharing

454. It was suggested by Professor Cuddihy in his evidence that the DMA Report of 2015 highlighted serious concerns and made important recommendations about the safety of the water system. On the face of the report, and noting what others such as HFS have said, it would be difficult to disagree with that assessment.

455. If it be the case that, at some point after commencement of the events in March 2018, GGC senior management discovered the existence of the report and learned that the recommendations made by DMA had not been actioned, that is likely to have been a matter of some concern. It might give rise to a question about the extent to which clinicians and patients and families were properly informed about the risks posed by the environment in which patients were being cared for. A similar point could be made about knowledge of the extent of the risks posed by the Ward 2A ventilation system. Whether this bears on the duty of candour in the legal sense or says more about information sharing and culture are again questions for another day.

Questions for CPs

456. Although as indicated, certain further investigations are required in order to complete the Term 8 communication questions, a considerable amount of evidence has now been heard on the subject at both the Glasgow 1 and 2 hearings. Where Core Participants have an involvement or interest in the matters discussed in the present chapter, they are invited to confirm their respective positions on the communication evidence heard thus far. Without being prescriptive, it might be useful if they had regard to the following specific questions (where they are able to do so):

Organisational responsibility

[571] Bundle 6, p.44.

(1) *Which organisations had responsibility for directing or had input into communications during the periods covered in the above narrative?*

As regards practicalities

(2) *Is it accepted that the practical arrangements for communication were as described?*

(3) *To what extent did those practical arrangements operate successfully?*

(4) *Is it accepted that the practical arrangements for communication were to any extent sub-optimal? If not, why not?*

(5) *Is it accepted that changes were made between 2018 and 2019 to improve the arrangements for communication; what were they and to what extent were they effective?*

(6) *What are the current practical arrangements for communication should an event of a similar nature reoccur?*

(7) *What more is needed to complete the investigation into the arrangements for communication?*

As regards effectiveness

(8) *What comments do CPs have to make on the discussion on the effectiveness of communications as regards: timing of communication; content of communication; and media briefing?*

(9) *Are the criticisms made by witnesses justified?*

(10) *What more is required to complete an evaluation of the effectiveness of communication?*

As regards standards of communication

(11) What ought the hallmarks of good communication in the healthcare setting to be?

(12) What is the threshold for communication about the cause of an infection?

(13) Was there a duty of candour conversation / communication with the Cuddihy family until prompted by Professor Cuddihy's email to Mr Redfern; was it intended that there should be one; who had responsibility for that; what is the explanation for that not happening?

CHAPTER 7: The present-day Schiehallion Unit

457. Wards 2A and 2B reopened in March 2022, three and a half years after they closed in September 2018. Detailed evidence about the nature of the works done, the rationale for those works and the current safety of the wards will be heard at a future hearing; investigations into those matters are ongoing. What follows is the understanding of Glasgow 2 witnesses about the works. The evidence of Melanie Hutton is of particular assistance on these matters. Ms Hutton was on the project board for the refurbishment project and is now the General Manager for the RHC.

458. There was clear evidence that, in September 2018, witnesses understood the closure of the wards would be for a relatively short period. For a number of reasons, the closure was extended. The scope of the works required to the ventilation system expanded to a complete replacement[572]. The works extended beyond replacement of the ventilation system to a complete rebuild of Ward 2A and a partial rebuild of Ward 2B[573]. The project was hit by delays caused by the Covid-19 pandemic and contractor-related issues[574].

459. Ms Hutton provided an overview of the works carried out on Ward 2A, aside from replacement of the ventilation system[575]. There was a known issue with the floors of the en-suite shower rooms. The floors had to be drilled out and

[572] Witness statement of Melanie Hutton, para. 227; transcript, p.59.
[573] Witness statement of Melanie Hutton, para. 126; transcript, p.62.
[574] Evidence of Melanie Hutton, transcript, p.66.
[575] Evidence of Melanie Hutton, transcript, p.62.

replaced. During the project, it was discovered that the walls had to be stripped back.

460. Given the extent of the works, an opportunity was taken to redesign Ward 2A. Lessons had been learned from the previous design[576]. Improved provision was made for the pharmacy team. Using fundraising from two young patients, a "Tween" room was introduced (described by Ms Hutton as having been a "*massive success*"). Additional storage was created. The number of plug points in rooms was increased due to an identified shortage.

461. The project was massive; a huge piece of work[577]. The impact on the RHC was hospital-wide. Access required to the fourth floor meant closing off a large area of third floor. The works to the en-suite floors were very noisy and affected Wards 1A and 1B in particular. Where possible, steps were taken to minimise the impacts, including scheduling works for weekends, purchasing noise cancelling headphones for patients and working creatively with the play team to minimise the impact on young patients. Scaffolding erected in the RHC main atrium impacted the flow of patients into clinics and outpatient areas.

462. Witnesses had a consistent understanding that the new ventilation system is to an extremely high specification. Ward 2A now has an airlock door system to the rest of the hospital[578]. It was understood to have positive pressure and HEPA filtration. HEPA filtration has also been introduced to Ward 2B[579].

463. Ms Hutton recalled that assurance was provided by an independent inspection of the ventilation system during the project, although she did not recall seeing the report itself. [580] There is now what Ms Hutton described as a very good programme of maintenance of the ventilation system including ceiling vent cleaning and HPV cleaning. Although the HPV cleaning process is improved from that introduced in 2018, this maintenance programme still requires patients to be decanted from their rooms[581].

[576] Evidence of Melanie Hutton, transcript, p.63.
[577] Evidence of Melanie Hutton, transcript, p.64.
[578] Evidence of Angela Howatt, transcript, p.60.
[579] Evidence of Angela Howatt, transcript, p.59.
[580] Evidence of Melanie Hutton, transcript, p.70.
[581] Evidence of Melanie Hutton, transcript, p.71.

464. Ms Hutton explained that prior to the move back to the RHC, the water supply was subjected to a rigorous sampling process. Routine sampling is ongoing[582]. Ms Hutton was not aware of a similar sampling process in 2018[583]. The evidence of other witnesses, including Mr Redfern, was that point of use filters remain on taps in Ward 2A. He described this as an added precaution, but one which still prompts questions from parents[584].

465. A number of witnesses identified that infection control measures are ongoing: HPV and drain cleaning; point of use of filters; water sampling; and IPC audits. When asked, witnesses had a vague understanding that these were likely additional precautions but some could not recall being provided with a clear explanation for their continuing use[585].

466. Nevertheless, the unanimous understanding of witnesses was that the Schiehallion Unit is now a safe environment for patients. They have one of the best ventilation systems that money can buy, the post-filter water is free from bacteria and a huge amount of money has been spent on the refurbishment[586]. The Unit is JACIE accredited[587]. It was described as one of the best units in the UK or even Europe[588].

Conclusion

467. The evidence just referred to in Chapter 7 presents the prospect of this closing statement ending on a hopeful note. Nowhere is that hope better expressed than in the conclusion to Professor Gibson's witness statement:

"As difficult and as unbearable as the last 3 and a half years have been, as a multidisciplinary team, we all recognise that we are privileged to look after this group of children and engage with their families at the worst time in their lives. I chose the name Schiehallion for our Unit to symbolise the uphill struggle that

[582] Evidence of Melanie Hutton, transcript, p.71; p.74.
[583] Evidence of Melanie Hutton, transcript, p.71; p.74.
[584] Evidence of James Redfern, transcript p.49.
[585] Evidence of Angela Howatt, p.61.
[586] Evidence of Professor Brenda Gibson, transcript, p.192.
[587] Evidence of Professor Brenda Gibson, transcript, p.60.
[588] Evidence of Melanie Hutton, transcript, p.69.

these families face. We are now back in our refurbished Unit and this summer will climb our mountain as we did in other years before this problem. Those who can walk up the steep but broad path will do so with staff, family and friends and those who can't will spend the day in the field at the bottom catching tadpoles in the stream, having their faces painted, having a massage, or toasting marshmallow on a bonfire because this is what we are about."

468. The cancer journey is a daunting one, especially for a young person, and it would be hard to think of a better encapsulation of how that challenge might be faced than in the words of Professor Gibson. In what has been seen of, and learned about, the multi-disciplinary team within the Schiehallion Unit, it is not difficult to see where the vital – and justifiable – belief that the difficult climb can be completed successfully might come from. This Inquiry is about issues unconnected to the provision of clinical care that may have risked undermining that belief.

469. Whilst Professor Gibson said she has no reason to doubt the safety of the new Schiehallion Unit, based on its extensive refurbishment, she is concerned that even now, families will be worried that infections are being caused by the built environment. There is no suggestion in the evidence before the Inquiry that that is happening. But as Professor Gibson indicated, you cannot tell someone not to worry about a problem if you do not know what the problem was in the first place. Reassurance that a risk has been addressed might count for little if the risk has not been explained. It is to be hoped that in her words Professor Gibson has again described a route that might be followed.

470. Concerns about the built environment of the QEUH and RHC are longstanding. The escalation of those concerns by clinical and IPC professionals to those with responsibility for providing a safe environment is a seam running through that history. It is to be hoped that the Inquiry will find a means of addressing these concerns and answering the questions that have been raised. The path to finding that route will be marked by the qualities referred to throughout this closing statement: transparency, openness, candour and accountability. That is where trust will be found.

The Closing Statement

of

Alastair Duncan KC

Victoria Arnott, advocate

21 July 2023

APPENDIX 1: LIST OF WITNESSES

Name	Role	Oral evidence / statement only
Professor Brenda Gibson	Consultant Paediatric Haematologist, GGC	Oral evidence and statement
Dr Dermot Murphy	Consultant Paediatric Oncologist, GGC	Oral evidence and statement
Dr Shahzya Chaudhury	Consultant Paediatric Haematologist, GGC	Oral evidence and statement
Dr Anna Maria Ewins	Associate Specialist in Paediatric Oncology, GGC	Statement only
Dr Jairam Sastry	Consultant Paediatric Oncologist, GGC	Statement only
Dr Milind Ronghe	Consultant Paediatric Oncologist, GGC	Statement only
Dr Alistair Hart	Consultant Haematologist, GGC	Statement only
Dr Jonathan Coutts	Consultant Neonatologist, GGC	Statement only
Dr Andrew Murray	Executive Medical Director, NHS Forth Valley	Statement only
Emma Sommerville	Senior Charge Nurse, GGC	Oral evidence and statement
Angela Howat	Neuro-oncology Clinical Nurse Specialist (formerly Senior Charge Nurse), GGC	Oral evidence and statement
Sarah-Jane McMillan	Clinical Nurse Educator (formerly Senior Staff Nurse), GGC	Statement only
Kathleen Thomson	Lead Nurse (2018-2020), GGC	Statement only
Gael Rolls	Senior Charge Nurse (2015 - 2019), GGC	Statement only
James Redfern	Director of Women and Children's Services (formerly General Manager for Paediatrics and Neonates)	Oral evidence and statement
Jennifer Rodgers MBE	Deputy Nurse Director for Corporate and Community Services (formerly Chief Nurse for Paediatrics and Neonates), GGC	Oral evidence and statement

Melanie Hutton	General Manager for Paediatrics and Neonates (formerly, Clinical Service Manager and Lead Nurse)	Oral evidence and statement

APPENDIX 2: POST-PATIENT MIGRATION TIMELINE OF INFECTION CONCERNS

(NB some pre-migration events have been included where they are thought to provide important context to concerns)

Date	Event	Comment	Bundle ref.	HOIC/ HOIC response ref.
2014				
April	HPS SBAR: taps	HPS advise that flow straighteners should not be used in high-risk units.	B3.5	HOIC 1.3
June	Meeting: taps	GGC/C&B say that it was agreed that fitting taps without flow straighteners was unnecessary. Measures taken to mitigate against retention of flow straighteners are presently unknown.		GGC §51 C&B NSS Sup. §1.3.4
Dec 2014	Testing	High TVCs; various deficiencies; missing information; no further testing?		HOIC 1.4
2014/ 2015	Ventilation concerns by Lead ICD	C&B say Infectious Diseases Unit not part of the brief.		HOIC 1.2
2015				
April-June	Patient migration		B4.11	HOIC 2.1
29.4.15/ 1.5.15	DMA Report		B6.122	HOIC 1.5 GGC §53 Cuddihy/Mac kay
8.5.15	SBAR: IPCT to BICC	Review of ventilation standards in lobbied single rooms (adult and child) is said to be complete.	B4.10	HOIC 2.2-
3.6.15-	Beginning of email chains about 2A BMT rooms	Disruption to transplanting because of concerns.	B8.127-	
5.6.15	Emails about HEPA filters	HEPA filters are missing from Ward 2A BMT rooms.	B8.125	HOIC 2.2.1

6.6.15	Adult BMT migration to Ward 4B			
June	HEPA filters installed.			
10 June	Paediatric patients move from Yorkhill to RHC	Move of all patients to QEUH campus complete by 14 June 2015.		HOIC 2.1.2
July?	SBAR : 4B	"potentially unsafe accommodation" Safety of water and ventilation "cannot be guaranteed" for immune-compromised patients on 4B.	B4.11	
6.7.15	Email from clinicians to JA re Ward 4B		B5.18	
9.7.15	(new) Lead ICD tenders resignation	Raises concerns about safety of ventilated areas and availability of information for as built water and ventilation systems. Although resignation tendered, Lead ICD continues in post.		HOIC 2.3.1 NSS p1
July 2015	Adult BMT patients return to Beatson.	Adult patients return to Beatson as a result of concern about the safety of Ward 4B. BMT patients do not return to Ward 4B until 2018.		HOIC 2.4
July 2015	PMI issued to Multiplex about Ward 4B	PMI relates to ventilation system requirements.		HOIC 2.5
19.8.15	Email chain about air quality on Ward 2A	More issues about Ward 2A and inability to transplant. Concerns about air quality.	B8.129	
2.9.15	Email about Ward 2A	"We should not have moved until the environment was safe."	B8.132	
4.9.15	BG email to Ward JA	"lost faith… due an explanation…transplant programme has been severely compromised."	B8.133	

7.9.15	Meeting re Ward 2A BMT Unit	Sealing. "testing suggests that the sealed rooms are providing the appropriate level of 10Pa positive pressure".	B6.20	
11-14 Sept	Emails re Ward 2A BMT Unit	Appears to indicate some debate on whether risk from fungal spores/environment.	B6.22-35	
14.9.15	SBAR: RHC BMT Dr Mathers	To determine if BMT viable at RHC.	B4.13	
9.11.15	Letter from Dr Inkster ("TI") and Dr Peters ("CP") to Dr Stewart	Various concerns. Request for an external expert opinion.	B8.121	HOIC 2.11
Nov/ Dec	IMT: NICU Serratia Marcescens ("SM")	One fatality. 13 cases	B1.7-16	HOIC 2.7
24.11.15	SBAR: NICU SM Pseudomonas ("Ps")	Fatal case of Ps. [SG] HAI Policy Unit wanted to know why Ps had not been reported.	B4.16	HOIC 2.10
Dec	SBARs: HPS SM/Ps in NICU	Taps were changed to those in RHC in the unit. An issue with ventilation? Consider use of sterile water and water sampling.	B3.8 & B3.17,19, 22	
18.12.15	SBAR: 1D/PICU Ps	2 x HAI Ps.	B4.18	
24.12.15	IMT: 1D 2x Ps	Water safety checklist. "preliminary feedback… on… commissioning… [is] ok."	B1.20	HOIC 2.10
Dec	SBAR: HPS 4B, SU, Critical Care, 1D	Ventilation requirements for BMT rooms.	B3.36	HOIC 2.9 NSS p2
Dec	PMI 471 issued to Multiplex re Ward 4B	NSS say that PMI contains different requirements from those in the HPS SBAR (and that they were unaware of that difference).		NSS p2

Dec	Upgrade works to 4B			HOIC 2.8.3
Overall? 2015	2 gram-negative infections identified by CNR.	2 gram-negative infections identified by CNR: Klebsiella and Ps. in Ward 2A patients. Infections understood not to have been investigated. GGC say no requirement to investigate Klebsiella.		HOIC 2.12 CNR, bundle 6, pp 1028-1029 GGC §52.
2016				
Early 2016	Cupriavidus ("Cu") infection	**GGC is understood to accept a link between this infection and the hospital environment.**		HOIC 3.4 GGC §45
2.2.16	Board Water Safety Group (BWSG) Ps	Flow straighteners risk discussed. NSS dispute the characterisation of the HPS advice discussed at this meeting.		HOIC 3.5.1 NSS p2
26.4.16	SBAR Timeline on move of ID Unit	Timeline from August 2014. Concern about lobbied rooms. Information on Adult BMT. The Scottish Health Planning Note 04 carve out for ID and immuno-compromised patients. Patient Pathways.	B4.20	
29.4.16	SBAR: NICU SM NICU	18 x SM from July 2015 to Feb 2016. The Unit is merged with PICU in June 2015. Now the same taps as RHC.	B4.26	HOIC 2.6-2.7
May 2016	SBAR: Critical Care Isolation Rooms	Critical Care. Access to Positive Pressure for ID patients. There are no negative pressure rooms in the QEUH.	B4.49	
6.5.16	Letter from Infectious Disease consultants	Raising concerns about ventilation arrangements.	See B4.104	

23.5.16	PAG: Cystic Fibrosis ("CF") patients M. Abscessus		B2.7	
June 2016	SBAR: CF patients	Air changes. Risk of patients with airborne infections. Energy efficiency > ACH. Risk.	B4.52	
16.6.16	PAG: ITU2 Increase in Aspergillus ("Asp")	Associated in time and place with water leak. Incorrectly placed vent. There is to be IMT.	B2.8	
17.6.16	PAG: Cu	Contaminated unit at RHC water supply. There is to be an IMT, but not obvious that an IMT was convened (based on documents disclosed to Inquiry). HIIAT Green. **Believed to relate to Cu infection in early 2016 which GGC accepts is linked to the water supply.**	B2.10	HOIC 3.4 Cf. GGC response: §§32 and 37
June 2016	Acinetobacter baumanii ("AB") x 2 in PICU			HOIC 3.6
June 2016	Klebsiella x 9	8 infections in Ward 2A. No IMT. GGC say no requirement to investigate Klebsiella infections.		HOIC 3.7.1 GGC §52.
4.8.16	PAG: 2A Asp x 2 2A	Numbers are higher than expected. Ventilation ductwork torn.	B2.11	HOIC 3.8
5.8.16	IMT: SU Asp x 2 Ps	Asp acquired in the SU Use of language: +ve/-ve pressure No air sampling	B1.22	HOIC 3.8

		Chilled beams Dust HEPA filtration Immense heat/humidity		
August	Increase in HEPA filtration on 2A.	See reference in IMT at B1.37. Record use of portable HEPA filters in Ward 2A and "increase" to hepafiltration.	B1.37	HOIC 3.9
September	Work to improve specification of Ward 2A BMT rooms.			HOIC 3.10
23.9.16	PAG: PICU Ps	Not considered HAI.	B2.12	
24.9.16	PAG: PICU SM	Some possibly HAI.	B2.13	HOIC 3.11
27.9.16	IMT: PICU SM Ps	Chilled beams.	B1.27	HOIC 3.11
4.10.16	IMT: PICU SM PICU	SM and Ps not found in taps but may be colonised with other GNB.	B1.31	HOIC 3.11
15.11.16	SBAR: IPCT	Roles and responsibilities.	B1.54	
Overall? 2016	26 infections caused by gram-negative bacteraemia in Schiehallion Unit patient cohort.	26 infections caused by 15 different species of organism. The CNR did not understand there to have been investigation of these infections (although one may have been investigated retrospectively in 2017). GGC say no requirement to investigate at least some of these infections.		HOIC 3.12 CNR, bundle 6, pp 1028-1032. GGC §52
2017				
2.2.17	SBAR Critical Care Isolation rooms	Infectious disease clinicians had written to Lead ICD re concerns; absence of negative pressure rooms.	B4.91	

Feb/Mar	PAGs: x 3 PICU/1D/NICU SM	Serratia Marcescens infections in PICU/NICU.	B2.15, 25 & 28	HOIC 4.2, 4.10
3.3.17	PAG:2A and 2B Elizabethkingia	A connection to leaked condensation water is suspected. Water testing instructed.	B2.16	HOIC 4.4, 4.7
3.3.17	PAG: RHC Increase in fungal infections Candida spp	Perceived increase raised by clinicians Concerns by Professor Gibson ("BG") Prophylaxis BMT ventilation	B2.19	
3.3.17	PAG Increase in blood cultures	Increase in +ve blood cultures in paediatric haematology patients. General upwards trend in acute wards. 13 +ve in Jan 11 +ve in Feb HIIAT Green No IMT required	B2.22	HOIC 4.6
6.3.17	AICC meeting	QEUH isolation rooms unsuitable.		HOIC 4.8
7.3.17	IMT: 2A Candida Asp.	Ventilation Prophylaxis HEPA filters	B1.35	HOIC 4.9
9.3.17	SBAR: BMT B8/9 4B	Air sampling guidance. Lack of clarity. Uncertainty about language. 4B contains medical patients with positive pressure turned off.	B4.95	
May	CLABSI QI Group	Aims to reduce rate of line infections.		HOIC 4.12

8.5.17	AICC	Notes work underway to change pressure in Ward 2A isolation rooms.		HOIC 4.13
June	NIPCM change	To include further alert organisms.		HOIC 4.15
19.6.17	IMT: Neuro Institute Enterobacter ("Ent")			
22.6.17	PAG: Neuro Institute Ent		B2.40	
20.7.17	IMT: CF patients M. abscessus	Microbiology / IPC concerned the environment is vector.	B1.43	HOIC 4.17
26.7.17	PAG: 2A Stenotrophomonas ("St")	Ref to QI Group Isolates sent for typing Review of environment HIIAT red Water sampling requested in July; carried out in September? Overall number of St cases unclear. The CNR indicates a total of 6 cases within the SU patient cohort in 2017.	B.2.44	HOIC 4.16 CNR, bundle 6, p1028-1029
July	BICC meeting	Fungal counts in 2A/TCT.		HOIC 4.19
2.8.17	PAG: PICU/1D Ps	Timeline showed an association between 2 cases: same bed.	B2.46	HOIC 4.21
3.8.17	PAG: NICU (?) Staphylococcus 3 x St		B2.49	HOIC 4.16
Sept	DMA Canyon begins work on a further report?			HOIC 4.22
Sept	Cu case 2A	Cf. B2.82: another aseptic pharmacy case but no links were made at the time to the previous case or to the aseptic pharmacy? HPS May report: no environmental or water sampling was done.	B3.87	HOIC 4.23

Sept	Whistleblow	Variety of patient safety issues raised. An SBAR is requested (and is prepared 3.10.17)		HOIC 4.24
Oct	NSS SBAR Adult BMT ventilation arrangements	The proposed solution does not meet the guidance or the 2015 SBAR.	B3.57	
3.10.17	SBAR Infection Control Various locations	Patient placement concerns: Ventilation issues Absence of documentation/risk assessment Air quality 2A High rates of infection 2A Water issues Delays in testing/reporting	B4.104	HOIC 4.25
4.10.17	Meeting to discuss concerns raised in SBAR.			
?	GGC Action plan	Action plan prepared in effort to address concerns raised in SBAR 3.10.17.	Cf. B4.220	HOIC 4.26
9.10.17	BICC meeting	Concern re ventilation.		HOIC 4.28
25.10.17	PAG: PICU Ps		B2.63	HOIC 4.21
27.10.17	PAG: 2A Asp.	Prophylaxis.	B2.66	HOIC 4.29
27.10.17	PAG: 10D Ps	Orthopaedic patients Water checklist	B2.67	HOIC 4.21
27.10.17	PAG: 10D Ps	The Ps was isolated in a wound. Now a third patient. Following wash out of wound. Water checklist HIIAT green	B2.69	HOIC 4.21
30.10.17	SBAR: 2A Fungal disease	Ventilation concerns	B4.113	

		Agreeing with HPS on recommendations No HEPA: risk Prophylaxis		
Nov	Work in 2A AICC	4 rooms are being converted to positive pressure. Considerable expenditure required for the rest.		HOIC 4.31
Nov	Ongoing CLABSI work			HOIC 4.32
3.11.17	IMT: 10D Ps			HOIC 4.21
3.11.17	SBAR Ps		B4.116	
July - Dec	Klebsiella in 2A	Multiple cases between July and December 2017.		HOIC 4.18
Dec	Work by contractors said to be complete?	What work was ongoing?		HOIC 4.33
Overall? 2017	51 gram-negative infections in SU patient cohort.	51 infections identified by CNR. These infections are caused by 27 different species of organism.		HOIC 4.34 CNR, bundle 6, pp1028 - 1032
2018				
22.1.18	PAG: PICU Ps.	Sink drains Water Testing and sampling requested Inspection of environment including water sources	B2.79	HOIC 5.3
Jan	HPS SBAR: 2B (misnamed – should be 2A)	Present situation: 8 PPVL rooms are neutral pressure with +ve lobby. Work ongoing to upgrade. A number of fungal infections that may be [HCAI].	B3.62	HOIC 5.1
31.1.18	DMA Canyon	Work continues on second report by DMA Canyon Ltd.		HOIC 5.2
	Klebsiella x 5			HOIC 5.4

Jan-May	2A			
Feb	Step 2 Whistleblow	Two microbiologist instigate Step 2 Whistleblow procedure.		HOIC 5.5
5.2.18	PAG: Cu	Cu isolated from blood from patient getting IV therapy prepared in the aseptic pharmacy. HIIAT Green.	B2.82	HOIC 5.6-5.7
Feb	SBAR Airborne infections	Concern about PPVL for patients with airborne infection. Discussion on +ve/-ve pressure.	B4.121 (see B4.49)	
Pre-March	Water testing is reactive	Professor Leonard report.	B6.1230	
March	GGC request support of HPS/HFS, SG, PHE and "experts".			HOIC 5.9
2.3.18	IMT: Water contamination Ward 2A Cu	Outlets testing positive for Cu and Ps. Hypothesis: outlets are source + seeding. Flow straighteners are high risk.	B1.54	HOIC 5.8-
6.3.18	IMT: Water Contamination 2A	Multiple samples from 2A +ve for Cu and Ps. Sphingomonas and fungi now isolated on testing. BG and Dr Murphy ("DM") concerned re Asp. Concerns about reporting to/response from senior management/outwith GGC.	B1.56	
9.3.18	IMT: 2A Water Incident	Fungal testing Taps: cost implications Considering changing all the taps in 2A Investigate taps with other HBs.	B1.60	
12.3.18	IMT: 2A Water Incident	Multiple +ve Cu from taps plus 2 x St.	B1.63	

		Potentially lethal organisms; safety concern. Perhaps not water supply but human touch; ok to use showers. HIIAT red		
16.3.18	IMT: 2A Water Incident Ps St 3C	3 additional bacteraemia in 24hrs. Consultant requests full requested full look back at infections in previous years. Hypothesis - outlets due to it being on other wards. Explanation of testing including Cu: usually don't test. Ciprofloxacin to be given. POUFs Comms: Cipro a "precaution"; and Jane Grant to be involved.	B1.66	
18.3.18	Email chain re water incident	There is/is to be an expert opinion from Susanne Lee. Filters are short term solution. Cu uncommon organism.	B5.116-	
19.3.18	IMT: 2A Water Incident 4B	St cases in 2A/PICU. 2 x Cu species identified. Water results. Control measures can be lifted once filters in and getting -ve results. HPS to update SG. Cu discovered in Ward 4B. Discussion of why now in the adult hospital.	B1.70	

20.3.18	Cabinet Secretary (Shona Robison) statement	Statement to Scottish Parliament about water incident.	B6.36	
21.3.18	IMT: Water Incident	HPS algorithm invoked. PHE/HPS helping on epidemiology of Cu and St. History of each of these discussed:- Strong epidemiology link between water and the 3 x Cu cases; and Cases of St have spiked but link unclear. Limitations in sampling. Widespread Cu in 2B and 3C water. Fungal matter in 2B and 3C. TI's plan of the water system. Ciprofloxacin. Tap/shower components are heavily contaminated. Comms: concern around transparency.	B1.75	
23.3.18	IMT Water Incident	No hospital acquired St or Cu attributed to QEUH since start of incident. Dr Kennedy: hypothesis on St cases. Ciprofloxacin. Knock on effects on treatment. Numerous pathogens predominantly found in soil and plant material which is very unusual. Expert view is being sought. Use of filters and straighteners elsewhere.	B1.81	

26.3.18	Stage 3 of National Framework	Support to be provided to GGC by HPS.		HOIC 5.10
27.3.18	IMT Water Incident 2A, 4B 4A, 4D	Evidence of widespread problem in RHC. HPS now going to do lookback on St, Cu and Ps. Ciprofloxacin not required. Hypotheses: back flow, biofilm or contamination during commissioning. Contingency if filters fail. IMT to be disbanded.	B1.86	HOIC 5.12
Mar/Apr	Technical Water Group (TWG) Established			HOIC 5.13
April	DMA Canyon Risk Assessment dated 25 April 2018		B6.417	
9.4.18	PAG Astrovirus 2A	Relevant?	B2.88	
April	HPS: SBAR: Delftia acidovorans Elizabethkingia		B1.66	
13.4.18	A full IMT report	Full report of water incident IMT. Contaminated water supply. Throughout RHC and QEUH. Possible all cases are linked to water. Hypothesis: contamination took place during installation and built-up creating biofilm. Filters are short term measure. Concerns from clinicians on comms.	B8.53	HOIC 5.12.1; 5.15

		Likelihood of recurrence: “high, in a new build hospital.”		
25.4.18	Susanne Lee Draft meeting report	Presence of Cu and other waterborne pathogens may indicate temperature control issue. Data loss on temperature. Risks from flow straighteners (and drains). Problems from the POU filters. Conclusions that can be drawn where environmental strains do not match.	B8.134	HOIC 5.14
?	Advice from Tom Makin	*To confirm whether complete set of documentation held.*		HOIC 5.19
May	TWG maps extent of the contamination	*To confirm whether complete set of documentation held.*		HOIC 5.18
May	BICC, AICC, CCGC said to be aware of the issue	*To confirm whether complete set of documentation held.*		HOIC 5.18
May	TWG plan for decontamination	*To confirm whether complete set of documentation held.*		HOIC 5.21
3.5.18	SBAR: water contamination in QEUH/RHC	Chemical dosing deemed ineffective. Further testing revealed more extensive contamination affecting both hospitals. Water testing reveals bacteria in tanks and risers so contamination is further back than just outlets. A range of bacteria and fungi have been found which pose risk to immunocompromised patients.	B4.124	
18.5.18	PAG: 2A/B Increase in St.	Thought unlikely to be associated with water contamination incident.	B2.97	
18.5.18	PAG: 2A/B Ent.	Increased incidence of Ent.	B2.102	HOIC 5.24
29.5.18	IMT: Ent. on 2A/B	Concern re drains.	B1.91	HOIC 5.25-

31.5.18	HPS Initial Report	Widespread contamination. Continues to be regressional seeding of contamination; numerous organisms.	B3.85	HOIC 5.22
4.6.18	Meeting of clinicians	See below.		
4.6.18	IMT: 2A Water System Incident 2A	Results of drain swabs: various organisms. Another gram -ve infection in patient (collapse at home). BG arranges urgent meeting on 2A and concerns around safety of the unit. Clinicians felt not safe to admit new patients. Agree to reinstate Ciprofloxacin Drains: a site wide problem.	B1.94	
6.6.18	IMT: Water System Incident	Drains. Various bacteraemias. Cipro side effects? Sink design? Ventilation and humidity of rooms. Drain cleaning. To be discussed at water group meeting. Regular sampling to be instigated. (B1.104)	B1.99	
6.6.18	IMT: PICU AB	6 cases in total since 18.2.18. There is predominant strain linked to Oct/Nov 2017. “Suggests issue with environment and also cross transmission by either shared equipment and/or poor hand hygiene.” Water testing -ve. Found on baby bath. 3 sinks removed.	B1.105	

8.6.18	IMT: 2A/B Water System Incident	Clinicians had a meeting; they are not confident GGC has control of environment.	B1.109	HOIC 5.29
11.6.18	IMT**:** 2A/B Water System Incident	Concern about uncertainty in 2A and delay to BMT patients. Sinks, drains. Note that doctors are more reassured.	B1.114	
12.6.18	IMT: 2A/B Water System Incident	TI going to speak to Dr Lee. Showers not draining. Question of what/whether NHSL should be told about issues.	B1.119	
14.6.18	IMT: 2A/B Water System Incident	Concern about cohort of patients in the official numbers in this incident. Discussion of issue with taps/guidance/risk assessment.	B1.123	
15.6.18	IMT: 2A/B Water System Incident	Case definition: gram -ve linked to water or drainage. 17 cases gram-negative infections. Some patients displaying multiple organisms. Two patients with atypical mycobacteria – Mycobacterium Chelone ("MCh"). Prophylaxis to cease.	B1.128	HOIC 5.28
18.6.18	IMT: 2A/B Water System Incident	No patients giving cause for concern. A case doesn't fit the case definition as no contact with 2A/B. Hypothesis now seems to be POUF and splashing. Prophylaxis can stop across the board. HIIAT Amber.	B1.132	

21.6.18	IMT: 2A/B Water System Incident	Hypothesis: drain design? Prophylaxis has been discontinued. HIIAT Green. If any more cases in 2/52, will reconvene. Otherwise back to normal "surveillance of 2 cases that fit the case definition".	B1.136	
22.6.18	Intertek Report	Flow straighteners: significant levels of biofilm contamination…not localised…but affecting all flow straighteners. Debris in raw water tank. Sponges in cold water storage tank for period exceeding 2 years.	B6.632 See: pp.640-641; 642; 644-646	HOIC 5.20
June	HPS SBAR HAI Situation Needs Assessment	HPS set out what they are proposing to do.	B3.68	
June/July	TWG	Remedial steps: *To confirm whether complete set of documentation held.*		HOIC 5.31
3.7.18	IMT: PICU AB	Drain cleaning. Drain and water samples negative. Query about water temperature.	B1.140	
5.7.18	SBAR: by Infection Control Manager	Investigation of increases in rates of infection. Result was higher than normal bacterial counts in the water supply. Reports relating to the commissioning of water have been identified in June 2018.	B4.126	HOIC 5.33
July 2018	TWG	Sampling of flow regulators: *Unless this refers to the Intertek report, details of this are not understood to be held presently by the Inquiry.*		HOIC 5.32

July 2018	Implementation of earlier DMA reporting?	*To confirm whether complete set of documentation held.*		HOIC 5.33
	Water system on risk register	*To confirm whether complete set of documentation held.*		HOIC 5.34
6.7.18	IMT: PICU Increase in AB	Most likely source environment/equipment – hand contact.	B1.140	
20.7.18	PAG: 2A/Asp.	Investigation of ventilation appears to show no issue (although reference to corridor not being HEPA filtered).	B2.105	
8.8.18	SBAR: by Infection Control Manager	The [DMA?] reports were "identified" in June 2018. "The board recognises the paramount importance of patient safety and the need to ensure that the water systems are consistently compliant with all relevant safety standards. It is vital that all recommendations [arising] from the internal and external reviews are fully addressed and implemented with NHSGGC." An internal review of the water system commissioning and maintenance processes has been commissioned.	B4.128	
15.8.18	PAG: NICU Increase in SM		B2.107	
17.8.18	HPS SBAR Summary Update Water Contamination Incident	MB testing of drains isolated Ent. and the IMT agreed a hypothesis that this was caused by splashes from POUF resulting in a number of BSI. Widespread contamination. NSS indicate this was a first draft report of the report published in December 2018.	B3.79	HOIC 5.36 NSS p7.
Aug	TWG results	*To confirm whether complete set of documentation held.*		HOIC 5.37

5.9.18	IMT X3 GNB: 2A	3 cases caused by gram-negative organisms isolated from the drains. Not HAI by the 48hr rule but were healthcare associated. Various organisms on swabbing. Concern re other wards. Thick black grime in drains. Dust. Chilled beams. Water sampling has not been taking place.	B1.149	HOIC 5.39-41
10.9.18	IMT: x3 GNB 2A	IMT convened as a result of further concerns about gram-negative infections. Total cases now 21. Discussion of incidence of infection. HPS: not seeing reduction in GNBs to be expected from new build environment. Concern that no closer to source of current problems.	B1.154	HOIC 5.43
13.9.18	IMT: GNB 2A Critical care Adult hospital	Clarification of previous minute. Typing results in environmental incident are unreliable. Case definition. Staff are very concerned that the unit is not safe. Black material coming up from sink. Water group looking at difference between RHC and QEUH. There are to be duty of candour discussions with affected families.	B1.160	

		Decant discussions (favouring portable decant?).		
14.9.18	IMT: Ward 2A	23 cases Drain survey by external company. Aerosolisation caused by filters. Ventilation being considered. The problem is potentially throughout the hospital. The phases and various decant options.	B1.164	
17.9.18	IMT: Ward 2A	Statement by BG expressing concern. There's another case; is appropriate expert evidence being relied upon? NB: IMT still records 23 cases since March 2018. The CDU. Peter Hoffman on the drain issues. More black gunge in 2B drains. Waiting for drainage expert. The QEUH not better for children re ventilation. Staff taking advice on risk from unions.	B1.169	
17.9.18	Options appraisals	Reference to a separate paper.	B6.38	HOIC5.44-5.47
18.9.18	IMT: Ward 2A	Drains A temperature issue with water in QEUH? The decant: Decision has been taken on BMT to 4B; no final decision on ward for the remainder or the date.	B1.175	

		RHC would not be suitable.		
19.9.18	IMT: Ward 2A	Sink Gaskets Ward 6A has been chosen. Precautions (POUFs etc) in 6A and 4B. Microbiology data showed clear increase in G -ve infection.	B1.180	
20.9.18	IMT: Ward 2A	To be separate meeting re the decant. There is to be a subgroup to pull together all of the reports on epidemiology. The decant plans are with executive colleagues.	B1.185	
25.9.18	IMT: Ward 2A	Plans for the move including drain cleaning. 12th version of patient pathway. Drain survey on 2A/B to follow move.	B1.190	
26.9.18	The decant.			
28.9.18	IMT: Ward 2A	Concerns about 6A – central monitoring.	B1.194	
3.10.18	PAG: NICU Increased incidence of STM.		B2.110	
5.10.18	IMT: Ward 2A	TI/IK: a combined report? Drain investigations. Dosing Decant could be > 4weeks.	B1.199	
10.10.18	PAG: NICU Ps in NICU		B2.112	
11.10.18	IMT: Ward 2A	TI/IK report finished? Tap replacements: no flow straighteners.	B1.204	

		Ventilation report on 2A/B awaited.		
Oct?	Paper by Dr Kennedy: Descriptive analysis of bacteraemia trends	*Is there a separate hospital microbiology and pharmacy report?* (HOIC 5.60)	B6.95	HOIC 5.61
15.10.18	Innovated Designs Report: 2B		B6.656	HOIC 5.49, 5.62
16.10.18	SBAR	Advice on Chlorine Dioxide dosing.	B4.130	
19.10.18	IMT: Ward 2A	Discussion about repainting 2A/2B. Issues with 6A.	B1.208	
24.10.18	Innovated Designs report: 2A	Analysis of 2A: "we anticipate the original accommodation design philosophy was not intended for use by patients with immune response/deficiency."	B6.674	HOIC 5.62
26.10.18	IMT: Ward 2A 2A	Epidemiology report to be issued after Nov 10th once comments received. More on painting 2A. Advice from Dr Lee: reduce no. of sinks. BG concerned about that.	B1.212	
Oct	SBAR HPS Trough sinks	Advice from Dr Lee Ventilation: PPVL converted to +ve pressure isolation rooms.	B3.115	
Oct	TWG	Steps to address contamination. *To confirm whether complete set of documentation held.*		HOIC 5.50
Undated	SBAR [NSS] Pressure Test methodology for +ve pressure protective environment rooms		B3.123	
25.10.18	PAG: theatre 6 RHC Ps	To date Ps has never been isolated in RHC water.	B2.115	

		Unlikely water and ventilation are the source.		
2.11.18	IMT: Theatre 6 RHC	Total cases for 2018: 5 2 of the 5 match Typing outstanding on others. Ps not isolated in the water in the water incident. Sewage smell in Theatre 8.	B1.216	
2.11.18	IMT Ward 2A	Discussion of ventilation and absence of +ve pressure in 2A. No evidence of outbreaks linked to this. Removal of sinks explained: all sinks are connected to the same plumbing system.	B1.223	
12.11.18	SBAR GGC	2A/B ventilation review The ACR is 2.5 and pressure is neutral to negative plus risk from air recycling and bypassing through the WC and thermal wheel potential for cross contamination. There was derogation to meet BREEAM. Recommendation: decant 3-6 months to prepare spec “to meet the requirements of this patient group… [with an overall decant of 12-15 months]”.	B4.132	
13.11.18	IMT: Ward 2A	Epidemiology report now after the 20th. More issues with ventilation 6A decant. Prophylaxis re cladding. SG want SBAR on ventilation.	B1.227	
13.11.18	SBAR GGC Sandra Devine To the Chairman	An increase in environmental organisms.	B4.133	

	Bacteria in the water system	There was risk assessment by SMT in relation to decant. "Members of senior management are fully engaged with [other teams]… in both the management of the situation and the implementation of a robust and permanent solution."		
14.11.18	IMT: Theatre 6 Ps	Sewage smell.	B1.231	
22.11.18	IMT: Ward 2A	A GNB case last week. Rates are low.	B1.237	
30.11.18	IMT: Ward 2A	Unclear update on TI/Kennedy report. Marked reduction in bacteraemias post-decant fitting with the hypothesis. No submission date for HPS report(s). Dosing started. Concerns re sinks. Parents concerns re sign-off of hospital. Clarity to be sought from HPS re MCh.	B1.241	
Nov	Chlorine Dioxide dosing RHC			HOIC 5.54
Dec	Chlorine Dioxide dosing QEUH			
6.12.18	SBAR	Ongoing need for ICD involvement in design is shown.	B4.136	
10.12.18	ACFG meeting	Records discovery of ventilation problem. *To confirm whether complete set of documentation held.*		HOIC 5.54
16.12.18	DMA recommendations said to have been implemented	*To confirm whether complete set of documentation held.*		HOIC 5.57

18.12.18	PAG: Cryptococcus	Incidence of this infection is low so to have 2 clinical isolates within 17 days of each other is of concern. Excess pigeon droppings outside PICU.	B2.118	HOIC 5.63
20.12.18	IMT: Cryptococcus	Rare; not typically HAI. A 3rd query case? Hypotheses: plant room; aerosolisation. Difference in strains not unusual.	B1.245	
20.12.18	HPS summary report			
22.12.18	Dosing is said to begin TWG: Sampling results good	*To confirm whether complete set of documentation held.*		HOIC 5.55 HOIC 5.56
27.12.18	IMT Cryptococcus Neoformans ("CN")	The change to the minute. 2 x HAI. Prophylaxis. Issues with samples. Dormancy of patient infection very unlikely. Prophylaxis: 2 children had reaction.	B1.250	
December	Increase in water sampling?	Routine sampling understood to have been expanded and formalised.	Report of D. Chaput at p.8	
December	HPS summary report published.	The range of organisms isolated in patient blood. Cases considered to be linked to the water system. This report is separate from the HFS report shared with Gc in March 2019.	B7.32	HOIC 5.58

Overall? 2018	48 infections affecting SU patient cohort in 2018	48 episodes of BSI. 46 gram-negative bacteria; 2 MCh. Infections caused by 20 different species of organism.		HOIC 5.59 CNR, bundle 6, p 1029-1032.
2019				
7.1.19	IMT: Cryptococcus	Concerns about prophylaxis (including absence of statement from Board). No CN identified in 6A. Limitations of air sampling. But significantly heavier growth of fungus in 6A than in 4C. Discussion of fungal growth in various areas. Ward 6A: a risk. Questions the decision to move to Ward 6A.	B1.255	
8.1.19	SBAR on decant of BMT services		B4.138	
8.1.19	Email from Professor Gibson to Dr Armstrong	Concerns about Ward 6A environment and need for prolonged use of prophylaxis. Followed by meetings among senior management and with consultants.	B6.43	
16.1.19	IMT	Mostly likely breach of ventilation system. Cryptococcus Albidus ("CA") isolated on Wards 6A and 4C. CA is also found in pigeon droppings and is still a risk. Patient families have gone to SG.	B1.261	HOIC 6.1
17.1.19	IMT	Higher particle counts that expected on 6A [even with] HEPA	B1. 266	

		filters turned on and lower on 4C where no HEPA filters. Nurses reporting poor sealed in shower rooms. Mould discovered. Cryptococcus hypotheses. Prophylaxis reinstated.		
Jan?	Short life expert group on CN	*To confirm whether complete set of documentation held.*		HOIC 6.10
17.1.19	IMT Cryptococcus	Peter Hoffman is confident in TI hypothesis. [Additional?] HEPA filters arriving. Decant options. Adult renal patients now going onto prophylaxis.	B1.270	
18.1.19	IMT Cryptococcus	HEPA filters expected. Conference with P Hoffman. Not all in agreement with press statement.	B1.274	
21.1.19	IMT Cryptococcus	Birds nesting near 4C. The move from 6A. Chilled beam cleaning.	B1.278	HOIC 6.2
Undated	SBAR Cryptococcus	2 cases of hospital acquired CN Thermal wheels. Various hypotheses. Access of Cryptococcus via ventilation “entirely plausible”.	B4.141	
22.1.19	IMT Cryptococcus	No immunocompromised patients to CDU. Cabinet Secretary attends and meets GGC CEO.	B1.282	
22.1.19	Decant from 6A	Patients split between Ward 4B, Ward 1, RHC and CDU, RHC. Staffing challenges.	See B4.168	

24.1.19	IMT Cryptococcus	Boxes delivered to ward with heavy pigeon faeces soiling. Challenge in covering the wards. Facebook. Facilities investigating filters to stop cryptococcus.	B1.286	
25.1.19	IMT Cryptococcus	Dr Hood will be assisting. Ward 6A: 80% of showers affected by mould. CDU being moved into 2A. Testing results. TI working on hypothesis supported by P Hoffman. Additional HEPA filters for 4C.	B1.291 HOIC 6.7	
28.1.19	IMT Cryptococcus	Work to 6A due to complete. HEPA filters by 30.1.19. CDU: very challenging working environment. A CNO inquiry. Dr Hood sub-group set up with Dr Peters, Peter Hoffman and estates; to report to IMT. [See NSS response referred to below.] HSE visit.	B1.295	HOIC 6.5
30.1.19	IMT Cryptococcus	Ward 6A work was complete but HEPA filters not there. Sampling results: a finding that CA is present in PICU [corridor] is significant. Suggestion that senior management should meet with families.	B1.299	

?/2019	Expert advice/Queseda Solutions	Advice on impact of air from helipad. *To confirm whether complete set of documentation held.*		HOIC 6.3, 6.4
31.1.19	PAG HAI Serratia in SCBU	Relevant?	B2.120	
Jan	Independent Review established			HOIC 6.6
Jan	DMA risk assessment work plan	*To confirm whether complete set of documentation held.*		HOIC 6.12
Jan	TWG	Testing of 2A/B and update on progress: *To confirm whether complete set of documentation held.*		HOIC 6.13
4.2.19	IMT Cryptococcus	Amendments to previous minutes. Duty of candour. HIIAT scoring: AMBER; BG disagrees. SG wants HIORTS sent direct.	B1.303	
Feb	TWG Water tests	*To confirm whether complete set of documentation held.*	HOIC 6.14	
7.2.19	PAG: 1D Increase in environmental organisms	Typing. No HIIAT assessment.	B2.123	HOIC 6.15
8.2.19	Return to Ward 6A		B4.168	
8.2.19	IMT Cryptococcus	To be a discussion about long term prophylaxis. IMT agree 6A is safe for new admissions. Microbiologists would like guidance on prophylaxis.	B1.307	
11.2.19	Letter from CNO to HAI Executive Leads	Communication requirements for infection incidents, including to all affected/concerned families.	B6.45	

26.2.19	Cabinet Secretary statement	Reference to loss of life where healthcare associated infection was contributory factor.	B6.46	
Feb/Mar	The reviews announced by GGC	Internal reviews *To confirm whether complete set of documentation held.*		HOIC 6.17
1.3.19	IMT: NICU SM		B1.311	
1.3.19	SBAR	Microbiology line management issue. Concerns raised about unusual organisms were not adequately addressed.	B4.151	
14.3.19	IMT: NICU SM		B1.315	
27.3.19	Ent. isolated in a water sample from kitchen/basement	*To confirm whether complete set of documentation held.*	Cf. B2.128 & B1.344?	HOIC 6.21
March	HFS report: Water Management Issues Technical Review	"NHS GGC had found organisms within the water system and had linked these to bloodstream infections associated with ward 2A".	B7.70	HOIC 6.18
March	TWG testing results	*To confirm whether complete set of documentation held.*		HOIC 6.19
March	Remedial works 2A	Taps and sinks. *To confirm whether complete set of documentation held.*		HOIC 6.20
March	Dosing said to have been completed	*To confirm whether complete set of documentation held.*		HOIC 6.22
April	Implementation of DMA recommendations?	*To confirm whether complete set of documentation held.*		HOIC 6.23
April	Cryptococcus sampling ongoing	*To confirm whether complete set of documentation held.*		HOIC 6.24
16.4.19	PAG: PICU AB		B2.125	HOIC 6.26

27.5.19	PAG: 6A STM	STM isolated in blood cultures and in basement. POUFS being changed.	B2.128	HOIC 6.25
May	Advice on ventilation	*To confirm whether complete set of documentation held.*		HOIC 6.28
3.6.19	PAG: 6A 4 x GNB	Gram-negative infections on ward 6A.	B2.130	
3.6.19	SBAR: water and pigeons	Leakage from chilled beams on 6A.	B4.154	
19.6.19	IMT: GNB 6A	4 GNB cases. 1 x case of MCh; MCh also isolated from water sampling on 6A. Reference to 2018 case. 2 cases in 1 year: data exceedance. 2019 patient parents to be spoken to. Duty of candour. **GGC is understood to accept a link between the 2019 MCh infection and the hospital water supply.**	B1.320	HOIC 6.29 to 6.31
25.6.19	IMT: GNB 6A	6 GNB: 2x HAI; 4x HCAI MCh cases: timeline puts second case in RHC theatres where line manipulated. Some [patient] areas had no POUFs. Sampling +ve for MCh. Hypothesis: MCh patients have had contact with unfiltered water in the hospital. 2019 patient/family seeing BG.	B1.325	

		JRe dealing with 2018 family with process for contact to be confirmed.		
June	HPS/ARHAI SBAR		B3.125	
June	HPS Situational Assessment Wards 2A and 2B		B7.194	HOIC 6.40
June	Fungal Growth said to have been found in water tanks	*Source of this presently unclear. To confirm whether complete set of documentation held.*		HOIC 6.33
June	Corrosion of the water system	*Source of this presently unclear. To confirm whether complete set of documentation held.*		HOIC 6.34
June	Mould in 2A	*Source of this presently unclear.*		HOIC 6.35
June	E. Cloacae isolated	*Source of this presently unclear.*		HOIC 6.36
June	Work to water system	*Source of this presently unclear. To confirm whether complete set of documentation held.*		HOIC 6.37
June	MCh added to alert IPCT list	*Source of this presently unclear.*		HOIC 6.38
June	Chilled beam investigation	*Source of this presently unclear. To confirm whether complete set of documentation held.*		HOIC 6.39
July	TWG sampling	*To confirm whether complete set of documentation held.*		HOIC 6.43
3.7.19	IMT	Sampling found MCh even with POUF in place. Not every water outlet is tested. All GNB have unique strains which rules out cross contamination but not from water/drains which have tested positive. Typing of MCh. Hypotheses: GNB unclear; MCh due to access to unfiltered water	B1.330	HOIC 6.41-?

		Staff: “is there fundamentally something wrong with the campus.” Duty of candour comms to be handled by consultant in the case of 2019 patient and the Chairman in is “in communication with the father [of the 2018 patient]”.		
July	SBAR 4C	Ventilation recommendations	B4.156	
July?	Dr Kennedy report: Descriptive Analysis of trends in bacteraemia rates for GN organisms	Update on October 2018 report. Summary: improvement in rates hypothesised to have come about because of decant, dosing, CLABSI measures and POUFS.	B6.104	HOIC 6.44
4.7.19	Letter from John Brown to Professor Cuddihy		B6.53	
17.7.19	Email from Professor Cuddihy to Mr Redfern		B6.55	
19.7.19	SBAR on ICE Neuro Theatres		B4.157	
21.7.19	SBAR PICU Ventilation	Validation in July 2019 raised issues about conformity with SHTM 03-01 No documentation on design intent, nor original validation and list of derogations. Therefore current verification to validation is impossible.	B4.161	
25.7.19	Email from Mr Redfern to Professor Cuddihy		B6.58	
1.8.19	IMT:GNB	2 new GNB: total 10 Impact of MCh infection. Hypothesis for MCh 2019 case is accepted as being exposure to water outwith 6A	B1.334	HOIC 6.45 HOIC 6.51

		GNB hypothesis unexplained; nature not number of GNBs is the concern; chilled beams mentioned. Clinicians concern: problems still here. Duty of candour discussion to have at the communications meeting.		
2.8.19	Ward 6A closed to new admissions.	Patients diverted to other centres.		HOIC 6.51
5.8.19	Professor Cuddihy to John Brown		B6.64	
8.8.19	IMT: GNB on 6A	Concerns about chilled beams. The two GNB hypotheses: chilled beams, unfiltered water.	B1.338	
14.8.19	IMT: GNB on 6A	11 cases MBs stressing unusual nature of the bloods culture was, and that would expect to see these in dirty water. Dr Deighan: numbers have not increased: see Dr Kennedy report. Drs Peters/Inkster: nature not number is the issue. Chilled beams. The slide from the CDC: environmental sampling is not an exact science.	B1.343	HOIC 6.46
20.8.19	Meeting about IMT		B6.70	
23.8.19	IMT: GNB 6A	Dr Inkster is no longer chair; Dr Crighton is the chair. [Frustration] of clinicians. Case definition.	B1.348	

		The hypotheses: chilled beams, unfiltered water. Input from GOSH. Discussions of Dr Kennedy report Cipro ongoing: side effects. Chilled beam dosing. More HEPA filtration? There is to be peer review of 6A from s/o in similar ward.		
25.8.19	SBAR: Dr Inkster to Chair of 6A IMT	An external report: Innovated Design concluded that the ventilation strategy for 2A was abnormal placing patients at risk of infection. From April 2019, bacteraemias secondary to environmental organisms have occurred eg St or Ent. Others are from unusual soil/water type bacteria e.g. Chryseomonas, Elizabethkingia, Pantoea septica. Environmental risks on 6A: ACH, chilled beams, pressure, HEPA, air sampling and other matters. 6A should be considered to have significant unacceptable levels of infection risk for the immune compromised patients due to the build environment.	B4.165	
Undated	SBAR: Estates and Sandra Devine	Comments on the SBAR dated 25.8.19.	B4.168	
30.8.19	Letter Professor Cuddihy to Jane Grant		B6.73	
30.8.19	Letter clinicians to Jane Grant and Dr Armstrong.	Need for external review. The respective responsibilities of clinical, management and IPC staff.	B6.1416	

Aug	Work understood to have been done to chilled beams	*To confirm whether complete set of documentation held.*		HOIC 6.52
Aug	Dosing understood to have been increased	*To confirm whether complete set of documentation held.*		HOIC 6.53?
Sept	Estates & Facilities are understood to have visited GOSH	*To confirm whether complete set of documentation held.*		HOIC 6.58
Sept	Competing epidemiological reports?	*To confirm whether complete set of documentation held.*	B4.180? B4.190? See below	HOIC 6.60
Sept	Work identified by DMA said to have been done	*To confirm whether complete set of documentation held.*		HOIC 6.63
Sept	PICU ventilation subgroup	*To confirm whether complete set of documentation held.*		HOIC 6.65
2.9.19	Meeting between clinicians and Jonathan Best.			
4.9.19	Jane Grant to clinicians	Efforts underway to find external advice	B8.85	
6.9.19	IMT: GNB 6A	Discussion of Microbiologist SBAR. 13 affected patients. Apparent agreement that chilled beams are not appropriate for areas where immunocompromised patients are cared for (but note change to minutes on 13.9.19) Conditions for reopening include peer review from GOSH.	B1.354	HOIC 6.57
9.9.19	Meeting between clinicians and Dr Armstrong			
13.9.19	IMT: GNB	Change to the minute of previous meeting: chilled beams; use depends on interpretation of guidance.	B1.360	

		12 GNBs. Professors Jones/Leonard: 6A is microbiologically safe. Discussion about peer review from Belfast MB.		
13.9.19	SBAR: HPS MCh	To support investigation into 6A GNB and MCh. 2A/B probable linked cases.	B3.127	
13.9.19	Options appraisal while 2A/B unavailable.	Options appraisal for alternative arrangements for SU patients given prolonged decant to Wards 6A and 4B.	B8.116	HOIC 6.59
18.9.19	IMT: GNB 6A	Discussion of infection patterns. Not all IMT members agreeing with the statement that ward 6A was microbiologically safe. HPS SBAR discussed? HIIAT Green but Dr Chaudhury wants to consult with colleagues: there is no consensus on reopening 6A to admissions. Epidemiology to be redone.	B1.365	
20.9.19	Telecon To discuss 6A status	All present on the call agreed to recommend reopening Ward 6A. No SU consultants present.	B1.370	
23.9.19	Clinicians meeting	Referenced in the 24.9.19 note.		
24.9.19	Meeting to discuss prophylaxis	Clarity needed on different assessments of risk. History of Prophylaxis use from June 2019.	B8.110	
27.9.19	SBAR 6A Leakage	Water leak by fridge. How serious? Risk it is source of mould.	B4.176	
27.9.19	Letter Jane Grant to Professor Cuddihy	Offers explanation for there being no communication about second MCh infection.	B6.75	

7.10.19	SBAR: Dr Inkster & Dr Peters		B4.180	
Undated	SBAR RCA		B4.190	
8.10.19	IMT 6A GNB Delftia	Discussion of Dr Inkster /Dr Peters SBAR. 3 new possible cases. RCA to be completed. "Any recommendation to re-open the ward to new admissions and high risk cases has not been implemented as clinicians obtained and [sic] agreement from the CEO for a peer review of microbiological data." Professor Leonard: pseudo-outbreak. Could be first in the world. The kitchen. Dr Sastry: there have been numerous incidents since moving to 6A.	B1.373	HOIC 6.70?
10.10.19	SBAR: 6A	Possible increase in GNB since mid 2019, 14 cases. Some the same as in 2018. Discussion of typing and sampling in relation to MCh cases. Information available from GSOH? Reopening recommended.	B4.193	
11.10.19	IMT: GNB 6A		B1.382	HOIC 6.67
25.10.19	IMT: GNB 6A		B1.388	
Nov	SBAR	Not relevant?	B4.199	
5.11.19	PAG: 1D Increase in AB	X3 All hospital acquired	B2.140	HOIC 6.78 To 6.79

5.11.19	IMT: GNB Ent.	Presentation by Professor Leonard: an endogenous explanation. Routine Ciprofloxacin is to stop and TauroLock to be used instead. It will be CNO who has final say on reopening. HPS/Professor Leonard to discuss WGS methodology.	B1.392	
11.11.19	IMT: Draft minute GNB	TauroLock. Ent cases have been excluded because endogenous.	B1.397	
11.11.19	Meeting on 6A	Consultant request for acknowledgment that there had been an IC problem. wants HPS to confirm ok to open. SG/Board role? All recent reports suggest no connection.	B4.209	
12.11.19	PAG: 1D Ps.		B2.135	
14.11.19	IMT: GNB	Final report from HPS stating that there is no evidence to continue restrictions to admissions. HPS appear not to want that circulated. Dr Murphy still concerned. Meeting with consultants was held and minutes will be available soon. Mr Redfern: “clinical team are happy.” Reasons are set out p.405: include no link between 6A and infections.	B1.402	
14.11.19	SBAR: Mr Redfern 6A GNB	There is no direct working hypothesis linking the series of infections which prompted the incident to Ward 6A environment.	B4.202, 206, 209	

		There is no connection to the 2A/B IMTs. Consultants in agreement that restrictions should be lifted.		
18.11.19	Bundle to the Cab Sec on reopening 6A	Table of reopening measures found at B4.48. Unclear if this is the full extent of the 'bundle'.	B6.94 B4.48	
19.11.19	IMT: 1D Ps.	NB Water sampling: as the water is supplied from the same main further water sampling in NICU and Theatre 8 is required. An outbreak is not indicated.	B1.407	
21.11.19	PAG: 1D Ps.	2 x HAI Typing awaited.	B1.138	
21.11.19	Ward 6A opens to new patients			HOIC 6.74
Nov	Reference to ventilation upgrade in PICU.	*To confirm whether complete set of documentation held.*		HOIC 6.76
22.11.19	Level 4 escalation			HOIC 6.77
27.11.19	IMT: 1D	Sinks. Discussion of ventilation. Duty of candour	B1.412	
Nov	SBAR: Review of 2017 mortalities in which Stenotrophomonas was isolated		B4.214	
5.12.19	Letter from clinicians to JG		B8.113	
5.12.19	Letter from JG to clinicians		B8.115	
12.12.19	SBAR Andrew Murray		B6.10	

17.12.19	IMT: 1D	"Original hypothesis was water but was negative and typing unique. Hypothesis disproven."	B1.417	
20.12.19	PAG: NICU SM		B2.143	
30.12.19	IMT: 1D	4 x GNB	B1.423	
Dec	HSE Improvement notice			HOIC 6.80
Overall? 2019	CNR identified 28 infections in SU patient cohort in 2019.	28 infections including 27 caused by gram-negative organisms and 1 MCh. Infections caused by 16 different species of organism.		CNR, bundle 6, 1028-1029
2020				
January	HPS SBAR PICU/1D		B3.132	
13.1.20	SBAR Communication		B4.217	
Feb	HPS SBAR PICU/1D	Ventilation Assessment on behalf of HAI Policy Unit Review of validation info. There is no evidence of validation or [sic] design data before April 2019. Cross contamination between cohorts in derogation?	B3.136	
16.4.20	IMT: 6A Draft GNB	Last case reported 7.4.20. Professor Leonard to investigate links with past cases. Comms: patients saying linked to water. IMT closed.	B1.428	
17.4.20	PAG 2 HAI Ent.	Going to try typing investigations but Covid appears to be hampering.	B2.146	

	Critical Care Unit 6 (COVID hub)	HIIAT Amber		
16.6.20	PAG Increase GNB in NICU/SCBU	3 colonisations in 2/52 COVID looks to hamper testing.	B2.150	
2.7.20	IMT: 6A	A positive Cryptococcus antigen test. History of sampling and the theories. No CN has been found at any time.	B1.431	
9.7.20	PAG: NICU	Another trigger event i/t the SOP. COVID again hampering?	B2.152	
27.7.20	PAG: NICU GNB		B2.155	
31.8.20	PAG: NICU GNB		B2.159	
7.9.20	PAG: 10B/21 Burkholderia	Discussion of possible environmental or equipment sources. Isolates for typing, testing to happen [only] if the cases are linked.	B2.162	
10.9.20	PAG: PICU GNB	Hypothesis is complex health and vulnerability.	B2.164	
Sept	SBAR: ARHAI Assessment of GGC reporting		B3.145	
8.10.20	PAG: 4C 2 HAI St.	Water testing appears to have been -ve. Typing done.	B2.168	
9.10.20	PAG: NICU Increase in SM		B2.171	
16.10.20	PAG: NICU Ps.	Typing requested. Hypotheses include environment.	B2.174	
9.11.20	PAG: PICU 2 x GNB	Ps. has not been isolated in water since Jan 20.	B2.177	

20.11.20	PAG: 6A SM Klebsiella	The IPCT has considered environmental sources and that remains under investigation. [Outcome?] No IMT.	B2.179	
25.11.20	PAG: PICU GNB	Environmental source remains under investigation. No IMT.	B2.182	
14.12.20	PAG: PICU GNB	One of the 2 cases seems to be the one referred to at 25.11.20. Environmental remains under investigation?	B2.184	
15.1.21	PAG: NICU GNB	Endogenous.	B2.186	
19.1.21	IMT Unusual Pathogens in Orthopaedics	A pseudo-outbreak.	B1.437	
21.1.21	PAG: NICU SM x 2 Asp.	Typing awaited. No HIIAT meantime. If typing matches reconvene; subsequently typing came back no match.	B2.187	
22.1.21	PAG: 1D/PICU 2 x GNB		B2.189	
28.1.21	IMT: Theatre Level 11/10 QEUH Burkholderia	Pseudo-outbreak.	B1.441	
23.4.21	PAG: NICU Ent x 3	Hypothesis under investigation.	B2.192	
30.4.21	IMT: NICU SM		B1.445	
Apr	SBAR: ARHAI Ventilation PICU	Background is potential environmental linked infections in Feb 2020. Requirements of SHTM 03-01 were not met.	B3.149	

		Now appears to be met though not in corridors? Further suggestions.		
12.5.21	PAG: NICU Klebsiella		B2.197	
12.5.21	IMT: NICU/1E SM		B1.455	
18.5.21	IMT: NICU SM Colonisation	Crossover with previous case: same room. Discussion of typing. AR open to idea source is environmental. JRe asks about the water supply: see p.467: separate supply. There has been no Chlorine Dioxide dosing in NICU. A report is to be prepared on the water system. Sampling is quarterly and only on legionella, Ps, TVC.	B1.463	
24.5.21	IMT: NICU SM	8 confirmed cases. Sampling found nothing in sinks but some GN (Ps, Klebsiella, Serratia) elsewhere. Ref to isolates from drains. Some sort of investigation into drains. Discussion of testing regime. Reference to the 2015 outbreak and investigation.	B1.474	
2.6.21	IMT: NICU SM	Report on drains and filters etc Hypothesis: unidentified source in unit or patient to patient.	B1.487	
8.6.21	SBAR	The Action Plan (originally presented to Clinical Care and	B4.220	

	Clinical Care and Gov paper	Governance on 5.12.17 following the infection control issues). Water testing not meeting national guidance.		
10.6.21	IMT SM	Draw a line under the incident but keep going with actions. Hypothesis is "unidentified probably environmental source and poss. patient to patient".	B1. 501	
5.8.21	IMT: GNB 6A	3 GNBs. All agree endogenous likely.	B1.512	
28.10.21	PAG: 1D/E SM x 2		B2.198	
12.1.22	PAG: 6A Chryseobacterium 6A	The QE water system is not designed to provide sterile water but is as clean as possible. It is filtered and chlorinated and most areas use POUF. But Chryseobacterium spp is chlorine resistant. It has been isolated sometimes in water. Sinks. Most likely acquired from environmental source (water). Cf. "if asked" message.	B2.206	
9.2.22	Update to PAG	Typing suggests different species. The hypothesis is now: unidentified, no evidence to suggest from hospital environment but cannot be completely excluded.	Ibid.	
9.2.22	IMT: 6A 6A Chryseo	Filter with Chryseo spp replaced. Hypothesis: above.	B1.517	
5.4.22	Cryptococcus sub-group report	Hypothesis 2 (CN entering from outside air via ventilation): "possible".	B6.115	HOIC 7.15 NSS response: 6.5.2

		Hypothesis 3 (unfiltered air from plant rooms gets into rooms/wards where “at risk” patients present): “possible” in the case of 1 patient, “much less likely” in the case of another. NSS: “*HPS and HFS belonged to this Sub-group, but the members of the Sub-Group were unable to agree on a final report. ARHAI/HFS did not support the findings by GGC. Instead, NHS GGC issued a report as a GGC report and not as a Sub-Group report*.”		
5.5.22 **19.5.22**	PAG: Neonates Burkholderia		B2.213 B2.220	
Overall	Period not examined by CNR.			

APPENDIX 3: THE INQUIRY'S KEY QUESTIONS AND ANCILLARY QUESTIONS

Key Questions

(1) From the point at which there were patients within the QEUH/RHC was the water system (including drainage) in an unsafe condition, in the sense that it presented an additional risk of avoidable infection to patients?

(2) From the same point and in the same way was the ventilation system in an unsafe condition?

(3) In the same sense, are these systems now in a safe condition?

(4) Is there a link, and if so in what way and to what extent, between patient infections and identified unsafe features of the water and ventilation systems?

Ancillary Questions

(1) In what ways did the issues narrated in the History of Infection Concern impact upon patients? (Term 8)

(2) Did the hospital's proximity to the Shieldhall waste water treatment works create a risk of infection to patients? (Term 10)

(3) In relation to the reporting of Healthcare Associated Infections, what lessons have been learned from the experiences within the QEUH; what remaining or additional issues require to be addressed? (Term 9)

(4) What contribution to the provision of unsafe features of the water and ventilation systems, and to the exposure of patients to these unsafe features, was made by the following arrangements for delivery of the hospital; how might that contribution have been avoided; what has been done to prevent this happening again:

(i) The frameworks and arrangements of the sort mentioned in Term 2 put in place by public bodies to deliver the key stages of the project;

(ii) The arrangements of the sort referred to in Term 6 made by GGC regarding (a) inspection and testing, (b) commissioning, validation and verification and (c) the provision of information and training to end users about operation and maintenance;

(iii) The arrangements made within GGC for delivery of the project in relation to (a) governance, (b) operational management and (c) provision of information by/to key stakeholders and advisers (all as referred to in Term 3); and

(iv) The arrangements in place at the time as regards governance, oversight and support of the project by national public bodies (the Remit and various Terms)?

(5) What contribution to the provision of unsafe features in the water and ventilation systems, and to the exposure of patients to these, was made by failures to raise concerns about those features including as regards impacts upon patients; whether that came about as a result of deliberate act; and what arrangements including policy or culture there was within the organisation in question to encourage and enable the raising of such concerns? (Term 3(d) and Term 4)