SCOTTISH HOSPITALS INQUIRY

Bundle of documents for Oral hearings commencing from 19 August 2024 in relation to the Queen Elizabeth University Hospital and the Royal Hospital for Children, Glasgow

Witness Statements – Week Commencing 9 September 2024 – Volume 4

Table of Contents

Scottish Hospitals Inquiry
Witness Statement of

Edward McLaughlan

This statement was produced by the process of sending the witness a questionnaire with an introduction followed by a series of questions and spaces for answers. The introduction, questions and answers are produced within the statement.

Witness Notes

Note 1: I have provided a witness statement dated 9 May 2022 to the Scottish Hospitals Inquiry which reflects my knowledge of the general principles of hospital ventilation, technical guidance, Scottish Health Technical Memorandum 00 and 03-01(SHTM 00 and SHTM 03-01), Scottish Health Planning Note 04 (SHPN 04), and documentation for tenderers.

Note 2: Having retired, I no longer have access to NHS NSS records. For this reason, everything below should bear the caveat “to the best of my recollection”. The inquiry team provided me with over 2000 pages of information to refer to for this statement, however for a number of reasons the time available has been insufficient to closely read this quantity of documentation. In an effort to meet the timescale, I have scanned and searched the documents, and whilst I have good confidence that I have picked out all salient information, this is not the level of thoroughness applied to my previous statement above. In addition, I am aware that some of the answers below may not be as full as they would have been if I was still working for NHS NSS and had access to their records. Where my memory of an event is not clear, I have not surmised and have referred the Inquiry to the appropriate written records.

Professional History

1. Please list your professional qualifications, with dates. Please give your chronological professional history, roles held, specialism, etc, and any update since you last spoke to the Inquiry. Please provide an up-to-date CV to assist with answering this question.

A. I retired on 31 March 2023. From 19 April 2022 I was seconded to NHS Lanarkshire to work on the project to replace Monklands hospital and my role was to help the project team to provide assurance of compliance with all appropriate standards and guidance in scope for NHS Scotland Assure. Prior to this date I was an Assistant Director of Health Facilities Scotland, having held that post since 2006. Health Facilities Scotland provides support to the health service in Scotland on matters that relate to the design, operation, maintenance, and disposal of its buildings. It is part of NHS National Services Scotland ("NSS") which is a National Health Board providing support to the NHS in a diverse range of topics. NSS is part of the health service. Since the creation of NHS Scotland Assure in 2020, Health Facilities Scotland is now part of NHS Scotland Assure, which in turn is part of NSS. I led a team of approximately 40 national leads and advisors to deliver a diverse range of services including developing national strategies and change programmes to deliver safe, effective healthcare facilities. I was accountable for various services including estates elements of infection prevention in the built environment, research, statutory compliance, critical engineering services (water systems, ventilation etc), medical device safety and sustainability. To provide perspective on the level of resource available to support NHS boards during the period the Inquiry is considering, i.e. 2009 to 2019, the resource available in engineering has been one member of staff across all health boards. I fulfilled a similar role to this during the 1990s for HFS' predecessor organisations, but not during the period the Inquiry is considering, i.e. 2009 to the present. At this time that role of Principal Engineer was filled by Ian Stewart and then Ian Storrar. Ian Stewart was a temporary member of staff who fulfilled the role between two permanent members of staff; Lex Campbell, who left the role in 2011, and Ian Storrar who came into the role in 2015. I was a member of the directorate management team for NHS Scotland Assure and have played a part in the development of that service from its inception. NHS Scotland Assure was formed to ensure that the buildings NHS Scotland builds and operates are compliant

with appropriate standards and guidance. It was launched in shadow form in late 2019 and full form in Summer 2021. When NHS Scotland Assure launched, Health Facilities Scotland was encompassed in it and therefore my role with Health Facilities Scotland and with NHS Scotland Assure were one and the same thing. Prior to my assistant director role, I was a director of NHS Scotland Property & Environment Forum Executive from 2002 to 2006. This is the organisation that became Health Facilities Scotland. Before this, the same service was called the Healthcare Engineering & Environment Unit, where I was Principal Engineer, providing the Health Service with technical advice on engineering and environment issues. I came to the Health Service from Winton Caledonian, a ventilation and water hygiene consultancy, where I was a Principal Engineer from 1993 to 1995. Prior to that I held posts in the Property Services Agency, which managed the non-health government property portfolio, and in the British Merchant Navy, serving as an engineering officer. I have the following academic qualifications and membership: MBA - Master of Business Administration (1996) BEng (hons)
- Bachelor of Engineering with Honours, Environmental Engineering (1991) CEng - Chartered Engineer (1993) MIHEEM – Member of the Institute of Healthcare Engineering and Estate Management (1996) I have a Bachelor's degree in Environmental Engineering. Environmental in this case refers to the built environment and thus the degree is in building services such as heating, lighting and ventilation. Therefore, I have qualifications relevant to ventilation but I would not class myself as an expert in healthcare ventilation as I have not spent the majority of my career working on this topic.

Involvement with QEUH

2. When did you become involved with issues at QEUH and in what capacity?

A. At any given time, my team would have been involved with multiple issues in multiple health boards. NHS NSS will have records giving exact circumstances and dates, however, all involvement in the issues of relevance to the Inquiry came after NHSGGC started managing these issues. From memory; for the issue of higher

than expected microorganisms in water samples, we were contacted by colleagues in HPS for support in advising NHSGGC in relation to their water systems.

Regarding the advice on Horne Optitherm taps, I think we were invited, along with colleagues from HPS to be part of a group working on options for these already purchased taps in light of recently revised guidance relating to measures to minimise the risk of Pseudomonas contamination. This was the only involvement during the construction phase. For the possibility of Cryptococcus contamination within plant rooms and ventilation systems, I am not sure whether we were contacted by NHSGGC or HPS for support. I can't remember how we were contacted about the move of adult BMTU into QEUH, but the paperwork supplied by the Inquiry involves correspondence and a meeting with Peter Moir. The role of my team, as with all of Health Facilities Scotland, and later, NHS Scotland Assure, was to provide support to health boards across Scotland on Estates and Facilities matters. This was carried out through the production of national guidance, provision of training, and direct advice on request. My role was as Assistant director, with responsibility for Engineering, Sustainability, Decontamination, Medical equipment safety notices, Research and several other issues. In relation to my understanding of the objectives of the Inquiry, the relevant part of my team would be engineering. During the period being considered the staffing was one Principal Engineer, with one additional temporary engineer for part of the time.

3. What was your understanding of the issues?

A. HFS's role was to provide support to Health Boards in relation to estates and facilities, particularly in relation to the interpretation of national guidance. Issue one was, NHS GGC was finding high bacteria counts in water samples. I think they contacted colleagues in HPS, who, when they understood the engineering implications, asked for support from HFS. Issue two related to concerns raised by NHSGGC about the possibility of bird droppings in a ventilation plant room being drawn into the ventilation system and infecting patients and HFS was asked for support by NHS GGC. The third issue would be when we were contacted because NHSGGC had decided to move bone marrow transplant patients into QEUH and were concerned that the design of the building did not provide sufficient space for the necessary ventilation services.

4. What advice and/or action, if any, was given/taken by you

A. Myself and my team attended numerous meetings in relation to issues at QEUH, answered numerous phone enquiries and in some cases, produced written advice. NHSS Assure will have records of any advice given in writing. I do not clearly recall any advice given orally.

5. To whom was any advice given, and was it acted on?

A. In each case, advice will have been given orally to the NHSGGC staff involved. Where advice was given during meetings, this will be minuted and NHSGGC should be able to provide these minutes. Where a report was produced, NSS will have records of the routes of communication. To the best of my knowledge, all relevant information has already been provided to the inquiry.

6. Which issues did the advice and/or action relate to?

A. Any advice given will have related to the issues above. If you would like any information on other issues, please clarify.

Please refer to (A47069198 – Hearing commencing 19 August 2024 - Estates Communications – Bundle 12.)

Adult BMT Unit, Ward 4B - 2015

7. When did you become aware of issues arising in relation to Ward 4B, the Adult BMT Unit? What was your understanding of the issues?

A. The relevant records have already been provided to the Inquiry when I was working for NHS NSS. As I no longer have access to these records, and as my memory would not be sufficiently reliable, I can only rely on the documents provided by the Inquiry, which indicate an email exchange and meeting with Peter Moir of NHS GGC (bundle 12 p744 – 746). I would be happy to do my best to respond to more specific questions.

a) What recommendations, if any, were made by you?

A. After the initial meeting, I asked Colin Clarke, an engineer in my team, to support the board. For the avoidance of confusion, Colin Clarke was employed as an Energy Manager in the Sustainability team, but as a Chartered Electrical Engineer, and given the lack of other resource, he agreed to support this work. NSS will have records of any advice given and these will already have been provided to the inquiry. My memory would not be sufficiently reliable to answer this further, although I would be happy to do my best to respond to more specific questions.

b) What action, if any, was taken by you?

A. Our only action would have been to advise Board staff in relation to their questions.

c) To what extent were the recommendations and/or action effective?

A. HFS has no remit to follow up on the implementation of any advice given as the actions taken are the responsibility of the Health Board.

8. Were you involved in the decision to decant Ward 4B to the Beatson? If so, please give details.

A. This would have been a clinical decision. Whilst HFS advice may have been considered, HFS was not involved in the decision.

Please see (A34466659 – Email Chain from David Wilson, Brookfield Multiplex to Peter Moir, NHS GCC – subject 'QEUH Ward 4B – Services Drawings' dated 24th December 2015 to 13th January 2016 – Bundle 12, page 745)

9. Please give details of the meeting which took place between you and Peter Moir on 23 December 2015.

a) Who organised the meeting?

A. I don't recall, at this remove, how we became involved in the board's considerations of ward 4b. Any relevant paperwork will already have been provided to the Inquiry whilst I was working for NHS NSS. From memory, I was involved in initial

discussions and then asked Colin Clarke from my team to provide support. Colin and I will have discussed the issues and I will have seen any written advice before it was provided. Although I do not have the details in memory, I am likely to be more able to comment when presented with written records.

b) Who was present?

A. Sorry, I don't remember.

c) What was the purpose of the meeting?

A. I think this would have been to discuss the implications for ventilation of the move of adult BMTU into QEUH, but my memory of this is not good.

d) What was discussed?

A. As above.

e) What was proposed and/or agreed?

A. We were asked for support and agreed to help. From the papers supplied by the Inquiry, it appears I agreed to have drawings reviewed. The work of supporting the board in relation to Ward 4b was done by Colin Clarke of my team.

10. Why were you sent the as-built ventilation drawings for Ward 4B?

A. Whilst I don't recall specifically at this time, this is likely to be related to the fact that the ward as built was not intended to house a specialised service such as bone marrow transplant, and as such, the existing ventilation would not be suitable.

11. What did you do on receipt of the drawings?

A. I believe I asked Colin Clarke of my team to review them and support the board.

12. If you examined the as-built ventilation drawings, what conclusions did you draw from them?

A. I don't think I examined them personally, although I am likely to have discussed his findings with Colin Clarke.

13. If another person examined the as-built ventilation drawings, who was that and what information did you receive from them, if any?

A. This is likely to have been Colin Clarke from my team. I remember asking Colin to support the board with this issue, but I am not sure at which point relative to these drawings.

14. What recommendations and/or action did you make/take?

A. I no longer have access to NSS records, however, NSS will have records of any written advice given.

15. To whom were any recommendations made, and were they acted on?

A. NSS will have records of any recommendations made and these are likely to have been supplied already. HFS had no remit to monitor the implementation of any advice given.

16. To what extent were the recommendations and/or action effective?

A. HFS had no remit to monitor the implementation of any recommendations. Responsibility for the management of its facilities lies with the Board, and HFS is a source of advice.

17. When did you become aware that Ward 4B did not comply with SHTM 03-01?

A. SHTMs are guidance and it is for those using the guidance to be able to demonstrate how they achieve appropriate safety. Guidance is not necessarily the only way of achieving safe effective premises and is there to be interpreted in light of the circumstances prevailing. From memory I think I was aware through conversations with colleagues that the board's approach did not follow the guidance completely, however I was not involved in evaluating the safety of the approach taken. I also don't have any records, or recollection, of when I became aware of this; however, this would have been through discussions with Colin Clarke when he was supporting the Board.

18. Would you have expected the design of the ventilation system to comply with SHTM 03-01?

A. For context, SHTMs are not standards, they are guidance. They are intended to support those designing, building and operating healthcare facilities in complying with requirements placed on them by legislation, policy or contracts. In the case of QEUH, I have been told, but have not verified, that they were specified in the contract, which would make them a contractual requirement. Health boards, in my understanding, have an obligation to provide an appropriately safe environment for patients. Following national guidance may be interpreted as a means to achieve this, however, there is no obligation on boards to comply with guidance if they can deliver on their obligations another way. In the case of ward 4B, the construction requirement was not for a bone marrow transplant unit, which to my mind would mean there is no compliance issue in regard to the original construction. I am not aware of the contractual arrangements for the modification to accommodate BMTU, but SHTM 03 01 places no obligation on the health board by itself. The obligations on the health board would have been in relation to Health and Safety legislation in addition to any government requirements. From a Health and Safety law perspective, the guidance might be seen as industry best practice, but this is not my area of expertise.

19. Would you have expected to be told if the ventilation system did not comply with SHTM 03-01?

A. HFS had no remit to police the decisions made by health boards. It would not be unusual for a board not to tell us where a facility did not comply with the guidance, unless they were looking for support on whether the solution chosen provided an appropriate level of safety.

20. To what extent were you aware of discussions around the ventilation specification?

A. I was aware through discussions with my team, supporting the board that the space within the QEUH building was insufficient to contain the ducting required for the air supply advocated by the guidance. Likewise, I understand the plant room did not have sufficient space for the necessary air handling plant. HFS will have advised on the best options for compliance with the intent of the guidance and may have sourced subject matter expertise. HFS had no remit to design, or sign off the solution. It is for those designing the solution to be able to demonstrate that they provided appropriate safety.

21. If you were aware, what were the discussions about?

A. At this point, it is difficult to be precise, however discussions did involve the difficulty in achieving the ventilation rates necessary for the facility in a building not designed to house the plant or ductwork.

22. To what extent were you aware of the ventilation specification for the various wards, following the move to QEUH?

A. Other than the initial request for support, I was one step removed from the discussions and would only have been aware of such details as came up in discussions with my engineer Colin Clarke. I was aware that the space available within QEUH was insufficient to accommodate all the equipment and ductwork to deliver a design compatible with that recommended in the national guidance. I was also aware of discussions around the lack of ventilation in the corridor, and the ceiling vent grilles where piped gases were present.

Emerging issues with the water system – 2018

Please see (A43119719 – Email Chain from Mary Anne Kane, NHS GGC to Ian Storrar, NHS NSS and others – subject 'QEUH & RHC – Water System Test Results' dated 23rd to 24th April 2018 - Bundle 12, p926) and

(A43119657 – Email Chain from Mary Ann Kane, NHS GCC to Edward McLaughlan, NHS NSS AND OTHERS -SUBJECT '[Blocked URL][External to GCC]' Dated 3rd April 2018 - Bundle 12, page 922)

23. What can you tell us about emerging issues with the water system?

a) When did the issues arise?

A. As above, I do not have access to NHS NSS records beyond those supplied to me by the Inquiry, and all relevant information was supplied to the Inquiry when I was with NSS. We were invited, I think through colleagues in HPS, to help support NHS GGC with issues relating to bacterial contamination of the QEUH water system. We attended meetings of the Incident Management Team and the Water Technical group. Representation from HFS was by Ian Storrar, with me covering when Ian wasn't available, or when the situation required. These meetings were minuted and NHS GGC will have supplied minutes to the Inquiry.

b) What was the nature of the issues - specifically what was thought to be wrong with the building system in question?

A. Water tests were showing higher than expected levels of various bacteria in various parts of the system.

c) At what stage did HFS become involved?

A. I don't have this information in my memory, however all relevant documentation has been supplied to the Inquiry. From memory, NHSGGC had been dealing with the high counts and informed HPS, who then involved HFS.

d) What was the nature of the risk posed to patient safety and care?

A. This question is outwith my expertise.

e) Was any action taken sufficient to address the concern?

A. HFS had no remit to monitor the actions taken by any health board. That said, understanding the nature of contamination in a large water system, is complex and multi faceted. I remember various actions, including shock dosing, thermal disinfection of taps, and the incorporation of Chlorine Dioxide dosing into the system.

24. Was HFS involved in any of the following issues:

a) Water temperature: problems with energy plants - hot water temperatures are not high enough to prevent/tackle bacterial growth.

A. I believe Ian Storrar was aware of the issue but I am not sure whether HFS was actually asked for support. Personally, I was aware of an issue, but the board was dealing with it through the contractor. I was not asked for any advice on this to the best of my recollection.

b) Thermal control design system.

A. I don't think I was ever close enough to the debate to have an understanding of the controls. I was however, told about times when the temperature of the water had been significantly below that required.

c) Debris in pipes

A. What we know of this issue is contained in the Water Technical report (HFS Water Management Issues Technical Review – March 2019) (A33448015 – Bundle 7, Document 4, page 70). It appears that the issue of protecting pipework on the construction site was raised repeatedly, possibly indicating poor compliance. The project supervisor would be able to give more detail.

d) Single room design - water outlets increased; flushing regimes; risk of stagnation.

A. What we knew of this issue is contained in the Water Technical report. (A33448015 – Bundle 7, Document 4, page 70)

e) Pipe size and storage volumes; encourages water stagnation

A. HFS had no remit to review the design, just the handover documentation and associated records.

f) Wet rooms and floor levels

A. I was aware of problems with mould, but had no involvement in the issue to the best of my recollection. I think I learned this was an issue from Ian Storrar, who may have had more involvement.

g) Drainage system

A. I am aware only of an issue with the retention of water due to faulty installation of wash hand basin drain seals. To the best of my recollection now, faulty installation of these seals at the outlet of wash basins caused water to collect, presenting a risk of contamination. I understand the manufacturer subsequently changed the design of this outlet.

25. Was HFS involved with Flow straighteners / regulators / tap type?

A. HFS was part of a group evaluating options to deal with already purchased Horne Optitherm taps in light of recent changes in guidance on water systems with respect to colonisation of outlets by Pseudomonas bacteria. I believe Horne's position was that their tap has an outlet fitting which is an integral part of the functioning of the tap, and not a flow straightener.

26. What is your understanding of the use and function of Horne taps?

A. Specifically the Horne Optitherm tap is a thermostatic mixing tap, which minimises the length of pipework at the temperature where legionella bacteria thrive, by moving the mixing function from an upstream valve to the body of the tap. The intention of mixing taps rather than upstream mixing valves is to minimise the risk of bacterial contamination. The design of this tap was slightly unusual, in that the outlet fitting was intended to retain water in the tap to minimise the air water interface, which is the route to contamination in some cases. Whilst this may make some intuitive sense, I don't believe I ever saw evidence of its effectiveness.

a) What concerns were there regarding the Horne taps?

A. Any concerns from HFS (and HPS) will have been minuted in the meetings where the board consulted with a range of advisors to make its decision about using the taps. When NHS GGC identified problems with the water system using these taps, we surveyed other boards in Scotland which had these taps in use. None reported any problems.

b) Were you aware of a meeting in June 2014 where Horne Engineering gave a presentation around why their taps prevented the creation of biofilm, if used properly?

A. I was aware. HFS was represented by Ian Stewart from my team, now sadly deceased. My understanding of the discussions at the time would have come from discussions with Ian Stewart, and subsequently, when the board was dealing with contamination.

c) Do you have any comment to make on Horne Engineering's position?

A. I would be surprised by a claim as bold as "prevent" the creation of biofilm (see the question above), which seems like a tall order. It may be the case that the taps reduced the creation of biofilm. In a subsequent meeting of the water technical group, Horne made a similar presentation to explain the purpose and function of their outlet fitting. I don't think I saw any evidence that the performance of the outlet fitting had been validated from a bacteriological perspective.

d) Did Horne attend a meeting on 6 April 2018 in relation to the taps?

A. I think this may have been the meeting mentioned above, however the meeting was convened by NHS GGC and they will have any records. I did attend a meeting, which I think was the one referred to here, where Horne gave a presentation on their tap.

e) Were you at the meeting? If so, who was present, what was discussed, what was the outcome of the meeting?

A. Assuming this is the meeting mentioned above, I was present. I think the meeting covered a number of issues, with the Horne presentation being one, but I cannot recall what they were, or who was present. Again, NHS GGC should have a record of the meeting.

f) What recommendations were made or advice given? e.g. replacement taps?

A. Any recommendations made will be recorded in the meeting minutes.

g) To what extent was any action taken effective?

A. HFS had no remit to judge the effectiveness of any board's actions.

27. In relation to the water system contamination, how concerned were you, if at all, that it was more widespread than the taps?

A Given the findings in the Water Technical Report (A33448015 – Bundle 7, Document 4, page 70) that the pipework was not fully protected on site; the water system was filled without filtration, and was filled a long time before handover, and the system was disinfected prior to handover to get bacterial counts down to a level to permit handover, I would have seen it as unlikely that contamination was confined to the taps. At this point I can't say how or when I would have communicated that view, but there will be records.

Wards 2A and 2B – The Water Incident 2018

Please see (A43158827 – Email chain from Mary Anne Kane, NHS GGC TO Tom Steele, NHS NSS and others – subject 'IMT WATER INCIDENT RHC, NHSGGC' dated 14th to 16th September 2018 – Bundle 12, p938 to 940)

What can you tell us about the issues in Wards 2A and 2B during 2018, known as the Water Incident?

a) When did the issue arise?

A. Sorry, I don't have access to NSS records, although these have already been passed to the Inquiry. Although I would have been aware of the specific issues relating to wards 2A and 2B the water system serves the whole hospital and I would have been focussed on the system in general. My memory of the specifics in relation to these wards is unfortunately not clear at this point.

b) What was the nature of the issue - specifically what was thought to be wrong with the building system in question?

A. The board was getting higher than expected bacterial counts in water samples at various points in the system.

c) What was the hypothesis?

A. The hypotheses at various times will be recorded in the NHSGGC IMT minutes.

d) At what stage did HFS become involved?

A. Sorry, I don't have access to NSS records, although these have already been passed to the Inquiry. I believe we were asked to become involved by HPS, after the issue had been notified to them.

e) What was the nature of the risk posed to patient safety and care?

A. The answer to this is beyond my competence.

f) What action, if any, was taken?

A. The actions will be recorded in the minutes of NHSGGC's IMT and water technical group.

g) Was any action taken sufficient to address the issue?

A. HFS had no remit to judge this.

The Water Technical Group

Please see (A48808270 – Water Technical Group – Water Review Group Minutes
– Bundle 10, pages 92, 97, 139, 150, 166 to 171)

28. The Water Technical Group (WTG) Sat 2018 and 2019, and you attended several meetings as noted above: -

a) What is the purpose of a WTG?

A. The WTG's purpose will be detailed in NHSGGC records, however it dealt with technical issues, not considered to be suitable for the IMT.

b) What issue/ event prompted the setting up of the WTG, and what was the aim of the WTG?

A. To the best of my recollection the WTG was set up to move detailed technical discussions to a more appropriate group to enable the IMT to more effectively do its work.

c) How did HFS become involved with the WTG?

A. To the best of my recollection, HFS was involved in the IMT before the WTG was set up. Those providing technical advice were asked to serve on the WTG. I'm sorry, I don't recall exactly how this was done, but there will be records detailing this.

d) What was your involvement with the WTG?

A. Support for NHSGGC's WTG was provided primarily by Ian Storrar from my team, with me covering when he wasn't available. That support was on the same basis as any other support for this or any other board; i.e. advice on the interpretation of national guidance and sourcing of suitable expertise.

e) What was the focus of the WTG? What issues came to light?

A. This will be recorded in NHSGGC's minutes.

f) What concerns did the Group have and how did the concerns impact patients?

A. This will be recorded in NHSGGC's minutes. To the best of my understanding, the IMT remained the Board's primary vehicle and the WTG reported to the IMT.

g) What recommendations and/or action were given/taken as a result of HFS involvement?

A. This will be recorded in NHSGGC's minutes.

h) How did clinical staff and estates get along at these meetings?

A. To the best of my recollection, very well. Naturally, when each discipline was discussing the sometimes specialised aspects of their area, there would be limited crossover to other disciplines. That said, beyond the natural tendency to see issues from the perspective of ones area of competence, which is very common, I do not recall much difficulty between disciplines.

29. Was assistance sought from the Water Regulations Advisory Service (WRAS) during this period? If so

a) What assistance was sought?

A. This will be recorded in NHSGGC's minutes, however, I have no recollection of being involved in seeking advice from WRAS.

b) What recommendations were made by WRAS?

A. Any recommendations are likely to have been made in writing and NHS GGC should be able to provide.

c) Were the recommendations implemented. If not, why not?

A. I don't know what recommendations were implemented. HFS had no remit to judge this.

d) To what extent were any actions taken sufficient to address the issue

A. I don't know the sufficiency of any actions. HFS had no remit to judge this.

30. Was any report and/or Action Plan prepared by HFS in relation to the Water Incident? If so,

a) Who prepared the report?

A. During this work NHS GGC asked HFS to review the building handover documentation against what would be expected with regard to national guidance. This review led to the creation of the Water Technical Report (A33448015 – Bundle 7, Document 4, page 70), which the Inquiry has been given. This report was primarily written by Ian Storrar of my team. I reviewed several drafts and discussed it with him before signing off the final draft.

b) What were the report's findings?

A. These are detailed in the Water Technical Report.

c) What recommendations were made, and to whom?

A. These are detailed in the Water Technical Report.

d) Were the recommendations acted upon by NHS GGC?

A. I don't know if the recommendations were acted upon. HFS had no remit to monitor this. There were also recommendations for other parties, including NHS NSS, which did work through an action plan to address the issues identified.

e) If not, do you know why?

A. I have no knowledge of this. HFS did not have a remit to monitor NHSGGC's actions.

f) What was the consequence of recommendations not being acted on, if any?

A. HFS had no remit to judge this.

<u>The DMA Canyon Reports</u>

31. To what extent were you aware, if at all, of the DMA Canyon 2015 report?

A. I think I became aware of both DMA Canyon audit reports through discussions with Ian Storrar during the creation of the Water Technical Report (A33448015 – Bundle 7, Document 4, page 70).

32. To what extent were you aware, if at all, of the DMA Canyon 2017 report?

A. I think I became aware of both DMA Canyon audit reports during the creation of the Water Technical Report.

33. When did you become aware of the reports, who made you aware of them, and did you discuss them with anyone?

A. I think I became aware of both DMA Canyon audit reports during the creation of the Water Technical Report. Ian Storrar and I will have discussed them in broad terms as evidence for the Water Technical report.

34. Do you know why a risk assessment was not carried out prior to handover of the hospital in 2015? Do you have any views as to why this was not carried out?

A. I don't think I had any knowledge of why a risk assessment was not carried out prior to handover. I don't think I was close enough to the decision making to have clarity on why it wasn't carried out.

35. The 2015 Report made various recommendations, do you know whether these were actioned, and when?

A. The Water Technical report says there was no evidence of any action being taken.

36. What are your views on the findings of the 2015 Report? Do you agree or disagree with it? Please explain your rationale.

A. I no longer have access to this report, however, from memory it contained a number of recommendations to address findings in relation to the management and operation of the water system. Many, or most, of these related to deviations from that expected in national guidance. HFS' position at

the time was that the guidance was the accepted general approach of NHS Scotland bodies, having been accepted by the Scottish Engineering Technology Advisory Group (SETAG). Whilst I don't have the report and can't be specific about my views on the specific recommendations, my view generally is that in any case where the guidance, NHS or other, was not followed, those responsible should be able to explain why not, and how an appropriately safe outcome was achieved by the approach taken.

Cryptococcus 2019

Please see (A47175206 – QEUH Cryptococcus Sub-Group Minutes – Bundle 9, pages 5, 12, 16, 19, 25, 30, 71, 85, 95, 130, 141,163.)
Regarding your understanding of Cryptococcus infections at QEUH:

37. What is Cryptococcus?

A. This is beyond my competence.

38. Had you seen or heard of Cryptococcus in a healthcare environment prior to QEUH?

A. No

39. What were the issues with Cryptococcus at QEUH? When and how did you become aware of the issues?

A. My understanding is that Cryptococcus infections were found in patients and an IMT was set up to establish what happened and identify remedial actions. I no longer have access to NHS NSS records, and I am not clear whether we were contacted by NHSGGC or HPS for support, as the ventilation system might be involved.

40. How did HFS become involved with the Cryptococcus Infection Management Team (IMT) Expert Advisory Sub-Group?

A. As I understand it, the acronym IMT stands for Incident Management Team. As I say above, I think we were asked for support by HPS.

41. When did you join the Sub-Group? Discuss your involvement with the Group.

A. I no longer have access to NHS NSS records, and the NHSGGC minutes supplied by the Inquiry don't contain this information; however, from memory, we were invited to support the sub group, chaired by Dr Hood, at or near its inception. Support from HFS was provided primarily by Ian Storrar, with me covering when he wasn't available. When appropriate and available, we were both present.

42. Who were the members of the Cryptococcus IMT Expert Advisory Sub-Group?

A. NHSGGC will have records of this. I don't propose to copy parts of them into this statement.

43. What were the hypotheses regarding the Cryptococcus issue?

A. The hypotheses at each point will be recorded in NHSGGC's minutes, and in the final report.

44. What was your view on the hypotheses?

A. I was advising on specific aspects of the hypotheses, i.e. ventilation guidance. I was content that each hypothesis should be investigated and judged on the merits of the evidence available.

45. What was your hypothesis and the rationale behind it?

A. I was not close enough to the issue to have a personal hypothesis. At all times, I was working on NHSGGC's agreed hypothesis.

46. What recommendations were made and/or actions taken?

A. Any recommendations made will be recorded in NHSGGC's minutes. I have not replicated them here.

47. To what extent were any actions taken sufficient to address the issue?

A. I do not have a view on this. HFS had no remit to judge this.

48. Did the Group come to an agreement regarding the hypotheses surrounding

the Cryptococcus issue?

A. Hypotheses were proposed and investigated. During my involvement, I don't think I encountered significant dissent, however, I am aware there was disagreement in later meetings which I did not attend.

49. If not, why not? What were the consequences of the Group not agreeing?

A. I don't recall significant disagreement in the meetings I attended. I am aware there was disagreement in later meetings when the report was being produced, however I don't have clarity on what the disagreements were or the consequences.

50. Did the Group come to an agreement regarding the actions to be taken?

A. I understand later meetings, where I was not present involved a degree of disagreement, however I am not close enough to the issue to take a view.

51. If not, why not? What were the consequences of the Group not agreeing?

A. I don't have a view on this.

Report from the Cryptococcus Incident Management Team Expert Advisory Sub-Group

(Please see – A39235063 – Report prepared by Cryptococcus Expert Advisory Sub-Group dated 5 April 2022 – Bundle 6, page 1115)

52. Dr John Hood prepared a report concerning Cryptococcus within QEUH. Did you read the report? When did you read the report? What was your understanding of the report's findings?

A. I think I read some early drafts of parts of it, however I was less involved later in the process and I don't recall seeing the final draft. From reading the version supplied by the Inquiry, I do not remember reading this, although I would normally expect to read any report listing me as a member of a group. I note it was published at about the time I was seconded to NHS Lanarkshire.

53. What observations did you make on the report?

A. NHSS Assure and NHSGGC will have records of correspondence on this issue, to which I no longer have access. I believe the HFS / Assure records have been supplied to the Inquiry.

54. Did you agree with the report's findings? If not, why not?

A. I don't think I saw the final draft, or expressed a view.

55. Did HFS agree with the report's findings? If not, why not?

A. I was aware through discussion with Ian Storrar that there was some dissent from within NSS, however, I don't know how much was HPS or HFS, or indeed, how much was shared between the two.

56. What action was taken following the report's findings?

A. I am not aware of what action was taken as HFS had no remit to monitor this.

57. What else could have been done? What could have been done differently? If so, in what way?

A. Given my role in HFS I was not involved in the later meetings and the drafting of the report, and as such, I am not close enough to the issues to have a view on this.

58. What concerns, if any, do you have about the ways matters were dealt with, any action taken, or not taken?

A. Given my role in HFS I was not involved in the later meetings and the drafting of the report, and as such, I am not close enough to the issues to have a view on this.

59. What was your view on the pigeon population on the QEUH/RHC site?

A. This is beyond my competence.

60. What is your view on the pigeon contamination in the plant rooms?

A. I was involved in a visit to a plant room where bird droppings were visible on the plant room floor. There was discussion of the risk of contamination from here being drawn into the ventilation system and thus passed to patient areas. My eventual view on this was that, although there was a spigot at a damper on the upstream side of the air handling unit, any air drawn in here, even if airborne cryptococcus was present in the plant room would likely be small compared to the adjacent air intake, where all the air for the system is drawn from outside. Both the spigot hole and the fresh air intake were upstream of the filtration, which would have had the same effect on both. The filtration incorporated was of a type typically used for ventilation of a general ward, not a ward housing immunosuppressed patient.

Re-design of Ward 2A – 2019 Upgrade Works

61. To what extent, if any, were you involved in the re-design of ward 2A in or around 2019?

A. I don't think I was involved personally. I am not sure if my team provided any advice. If so, NHSS Assure will have records which will already have been supplied to the Inquiry.

62. If you were involved in reviewing the design, why was that?

A. I have no recollection of being involved in this.

63. Why were you reviewing the hospital ward 2A design?

A. I do not think I had any involvement in the review of the design for ward 2a.

64. What recommendations, if any, did you provide regarding the design?

A. I think none.

Documents for the witness Edward McLaughlan

Bundle 12
Bundle 10
Bundle 9
Bundle 7
Bundle 6

1. A47069198 – Hearing commencing 19 August 2024 - Estates Communications – Bundle 12

2. A34466659 – Email Chain from David Wilson, Brookfield Multiplex to Peter Moir, NHS GCC – subject ‘QEUH Ward 4B – Services Drawings’ dated 24th December 2015 to 13th January 2016 – Bundle 12, page 745

3. A43119719 – Email Chain from Mary Anne Kane, NHS GGC to Ian Storrar, NHS NSS and others – subject ‘QEUH & RHC – Water System Test Results’ dated 23rd to 24th April 2018 - Bundle 12, p926

4. A43119657 – Email Chain from Mary Ann Kane, NHS GCC to Edward McLaughlan, NHS NSS AND OTHERS -SUBJECT ‘[Blocked URL][External to GCC]’ Dated 3rd April 2018 - Bundle 12, page 922

5. A43158827 – Email chain from Mary Anne Kane, NHS GGC TO Tom Steele, NHS NSS and others – subject ‘IMT WATER INCIDENT RHC, NHSGGC’ dated 14th to 16th September 2018 – Bundle 12, p938 to 940

6. A48808270 – Water Technical Group – Water Review Group Minutes – Bundle 10, pages 92, 97, 139, 150, 166 to 171)

7. A47175206 – QEUH Cryptococcus Sub-Group Minutes – Bundle 9, pages 5,

12, 16, 19, 25, 30, 71, 85, 95, 130, 141,163

8. A33448015 – HFS Water Management Issues Technical Review – March 2019 – Bundle 7, page 70

9. A39235063 – Report prepared by Cryptococcus Expert Advisory Sub-Group dated 5 April 2022 – Bundle 6, page 11

Scottish Hospitals Inquiry
Witness Statement of
Dr Susanne Surman-Lee

This statement was produced by the process of sending the witness a questionnaire with an introduction followed by a series of questions and spaces for answers. The introduction, questions and answers are produced within the statement.

Personal Details

1. Name, qualifications, chronological professional history, specialism etc – please provide an up-to-date CV to assist with answering this question.

A Dr Susanne Surman-Lee is my professional name, (my married name is Dr Susanne Lee). I am a Consultant Clinical Scientist (Public Health Microbiologist) registered with the UK Health Professions Council (Reg. No. CS02982) and Director of Legionellae Ltd).

I am also a Chartered Biologist, an Honorary Fellow of the Royal Society for Public Health, a Fellow of the Royal Society of Biology, a Fellow of the Institute of Healthcare Engineering and Estate Management, a Fellow and member of the Technical Committee of the Water Management Society and a Fellow and Council Member of the Pool Water Advisory Group
My specialism is public health microbiology especially water hygiene and infection control in the built environment.
See also attached CV for chronology

Summary of Involvement

2. Can you provide a brief summary of your involvement with the QEUH and RHC?
Ref Bundle 8 – Page 134

A I was initially contacted via an email from Phil Ashcroft the former, Department of Health Principal Buildings & Facilities Management Services Engineer, on the 16th of March 2018, asking for help on behalf of Ian Storrar, Health facilities Scotland. Following this I exchanged telephone conversations and emails with Dr Teresa Inkster to get an update and background information on the situation and to see if I could be of help. I then made a site visit on the 25th of April 2018 primarily to visit the problem areas.

I attended an initial meeting with Dr Inkster, Annette Rankin, Health Protection Scotland, Nurse Consultant, Prof Brenda Gibson, Consultant Haematologist, at the Royal Hospital for Children and Susie Dodd, the Lead IPCN at RHC and in the afternoon with Dr Teresa Inkster, Annette Rankin, Maryanne Kane – the Interim Director of facilities, Ian Powrie, the Estates manager Colin Purdon, estates and Ian Storrar -.

Because of the limited time the discussions focused on the children's hospital only and included a visit to ward 2A. I gave some feedback on the day and prepared a report for Dr Inkster with some observations and recommendations following the visit.

After that I exchanged a number of emails and telephone calls with Dr Inkster to answer queries on the ongoing situation.
I was later contacted by the Lisa Summers from BBC Scotland in January 2020 to ask if I would be willing to give them independent expert advice on the water issues at QEUH. I subsequently was asked to take part in a BBC documentary which was filmed in March 2020. **Ref Bundle 8 – Page 134**

Limitations

3. Considering the limitations described – only discussing the children's hospital and your visit to ward 2A – did/have these limitations restricted your ability to give an opinion or advice in relation to the water situation at the QEUH/RHC in any way? If so, please explain how and why you were so restricted.

A The intention of the meeting was what I understood to be a preliminary visit to visit Ward 2a following the isolation of *Cupriavidus paulculus* and *Stenotrophomonas* spp. This was suggested during discussions with Dr Inkster to better understand the water related risks in the RCH as it is always difficult to envisage areas just from verbal descriptions and wanted to see for myself the physical layout to avoid making assumptions based on verbal information only. The reason the visit was shorter than I would have liked was that I had an upcoming planned hospital procedure which required some recovery time and limited time available between existing work including a series of teaching commitments in the USA. I was also under the impression this was a preliminary visit, and I would have time for more in-depth visits at a later date.

Summary:

4. Did you have contact with Dr Inkster in advance of your visit? If so, when did you have contact with Dr Inkster? What was the nature and details of any such contact?

A Yes, see above, both emails and telephone conversations to give me the background to the water hygiene issues current at that time and make arrangements for the visit.

5. Can you explain what Cupriavidus Pauculus and Stenotrophomonas are? What is your knowledge/experience of these? Are you aware of the circumstances surrounding the discovery of these hospital acquired infections (HAIs)? Can you explain what you mean by 'clinically significant'?

A Both *Cupriavidus paulculus* (previously known as *Ralstonia paucula*) and *Stenotrophomonas* species belong to a group of Gram negative* bacteria which have been previously shown to cause hospital acquired infections associated with exposure to water. Whilst naturally occurring opportunistic pathogens

present in water supplies, including *Stenotrophomonas* and *Cupriavidus* species, rarely cause infection in those with competent immune systems they can cause serious illness and sometimes death in those who are at high risk of infection because they are immunocompromised as a result of their illness or treatment.

a) What is your knowledge/experience of these?

A I had not had personal experience of this particular opportunistic pathogen, but I have many years' experience working in both clinical and public health microbiology and investigating adverse results, cases and outbreaks associated with the range of microbial waterborne pathogens including from healthcare premises.

The ecology and routes of transmission of *Cupriavidus* and *Stenotrophomonas* species have many similarities to those of *Pseudomonas aeruginosa,* a common Gram-negative opportunistic pathogen associated with causing waterborne infections and outbreaks particularly in immunocompromised patients. The range of recognized waterborne pathogens associated with causing infection is growing and we are seeing many species of bacteria, previously unrecognized as causative agents of infections from water and the environment being reported. This increase is partly because the methods for identifying environmental pathogens correctly was previously difficult, time consuming and costly and limited by the available techniques, as most identification kits for identifying pathogens were aimed at the common pathogens associated with causing human infections so environmental [1]isolates of concern, obtained during investigations, had to be sent to specialist reference laboratories for identification. Developments in technology over the last few years have drastically improved the ability to identify environmental isolates as this technology has become more available, simplified, and able to give rapid results at reasonable costs.

My understanding from conversations with Dr Inkster at that time was that there was an epidemiological relationship which suggested the hospital water in 2a

[1] *Gram staining is used in the laboratory to differentiate between different groups of bacteria based on the properties of the cell wall which affect their ability to take up coloured dyes (stains). Gram positive bacteria retain the stain and look dark purple under the microscope whereas Gram negative bacteria are not able to retain the stain and look pale pink.

could be a source of infections that had caused harm to two patients. Sampling had also identified environmental sites positive for *C. paulculus.*

b) Can you explain what you mean by 'clinically significant'?

A Both *C. paulculus* and *Stenotrophomonas* spp. have previously been linked to causing infections in highly susceptible patients. If present in healthcare wards / units where patients at higher risk of infection can be exposed to water, sprays or aerosols derived from water or wastewater, either directly or indirectly, they potentially pose a significant risk of harm to patients. Indirect transmission can occur from cross contamination from splashes containing pathogens from water and / or associated drains, landing on surfaces. For example, on water system fittings, equipment and personal effects within the splash zone from a sink (this can be up to 2m), as well as clothing, drinking water, staff or other persons etc. which can then be transferred either directly i.e. via direct patient contact or indirectly, via contact with a person or object previously splashed).

6. Do you recall how you were received at the meetings? Did those with whom you met engage with you and actively seek your advice? Did anyone not engage with you? If so, can you recall who and in what way they didn't engage?

A I have had many meetings like this during previous investigations into hospital acquired cases. It is such a long time ago now so cannot be sure, but I can't remember it felt any different to similar situations I had been in previously.

7. You briefly described the water supply/system to both the QEUH/RHC. In your opinion, and based on your experience, is the water supply and system what you would expect for a new build hospital? If not, what would you typically expect in this regard? Why would you expect the water supply and system to be set up in that way? What is the risk of the water supply and system not being set up as you would expect?

A I was surprised that such a large hospital, particularly one intended for use by high-risk patients with compromised immune systems was not designed to protect patients at high risk of waterborne infections with good design and engineering and a multiple barrier approach to prevent waterborne infections Supply water, even when meeting all the regulatory standards is not sterile and will contain a range of microorganisms which rarely do harm to the general population however it is recognized that they may cause serious harm and sometimes death to patients highly susceptible to infection. When water is supplied into the building, bacterial pathogens at cold water supply temperatures are usually present in low numbers and with a low capability to cause infection.

As temperatures rise, their ability to colonise and grow within water systems increases, as does their ability to cause infection. In large and complex systems such as in hospitals, the risk of microbial colonisation within system pipework and fittings increases from the point of supply entry as it travels through the complex water systems within buildings, particularly where there are many floors and loops, and sub loops of water system pipework within the system.

It is predictable that the traditional primary control within building water systems to manage the risk of microbial growth i.e. temperature will not be achieved consistently throughout the entire systems, including up to all outlets, particularly when there are areas which are intermittently used such as OPDs etc and ensuite facilities for patients who are too ill to use the facilities e.g. showers etc.

I would have hoped for a risk assessment for water safety at the design stage, to ensure the systems were designed to maintain water quality targets which would ensure safety for all intended users who may be exposed to water and wastewater as well as sprays and aerosols derived from water sources. This risk

assessment should include all potential modes of transmission taking account of those who are most susceptible to infection. Because of the complexity of large hospital systems and the susceptibility of the intended user groups, I would also have expected a multibarrier approach e.g. temperature as the primary control backed up by a water treatment system such as chemical disinfection (the type of biocide should be determined based on risk assessment) together with a flushing regime to ensure the controls (temperature and biocide) were pulled through to all the outlets. Hot water maintained at 55°C will control bacteria released from biofilms whilst maintaining water at ≤ 20°C minimises the risk of growth and transmission of waterborne pathogens. Even when there are controls in place there is the potential for contamination of the outlet and retrograde colonisation (growth backwards from the outlet) through the system particularly for *P.aeruginosa* and other similar Gram-negative organisms which typically grow in higher oxygenated areas of the system.

All outlets should therefore have been designed to minimise risk of biofilm formation without any inserts to increase the risk of microbial colonisation as they increase the surface area for biofilm formation especially as these were identified as a risk factor for *P. aeruginosa* infections in the Belfast outbreak which resulted in the deaths of neonates.

8. As an interim measure, point of use filters had been put in place in the children's hospital whilst a longer-term measure was sought. What was your view on the use of point of use filters? Was this an appropriate solution? What, if any, is the risk in using point of use filters? In your experience, how can any such risk be mitigated? Were any such mitigation measures in place in the RHC?

A In my opinion this was a sensible and a commonly used option to protect patients whilst the root cause of water hygiene problems is being investigated, especially for patients at increased risk of waterborne infections (*see HSE HSG 274-part 2 para. 2.117*). For high-risk patients, the point of use filters (POUF) should be of an absolute sterilising grade (0.2 micron) to give the highest level of protection and prevent exposure to all waterborne pathogens.

As with all control measures there are several factors that need to be considered in the decision-making process. For example: -

1. When filters are fitted it reduces the activity space (the space between the outlet and the basin / basin drain) for handwashing and increases the risk of touching and contaminating the filter or the drain below if the distance from the filter outlet and basin have not been designed to take POUF. Depending on the design of the basin and tap, the fittings may need to be changed to ensure the risk of POUF contamination during handwashing activities is minimised.
2. There is also a risk of breaching the water fittings regulations if the air gap between the water level and outlet is breached so the filter comes in contact with water in the basin (which because plugs are not used in wash hand basins in clinical settings, will be in contact with the drain contents increasing the potential for contamination of the sink surfaces and for backflow into the distributed water supply.
3. Particularly in water systems with hard water and / or particulates the flow through the filter may become reduced to the extent that users have been known to remove the filter to get a suitable flow for washing/ showering etc. particulates can be a problem even in soft water.
4. Where there is a drain directly below the filter outlet splash back from the drain may contaminate the filter outlet, so it becomes colonised with potential pathogens.
5. If the fitting of the filter is not carried out by someone trained and competent then there may be leakage around the filter which results in the water delivered through the outlet of the filter becoming contaminated.
6. Poor cleaning techniques can also result in filter outlet contamination.
7. Those taking samples may remove and refit filters resulting in cross contamination.
8. The casings are more fragile in some filters and so may get damaged if badly handled or dropped, for example.

These risk can be mitigated if:

- there is a due diligence approach to the selection and procurement of filters,
- they are fitted by trained personnel, preferably trained by the manufacturer.
- ward, cleaning staff and users have awareness training, so they understand.
  - why the filters have been fitted,
  - how to avoid contamination
  - how to clean basins with filters present.
- Those taking samples and directing sampling should ensure it is understood that filters should not be reinstalled.
- new filters must be fitted by those trained to do so after filter removal.
- All relevant personnel e.g. those installing filters, ward staff, IPC teams risk assessors and cleaners should also know to report any signs of leakage around the joint between the tap and the filter so immediate action can be taken.

I was not party to the decision-making process for using POU filters so cannot comment on the last part of the question.

Discussion Points Included:

9. Reason for growth of waterborne opportunistic pathogens:

a) You stated that the presence of these pathogens in the water supply, particularly the hot water supply, suggested that temperature control had not always been achieved. Can you expand on this and explain your reasoning behind this conclusion? What is the importance of maintaining temperature control?

A See also answer above, repeated adverse results suggests that there has been a failure in water management.

At low temperatures, background bacteria which occur naturally in supply waters are typically in low numbers in the incoming water, and may be dormant, in a viable but not culturable state (VBNC) or growing slowly and have a low capacity to cause infection. There was evidence of ongoing issues with poor temperature management in the draft Review of Issues Relating to Hospital Water Systems' Risk Assessment A43941023 which had been sent to me prior to my visit.

The presence of these opportunistic pathogens such as *Cupriavidus paulculus* and *Stenotrophomonas* spp. etc. suggests that there had not been adequate management of the water systems since the systems were filled. Water borne pathogens can be controlled in the flowing hot and cold water to the outlet if kept at the HSE ACOP L8 and Guidance HSG 274 / SHTM/HTM target temperatures right up to the outlet. This requires a design that ensures good flow, and minimises the distance from the supply pipework to the outlet or inlet to thermostatic mixing valves (TMVs) where fitted.

Effective biocide dosing acts as a secondary barrier to keep patients safe when target temperatures are not maintained, whilst it does not remove biofilms, it mops up the microorganisms released from the biofilm in the planktonic (water phase).

Temperature control is the traditional method advocated in national codes of practice and guidance for controlling the risk of *Legionella* and if applied consistently would also have helped to control and minimise the risk from other waterborne pathogens in the distributed water too.
An additional biocide would also have helped to prevent intermittent contamination events during remedial works or maintenance, for example, when replacing outlets and retrograde growth from outlets contaminated by staff and / or patients which can track backwards up through up the pipework (called retrograde contamination).

10 Do you have a view on whether the pipework was contaminated before installation? If so, what is your view and what is it based on?

A The Draft Review of Issues Relating to Hospital Water Systems' Risk Assessment A43941023 identified that there was documented evidence that there were open ended pipes on site. This is bad practice and means that nutrients, dust debris, contamination from insect and rodents which can support the growth for microorganisms could have entered the pipes before fitting. Tap fittings, TMV s etc. maybe contaminated before they are fitted into the system if they had been pre wetted during the manufacturers testing process and can contain several mls of water; visible biofilm has also previously been seen in

new off the shelf fittings. Without a validated disinfection step before installing into an existing water system new components such as TMvs, outlets etc. these can then introduce potential opportunistic pathogens into the system.

a) Do you have a view on whether there was mismanagement of the water system following pressure testing which then led to contamination? If so, what is your view and what is it based on? **Ref Bundle 8, Page 150 (and again on pages 11,12,13,15,)**

A I don't personally have the evidence of when ingress occurred except for the potential for contamination by poor management of pipework on site (see answer above), for example it could have been at multiple occasions from when items were wet tested by the manufacturer, then transported and stored on site or during construction with retained water or damp areas within, but also there could have been contamination during installation, filling or commissioning by poor hygiene and / or using equipment that had been previously used or wet tested at manufacture. The Review of Issues Relating to Hospital Water Systems' Risk Assessment A43941023 indicated that there were many issues which could have led to ingress into the systems during construction including; the incoming mains pipe which was identified as being contaminated with soil and debris, the water tanks were not clean at the time of handover and hot and cold water system pipe work at both QEUH and RCH were contaminated during the installation process with documented evidence of open ended pipes and that flushing took place without the Point of Entry Filters (POEF) in place which were intended to prevent organisms entering the hospital water system.

11 You stated that there was at least a 12-month lag in filling the system and occupation of the building. Where did you get this information from? Were you advised of this? If so, by whom? Were you provided with documentation or other information regarding this? If so, what were you provided with and who provided it to you? In your opinion, what is the significance of a 12-month lag between filling a water system and occupation of a building?

A This recommendation was based on information in Review of Issues Relating to Hospital Water Systems' Risk Assessment A43941023 mentioned above hat Scottish Water had tested the supply of both QEUH and RCH in 2012,

- there was water in at least some of the pipework in August 2014 and

- commissioning of the systems did not take place until November 2014.

I cannot remember exactly where the 12-month period came from (probably verbally during my site visit). The evidence that there was at least several months between filling and handover means the system was put at significant risk. Even a short period of time following filling with water when the system is not safely managed poses a risk of systemic colonization and growth of biofilms especially if the filling process bypassed the point of entry filtration system and there was no ongoing flushing with disinfected water of the entire filled system.

a) You stated that biofilm was developing in the water system. Were you provided with evidence relating to this? Did you view biofilm on your visit to Ward 2A? You state that biofilm is more resistant to biocide than others. Can you explain and expand on this point please?

A The isolation of several opportunistic pathogens from water samples is consistent with the presence of biofilms on the surfaces of water system pipework and components. Microorganisms within water preferentially grow on surfaces and not usually within the water phase. It is usually not possible without taking systems apart and culturing and / or visualising them under a microscope to prove that biofilms are present except when there is gross colonisation of visible components.

Biofilm within pipework etc. is not usually visible to the naked eye. There are many peer reviewed publications, over several decades, that have shown colonization and growth of biofilms rapidly occurs when conditions allow within water systems and components, and that biofilm associated bacteria are inherently resistant to the levels of biocide commonly used in water treatment when compared to the same species in the planktonic phase (i.e. unattached to biofilms).

12 Recommendation 1 related to what should have been done in advance of the building handover. Were you provided with details of what happened pre-handover and how the water system was managed? If so, what information were you provided with? What was this recommendation based on? Was this specific to the QEUH/RHC based on your visit, or general advice that would be given to all hospitals?

A General advice for all new systems is that they should be filled with water as close to handover as possible to minimize the risk of colonization and growth of microorganisms during the period between filling, commissioning and handover which, for a hospital can be for some months. For this reason, national guidance states that initial pressure testing should be with air or an inert gas via a filter to prevent the ingress of airborne microorganisms. Once filled, systems and any attached equipment should be disinfected and flushed to remove nutrients present from manufacture and installation etc. and then kept flowing and disinfected as if the building was in full operational use.

Records should be kept of when the system is filled; commissioned; handed over; and occupied together with all disinfection monitoring and flushing and any remedial works that need to be carried out.

Fungal Contamination including Aspergillus:

13 Can you explain what you meant by ‘damping down’ being used as a control measure to reduce fungi being released into the air?

A Damping down is using water (usually as water sprays) to minimise the risk of airborne contamination during demolition, including from fungal spores.

a. What were you advised of regarding cleaners’ observations on the amount of dust in the hospital? If so, what were you advised in this regard? What did you consider the significance of any such observations?

A I cannot recall whether this was discussed at the time of my visit.

b. You stated that Aspergillus had been cultured from numerous hospital sources, including food and water. Who advised you of this? Did you see documentation to support this? What is the significance of this observation?

A This was not specific to RCH or QUEH, I am aware of this from previous incidents I had been involved in and from peer several publications to this effect. *Aspergillus* spp. and other fungal pathogens have previously been identified as a cause of hospital acquired infections, particularly in immunocompromised patients. There are various recognized potential routes of transmission including water, food and airborne transmission. Because it is recognized that immunocompromised patients are at higher risk of both water and airborne transmission of a range of opportunistic pathogens, mitigations should be in place to prevent exposure from the concept stage of the building for example units for high- risk patients designed with appropriate ventilation and HEPA filters in place to minimise the risk of ingress of airborne particles including airborne pathogens and fungal spores.

c. You stated that fungal contamination is likely a result of the ongoing demolition works in the hospital. Can you expand on this please? Were any alternatives to the demolition works being the source of the contamination considered? If so, what sources were considered? What, if anything, was your view on the most likely source of contamination?

A Dust and debris released during demolition is recognized as a source of fungal spores. Please see answer above for alternative sources. In my opinion it is possible that the contamination came from demolition works.

Training:

14 What were your specific concerns regarding staff training at the QEUH/RHC? What were these concerns based on? Did you consider staff training to have been adequate? If not, why not?

A This follows on from the answers from previous questions where it was identified in the Review of Issues Relating to Hospital Water Systems' Risk Assessment A43941023 that there were failures during installation, with pipework being uncapped, point of entry filtration bypassed for example which suggests there was a lack of understanding of the importance of maintaining water hygiene and the effect on patient safety. This is especially important where there are patients at high risk of infection and the need for everyone involved in the construction of new healthcare premises, including those involved in designing, constructing, procurement, installing, filling systems, commissioning and normal operation and maintenance to have at the very least a basic understanding of water hygiene requirements and the implications if care is not taken to avoid contamination.

a. You mentioned the HSE Guidance and HTM Series HTM 04-01 and changes to this guidance. Can you explain what this guidance is? What is its importance? Who would you expect to have received this training? Who should be complying with the aforementioned guidance?

A The HSE is responsible for ensuring that risks health and safety in the workplace are appropriately managed to comply with the Health and Safety at Work Act and associated legislation including the Control of Substances Hazardous to Health Regulations (COSHH). This includes the management of risks from biological

agents for example *Legionella*. The HSE Approved Code Of Practice (ACOP L8) is intended to help to explain the requirements necessary to comply with legislation and explain the duties for those with responsibility for health and safety under the law, the associated guidance HSG 274 part 2 gives examples of good practice of how water systems can be managed safely. Whilst it is not essential that the ACOP and guidance have to be followed, the onus is on those responsible for health and safety usually in a large organisation the Duty Holder supported by the Board, to show that if they do deviate from the ACOP and guidance the outcome should be as good or better than if they had fully followed the ACOP and guidance. The HSE ACOP and guidance are applicable to all organisations with five or more employees.

The HTM's are Department of Health guidance documents (and SHTMs in Scotland) which provide additional guidance over and above that published by the HSE to give advice relating to governance, the design, operation and management of hospital premises and facilities including the provision of water for the purposes outlined in the drinking water regulations as well for specialist uses in the diagnosis and treatment of patients. Whilst there are different versions in England and Scotland, the SHTMs are generally based on or similar to the HTMs and reflect Scottish local requirements. Contracts for capital projects that I have seen, all stipulate that standards and guidance documents should be followed and complied with.

Training: -All those who have an effect on water quality, specially architects, design engineers, procurement teams, contractors such as plumbers / installers should receive training on water hygiene and the contents of the guidance within the HSE ACOP and associated guidance and that from the SHTMs, HTMs, HBNs as appropriate and how to maintain water hygiene.

Compliance; whilst contracts I have seen tend to list compliance with all standards and guidance including that from professional bodies these are often out of date and may not reflect current best practice since the guidance was published, Those writing tender specifications and contracts should be aware of the limitations of what they are asking for and the need to specify and derogate

where guidance no longer ensures the safety of the intended patients.

b. Recommendation 2 highlights the importance of internal maintenance staff training and training not being restricted to Legionella. Was Legionella training the limitations of the training in place for staff at the QEUH/RHC? What was your understanding of the staff training programme at the hospital at the time of your visit and what was this understanding based on? Did you have any concerns relating to the training programme?

A See previous answers also due to time limitations, I did not go into training during my visit, I was under the impression this was a preliminary visit to give immediate advice on the ongoing problem, this is a recommendation I would give to any premises with water hygiene problems, particularly where there are immunocompromised patients at high risk of infection and indications of poor system management. It is important to underline that it is not just the estates team needing to be informed on water hygiene issues but all who can have an impact on water hygiene including: - clinical and IPC teams, ward staff, ancillary and specialist service groups, patient support services, contractors as well as the patients themselves and visitors too, in high-risk areas. etc.

c. Recommendation 3 refers to plumbers and contractors requiring to have completed an approved training programme before being engaged. Is this recommendation based on those engaged by the QEUH/RHC not having appropriate training or experience? If so, who advised you of this? If not, what was your understanding of the training of those engaged to carry out the work on the hospital?

A This is a common finding that plumbers, installers, commissioning teams etc. do not have sufficient training. The SHTM 0:01 part B identifies training as a key component of competence. The leaving of debris in water tanks and failure to achieve target temperatures indicates poor understanding, lack of supervision and training was a likely scenario. See also previous answers.

Water Safety Group:

15 You mentioned the 'scheme of control', can you explain what this is and who advised you of this/where your knowledge of this comes from? In what way does it not comply with best practice guidelines?

A The scheme of control is a legal requirement Health & Safety Executive Approved Code of Practice and guidance (ACOP L8) "Legionnaires' disease The control of legionella bacteria in water systems".to describe and document the measures to prevent or control the risk from exposure to legionella bacteria" The written scheme should specify measures to take to ensure that control measures minimize risk as far as reasonably practical and remain effective." It is in effect the water management plan which includes the barriers put in place to minimise the risk of ingress and colonisation of microorganisms into water systems and the ongoing controls and monitoring to ensure water hygiene is maintained. In healthcare where *Legionella* is not the only hazard it should be based on a risk assessment which identifies all potential hazards (agents which can do harm) and hazardous events (events that can lead to ingress or an increase in the levels of hazard such that they can cause harm. Water hygiene targets for each use should be specified for each patient group depending on their susceptibility and taking account of all the potential sources and modes of exposure etc. to keep patients, staff and visitors safe. This includes not just water in distribution, but also water used for patient diagnosis and treatment. The risk assessment should evaluate the effectiveness of the scheme of control and make recommendations for improvement.

A copy of the written scheme (SHTM 04-01: Water Safety Written Schemes, NHS GG&C Generic Written Scheme) was sent to me by Dr Inkster on the 17/4/2018.

Greater Glasgow and Clyde Written Scheme Hierarchy Diagram on page 4 of this document shows the WSG which includes much representation from Estates and Engineering including the legionella risk assessor but not those assessing for other waterborne pathogens including for *P. aeruginosa* or input from the IPC team or other specialist users of water e.g. dialysis, , with the consultant microbiologist in an advisory capacity. The notes on page 6 of the written scheme refer to a *Legionella* role but no mention of responsibility for

other pathogens. Similarly, the table on page 8 refers to what is need for L8 (*Legionella* compliance), the only reference to *P. aeruginosa* is in a cross reference to *"All outlets advised to be flushed daily in NHS GG&C Standard Operating Procedure (SOP) For Minimising The Risk Of Pseudomonas Aeruginosa Infection From Water"* and whilst augmented care is mentioned on page 9 it is only in the context of *Legionella* risk. There is no mention of precautions to be taken to protect immunocompromised patients at increased risk of infection from other waterborne pathogens.

a. In what way was it 'geared towards legionella'? Can you provide more information on this? What risks are associated with focusing on legionella? In what way can it be improved to focus on other pathogens?

A See also above answers. The risk assessments carried out by DMA are entitled as L8 Risk Assessments. L8 is the shortened term used for the HSE Approved Code of Practice and Guidance Legionnaires' disease – The control of legionella bacteria in water systems and also quotes BS 8580:2010 Water quality – Risk assessments for Legionella control – Code of practice and refers to it being a Legionella risk assessment.

For high-risk patients such as those in the children's haematology oncology, whilst it is important to effectively control the risks from *Legionella,* this is not the greatest risk to these patients. Because of their immunocompromised state they are at risk from a whole range waterborne pathogens particularly *Pseudomonas aeruginosa* and other gram-negative bacteria as well as from non- tuberculous mycobacteria, and fungal infections. There is much evidence from a range of peer reviewed journal publications highlighting the risks to immunocompromised patients from such a wide range of waterborne pathogens and that preventing exposure to tap water for those at greatest risk, significantly reduces the risk. The World Health Organisation (WHO) published a helpful table identifying the quality of water for patients at high risk of infection in their 2003 publication "Heterotrophic Plate Counts and Drinking-water Safety, *The Significance of HPCs for Water Quality and Human Health.* This is referred to in the latest WHO guidelines for drinking water quality 2022. The 2018 DMA risk assessment whilst still focused on *Legionella* does make some recommendations which would

improve the management and monitoring the risk from *P. aeruginosa* e.g. that the use of hand gels would discourage water use, and that as there had been positive samples for *Legionella* sampling, they advised IPC have input into the sampling plan for *Pseudomonas*.

b. Recommendation 4 concerns changing the composition of the Water Safety Group. What was the composition of the group at the time of your visit? Why did you recommend changing the group structure? You recommended a more holistic/multi-disciplinary approach to the group composition. What in your opinion would this look like and who would participate? Why did you recommend a more holistic/multi-disciplinary approach?

A See also answer above. Prior to the issues ongoing at the time of my visit, the focus of the scheme of control is focused on the risks from *Legionella*. A Water Safety Group (WSG), especially where there are patients at high risk of infections, including those from exposure to water and wastewater, needs to be multidisciplinary with the skills and competencies required to deliver safe water for all users and types of use within healthcare to be able to consider all potential hazards relevant to the susceptibilities of the population who are likely to be exposed. The British standard for developing water safety plans (BS 8680:2020) advises that a gap analysis should be carried out on existing risk assessments to identify what is missing to ensure that water is safe the intended population. This would include a risk assessment for *P.aeruginosa* and other waterborne pathogens for this group of patients and appropriate barriers put in place to protect them from harm. (BS 8580-2) recommends a multidisciplinary approach is needed for risk assessment for *P. aeruginosa* and other waterborne pathogens which would include those involved in the patient day-to-day care as well as infection prevention and control specialists and others as required, should carry out these risk assessments. They should identify all potential hazards and hazardous events that is, events that could lead to the ingress or an increase in levels of hazards which could cause harm to the population likely to be exposed. (a hazard is an agent which can do harm, these may be biological (including bacteria such as *Legionella, Pseudomonas aeruginosa*, *Stenotrophomonas* spp., *Cupriavidus paulculus* etc., chemical such as biocides

and their breakdown products, physical e.g. water which could cause scalds, spilt water resulting in falls, or radiological e.g. in areas where radioisotopes are used in treatment and / or research) plan (scheme of control) should then put in place to minimise these risks from water in an individual healthcare environment (ward/ unit etc). A multidisciplinary approach (and therefore a multidisciplinary group of personal with different and necessary skills to identify all hazards, potential sources of exposure to water, sprays and aerosols derived from water as well as the modes of transmission applicable to each particular patient group. They also need to understand the harm they can cause, and the measures required to prevent that harm. This needs input from medical microbiologists, clinical teams, IPC teams with experience in the built environment, and estates teams and those responsible for all uses of water to which patients may be exposed including where water is used for patient diagnosis and treatment such as aquatic therapy, dialysis, decontamination teams etc. In addition, representation is needed from those responsible for housekeeping including the application of correct cleaning techniques of water fittings and components, water used for food preparation and drinking water and how systems and equipment are maintained are all important for maintaining safe water hygiene.

c. In recommendation 5, you advised to include water from diagnosis and treatment to be included in the WSP. What is the WSP? Please explain the rationale behind this recommendation.

A See above: The water safety plan is a holistic management plan for drinking water safety based on risk assessment using Hazard Analysis of Critical Control Points (HACCP) principles as advocated by the World Health Organization. HACCP was originally developed for the space program to prevent food and waterborne infections whilst astronauts were in space and then adopted by the WHO in 2003 to reduce the risk from contamination of water supplies, moving away from a reactive scheme of control based on sampling results to a proactive and preventive water safety plan approach which looks at the points where contamination could enter water systems or equipment and identifying barriers to prevent such contamination.. Once the risk assessment has been completed then a scheme of control should be developed based on the risk assessment findings to prioritize and mitigate identified risks as well as a program of monitoring to ensure the plan remains effective. This is backed up by supporting programmes such as training, surveillance, audits and ongoing review. The

WSP includes the processes by which an organization ensures water will be safe for all uses and all users at the point of exposure. Exposure to waterborne pathogens can be by:

- **direct contact** for example: bathing in water,
- **indirect contact** e.g., touching surfaces which have been wetted including by being sprayed with water droplets.
- **direct consumption** – e.g. drinking water
- **indirect consumption** -e.g. eating food irrigated or washed by contaminated water
- **inhalation** e.g. inhalation of aerosols (formed from when water is aerosolized for example through turning on a shower or when a tap is turned on and water hits a hard surface or when a toilet is flushed. Aerosols which cause infection in humans have to be less than 0.5 microns, (1 Micron = one millionth of a meter, a human hair is about 50 microns wide).
- **aspiration** e.g. when water is drunk but instead of going into the gastrointestinal tract enters the respiratory tract instead (commonly referred to “as going down the wrong way”

The WSP approach is advocated for the management of *Legionella* risks in the 2007 publication Legionella and the prevention of legionellosis and more holistically for all waterborne pathogens in the WHO Water safety in Buildings (i.e. those based on the results of sampling water and then only reacting when results are available Reactive water management plans which rely on sampling results are not effective as by the time the results are returned the water has already been consumed / used)

published in 2011. there is also a British Standard BS 8680:2020 previously mentioned for the development of WSPs

d. What was the current role of Infection Prevention Control within the water safety group at the time of your visit and report? Who at that time had oversight of water use? Did you consider the oversight regime to be appropriate?

A See earlier answer; - the WSG was very much legionella focused. As far as I can recall Dr Inkster was the lead infection control doctor and was an advisor to the WSG. However as previously identified the scheme of control available at the time did not include membership of the IPC team. In Scotland the SHTM part B (2014) advises that WSGs were led by the Responsible person, whereas in England the DH HTM 04:01 and under the Health and Social Care Act it is the Director for Infection Prevention and Control (DIPC).

e. You referred to special user groups. Can you explain what a special user group is? Would special user groups not normally be included? What is the importance of including them?

A Specialist user groups are for example, those providing diagnosis and/ or treatment which requires the use of water, which usually has special water quality requirements (with water quality targets different to and often over and above those needed to comply with tap water quality requirements as distributed to outlets in general wards etc.). The types of specialist user groups in hospitals depends on the types of patient groups using the facilities, for example, those responsible for haemodialysis, decontamination, aquatic therapy, pharmacy preparations, laundry, food preparation, patient support services including cleaning and water treatment providers. These specialist services usually either require water of a defined water quality for their intended purpose to keep patients safe or which have an impact on water hygiene.

Water Safety Plan:

16 You suggested the development of an asset register. Can you explain what this is? What would this look like? How would you expect this to be managed? Who would normally be involved with this? Is having an asset register, based on your experience, standard practice? How might this assist the water management/contamination?

A An asset register is a requirement within the HSE *Legionella* ACOP guidance to ensure that assets which could pose a risk of Legionnaires' disease if not managed or maintained appropriately, are identified and included in risk assessments and those which require maintenance, as well as ongoing surveillance and monitoring as required, for example, regulating valves, thermostatic mixing valves, calorifiers, RO units etc. This is usually the remit of the estates team. In high-risk patient areas the risk assessment a multidisciplinary group should carry out a risk assessment and also ensure that systems, water and wastewater components, fittings, equipment, placement of patients' personal effects and furniture etc which could pose risks of infection from other waterborne pathogens are also listed to ensure they are risk assessed, managed and maintained appropriately. This would normally include for example the IPC, ward manager, cleaning supervisor, matron etc. (see also BS 8580-2)

b. You stated that the water safety group (WSG) should determine the water quality required for the safety of each user group, and you mentioned WHO and 'French Guidelines'. Can you advise whether this is general guidance which any hospital would be expected to follow or guidance in response to something you had observed or were advised of at the QEUH/RHC?

A This is something should be considered at the design stage of each hospital taking account of the type of patients, their susceptibility to infection and treatments offered. Some patients, because of increased susceptibility to infections, need a defined water quality over and above that supplied by the water distribution system. For some neutropenic patients for example, only sterile water will be considered safe for both consumption and personal hygiene. WHO published some guidance in 2002 which indicated the water quality needed to protect immunocompromised patients based on their immune status, this is

referenced in the latest version of the WHO Guidelines for Drinking Water Quality 2022. The specialist needs of patients should be taken into account at the concept stage of the building and included in the design brief. The French guidelines include defined water qualities for different uses and patients and are referenced in Table 4.1 Nomenclature of waters used in health- care buildings in France (this is referenced within WHO Water Safety in Buildings 2011)[2]

Design Issues:

17 Single Barrier Approach:

i. Can you explain what a multi-barrier approach is? From your experience, is it unusual for a hospital not to have a multi-barrier approach? If so, why is that unusual?

A See above, the multi-barrier approach is advocated by the World Health Organisation (WHO) to minimise the risk of harm from exposure to water. For example, whilst temperature control may be the traditional primary control measure in a healthcare environment if there is failure in the attainment of target control temperatures, then patients and staff would be put at risk. Cold water risks are increased when water temperatures rise during a heatwave and likely to result in increasing incoming cold- water temperatures, other factors which could compromise temperature management could include calorifier breakdowns, power cuts etc. affecting the ability to control hot water for example. A second barrier such as chemical water treatment regime, if in place and appropriately managed would still continue to provide protection from growth of microorganisms within the water system for patients to ensure its safety.

ii. Can you expand on why you state that the temperature will not meet the target 100% of the time at every outlet? What are the implications of this?

A See also above; Effective temperature control depends on the outlets being frequently used (at least daily) to draw water at the target temperatures (cold < 20

°C and hot >55 °C) through to the periphery of the system up to the point of delivery to avoid temperatures reaching the range at which waterborne pathogens such as legionellae and others will grow. The way hospitals are now designed with a high number of single ensuite rooms mean that for very ill patients who are not able to use the ensuite, there is a risk of stagnation in the unused outlets and toilet which is a high-risk factor for waterborne pathogen growth and the potential for exposure to high levels when patients recover enough to use the ensuite. To mitigate this there should be a flushing regime to flush each outlet on a daily basis and flush the toilets. However, this is very rarely achieved for all outlets, very difficult to audit and costly in terms of staff time and wasted water. There is increasing evidence that where water and associated above ground wastewater systems are provided in patient rooms at high-risk of infection because of their immune status or breaches in the skins integrity due to indwelling venous catheters (e.g. central lines), there is an increased risk of waterborne infections particularly from Gram-negative bacteria, and for transfer of antimicrobial resistance genes within the associated drainage.

Designs should take account of the change in patient behaviours for example, for many procedures, patients no longer spend time in hospital before and after procedures, they are expected to shower at home and come into hospital on the day of their procedure and return home the same day not using the ensuite shower at all. The presence of little used outlets puts the entire system at risk and increases: -

- water management costs,
- the risk of infection leading to increased patient stays and antibiotic use
- an increased risk of antimicrobial resistance and
- an increased use of water and personnel to flush little used outlets.
- the impact on sustainability targets as water of drinking water quality is flushed to waste.

iii. You stated that it would have been prudent to have had point of use filters to protect the highest risk patients. Can you explain how point of use filters work? Why would they protect the highest risk patients? Do you consider it to be standard practice to have point of use filters in place? What, in your opinion, is the risk in not having point of use filters in place?

A Point of Use Filter (POUF), depending on the specification, minimise the risks from distributed water by filtering out microbial hazards immediately before water is dispensed at the outlet. As long as the appropriate filters (sterilising grade absolute filters) are fitted correctly and managed appropriately, they retain microbial hazards which can cause infection, including legionellae and other Gram-negative bacteria as well as NTMs, to deliver safe water. (see earlier comments re POUF above). There is good peer reviewed evidence of their effectiveness at reducing risks to patients from waterborne hazards, reducing costs associated with waterborne infections and lowering the risk of transmission of antimicrobial resistance.

b. Overprovision of water outlets:

i. You stated that, 'it was felt' that there was an overprovision of water outlets. How was this communicated to you? By whom was it communicated to you? Was this your observation? Were you advised of this during your visit? Did you agree with this?

A This is a common design problem in that the calculation for provision of water outlets guidance is out of date and nearly all hospitals have too many outlets. In recent years the risk from unused outlets, the increased use of hand gels, and the risks from waterborne pathogens in outlets and drains in causing waterborne infections, is better understood. This was discussed during my visit and yes I very much agree with this.

ii. Why would an overprovision of outlets contribute to low flow in the system?

A Where there are many outlets which aren't used, the spurs which feed the taps off the distribution pipework (usually a few feet in length) remain stagnant. Stagnant water is subject to temperature loss in hot water pipes and temperature gain in cold water pipes feeding these. Where water is not moving (because the outlets aren't used then the control measures, whether temperature or biocide do not reach the outlet continuously. Warm water temperatures and stagnation provide ideal conditions for waterborne pathogens to grow.

iii. From your experience, are ensuite bathrooms and showers common in new build hospitals? Did you have any concerns regarding this?

A Unfortunately, yes they are common, the current NHS policy focus seems to be more geared to giving patients a hotel type of experience rather than providing a safe, nurturing and sustainable environment to recover from illness. Whilst single ensuite rooms have some benefits in that patients get better sleep and there is a lower risk of patient-to-patient transmission of infection, (therefore it is necessary to have some isolation rooms). In my experience there is a growing body of infection prevention and control specialists in the built environment and estates engineers who consider the risk is much higher of patient harm from water and drains which aren't used sufficiently to ensure their safety in patient rooms.

For some patients as already explained, exposure to water and associated above

ground drainage poses too great a risk of direct harm and also increases the potential for an increase in the development of antibiotic resistance as many of these waterborne opportunistic pathogens are inherently resistant and facilitate the spread of antibiotic resistance between microbial species. There will always be some long-term patients who will need an ensuite shower, but the design of patient rooms should not be a one size fits all. The trues cost of the provision of all ensuite rooms should take into account:

- The initial cost of the fittings and installation
- The cost in terms of manpower of managing the unused outlets.
- The cost of water and sustainability implications of using more tap water than necessary for flushing
- also, the sustainability implications of heating and treating water to be flushed
- the cost of monitoring and testing to verify controls are effective, taking account of personnel and laboratory costs
- The increased length of patient stays, theatre time and antibiotics for resulting Gram-negative infections (there is much evidence in peer reviewed publications that providing filtered “sterilised” water or preventing exposure altogether reduces the overall number of gram -negative infections and reduces antibiotic use)
- The economic and social cost to those infected and their families
- The increased risk of antibiotic resistance
- The increased cost of wastewater management to treatment works.

iv. Recommendation 7 suggests that outlets are reviewed and removed if unnecessary. Are you aware if this happened or was considered by the QEUH? In your experience, for what reason would an outlet be deemed unnecessary?

A As far as I recall I did not know, until I read the documentation provided for this inquiry that an SBAR raised. It has been usual in designs (until recently) that as well as a wash hand basin for
patients in their ensuite there has also been a clinical wash hand basin in the patient room for handwashing. Handwashing provision for staff is not always necessary in patient rooms and can be safely provided outside the patient area / room with gel provision once inside. The provision of wash hand basins in

rooms should be subject to risk assessment based on the immune status of the patient and any co morbidities which may affect their risk of waterborne infection. Providing just one wash hand basin in the ensuite, and not in the patient room, can protect patients from splash and aerosol contamination

v. How would you expect such action be balanced against the risk of contamination from contractors?

A The way that we design and build hospitals has to change so that the focus is on patient safety first and foremost. Site management is important, a clerk of works or equivalent working for the intended owner and with the project water safety group should ensure that all materials, components and fittings arrive and are managed on site as specified and are suitably protected so they do not introduce nutrients and microorganisms into the system during construction, installation, filling, commissioning up to the point of handover and beyond. All water system and fittings as well as drainage (including toilets) should remain sealed until handover so they can't be used by contractors and contaminated. The filling of the system should be at a time agreed by the project water safety group as late as possible in the project to avoid stagnation in the period between filling and handover.

vi. Are flow sensors and flushing regimes commonly used from your experience? How effective are they? Given your knowledge of the water contamination at the QEUH/RHC, how effective do you think sensors and flushing regimes would have been at resolving the water contamination issues?

A The use of remote monitoring by automatic sensor devices including of flow, temperature and biocides is increasing and becoming more available and cost effective. Remote monitoring would not remove the risk from poor design installation and commissioning. As long as the system has been kept free from contamination during the build process to handover and remote monitoring is a very useful tool in keeping the system safe. However, there are some factors that need to be considered to ensure its effectiveness depends on for example:

- the type and positioning of sensor chosen,
- the quality and calibration (needs to be calibrated for the parameters to be measured and robust),

- the accessibility for calibration and maintenance,
- the strength and type of signal
- the frequency of sensing (too frequent (multiple time per minute for example) can generate so much data that deviations may be missed,
- the way the data is transmitted (how good the signal from the sensor to the data collection device),
- the way that data handling and trend analysis is carried out and
- how alerts to out of target parameters are transmitted and
- the chains of communication to manage any actions necessary.
- The integration of AI technology

In my opinion automated remote monitoring is the future but we are still on a learning curve. However, there are already remote sensors already in use, such as in self-flushing outlets which can be set to flush if an outlet has not been used for a period of time and that can collect data on the type of usage etc. I am aware of hospitals where these are already successfully used to help manage the risk in low use and high-risk areas. As with anything electrical and mechanical they need to be risk assessed, installed and maintained appropriately.

c. Sluice rooms:

i. Can you explain the risks associated with the positioning of the sluice rooms? How does the positioning of sluice rooms relate to water contamination? Did anyone else share your concerns regarding the design of Ward 2A?

A It is generally accepted that the risk of waterborne infections resulting from exposure to water and wastewater is increased when sinks are used for anything other than handwashing, e.g. disposing of water used for patient hygiene, drinks, antibiotic infusions etc. are disposed of down the sink. The risk of such instances is increased if the sluice room is positioned far from the patients especially those who are critically ill, as nursing staff will not want to leave their patients. In addition, there is an increased risk of spills resulting in slips and falls if water has to be carried some distance from the point of use.

Designing sluice rooms to be central to avoid these risks is a sensible approach. I cannot remember if anyone else shared these concerns before my visit but I would be surprised if it hadn't been raised previously.

ii. Recommendation 8 suggests that the Trust review their design guide with infection specialists for future designs. Are you aware if infection specialist had been involved from the point of designing the QEUH/RHC?

A No I am not aware.

iii. Would you have expected such experts to have been involved?

A Ideally Yes although there are currently very few IPC professionals with expertise in the built environment. There are also very few architects and design engineers who understand the risks associated with poor water system design.

iv. How effective was the design process in your view?

A I think the outcome for the patients and their families affected speaks for itself. The problem with design and build projects is that the contractors do not have sufficient knowledge to design out risks and there is usually no one on-site oversight to ensure the build is carried out as specified and the focus is on the absolute requirement to provide a safe outcome for all patients including those at the highest risk of harm.

v. Did you discuss collaboration with infection control at your meeting on 25th April 2018? If so, what was the discussion around this? Were any concerns shared? If so, what concerns were shared, and by whom?

A It is so long ago I can't remember exactly but I am fairly confident this would have been discussed especially when Dr Inkster and I visited the ward in question.

c. Flow straighteners/aerators:

i. Can you explain what a flow straightener/aerator is?

A A flow straightener is a device fitted into the spout of the tap to create a laminar flow (smooth the flow and decrease turbulence) to reduce the risk from splashing. An aerator typically introduces air into the flow and reduces the volume of water passing out of the outlet to reduce water use. There are different types and complexity of flow straighteners, the investigation into the Belfast outbreak showed that the more complex type are more likely to be colonised than the simpler types. These inserts typically look a sieve-like structure and are made of materials (some plastic or metal) and inserted into the outlet and provide an increased surface area for biofilm growth.

ii. Is it well known that these inserts cause waterborne HAIs? If so, how do flow straighteners and aerators cause waterborne HAIs? Do you have a view on why these would have been included in the design of the hospital? Are they common features in other hospitals?

A Following the Belfast outbreak in particular I would have expected that architects, design engineers, Estates and IPC teams understand the implications of fitting these especially in augmented care areas. The first mention I am aware of was of flow straighteners linked to waterborne infections in a neonatal unit was published in the New England Journal of Infection in 1966. Since then, the outbreak which occurred in Belfast in 2011/ 2012 made national news and resulted in an independent review (similar to a public inquiry) and in addition, there are many publications in peer-reviewed journals and guidance at the time from the Department of Health *"Pseudomonas aeruginosa – advice for augmented care units"* published in 2013.

My personal experience is that the design engineers and those responsible for procurement were not sufficiently aware of the risks to successfully design out risks from water systems in healthcare premises. Despite Department of Health guidance that aerators/flow straighteners should be avoided my experience is that they are still found in healthcare premises.

You mention an outbreak of Pseudomonas Aeruginosa linked to flow straighteners. Can you expand on this? Why do you consider that the outbreak was linked to the flow straighteners? Would those at GGC have been aware of

the deaths in Belfast? On what basis would you consider that they would have been so aware? Had they been aware, what do you consider they should have taken from the incident in Belfast**?**

8

A See above answer and the findings from the independent review and publications related to the Belfast outbreak. I would be surprised if those designing the hospital had not been aware of the Belfast outbreak. As identified earlier it made the news UK wide and resulted in new guidance from the Department of Health. The design brief for QEUH should have been specific and excluded these taps with inserts from the design. There should also have been a process within the WSP to ensure that the procurement of taps was such that they did not incorporate aerators/flow straighteners. I would have hoped that those designing and engineering the project, taking account of the intended user group, would have sufficient competence that to ensure they were designing safe spaces for the intended users and collaborated with IPC and the clinical teams to establish if there were any special requirements needed in the design. For example, ensured there was sufficient collaboration with IPC, clinical teams, estates, microbiologists etc. to ensure materials, components and fittings would not pose a risk to these patients and could be effectively disinfected for example by putting through a wash and disinfector or to be autoclaved.

iii. Recommendation 9 suggests that flow straighteners and aerators are removed in high-risk areas and replaced with outlets which can be more easily maintained. Why are flow straighteners and aerators difficult to maintain?

A See earlier answers, Because of their complexity and the likelihood of them collecting scale, particulates and biofilm. They have an increased surface area for colonisation with biofilms and are difficult to clean and disinfect. They increase the risk of infection, are an avoidable risk, and therefore under health and safety legislation (e.g. COSHH) they should be removed or replaced with something which minimises this risk.

iv. How easily can they be replaced?

A There are taps available which do not require inserts available

v. What effect in respect of infection risk would there be in replacing the flow straighteners and aerators?

A It's not possible just to replace the flow straighteners/ aerator in a tap that is designed to work with them in place, the tap needs to be designed to give laminar flow removing them with just increase the splashing risk. Taps without inserts reduces the risk of harm to patients.

vi. Would this be a reasonable step for the hospital to take considering factors such as the cost and disruption to patients?

A Patient safety has to come first, The risk of colonisation of outlets would be significantly reduced therefore also the high risk of waterborne infections for these patients. There is good peer reviewed evidence that if you remove the risk of waterborne infections there is not just a cost saving to the organisation, but reduced overall levels of Gram-negative infections, reduced antibiotic use and theatre time and reduced patient lengths of stay compared to those who do not get infected within healthcare premises.

e **Point of use filters:**

i. Can you explain what you mean when you refer to 'demountable outlets? Why are these more effective for highly vulnerable patients?

A These are outlets which can be removed for disinfection / sterilisation. The ability to remove, clean and disinfect/ sterilise the outlet (see above) by putting through a washer disinfect, or autoclaving is a more effective way to reduce microbial colonisation than trying to disinfect the tap in situ.

ii. Can you recall how often filters were being changed? How often would you expect the filters to be changed? What do you consider the risk to be if filters are not changed as you would expect?

A I can't remember if this was discussed, the timescale depends on the manufacturer, type of filter and the hardness and amount of particulates in the

water as to what the recommended time frame would be. Another factor when considering if they need to be replaced is if the water pressure drops through the filter due to clogging. If I recall correctly, they used PALL filters which typically had a 30-day lifespan.

iii. You state that contamination of the filter is extremely rare and most likely to be the result of external factors. Were the filters within the QUEH/RHC contaminated at the time of your visit and report?

A Not determined

iv. If so, what was the source of the contamination? How do filters typically become contaminated? What do they typically become contaminated with? How is such contamination a risk to vulnerable patients?

A See earlier answer about point of use filters.

v. Recommendation 12 suggests parents fill their baby baths from the shower to reduce the risk of filter removal: why would this reduce the risk of filter removal? How were parents filling baths and children being washed? Is this recommendation based on your observations and/or understanding of what was happening in ward 2A?

A If I recall correctly there was evidence of patients parents removing point of use filters from the wash hand basin to fill the baby bath because wouldn't fit under the tap with the filter in place. This was a practical solution and removal was less likely to happen if they used the shower instead.

f **Cleaning:**

i. Can you recall the details of any discussions on cleaning the point of use filters? If so, what was the nature and details of any such discussions?

A I don't recall the exact discussions, but I sent Dr Inkster a video that I was involved with making with Dr Elaine Cloutman Green in collaboration with the Royal Society for Public health and Great Ormond Street Hospital.

ii. How were point of use filters being cleaned at the time of your visit? How are point of use filters typically cleaned? Do you have an opinion on the methods

being used and the risk of contamination associated with these methods?

A I don't know how the point of use filters were being cleaned at the time of my visit. Different manufacturers have different opinions as to whether the filter should be cleaned or not as there is a risk of contamination of the outlet of the filter from poor technique particularly if those cleaning them do not understand or have been trained to clean these effectively and without the potential to contaminate the filter outlet during the process.

iii. What are the water regulations on backflow prevention and who should comply with these? Can you explain the importance of having 'an effective air gap'? What are the consequences of the sinks in patients' bathrooms not being compliant?

A In Scotland these are bylaws; "*Paragraph 15 (Byelaws in Scotland)*

(1) *Subject to sub-paragraphs (2) to (5), every water system must contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring".*

(2) *The definition in Water Regs UK is that "An air gap' means a visible, unobstructed and complete physical air break between the lowest level of water discharge and the level of potentially contaminated fluid downstream (critical water level) within a cistern, vessel, fitting or appliance, hereinafter called a receptacle, for example if a tap was fitted so that the spout protruded below the water line there is a potential for water which had been in contact with the contents of the drain, to flow into the tap spout and contaminate the fitting and water within it. By ensuring that the tap cannot protrude below the water line means that there is a water free space (air gap) between the outlet and the water in the sink/ basin and so backflow cannot occur.*

iv. In terms of Recommendation 14, what measures were taken to remedy the sinks in the bathrooms? Were new sinks fitted or plugs removed? How effective do you consider any remedial work to have been in relation to infection control?

A I have no information to answer this

g

Patient and environmental isolates:

i. Can you recall details of the discussion around ruling out water as a potential source for cupriavidus? Who was involved in any such discussion? What position(s) were taken during the discussion?

A I think it was with Dr Inkster and we were both on the same page that it was likely to be associated with the water and / or drainage system.

ii. What was the basis of your opinion that water should not be ruled out as an environmental source despite different strains being identified met? What was the outcome of the discussion?

A It is not possible to exclude a match between the clinical isolates and environmental sources for several reasons,

- There is a huge sampling error when taking samples, for example the point at which patients would be at highest risk is when the outlet had s not been used for several hours. When taking a true pre flush sample i.e. when an outlet hasn't been used for several hours) the potential for positive results decreases significantly within seconds of the outlet being turned on. False negatives results are likely after only minutes of the tap being turned on and water flowing as the biofilm in the outlet is washed away.

  There were insufficient isolates tested at the same time from a single sampling event. To have a 95% statistical probability that there is no link between patient and environmental sources you would need to pick and type at least 30 isolates from the same sampling event and same culture plate.
  For the same reason it is possible that patients, particularly if immunocompromised may be infected with more than one strain.
  All potential sources of exposure and transmission were not as far as I am aware, sampled, for example all drains, overflows, toilets, cleaning equipment, outlets and drains in staff and parent areas, etc.
  In addition, recent work published in Nature confirms that patients may commonly be co-infected by multiple pathogen clones, so the isolate picked for typing may not be representative.

iii. You state that it was likely that water was the source and cannot be ruled out due to isolates not matching. Can you explain this further and provide reasoning for this conclusion?

A See above

iv. Are you aware if the steps you describe were taken to rule out environmental sources and confirm a patient strain in the system?

A No

h Water temperature:

i. Can you explain the importance of maintaining water temperature?

A Already answered above.

ii. What is the importance of maintaining data on water temperature? What kind of data would you expect to see being maintained?

A Already answered above.

iii. Over what time period should such data be maintained?

A *It is a legal requirement see HSE ACOP L8:- Record keeping.*

" person or persons appointed under paragraph 39 shall ensure that appropriate records are kept, including details of:

a. the person or persons responsible for conducting the risk assessment, managing, and implementing the written scheme.

b. the significant findings of the risk assessment.

c. the written scheme required under paragraph 53 and details of its implementation; and

d. the results of any monitoring, inspection, test or check carried out, and the dates. This should include details of the state of operation of the system, ie in use/not in use.

67 Records kept in accordance with paragraph 66 should be retained throughout the period for which they remain current and for at least two years after that period. Records kept in accordance with paragraph 66(d) should be retained for at least five years'"

iv. How should any such data be utilised?

A Already answered above

v. Did not having this data available cause you concern? If so, why?

A Yes, because of noncompliance with their legal duty, which in turn is a cause of concern regarding their competence. The lack of such data means it is difficult to do any root cause analysis when adverse results were identified.

Communication with GGC and Dr Teresa Inkster

Refer to email correspondence of 16 March 2018 between Ian Storrar, Philip Ashcroft and Susanne Lee: Fw cupriavidus pauculus URGENT.

18. Was this the first contact you had regarding the water contamination at the QEUH/RHC?

A Yes this is a repeat question see above.

19. What knowledge, if any, did you have of the issues with the water in advance of this?

A Non.

20. In this email you refer to Cupriavidus Pauculus. Can you explain what this pathogen is? Is this a common pathogen? Where is this pathogen normally detected? In your experience, what is the typical cause of its appearance?

A This is a repeat question.

21. Following this email, did anyone from GGC contact you to follow up on your advice? If so, from whom did you receive contact? How did they contact you? Can you please provide details of any such communication? Did you respond to any such communication? If so, when did you respond? How did you respond? What was the nature of your response?

A Non except I received a nice email from Ian Storrar thanking me, I did receive a forwarded email from the Director of Facilities, Allyson Hirst via Dr Inkster asking

for availability for a joint meeting with Tom Makin, however, I was told when I replied to Dr Inkster this was no longer needed. Dr Inkster told me later when I asked about why, that they did not allow her to invite me again as they didn't like what I had said.

22. When was your first contact with Dr Inkster? Can you provide the details of this contact from Dr Inkster? What information did she provide you with? What, if anything, did she request of you? How long did your contact with Dr Inkster continue for? When was your last contact with Dr Inkster?

A This has already been answered.

I am in contact with Dr Inkster regularly, I have asked Dr Inkster to present a webinar for the RSPH and as a recognized expert I have asked she be part of British standard committees I chair, writing new waters safety standards. She is also a respected member of a group I am the lead technical author of writing a Department of Health Technical bulletin to update HTM 0401 for the design of units for high-risk patients. Last contact probably wb 15.7 2024 to discuss the drafting of the technical bulletin.

23. Did you have any involvement with the water technical group? If so, can you please provide details of the nature of your involvement?

A Not since my visit

Other than your meeting of 25th April 2018, did you have contact with anyone else from the hospital or GGC either in person, by email, phone or otherwise? If so, can you please provide details of who you had contact with, how you were in contact with them, and the nature and details of those communications?

A This is a repeat question and not as far as I recall.

Refer to email – 23 March 2018: Teresa Inkster and Susanne Lee - Re: Glasgow water incident - request for assistance.

24. In this email, Dr Inkster advises that she, along with Dr Armstrong and Mary Anne Kane, would like to invite you to undertake a more formal role to assist going forward. What was your understanding of this invitation and what your role would be going forward?

A This is already answered.

25. Did you ever have any contact with either Jennifer Armstrong or Mary Anne Kane?

A Not to my knowledge If so, can you please provide details of the dates of any such contact, and the nature and details of any communications? Did you communicate with anyone else other than Dr Inkster in this regard? No not as far as I can remember

a) If so, can you please provide details as to who you were in contact with, when, in what manner, and the nature and details of any such contact?

A Not as far as I can remember, apart from at the meetings in Glasgow and the ward visit my contact was Dr Inkster.

Refer to Email – 24 March 2018: action points from teleconference.

26. Dr Inkster and Annette Rankin undertook to discuss your remit and email you. Do you remember receiving these emails? If so, what was your official remit? Were you satisfied with the terms of your remit? If you were not, on what basis were you not so satisfied, and what do you consider your remit ought to have encompassed?

A Because I was not asked to return as expected as far as I recall a remit was never agreed

Refer to IMT 23 March 2018 – Future Preventative Measures

27. The minutes of this IMT state that Dr Inkster formally invited you to explore the hypothesis and consider additional measures, especially for BMT patients. Did you have a hypothesis at this point regarding what might be causing the water contamination? If so, can you please provide details of what your hypothesis was, and how you reached it? Did this hypothesis change following your visit and/or as you were provided with further updates from Dr Inkster throughout your involvement with the incident? What is your current hypothesis on the cause of water contamination at the hospital? On what basis did you reach this hypothesis? Has this hypothesis been communicated to anyone at GGC? If so, when was it communicated, to whom was it communicated, and how was it communicated?

A I have already answered this in previous questions. My opinion is that the hospital was poorly designed and managed during the construction and following filling with water. The evidence is in the documentation and speaks for itself. as far as I remember some of this was discussed during the visit.

28. Did Dr Inkster seek your advice on the introduction of new taps and dosing the water supply to the hospital? If so, when did she seek your advice on this? What advice did you provide to her? When did you provide this advice? On what basis was any such advice provided?

A We talked about dosing alternatives during the meeting at the hospital and in following emails

Refer to IMT 12 June 2018

29. It was noted that there were cases of Enterobacter within the hospital and that Dr Inkster had been consulting with you regarding this. Do you recall these discussions? What information were you provided with by Dr Inkster relating to these cases? Were you provided with documents or was your knowledge restricted to verbal conversations and/or emails?

A As far as I recall via an email on the 10th June 2018 from Dr Inkster. Did you consider that you had been provided with all relevant information in relation to the cases of Enterobacter? As I understood it the Enterobacter was likely to be related to the ongoing issues. What advice did you give to Dr Inkster? My

response was in relation to the risk of splashing and increased risk where filters are fitted when the outlets have not been designed to take them as raised by Dr Inkster. Also, the difficulties in cleaning drains and referred her to George McCracken head of the estates risk team at the Belfast Trust whom I know had tried disinfecting drains with Actichlor.

30. How did you reach any conclusions that you did? Was your advice was taken forward and actioned? If so, how do you understand your advice was taken forward? Was there any follow-up from the initial discussions with Dr Inkster where you were advised of the outcomes, and the details of any outcomes?

A From experience, and Dr Inkster told me she was going to call George apart from that I was not aware of further actions.

Point of Use Filters

Refer to IMT 21 March 2018

31. With reference to page 5 of the Minutes from the IMT on 21 March 2018, it states that a decision was taken to use the water without first testing the microbiological efficacy of the filters and that this was something you agreed with. Do you recall the nature and details of any discussions regarding the microbiological efficacy of point of use filters which you may have had? If so, who did you have these discussions with? Was the decision to proceed to use the water something which you agreed with? If not, why not? What did you understand the reasoning behind this decision to be? Are there risks involved in proceeding to use the water without confirmation of the efficacy of the filters? If so, how would you expect these risks to be balanced?

A I only vaguely recall these discussions. The filters that were proposed were PALL filters. PALL filters have been used around the world, they have good validation data and there are many peer reviewed international independent evaluations in the literature of their efficacy in reducing the risk of waterborne infection in high-risk patient areas.

Concerns about mobile sinks and bottled water

Refer to email correspondence of 16 March 2018 between Ian Storrar, Philip Ashcroft and Susanne Lee: Fw cupriavidus pauculus URGENT.

32. In an email dated 16th March 2018 to Philip Ashcroft, you expressed concerns regarding the use of mobile sinks and bottled water. Can you expand on these concerns? What did you consider the risks to be in using mobile sinks and bottled water? Why were they risks? To whom were they risks?

A This was based on previous observations of how these mobile sinks have been stored between uses in other hospitals which put them at risk of colonisation, which was a cause of concern, particularly when intended for high risk patient areas. I have previously observed mobile sinks had been left for some time with residual water in them, This allows them to be colonised with biofilm microorganisms and therefore they pose a continued risk.

33. What is the significance of the distinction between bottled water and sterile water for immunocompromised patients?

A Bottled water is not sterile and can contain a range of naturally occurring waterborne pathogens including *Pseudomonas aeruginosa.* There have been outbreaks in hospital intensive care units from using *Pseudomonas aeruginosa* colonised bottled water.

34. Are you aware if mobile sinks were being thoroughly disinfected before use? How are mobile sinks disinfected?

A No I did not have any information on whether they were being disinfected before use. Ideally they would be drained after use and dried as far as possible , and then disinfected, pipework replaced and disinfected again before use

35. How often would you expect them to be disinfected?

A Depends on the usage. A risk assessment is needed good practice would be to drain, disinfect and dry thoroughly after use and in my opinion a minimum of at least weekly to prevent biofilm growth whilst in use. The sump should have disinfected water to control growth in the pipework (as for distributed water) Chlorine tablets or chlorine dioxide tablets would suffice.

36. What, if any, are the risks in not disinfecting mobile sinks at the intervals that you would expect?

A As above they become colonised potentially with waterborne pathogens particularly *Pseudomonas aeruginosa.* Biofilms once established cannot be removed effectively over the long term. Replacement of tubing etc. would be needed.

37. Can you explain what the 'Dutch Lead' is? What is the significance of it?

A Joost Hopman from the Netherlands was the first to carry out research and publish on the decreased risk to patients from waterborne infections when sinks were removed from ICUs is removing water completely from the highest risk places something which happens often? Why would you expect water to be removed completely from these areas?

Still not commonplace but it is becoming increasingly discussed to protect high risk patients. It depends on the susceptibility of the patients and based on clinical risk. The idea is to protect patients from being in the vicinity of sources of exposure to water and drains and any sprays or aerosols emanating from them.

38. Do you know if your concerns were considered, and any action subsequently taken by the hospital? If so, what actions do you understand to have been taken, and when?

A No Repeat question.

39. Following this email exchange, did you discuss the issues of mobile sinks and bottled water with anyone either directly or via email?

A Not as far as I can recall.

40. If so, who did you discuss the matter with, when, and what was the nature and details of any such communications?

Site Visit

41. In advance of your visit to the QEUH/RHC on 25th April 2018, what, if any, information were you provided with in advance of the meeting? Who provided you with this information? Were you able to consider any information provided to you in advance of the meeting? If so, what were your impressions of what you had been provided with? Why did you suggest a meeting was necessary? What was your understanding of the purpose of this meeting? Who was your main point of contact for the meeting?

A Repeat question.

42. In the morning, you met with Dr Inkster, Annette Rankin, Professor Brenda Gibson and Susie Dodd. What do you recall from this meeting? What was discussed? Were you provided with any documentation? Can you recall what views had been taken by those who you were meeting with on water contamination? At this meeting, and before your visit to the ward, did you form an initial view on the issue of water contamination? If so, what initial view had you formed, and on what basis was it so formed?

A Repeat question, the purpose of the visit was to see the ward for myself (that was the purpose) and to put the problems into context. I try to keep an open mind.

43. In your report, you advised of your concerns from observations which you made on your visit to Ward 2A. If you have not already done so, can you expand on those concerns and the basis on which you reached them?

A Already answered.

44. How long did you spend in Ward 2A? Did you view any other parts of the hospital? Were you given access to all areas which you requested? Did you feel you had enough time to complete your inspection? Was there an opportunity to speak to staff working on the ward? Did the staff have any concerns which they expressed to you? If so, what concerns were communicated to you?

A I don't recall exactly how much time I spent on the ward, there are always limitations in what is possible on such a visit especially where there are highly immunocompromised patients and children with parents, but I was able to see

sufficient for an initial visit. I did speak to staff, including Professor Gibson as we walked to the ward, she was clearly concerned about the patients. I recall being shown the agreement that if I remember correctly was for parents to read and sign to show they have an understanding of the need to keep patients safe.

45. Can you expand on your concerns regarding the design of Ward 2A?

A The layout was such that the sluice rooms were placed so that staff had to walk relatively long distances to dispose of water used for example, for personal hygiene in the sluices. This is difficult for staff who do not want to leave their patients and poses risks of slips and trips and an increased likelihood that wash hand basins will be used for disposal purposes. There had not been any consideration of the practicalities of using the ensuites for parent childcare for example it was very difficult to fill baby baths and so filters were removed, the sinks had also not been designed to take POUF.

46. In the afternoon, you met with Dr Inkster, Annette Rankin, Mary Anne Kane, Ian Powrie, Ian Storrar and Colin Purdon. What do you recall from this meeting? What was discussed? How were you received at this meeting? Can you recall what view, if any, those attending the meeting had on the issue of water contamination? What, if any, advice or opinions did you express during this meeting? How was this received by those at the meeting?

A I gave feedback on what I had seen as described above and described in my report. I cannot remember whether we discussed disinfection at this point or in the morning.

Water Outlets

Refer to IMT 26 October 2018:

47. Following your recommendation to reduce the number of water outlets, changes to hand facilities were discussed with a focus on the ante rooms in BMT, and the suggestion that trough sinks be removed. Were you aware of this proposal and were you asked for advice on it? If so, what advice did you give? Is this something which you would have recommended? If so, on what basis would you have recommended it? Did you view the BMT and the trough sinks on your site visit? If so, what were your observations? Did you have any concerns?

A I was not aware of the actions taken but I was aware of the increased risks from sinks and drains to high-risk patients including from splash contamination. Yes based on risk assessment as I had some concerns re splashing and resultant potential for cross contamination

Refer to SBAR: October 2018:

48. This SBAR was produced following your advice to reduce the number of water outlets. It states, '*the isolation rooms in ward 2A have recently been converted from positive pressure ventilation lobby rooms to positive pressure isolation rooms with an ante room'*. Can you explain what a positive pressure ventilation lobby room is? Can you explain what a positive pressure isolation room with an ante room is? What are the key differences between these rooms?

A Ventilation is outside my area of expertise so I was just repeating what I had been told.

49. Did the conversion of the rooms have any impact on water contamination? In your opinion, would such a change be made in response to issues with water contamination or other environmental factors?

A I didn't visit again so cannot comment.

50. The recommendations in the SBAR suggest that staff should be given an opportunity to demonstrate the need for handwashing in the ante room given there are prescribed circumstances where handwashing should take place rather than alcohol-based hand rub. What are your views on this recommendation? Do you agree that the circumstances described justify the need for the sinks to remain in the context of the bigger issue of water contamination?

A There has to be a risk assessment depending on the uses of water and the susceptibility and closeness of outlets and drains to the patient. A considered need for handwashing as opposed to just hand gel would be if there was a *C.difficile* problem for example, (I was not aware if this was the case) Consideration should also be considered in the risk assessment in areas where nappies are changed.

Drains

Refer to IMT 13 September 2018:

51. Reference is made at page 3 of the Minutes by Dr Inkster to a conversation she had with you where you asked whether a drain survey had been undertaken. Do you recall this conversation? If so, why did you ask about a drain survey and how does this relate to the wider issue of water contamination?

A Drains are a recognized risk factor for the growth of microorganisms, particularly unusual opportunistic pathogens. I was aware that there had been debris found in the water tanks and therefore likely that due diligence had not been followed re the fitting of the drains. If drains are occluded, then there can be backflow onto the surfaces of the wash-hand basins leaving contamination from the drains on surfaces to which patients may be exposed both directly from direct contact and indirectly from splashing.

52. You asked about scopes being put down the drain. Can you explain why you were asking about this? Is this something which you would recommend? Does this enhance the efficacy of the survey? If so, in what way?

A It is the most sensible way to investigate drains to look for blockages.

53. Do you know if a drain survey was carried out? If so, when was it carried out? By whom was it carried out? Were the results of this shared and discussed with you? If so, what were the results? How were the results taken forward? Are you aware of any actions taken as a result of the survey?

A I recall Dr Inkster telling me that there was black slime but apart from that I'm unable to answer the remaining questions.

54. Your comments on the drain survey were to be sent to others in the meeting and then actioned. Did you have contact with anyone else from the hospital or GGC in relation to your advice on a drain survey? If so, with whom did you have contact, in what manner, and what is the nature and details of any such communication?

A See above, nothing further as far as I recall.

Refer to email 13 September 2018:

55. In this email, you provided advice on the drains. What do you mean when you refer to, 'insufficient fall in the drains? What is the significance of this?

A There needs to be sufficient fall (slope downwards) in the drainpipes to give sufficient flow otherwise water, sediment, faeces, paper etc will accumulate.

56. In your view, and given the information you had available, what was the likelihood that there was:

a. Insufficient fall in the drains?

b. Insufficient capacity in the drains?

c. Builders' debris in the pipework?

On what basis did you reach the conclusions in respect of the above?

A I was only aware of the builder's rubble as stated above.

57. Can you explain why disposable wipes and nappy liners are a potential contributor to the problems with the drains? Is this a common problem in children's hospitals? How would disposable wipes and nappy liners contribute to problems with drains?

A It's a problem in most hospitals, wipes and paper towels are disposed of down the toilet and cause blockages.

58. How would this normally be managed?

A Signage, though this is ignored, provisions of sufficient waste bins, regular emptying, and plumbers physically unblocking drains.

59. Can you explain the risk of splash back from the sinks and why this would contaminate the filters and sinks?

A When taps are turned on the water hits the surface of the sink and also the drain if the spout is directly over the drain. This causes splashes which experimentation has showed can reach up to 2 m from the sink. These splashes can contain microorganisms from the drain, including antibiotic resistant strains which can contaminate surfaces, staff and patients themselves.

60. You agree that closing the unit is in the best interests of the patients. Can you expand on this and the reasoning behind this conclusion?

A The unit needed a great deal of work to make it safe, once a system is colonised by biofilm containing waterborne pathogens there is no effective way of long-term removal i.e. the water system and associated drainage would have posed an ongoing risk of harm to these patients and costs to the Board. Removing drains etc. increases the risk of cross contamination potentially leading to infection. The safest option for these patients was to move them to a safe space whilst this work to replace the plumbing was carried out.

Chemical Dosing

Refer to Water Technical Group: 27 April 2018

61. When discussing your report, your conclusion that the water system was likely contaminated before handover is mentioned. Can you explain this conclusion? What was the nature of any discussion about it?

A Repeat question.

62. When discussing chemical dosing, you advised that a higher dose of Sanosil would be more effective in clearing biofilm. However, you also advised that it may cause damage to the pipes longer term. Can you expand on this advice in more detail? How would it cause damage to the pipes? How would a higher dose of Sanosil be more effective at clearing biofilm?

As far as I remember we discussed options for dosing of chlorine dioxide and copper silver ionisation, copper silver was ruled out because of the materials in the system. I don't recall advising on the use of Sanosil as our experience (both my business partner and mine) is that Sanosil does not work effectively in colonised systems, and I always advise on caution about its use especially in heavily colonised systems as our combined experience has shown it is not effective throughout the system and that quite often the recommended doses and contact time by manufacturers are not followed.

I do not recall saying this about Sanosil as I don't advise it is used in highly colonised systems, I would certainly have said this about chlorine dioxide.

63. Are you aware of how GGC proceeded to dose the pipes?

A Sorry No.

64. Was this something which was discussed further with you? If so, with whom did you discuss it? What was the nature and details of any such discussions?

A Not that I recall directly, though I think i recall Dr Inkster telling me in a call that Sanosil was deemed incompatible with the types of taps that were in use.

65. How would the risk of damaging the pipes in the longer term be balanced with the use of a higher dose of Sanosil?

A See above, for oxidising biocides including chlorine dioxide it is recognised that its use even at recommended levels, decreases the lifecycle off the materials. this is accepted by mechanical engineers as a worthwhile pay off for keeping systems safe.

Action Plan from Susanne Lee Report

Refer to Action Plan – 17 August 2018

66. Have you seen this document previously?

A No.

67. The Action Plan was created by Dr Inkster and Ian Powrie based on the recommendations in your report dated 25th April 2018. Is the Action Plan an accurate reflection of your recommendations? If not, why not?

A Yes.

68. Was this document discussed with you or did you have any input into it?

A No.

69. Do you have any comments to make on this document?

A Only that there seems to be a long interval between the issuing of my report and action plan development.

70. Can you provide comments on the ‘Action’, ‘Timescale’ and ‘Status’ in relation to the following: see above I am not sure what is being asked for here above what has already been stated?

a) Recommendation 1:

b) Recommendation 2:

c) Recommendation 3:

d) Recommendation 4:

e) Recommendation 5:

f) Recommendation 6:

g) Recommendation 7:

h) Recommendation 8:

i) Recommendation 9:

j) Recommendation 10:

k) Recommendation 11:

l) Recommendation 12:

m) Recommendation 13:

n) Recommendation 14:

A no I was not party to any discussions following my report as far as I can remember.

BBC Documentary: Secrets of Scotland’s Super Hospital

71. You participated in the BBC Documentary Secrets of Scotland’s Super Hospital which aired in June 2020: when did the BBC approach you to participate in this? What documentation were you provided with prior to your interview? When were you interviewed for the documentary?

A I no longer have this documentation as it was given in confidence, I also had problems with my computer, I have since changed computers and could not access them which is why I had to contact Dr Inkster for a copy of my report . I did contact the police to ask for the list of what I gave to them when they visited me, which I have since forwarded.

a) Was it substantial (the list)?

A A Some of it was redacted the documents I concentrated on were the two DMA risk assessments, 2015 and 2018. My conclusion was they should never have admitted patients into the hospital until they fixed the water contamination problems they were having within the hospital.

72. In the documentary, you commented on the management of the water temperature and that basic control measures were not working at the time of the risk assessment. Can you expand on this?

A A HSE and NHS guidance on control measures is there to prevent microbial growth so if you keep water below 20 °C , (most bacteria will be in a dormant stage and not actually growing, so below 20 °C there is a very low risk of infection but once the temperatures are above 25 °C you get a very steep growth curve (exponential growth) i.e. the bacteria grow very quickly and their ability to cause infection increases . Though a maximum 25 °C is allowed in some European guidance as this is in the slow growth phase of legionella for example). To minimise risk as far as possible cold water temperatures should be kept below 20°C . Stagnation increases the ability of bacteria to stick to surfaces in biofilms, once growing in biofilms microorganisms are much more resistant to biocide treatment so a control measure is to keep the water moving to each outlet to ensure the control measures are achieved throughout the system. Hot water systems should be delivered at a minimum of 55 degrees as there are some bacteria such as Nontuberculous mycobacteria (NTM) which are very resistant to temperature control. There is evidence that the cannot be recovered in hot water systems at 55°C but at 50 °C they can still be recovered. The aim should be to keep water in the cold water tanks 2 °C less than 20 °C to allow for heat gain between the tank to the outlet.

The documentary highlights further concerns which you had, including the high risk of contamination from stagnating water and significant communication issues with those responsible for maintaining the water system. Can you comment further on these concerns?

As above re stagnation which increases the risk of colonisation and microbial growth. The DMA risk assessment 2015 raised the issue of poor communication and this having the potential to exacerbate the risk of microbial growth. *"lack of defined communication between involved parties may be a contributing factor to the out of specification bacterial and legionella results recently recorded bv NHS Estates".* In addition, there was a lack of communication highlighted between Estates and the contractor with the example of a calorifier being reinstated without evidence of appropriate safeguards to protect the system from contamination and the lack of communication meaning Estates had no knowledge at the time this was being carried out.

73. You describe 'fundamental failures' by not ensuring those involved in water safety were being trained to understand risk and what they should be doing to manage it. Can you expand on these failures please?

A See 72 which Refers to DMA Canyon Reports 2015 and 2018. The contractor reinstated a calorifier without any evidence of communication with estates and of taking measures to ensure the risk of cross contamination was managed. The pipework was left uncapped during construction allowing nutrient ingress, there was debris in the CWSTs, and a lack of understanding of the risks from flexible hoses are just a few examples highlighted in the DMA risk assessments

A big problem is a lack of understanding for example is if people don't know why the poor temperature controls are significant in managing the risk, and they don't understand the consequences to patients if the temperatures are incorrect, the importance doesn't register with them. We all see that if people don't understand, from the architects onwards, they don't know how to design out risk factors and what they need to do so good control of all water systems can be achieved, They need to understand why good water system design is so important.

74. At the time of your visit to the QEUH/RHC, were you aware of the report published by specialist water consultants DMA Canyon dated 29 April 2015? If so, had you considered it prior to your visit? Had you considered the report prior to the preparation of your report? If so, what were your impressions of the report by DMA Canyon? How did this report impact on the preparation of your report? Were you aware of any actions taken in respect of the recommendations made by DMA Canyon?

A see above, yes I was aware but the version I remember had redactions, so I don't think I saw the whole report until it was provided in the bundle.

I was really shocked that there was so much wrong at the time they were about to admit patients. They had high cold-water temperatures (at 30 degrees), that is frighteningly high as it is in the exponential growth stage for legionellae for example, . They hadn't got a disinfection system installed to mitigate the risk from poor temperature control. It's highly likely that a large hospital with a large water system won't achieve consistent temperatures, so there is a need for a multi barrier approach as advised by the World Health Organization guidelines. Particularly as the intended patient group: bone marrow transplant patients are one of the highest risk patients you can have – they should have the highest level or protection. If you follow the WHO 2003 guidelines (referred to in the current WHO guidelines for drinking water quality (2022[3]) , neutropenic patients should have sterile water and shouldn't be exposed to tap water, so to have water that wasn't controlled as far as reasonably possible is putting the patients at high risk of infection. There should have been a multidisciplinary risk assessment (environmental and clinical involvement) for the spaces these particularly vulnerable patients were in.

75. At the time of your visit to the QEUH/RHC, were you aware of the report published by specialist water consultants DMA Canyon for 2017, which is dated 31 January 2018? If so, had you considered it prior to your visit? Had you considered the report prior to the preparation of your report? If so, what were your impressions of the report by DMA Canyon? How did this report impact on the preparation of your report? Were you aware of any actions taken in respect of the recommendations made by DMA Canyon?

A see above and as far as I can remember I had only seen the full report when you supplied the bundle. I was impressed by these risk assessments; this is not something I say often). I was part of the committee which wrote the BS 8580-1 so am very critical. Apart from being a bit long winded and a bit repetitive this was one off the best risk assessments I had seen (and I have seen many). I took their risk assessments on board and included some recommendation based on their observations into my report.

76. In relation to the report by DMA Canyon dated 29 April 2015, you stated in the documentary that you would have expected it to go straight to board level to allow a decision to be made at corporate level as to whether the hospital was safe to open. Can you comment further on this?

A I was really shocked that there was so much wrong, they'd finished construction in 2015 and started occupation fairly soon afterwards, this risk assessment was done as a preoccupation assessment, there were so many things wrong, and they didn't address those before admitting patients. So, I would have expected the findings to be put on the risk registers and discussed at board level or senior management to discuss the implications of the risk assessment. I haven't seen anything to say this happened, that there were many things not addressed inby the time the 2017 assessment was completed us a cause for concern. . I haven't seen any evidence that senior management action actually happened.

77. Is there anything further you would like to comment on in relation to the report by DMA Canyon dated 29 April 2015?

A I am rarely impressed by risk assessments, but I actually feel they did a good job and made some good recommendations, they seem to be very thorough, and I was shocked that the remedial actions from 2015 had not been carried out.

78. In the documentary, you described yourself being 'horrified' that so many defects identified in 2015 had not been rectified in 2017. Can you explain what defects you are referring to and the concerns these raise? Are you aware of why any such defects had not been remedied as you would have expected?

A Temperatures seem to have got better, but they are still talking about cold water temperatures being a problem, expansion vessels still not as in the recommended guidance, lots of flexible hoses, the double check valve on the CWST still in the 2017 version, as well as dead legs etc. etc. There was a Department of Health letter which went out in 2013 (?), which advised against use of these hoses as they had been found to be heavily colonised, including with legionellae. That information was well known, these hoses should not be used in healthcare premises. The risks hadn't been mitigated and the longer that you have the potential for increasing microbial growth, the risk is going to rise. In 2017 risk assessment they still had the same debris in cold water tank that they identified as present in 2015 one, not carrying out something as basic as cleaning out a cold-water tank is not acceptable.

79. Were patients being put at risk by the failure to remedy these defects? If so, why do you consider that to be so?

A If you hand over the design and build to a contractor who doesn't have the necessary skills and knowledge to understand the risk from poor design, construction, installation, commissioning, and operation, particularly for a hospital with high risk patients, then there are going to be problems. You've absolutely got to take account of the intended patient group when you're designing a hospital. There wasn't as far as I know, any risk assessment on the patients and what they needed to keep safe. It is almost as if it was designed for a general hospital and not considering the vulnerable patient groups which is shocking.

80. Is there anything further you would like to comment on in relation to the report by DMA Canyon dated 31 January 2018?

A not that I can think of at present

81. Have you been approached by anyone else other than the BBC in relation to the issue of water contamination at the QEUH/RHC?

A Other than Doctor Inkster not that I recall.

Any other relevant information

82. Is there anything else which you believe is relevant and would like to bring to the Inquiry's attention?

A An additional comment on Dr Inkster - I have huge respect for her, particularly in raising her very valid concerns despite the consequences. I have invited her to present at seminars, conferences and international postgraduate training courses I've organized and because of her unique expertise I've invited her to be on British Standard Groups writing risk assessment standards for *Pseudononas aeruginosa* and other waterborne pathogens and sampling for *Pseudomonas aeruginosa*, as well as contributing in an expert group writing guidance for the design of hospital units intended for patients at high risk of infection. I think she's been treated appallingly.

I would also like to point the Inquiry in the direction of the following documents for their reference.

- Review of Issues Relating to Hospital Water Systems' Risk Assessment A43941023
- Health & Safety Executive in their Approved Code of Practice and guidance ACOP L8 "Legionnaires' disease. The control of legionella bacteria in water systems".

Declaration

I believe that the facts stated in this witness statement are true. I understand that proceedings for contempt of court may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief in its truth.

The witness was provided the following Scottish Hospital Inquiry documents for reference when they completed their questionnaire statement.

Appendix A

A43255563 – Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes)
A43299519 – Bundle 4 - NHS Greater Glasgow and Clyde: BAR Documentation
A43955371 – Bundle 8 - Supplementary Documents
A43293438 – Bundle 6 - Miscellaneous Documents
A47175206 – Bundle 9 - QEUH Cryptococcus Sub-Group Minutes
A47395429 – Bundle 10 - Water Technical Group / Water Review Group Minutes
A47390519 – Bundle 11 - Water Safety Group
A47069198 – Bundle 12 - Estates Communications

The witness provided the following documents to the Scottish Hospital Inquiry for reference when they completed their questionnaire statement.

Appendix B

A49639088 – Dr Susanne Barbara Surman-Lee CV 2024

Dr Susanne Surman-Lee
[redacted]
Telephone: [redacted] Mobile
Email: [redacted]

PROFILE OVERVIEW

- Dr Susanne Surman-Lee, Hon. FRSPH, FRSB, CBIOL., FIHEEM., FWMSoc, FPWTAG, is a Consultant Clinical Scientist (Public Health Microbiologist) registered with the UK Health Professions Council (Reg. No. CS02982)), a Chartered Biologist and Director of Legionellae Ltd which provide legal and independent public health consultancy and advisory services.
- Susanne has over 40 years of experience in Clinical and Public Health Microbiology and has a strong scientific and research background with a PhD on *Legionella* growth within biofilms and protozoa and over 30 years of experience; advising, troubleshooting, providing training, auditing and investigating cases and incidents in over 50 healthcare premises nationally and internationally. She has also worked as a temporary advisor to WHO at a workshop in the Middle East on Water Hygiene in Healthcare, as well as at a web based international WHO meeting on water quality. She is an author / editor of the WHO Legionella and the Prevention of Legionellosis (2007) and Water Safety in Buildings (2011). She is passionate about ensuring that patient safety is put first and foremost in with the aim that all newly built healthcare premises should be safe for all users and all uses of water to which patients, staff and visitors might be exposed.
- For over 20 years, she has supported the development of legislation, guidance and standards, working with government departments, professional societies and standards bodies nationally and internationally including as a member of the working groups developing the Department of Health's' HTM 04:01, the UK Health and Safety Executives' Approved Code of Practice and associated guidance for managing risks associated with *Legionella* in water systems HSG 274 and also the Pool Water Treatment Advisory Groups guidance on pool water quality, leading the chapter on hydrotherapy pools. Her work with the British Standards Institution is supporting the UK's work towards the achievement of the UN Sustainable Development Goals SDG6 on the provision of safe water and sanitation for all, proposing the relevant standards and chairing the committee which developed BS 8680-2020 on the development of water safety plans, BS 8580-2 risk assessment for *Pseudomonas aeruginosa* and other waterborne pathogens and is leading the development of a new standard on sampling for *Pseudomonas aeruginosa.* She is also currently chairing a group for the Department of Health, writing a technical bulletin to update current guidance on preventing the risk of NTM infections in newly built hospital units intended to house patients at the highest risk of waterborne infections.
- Susanne's recent and current activities include being an invited speaker at the Lord Mayor of London's Coffee Colloquy on working towards the UN SDG6 goals, working with other professionals to produce a practical book for healthcare professionals on water hygiene (Walker et al., 2023) and working with the NHS England New Hospital program as a subject matter expert on water hygiene, wastewater systems and safety standards. In October 2023, was a co-organizer, chair and lecturer of a very successful ESCMID postgraduate course on water hygiene for healthcare professionals, which took place in Belfast.

ADDITIONAL ACTIVITIES AND AFFILIATIONS INLCUDE:-

CURRENT

- Chair of a Department of Health technical bulletin expert group to enhance HTM 04:01

guidance for NHSE on designing safe spaces for patients at high risk of NTM and other waterborne pathogens since 2023

- -National Health Service England (NHSE) New Hospital Programme - invited member of the Water and Wastewater Safety Group, Sampling Group, Safety Standards Group, Safety Standards Steering Panel Member and Safety Criteria Panel
- **L**ecturer; Great Ormand Street Environmental Network training course on Waterborne transmission, monitoring and control since 2022.'
- Invited speaker Infection Prevention Society Environment, Cleaning and Decontamination Conference
- Member off the Scientific committee for the ESCMID Study Group for Legionella Infections conference Dresden 2024
- Honorary Fellow of the Royal Society for Public Health and Programme Director of their water webinar series,
- Chair of the RSPH Water Special Interest Steering Group
- Fellow of the Water Management Society and member of their technical committee
- Trusted grant and abstract reviewer for the European Society for Clinical Microbiology and Infectious Diseases (ESCMID).
- A Fellow and member of Council of the Pool Water Treatment Advisory Group
- A Freeman of the City of London and Liveryman of the Worshipful Company of Plumbers (WCOP),
- A member of the WCOP Educational and Technical Committee.
- Working with the Belfast Health and Social Care Trust since 2013, as their independent water hygiene advisor, designing and leading research projects into microbial colonisation of hospital water systems and a member of the Trust water safety and usage group. Providing advice and training to infection prevention and control teams, aquatic physiotherapists, contractors, plumbers and patient support staff. I am also a member of the pool water safety group.
- Providing expert water hygiene advisory services to Dolphin Square, the largest privately rented residential complex in the UK, providing water hygiene and safe water design training and chairing the Dolphin Square Water Safety Group since 2019
- Chair of the European Society for Clinical Microbiology and Infectious Diseases Legionella Study Group revising the European working European Guidelines for Control and Prevention of Travel Associated Legionnaires' Disease since 2022
-

2023-

- Invited speaker, water hygiene seminar , Organized by Oslo University Hospital
- International postgraduate training on water hygiene in healthcare Course, programme development lead , chair and lecturer, collaborative ESCMID Study Groups
- Coauthor of Water Safety in Healthcare published by Elsevier.
- invited to be a member of the American Society of Plumbing Engineers, ASPE 82 -Drains and Wastewater
- Elected as a Fellow of the Pool Water Treatment Advisory Group.

MEMBERSHIPS OF LEARNED AND PROFESSIONAL SOCIETIES INCLUDE

- Member of the International Water Association, the Healthcare Infection Society, the Infection Prevention Society, the Central Sterilizing Club and the Association for Professionals in Infection Control and Epidemiology (APIC). A member of ESCMID Study Groups, including for Legionella infections (ESGLI), nosocomial infections (ESGNI), and infections caused by food and water (EFSWIG). Also as an affiliate member of the Chartered Institute for Building Service Engineers and the Chartered Society of Physiotherapy

HISTORY

- From leaving the Health Protection Agency in 2009 to the present, Dr Susanne Surman-Lee has been a trusted source of professional independent public health microbiology advice and consultancy nationally and internationally for the prevention and control of infections caused by water in built and recreational environments, including for incident and outbreak investigation support. She provides independent professional public health microbiology and advice and, consultancy services and bespoke training to NHS, other healthcare providers and others on water system safety and infection prevention and control (IPC) in the built environment as well as on good water system design to CEOs, IPC teams, patient support, plumbers, contractors and design teams, public health and estates engineers, water treatment providers and providers of water hygiene equipment. She is frequently asked to present at national and international meetings.
- **From 1998-to 2009,** Health Protection Agency (HPA) Unit Head then promoted to Director of the London Regional Food Water and Environmental Microbiology Services Laboratory and Lead London, Home Counties and Eastern Regional HPA Food and Water Microbiologist responsible for providing routine food and water microbiology testing services support and training services for all the environmental health and port health authorities and health protection Units, in London and the Home Counties as well as commercial clients. In addition supporting national food and water outbreak investigation teams including in the detection and prevention of food and waterborne illness, leading research on microbial hazards from food and water with local authorities and the Port Health Authorities, including the impact of rainfall on the River Thames. Susanne was a member of the National Outbreak Investigation Team and also represented the HPA on national and international food and water standards bodies. Susanne was also the Founder of the London Wide Water Forum, which included water utilities, regulatory and public health bodies to rationalise the approach to the investigation of outbreaks of waterborne disease within London. Susanne also developed and taught for several years an MSC module on waterborne pathogens and infections caused by water for the London and Queen Mary Medical School.
- **1994 -1998** Public Health Laboratory Service Grade B Clinical Scientist and Deputy Head of the PHLS Water and Environmental Research Laboratory, providing routine public health water microbiology services, water quality research projects, external quality assurance provision for *Legionella* testing laboratories, and outbreak investigation support for regulatory and public health bodies and support for the University of Nottingham Medical school student teaching.
- **1994** Grade A Trainee Clinical Scientist Preston Public Health Laboratory carrying out research and routine public health microbiology and day-to-day management of a collaborative research project investigating the survival of species of *Salmonella* and *Campylobacter* on designated and non-designated bathing beaches.
- !**990-1994** researching for a PhD in the growth of Legionella in Biofilms and protozoa in collaboration with PHLS Centre for Applied Microbiology and Research Porton Down, and part-time radiation protection officer for the University of Central Lancashire
- **1988-1990** Grade A clinical research Scientist, clinical microbiology Hope Hospital Salford on various clinical microbiology projects, including biofilm growth in urinary catheters, validation of microbiology testing and identification kits and mentoring and supervising medical colleagues undertaking masters' projects.
- **1985-88** Further education BSc Joint Honours in Biochemistry and Physiology
- 1980-1985 career break
- **From 1970- 1980** , I worked as a biomedical scientist in NHS and Public Health Laboratories; Manchester Royal Infirmary and St Mary's Manchester, Joint appointment Preston Royal infirmary and Preston Public health laboratory, providing routine clinical and public health microbiology, including Brucella typing, and supporting research projects.

Susanne has been involved in the development of national and international guidance and publications and reports on water quality and hygiene for over 20 years including: ---

- Chair ESCMID *Legionella* study group which produced guidelines for managing water system in buildings during the time of COVID for hospitals, nursing homes, dentists, and other buildings published 2020.
- Chair and Editor, European working European Guidelines for Control and Prevention of Travel Associated Legionnaires' Disease, published on the ECDC website 2017
- Member of the working group UK Department of Health Guidance HTM 04---01 parts A---C 2016
- Member of the working groups updating the HSE ACoP and Guidance HSG 274 2013-14
- Member of the working group updating guidance for spa pools HSG 282 2016
- Lead author PWTAG Swimming Pool Water chapter 21 on Hydrotherapy pools
- Author and editor of the World Health Organizations' Water Safety in Buildings 2011
- Author and editor of the World Health Organizations' *Legionella* and the prevention of legionellosis –2007
- Contributor, WHO Guidelines for drinking water quality

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Scottish Hospitals Inquiry

Statement of Dr Christine Peters MBCHB BSC FRCPATH

Glossary/Acronyms

A&E	Accident Emergency Department
AICC	Acute Infection Control Committee
BMT	Bone Marrow Transplant
The Board	NHS Greater Glasgow and Clyde Health Board
CF	Cystic Fibrosis
CNS	Central Nervous System
HAI	Healthcare Acquired Infection
HEPA	High Efficiency Particulate Air
IC	Infection Control
ICD	Infection Control Doctor
ICN	Infection Control Nurse
ID	Infectious Diseases
IPC	Infection Prevention and Control
IMT	Incident Management Team
NICU	Neonatal Intensive Care Unit
NPV	Negative Pressure Ventilation
PICU	Paediatric Intensive Care Unit
PPV	Positive Pressure Ventilation
PPVL	Positive Pressure Ventilated Lobby
PSCU	Paediatric Special Care Unit
RHC	Royal Hospital for Children Glasgow
QEUH	Queen Elizabeth University Hospital, Glasgow
RAH	Royal Alexandra Hospital Paisley
SCBU	Special Care Baby Unit
SMT	Senior Management Team

Wards/Departments

QEUH Building

2D	Dialysis
4A	Renal Medicine
4B	Bone Marrow Transplant Unit
4C	Haematology oncology/Renal Transplant
5C	Infectious Diseases
6A	Rheumatology (repurposed as paediatric BMT unit)
7A-D	Respiratory
10A-D	Orthopaedics

RHC

1D	PICU
1E	Cardiothoracic (surgical)
2A	Haematology/Oncology including Teenage Cancer Trust (known as Schiehallion Unit)
2B	Paediatric Haematology/Oncology day care
2C	Acute receiving unit (medical and surgical)
MAU	Medical admissions unit
3A	Neurosurgery
3B	Surgery
3C	Renal

Key Individuals

Referred to in this statement as	Full Name	Role (excluding management or other additional responsibilities from time to time)
Mr Archibald	Grant Archibald	Board Chief Operating Officer
Dr Armstrong	Jennifer Armstrong	Board Medical Director
Ms Bain	Marion Bain	Interim Director of Infection Control/Scottish Government Advisor
Dr Bal	Abhijit Bal	Consultant Microbiologist
Dr Bagrade	Linda Bagrade	Consultant Microbiologist
Dr Balfour	Alison Balfour	Consultant Microbiologist
Dr Cruickshank	Anne Cruickshank	Consultant Biochemist
Mrs Devine	Sandra Devine (nee McNamee)	Infection Control Nurse
Prof Gibson	Brenda Gibson	Consultant Paediatric Haematologist
Dr Green	Rachel Green	Consultant in Transfusion Medicine
Dr Hood	John Hood	Consultant Microbiologist
Ms Joannidis	Pamela Joannidis	Infection Control Nurse
Prof Jones	Brian Jones	Consultant Microbiologist
Dr Khanna	Nitish Khanna	Consultant Microbiologist
Prof Leanord	Alistair Leanord	Consultant Microbiologist
Ms McQueen	Fiona McQueen	Chief Nursing Officer for Scotland
Mr Powrie	Ian Powrie	Board Deputy Estates Manager

Dr Redding	Penelope Redding	Consultant Microbiologist
Dr Valyraki	Pepi Valyraki	Consultant Microbiologist
Ms Shepherd	Lesley Shepherd	Nurse Advisor, Healthcare Acquired Infection, Scottish Government
Ms Wallace	Angela Wallace	Director of Infection Control, Scottish Government
Mr Walsh	Tom Walsh	Infection Control Manager
Prof Williams	Professor Prof Williams	Consultant Microbiologist
Dr Wright	Pauline Wright	Consultant Microbiologist

Personal and Professional Information

Introduction

1. I am Dr Christine Peters. I am 49 years old. I am currently employed as a Consultant Microbiologist by the GGC Health Board. I am based at QEUH. My line manager is Dr Bal, who is currently Head of Service and Clinical Lead for the QEUH/RHC.

2. I joined the Board as a Consultant in August 2014. When I joined I was one of the ICDs in a shared role with Dr Pauline Wright at QEUH. In October 2016 I handed over the role to [redacted], having asked to resign from the role in June 2015 for reasons which are set out fully in this statement. However, I have continued to cover the ICD role out of hours and at weekends to date as well as covering ICD leave until 2019. I was subsequently appointed as clinical lead for Microbiology at QEUH in May 2017. I resigned from that role in August 2022 for reasons which are also set out below.

3. I have prepared this statement to assist the Inquiry. I would be pleased to provide any further detail or documentation that would assist the Inquiry.

Qualifications

4. I studied medicine at the University of Edinburgh. I graduated in 1998. During medical school I undertook an extra year of study and obtained a BSc degree in Parasitology and Entomology with 1st Class Honours, in addition to my medical qualification.

5. I have a Diploma in Tropical Medicine and Hygiene from the London School of Tropical Medicine and Hygiene 2001. I passed my professional exams to become a Fellow of the Royal College of Pathologists in 2010.

A copy of my CV has been provided to the Inquiry.

Professional Experience

6. After graduating from medical school in 1998, I completed one year of hospital based pre-registration house officer training as a junior doctor for one year. I worked at St Johns Hospital, Livingston, and the Edinburgh Royal Infirmary. I did posts in plastics and general surgery at St Johns, and Cardiology and Respiratory and Acute Admissions at Edinburgh Royal Infirmary.

7. Thereafter, I had a year off and did voluntary work in India before moving to Glasgow. On my return in 2000 I obtained an SHO post in Microbiology at the South Glasgow Universities Trust, followed by a Specialist Registrar training post in Medical Microbiology and Virology in 2001. I also worked in Virology as part of my training at Gartnavel Hospital, Glasgow. I had my first child in 2002 and my second in 2005. I had around one year of maternity leave for each of my children and returned to work part time to complete my training. I became a Consultant in 2012 and was entered on the GMC specialist register for Medical Microbiology and Virology in November 2011.

8. My first Consultant job was in Oman where I was based for three months. I returned to Scotland in April of 2012 and was appointed as a Consultant Microbiologist and Virologist at Crosshouse Hospital, Kilmarnock. I remained there for two years and three months during which I time I had ICD responsibilities as the ICD for the hospital. I left that post in 2014 to take up my current appointment.

9. Throughout my training and Consultant jobs prior to appointment in Glasgow I had significant experience of infection control and the built environment, having been involved as a trainee with issues relating to theatre ventilation. I had managed outbreaks associated with building works, and contributed to the national re-writing of the HAI Scribe documents and HAI Standards. I had also completed the IPC module in Epidemiology at UHI in 2006 and a Medical Statistics course at Glasgow University in 2006. I was a trainee at the Victoria Infirmary at the time of the Watt Report and was aware of its findings and recommendations. I was also a trainee in Glasgow during the Vale of Leven incident and Inquiry.

10. I lecture on the postgraduate GOSH/UCL IPC and the Built Environment Microbiology Course that commenced in 2023 and which will run three times a year for Estates, Microbiology and ICN practitioners.

Structure, organisation and key colleagues

11. When I joined the Board I was appointed to the role of ICD at the old Southern General, Glasgow and Victoria Infirmary, Glasgow. I worked 3 days a week because of my family commitments. Dr Wright was the ICD who covered when I was not working. I had two IPC sessions to cover a week. These sessions were run at the same time as being on the Microbiology rota as there was no proper job plan in place and no protected time for the ICD role at that time. The other Microbiology Consultants at that time were Prof Williams, Prof Leanord, Dr Redding, Dr Balfour, and Dr Khanna.

12. Prof Williams was the Lead ICD. I have provided an organisational chart to assist in understanding the structure. My line manager when I joined was Prof Leanord, who was the Head of the Microbiology Department at the Southern General. Prof Leanord's line manager was Prof Jones who was Head of Service for Microbiology for the Board.

13. The Board's Clinical Director with responsibility (which included Microbiology) for laboratories was Dr Cruickshank. She reported to Dr Green, who reported to Dr Armstrong, who has been the Medical Director for the Board since 2012.

14. In addition to the medical team, there was a nursing team with IPC responsibility. The Lead ICN was Mrs Devine. There was also an Infection Control Manager, Mr Walsh. I don't know what his qualifications were. There was a Lead Nurse Consultant for IPC, Ms Joannidis.

15. There was no job description for the ICD role. In practice, any issues relating to the management of outbreaks would be discussed with the Lead ICD by members of the IPC team. The SMT was comprised of Mrs Devine, Prof Williams, and Mr Walsh. At the monthly meetings the SMT would meet with all of the ICDs from across the Board, the Sector ICN Leads (at that time North, South, West, Clyde and Paediatrics), the Surveillance Leads and Ms Joannidis. The Surveillance Leads were responsible for the mandatory national surveillance data and audit.

16. In addition to the medical and nursing staff there was a non-clinical management structure within the laboratory services. Bernadette Findlay was General Manager for Microbiology and Pathology. She reported to Isobel Neil who was the manager for the diagnostic laboratories. There was a Director of Diagnostics (which includes radiology and the lab services), who was Aileen McLellan.

17. The COO at this time was Mr Archibald. The role was later taken over by Jonathan Best, who has now retired.

Early experiences at the Board

18. When I joined the IC team in August 2014 I quickly became concerned about the culture within the team.

Raising concerns

19. I was told by Prof Williams shortly after I joined that I should not record any concerns in writing "because of inquiries and things". I understood he meant that any written record could be used against the Board in a future investigation, inquiry or claim. I was told after my first SMT meeting that I should not challenge Prof Williams or indeed any member of the SMT at all at the SMTs meetings. This was after a meeting at which I had asked questions. I was told that this "*was not the done thing*" by Dr Bagrade. I reported my concerns about Prof Williams and his behaviour towards me to Prof

Leanord shortly after I joined. He asked me to keep a written record of key events which I did intermittently I can provide notes and correspondence to evidence this if it would assist the Inquiry.

20. Within a couple of months of joining the Board I had identified the following areas of serious concern:

    i. Decisions taken at ICD meetings were not properly minuted.
    ii. Concerns raised were not properly minuted.
    iii. The culture within the team was such that people were uncomfortable with speaking up about any concerns they had at ICD meetings for fear of being bullied by senior colleagues.
    iv. Interactions between the Microbiology lead and the infection control lead were dysfunctional.

21. I can provide further details or documentation about any of these issues if the Inquiry wishes to see it.

22. I was particularly concerned by the team response to the publication of the Vale of Leven Inquiry report in late 2014. This was discussed at a special SMT meeting and the focus was on press coverage of the expense of the inquiry and not on learning or on the sadness of the lives lost.

Bullying by Prof Williams

23. I was bullied by Prof Williams. I can provide detail if the Inquiry wishes it. I was not alone in this experience; multiple colleagues complained about him. Prof Williams and Prof Jones had a very poor working relationship which affected the working culture in the department.

24. Eventually, 14 out of the 18 Microbiology Consultants participating in the review chaired by David Stewart (discussed below) supported Prof Jones in a document which

he had produced which included a statement that Prof Williams was a relentless bully, who had destroyed the team and who had a toxic management style. Prof Williams resigned from his post and left. I can provide a copy of the document.

25. There were other problems with Prof William's professionalism. He was often away at key times. He took periods of extended annual leave. His communications were scanty and he did not stick to documented decisions. He and Dr Bagrade had full time substantive Consultant appointments covering Western Isles at the same time as holding full time substantive Consultant appointments in Glasgow. This meant that he was not always available even when not on leave.

Events prior to opening of the QEUH

26. Prof Williams was to be the lead ICD for the Board's area including the QEUH when it opened. Dr Wright and I shared the role of sector ICD for the QEUH site at this point. I had a particular interest in the built environment. I worked three days a week whilst she worked two days. In practice I took the lead on issues relating to the built environment, although she had formal responsibility for *Legionella sp. ("Legionella")* for the building (unknown to me at the time as there were no job descriptions). As the opening date approached, I asked for information from Prof Williams and Mr Walsh about the ventilation and water systems in order to make sure that I was sufficiently well informed to properly discharge my duties. I also raised questions at SMT meetings (some of which are recorded in the SMT minutes). I was often not given the information that I asked for. When I was given information, it was sometimes obviously wrong. For example, Mrs McNamee told me that the whole new hospital would be 100% naturally ventilated, which I knew could not possibly be correct. In fact, the windows throughout the hospital are sealed shut to avoid the odour from the nearby sewage plant entering the buildings. It was 100% mechanically ventilated.

27. I had no involvement in the design or the commissioning of QEUH. I joined in August 2014, and the hospital opened in April 2015, so work was largely completed before I

was appointed. My understanding is that Dr Hood and Dr Redding had been involved at early stages, as had Annette Rankin, who was an ICN. The ICD involved in the new build project was Prof Williams, assisted by Sandra Devine, Jackie Balmanroy and Pamela Joannidis. When I first joined we were given general updates by Prof Williams at the SMT meetings. These updates did not include any technical information. Prior to the opening of the building I had not received any information relating to the ventilation or water systems, despite being the one of the sector ICDs for the site.

HAI Scribe

28. When I worked in Crosshouse Hospital I was heavily involved in HAI Scribe process which included signing off on specialist suites in the infectious disease unit, as well as dealing with an aspergillus outbreak in haematology and ITU patients. I was asked to input into the re-writing of the HAI Scribe documentation at a National level by Geraldine O'Brien of HFS after she observed me chairing a SCRIBE meeting in Crosshouse.

29. An HAI Scribe is a methodology developed to ensure safe practices when any form of building work is taking place in the hospital environment. It is a Scottish standard but it is very similar to ICRA which is a system used in the USA. It is designed to encourage key teams (for example estates, fire safety, infection control) to collaborate in relation to building work. By the time I joined the QEUH I already had established a level of expertise based on experience in the built environment and infection risk. This was a key part of the experience I had when I applied for the role at QEUH and my senior colleagues, including Prof Williams, were aware of my experience in these areas.

April 2015

30. I first became aware of issues with the built environment in the new hospital during a walk around. In October 2014 I did my first walk around of the hospital. Dr Wright and I were given a tour. As we walked around I noticed two particular things. I looked at

the sinks and I could see that the drainage outlet on the sink was vertical rather than horizontal which causes pooling. Jackie Stewart (now Jackie Balmanroy) was with me on this walk around. She said that she had chosen them and they met the required specification. I had just come from Crosshouse Hospital where they had PPVL suites so I was very familiar with how those worked. I was shown the rooms which were to be our NPV rooms. I immediately noticed that they were not NPV rooms, they were PPV rooms with lobbies. I pointed this out and was told that Prof Williams had approved them as negative pressure rooms for TB etc.

31. Later, in April 2015 when the hospital had just opened and patients had moved in, I did another walkaround specifically to plan for any viral haemorrhagic fever admissions. I was the ICD Network representative on the National viral haemorrhagic fever planning group. There was an ongoing Ebola epidemic in western Africa and the QEUH was to be the designated treatment site in the event of any suspected cases in the area. The purpose of the walkaround was to assess our readiness to deal with patients suffering from viral haemorrhagic fever. I went into a room that had apparently been set aside for this purpose. There was a ceiling tile missing, the water supply wasn't working, the automatic external doors kept opening and closing, no ventilation specification was available, and the flooring material wasn't suitable for the level of cleaning that would be required. It was not an NPV room, and in fact I was told that there were no NPV rooms in the entire hospital, despite the fact that it was housing the ID unit which had already moved to the site from Gartnavel Hospital.

June 2015

32. I had sought information from Prof Williams in the hope of being reassured. I asked for technical information like ventilation schematics. I told Anne Harkness that I would review the ventilation specifications when they were provided to me. She told me I didn't need to because Prof Williams had reviewed them and was content. I have provided the Inquiry with emails to this effect. I can provide further emails if the Inquiry wishes to have them. Initially, Prof Williams responded to say that everything

was fine. Latterly he responded to say that he didn't know anything about the ventilation and that I would need to speak to Mr Powrie. I have provided the Inquiry with some of the emails about this and can provide further correspondence if the Inquiry wishes to have it.

33. By this time, I was questioning the sign off of the new building. On 23 June 2015 I visited A&E again and this time I observed a number of problems with the decontamination room for high-risk infectious patients. The room had been designed for chemical hazard management and not for infective pathogens. This is the same room I discuss above at paragraph 31.

34. I asked Mr Walsh in an email who had signed off the ventilation from the IPC perspective he replied to say that it had been Prof Williams, Dr Hood and Jackie Balmanroy. I have provided this email. As a result of my concerns I instigated a meeting with Mr Powrie, and a representative from Brookfield Place, and from the Health Board commissioning team (David Hall). Dr Inkster also attended this meeting. This took place on 25 June 2015 whilst Prof Williams was on holiday. During, and in the immediate aftermath of this meeting, a number of further concerns arose:

- There were verbal reports of possible *Legionella* contamination from Mr Powrie. He did not want to put this in writing. No water testing data was available, and I asked for risk assessments for waterborne infection in the QEUH and they were not forthcoming from the Project Management Team, Estates, Mary Anne Kane or Tom Walsh who sat on the Board Water Safety Group.

- The Brookfield Place representative and the Commissioning Team representative said that they were unaware that the ID unit and the BMT unit were already on site. In fact, they did not know that ID was ever planned to be based at the QEUH. David Hall said he would discuss this with David Louden.

- The ventilation arrangements relating to the theatres were concerning. No air sampling had been carried out at all.

- The Ebola pathway was unsafe. The A&E department had no infection isolation rooms.

- There were PPVL rooms which did not have their own toilet facilities.

- There were vertical drains leading to pooling water in sinks (stagnant water creates a biofilm which can be a source of environmental organisms).

- Rooms that were described to me as being NPV rooms were not in fact negatively pressurised.

35. Following this meeting, I sent an email to Mr Powrie summarising my concerns. I have provided this email.

Visit to 4B

36. I was particularly concerned about the ventilation for 4B. I had seen the ventilation specification by this point and I thought it was inadequate. I had specifically asked Mr Powrie if the *Legionella* positives had come from 4B (by email) and he was unable to say. I was very familiar with the SHTM documents from my time in Crosshouse as well as the risks and evidence base around risks of invasive fungal infections in immune suppressed cohorts linked to building works. I based all my assessments and recommendations on this evidence base.

37. Following the meeting with Mr Powrie on 25 June 2015 I went to 4B. Myra Campbell, who was a member of the nursing staff, approached me. She told me that the clinical staff were very worried about the unit because there were no pressure gauges (these are standard in PPV rooms) and she wasn't aware of air sampling results being

monitored, which had been done at the Beatson. I held a tissue under a number of doors and it was sucked in. This means that the rooms were operating with negative rather than positive pressure. I went to the pentamidine room. This room should have been negatively pressurised because pentamidine is a hazardous substance for pregnant women and so care needs to be taken to ensure that it doesn't get into the wider air supply. The room was clearly positively pressurised because a tissue placed at the door was blown out.

38. It was also reported to me that on many of the doors and windows throughout the hospital the internal blind mechanisms were breaking so they could not be opened or closed. If the blinds were stuck open then the patient had no privacy and the nurses were taping plastic aprons over the window. The breaking mechanism also created a hole in the window. I have provided a copy of this photograph which I took to illustrate this problem which was widespread; a tissue has been stuffed in the hole to plug it. Clearly this is not safe in the context of isolation rooms. Of relevance is that this problem, specifically the hole in the window, was observed by Jim McMenamin from HPS and representatives from HP Wales while they were on a tour of our facilities. I can provide emails about this if it would assist.

39. All of the rooms in 4B were meant to have HEPA filtration. There were approximately 24 rooms. I was told by Mr Powrie that two or three rooms did not have HEPA filters but no one knew which rooms these were. The rooms were not sealed with a substantial pressure differential so the filtration would have been ineffective in any event. The purpose of HEPA filtration is to ensure that a BMT patient only breathes filtered air.

40. As I discovered these problems I was escalating them immediately because I felt they presented immediate risks and it appeared to me at the time that these issues were not known about as I had not been sighted on them, despite my role. I had no idea how widespread these things were or whether there was a plan to fix them. On 26 June 2015 I sent a summary of my concerns to Mr Walsh specifically asking for advice on how I should proceed in order to ensure an efficient, collaborative and coordinated

response. I have provided a copy of this. He responded by email agreeing that he would escalate my concerns to Dr Armstrong and Mr Archibald. I have provided the Inquiry with his email.

41. On 29 June 2015 I prepared a gap analysis of what I felt the PPVL rooms for ID patients needed, and what the BMT patients needed from their rooms. This took the form of two tables highlighting the issues with design, commissioning, monitoring and maintenance requirements, what we actually had, and providing space for them to tell me what actions I should take to resolve the issues. I sent this by email. I have provided the Inquiry with the gap analysis and the covering email. I also shared this with Prof Jones to keep him in the loop, and in the hope that he would support me in my concerns.

42. My concerns were escalated to Gary Jenkins, Dr Armstrong and Mr Archibald.

43. On 26 June 2015 Dr Wright asked for a regular program of *Legionella* water surveillance in 4B to be established. It was clear that the Beatson monitoring program hadn't been implemented before they moved the patients over. This should have been done. Dr Inkster suggested a fortnightly monitoring system be instigated.

44. On 30 June 2015, air sampling took place in 4B and 2A. The particle counts were extremely high; they should be below 100 and they were in the tens of thousands which is very dangerous for BMT patients. Further, sampling grew *Aspergillus sp.* ("*Aspergillus*"). This suggested a complete failure of air quality management. I was not surprised by this given my concerns about the ventilation design and the problems outlined above. Even if the particle counts had not been high the design would not have been capable of providing a safe environment to care for these very vulnerable patients. A meeting was fixed for 1 July 2015 given the seriousness of the situation. Mr Walsh wanted to delay the meeting until Prof Williams returned. I can provide correspondence about this if the Inquiry wishes to have it. I was very concerned that this posed an imminent risk to patients who were currently housed in the unit, having bone marrow transplants and with complete immune suppression. I am aware there

were also concerns with the paediatric unit at this point which Dr Inkster was dealing with and which also posed an imminent risk.

July 2015

45. The meeting on 1 July 2015 was chaired by Gary Jenkins. I think the others present were Mr Powrie, Ms Joannidis, Jackie Balmanroy, and myself. I cannot recall if Dr Inkster was also there. The Board should have minutes of this meeting but they were never distributed to me. We decided that further information was needed to allow us to decide what steps to take. I emailed Peter Moir from the Project Team after this meeting to ask for design specifications, commissioning, and validation data. I never received the information I asked for.

46. A follow up meeting was held on 3 July 2015 at which a unanimous decision (with haematologists present), was taken to move the patients from 4B back to the Beatson. We could not be satisfied that they were safe in the QEUH because of the fundamentally unsafe design. Anne Parker wrote an SBAR relating to this decision which was passed to Dr Armstrong (a copy of which I have provided to the Inquiry). It is extremely undesirable to have to transfer BMT patients from hospital to hospital but in the circumstances, this was felt to be the least risky option. Thereafter, I had no further involvement with these issues until October 2018. It is important to note that the problems were not first identified by air sampling, rather by an inspection of the design which pre-empted the air sampling.

47. On 6 July 2015 an AICC meeting took place. Prof Williams returned from annual leave that morning and attended the meeting, which was chaired by David Stewart. Prof Williams said that there were no issues with the ventilation. I felt compelled to intervene and I listed my concerns. When I received the draft minutes of this meeting, I was surprised to see that they did not fully reflect my concerns. I asked for them to be amended. I have provided the Inquiry with the draft minutes. At the subsequent meeting I asked that the minutes of the meeting of 6 July 2015 be revised to reflect

the concerns that I had raised. I do not know if that was minuted; I do not have those minutes. I did not send an email about this because by that point I was being criticised for sending too many emails. To my knowledge, the minutes were never revised. Prior to the meeting Dr Inkster told me that Dr Bagrade had told her to instruct me not to raise concerns about the ventilation at the meeting. I think this was to avoid it being minuted.

48. Also on 6 July 2015, I became aware via Dr Inkster that air sampling had showed fungal growth including *Aspergillus*. These results were from 23 June 2015 but I was only advised of them on 6 July. Dr Inkster told me that BMTs were proceeding despite the concerns about air quality.

49. On 7 July 2015 Prof Williams emailed Dr Inkster, Dr Hood, Prof Jones, Gary Jenkins, and me (copying in Mr Walsh) and asked us to confirm that, if the building was supplied to the original specification, it would provide a safe environment. I have provided the Inquiry with a copy of this email. He sent the email at 1025 and asked for us to respond by 1130. I was on a ward round when I received his email. Dr Inkster and I worked together to provide a response (a copy of which I have provided to the Inquiry) which stated that we did not agree with Prof Williams' proposition; we felt that the specification itself was inadequate to create a safe environment even if it had been properly delivered. In any event, the specification which Prof Williams was referring to was from 2009, when a non-BMT haemato-oncology unit was in contemplation. The specification required for general haemato-oncology is different to that required for BMT patients, who are probably the single most vulnerable patient population from an IPC perspective.

50. Dr Hood sent detailed comments (a copy of which I have provided to the Inquiry) stating that the 2009 specification did not apply and setting out what proper commissioning should have included. Prof Williams replied (also provided to the Inquiry) simply stating that these issues would be picked up on during future discussions in a group that Anne Harkness would be setting up. He did not seem to

recognise the seriousness of our concerns, or the urgency given that BMT patients were being cared for in an environment with unsafe ventilation.

51. Also on 7 July 2015, the Board put out a press release regarding the move of patients to the Beatson. I have provided the Inquiry with a copy of the release. This release gave the impression that there were no issues with the BMT unit at the RHC. (See for example, Question & Answer 8 in the press release, "Q - In view of these issues only being discovered now what reassurance can you provide that all other areas of the hospital are safe for patients? A - We are not aware of any other issues.") I knew that this was not true. I felt that senior Board officials, including Dr Armstrong, must have known that the statement was potentially misleading when it was made.

52. Given the circumstances, I did not feel that I could continue working as an ICD. I had grave concerns about Mr Walsh's performance as ICM and Prof Williams' performance as lead ICD. I felt there was a lack of transparency in their approach. I had repeatedly raised serious concerns. They were not taking these concerns seriously or responding with the urgency that I felt was required. I did not feel I could continue to work alongside them. I prepared a letter which set out my reasons for wanting to resign. I have provided the Inquiry with a copy of my letter.

53. On 8 July 2015, and following a discussion with Prof Jones about the proper procedure for resigning, I intimated my resignation to him and then I went on leave for 4 weeks for a long-planned and pre agreed special trip to India where I grew up; the purpose of this trip was to show my children where I lived as a child and to visit friends there.

August 2015

54. On 10 August 2015 I returned to work. On returning I was told by Prof Jones that I would have to remain in post as ICD, because there was no other Consultant Microbiologist willing to take on the role. I am aware that Dr Inkster had also intimated her resignation and had also been told that she would have to continue in her post.

55. Dr Wright informed me on my return that whilst I had been on leave, they had detected mould including *Mucor sp.* ("*Mucor*") in air samples from 2A. She also told me that Anna Maria Ewins had raised concerns with her about safe patient placement. She told me that a number of meetings had taken place in my absence, which had been attended by various senior employees including Dr Armstrong.

56. At around this time I had a conversation with Prof Leanord. I expressed my concerns about the building and the infection control set up within the Board and he specifically said to me "why would you raise your head above the parapet?". He also encouraged me to "pipe down" as otherwise I would find things hard. I don't believe that he was trying to sound nasty or threatening; I think he just thought that I would make things difficult for myself if I kept raising concerns. I also got the clear implication that he was not willing to raise his own head "over the parapet" and he didn't want to be associated with any steps I might take to raise concerns.

Review by David Stewart

57. At around about this time, the Board commissioned a review to investigate the concerns about IPC in QEUH and RHC which I believe came about as a result of Anne Cruikshank acting on concerns QEUH Microbiologists had raised with her. The review was to be chaired by David Stewart. Dr Inkster and I wrote a detailed letter to David Stewart setting out our ongoing concerns (a copy of this letter has been provided to the Inquiry).

58. On 12 August 2015 I received an email from Dr Wright which included a thread of earlier correspondence starting on 3 August 2015 (a copy of which has been provided). The thread included an email from Prof Williams stating that, what I took to be the PPVL rooms in 2A, were built to national standard specification and were *"okay to be used for any purpose including transplants"*. This was wrong; the rooms were not safe for use by these extremely vulnerable patients. Throughout August the ICDs continued to be asked to confirm the safety of isolation rooms for infectious patients (including

high risk multi-drug resistant TB patients). I repeatedly asked Prof Williams for information relating to remedial works for isolation units to allow me to provide the necessary reassurance but no information was provided by him. On 30 August 2015 high risk ID patients had to be transferred to Monklands due to failure of PPVL rooms in the ITU at QEUH. I am aware that the same PPVL design was used for the isolation rooms in 2A, the isolation rooms in the PICU, the adult ITU for ID patients and BMT patients, and two rooms in 4A. I therefore thought it likely that a problem in one area would ultimately be replicated elsewhere in the hospital.

59. One of the biggest risks which a hospital has to manage is the ability to isolate infectious patients. The issues regarding the PPVL rooms commissioning and appropriate use continued from this point right up until 2020 when there were concerns regarding their use in the context of the emerging COVID pandemic. I have many emails that span 6 years since the building opened in which myself and others highlight the failure to complete the assessment of these rooms should the inquiry wish to see them, including the mis recording of commissioning results and presence or absence of HEPA filtration.

October 2015

60. I am aware that on 21 October 2015 Dr Redding wrote to David Stewart advising him that a number of Microbiologists, ICDs and ID Consultants had continued concerns about the building. Dr Redding shared her email with me (a copy of which I have provided to the Inquiry). She stated in her email that she was worried about patient safety as a result of these issues and that the organisation should be obtaining independent advice on how to proceed.

61. On 30 October 2015 David Stewart wrote to the ICD team to advise that there would be an organisational development day to deal with team dynamics. There was undoubtedly a problem with team dynamics, but I felt that there were pressing safety issues arising from the state of the hospital which required a more urgent response.

David Stewart asked me to elaborate more on the ongoing safety issues and Dr Inkster and I prepared a summary of our concerns which we sent to him by email. I have provided a copy of this. Our concerns included:

- Dr Inkster being asked to sign off remedial work despite having had no involvement in it and no communication since 10 July 2015 about the work being done.
- Our concerns about 4B had not been addressed.
- Highly pathogenic fungi (*Mucor*) had been found in the paediatric BMT and yet transplants were continuing to take place.
- We remained concerned about the PPVL rooms and whether they were actually functioning effectively.
- There were also significant problems with the neurosurgery theatres involving repeated sewage ingress, and very poor building materials which I can provide further information about if the Inquiry wishes to have it. Despite having outlined numerous critical failings in the theatre suites Prof Williams asked in an email if I could point out any "actual patient safety risks" and noted that the theatres had been given gold ratings on recent audits. Repeated water ingress is an issue which continues into 2024.

Orthopaedic theatres

62. Around this time I was involved in an investigation arising from an increase in infections in orthopaedic patients. I felt that there were a number of issues with the theatres that might be contributing to this increase and I wrote a detailed report (a copy of which I have provided) which I submitted to Prof Williams, Mr Walsh, and Dr Cruickshank. My work on orthopaedic infections was commended by the orthopaedic team and management at the time, as they had been struggling to get the IPC surveillance team to recognise the realities of the problems.

November 2015

63. Up until this point I had raised my concerns through the IC management structure, and I was aware that senior Board employees had been told of my concerns including Dr Armstrong, Mr Archibald, David Louden, and Bob Calderwood. Within the Microbiology department my line manager above Prof Leanord was Dr Cruickshank. On 23 November 2015 I sent her an email setting out all of the concerns which I had and specifically stating that I did not agree with the public statements issued by the Board. I have provided the Inquiry with a copy of this email.

December 2015

64. On 22 December 2015 David Stewart emailed Dr Inkster and I asking if our concerns had been addressed. I replied to state that my concerns remained despite involvement of HPS and HFS. I have provided the Inquiry with a copy of my response. I can provide further information about the involvement of HPS and HFS if the Inquiry wishes to have it.

January 2016

65. At the start of 2016 the position continued to be totally unsatisfactory; there was ongoing confusion about the safety of the PPVL rooms and their adequacy for isolating infectious and/or immunosuppressed patients. The ID Consultants were still trying to establish whether they could be used for infectious TB patients. I have numerous emails pertaining to the PPVL rooms and the lack of a co-ordinated approach to fixing the problems which I can provide if required.

66. On 18 January 2016 I visited the ITU and found two rooms with incorrect pressures. I continued to have no confidence that patients could be safely placed in these rooms, particularly because there was no alarm system to create alert when a room was not working.

Horne Taps

67. Also in January 2016, Dr Inkster told me that there was an SBAR which had been compiled by HPS regarding Horne taps in which HPS had advised that these types of taps should not be used in high risk settings but which had been fitted throughout the new building.

68. At this point patients who had been moved to the Beatson but required critical care were being transferred back to QEUH for that care. There was still doubt about the safety of the PPVL rooms and now there was a further concern about the taps. I arranged to review the rooms with Mr Powrie because the ID Consultants were seriously concerned. I have provided the Inquiry with examples of a number of emails illustrating this concern; I can provide further correspondence if the Inquiry wishes to have it.

Resignation of Prof Williams

69. At the end of January 2016 Prof Williams resigned. Before he left, I wrote to Anne Cruickshank on 9 February 2016 to ask that she ensure Prof Williams provided a handover of relevant information (including the Schiehallion testing protocols and isolation rooms). A copy of this email can be provided. However, despite this email, it is my understanding that he left without providing a handover and without adequately addressing the vast majority of the serious concerns we had raised with him.

70. After he left, Dr Inkster was appointed to replace him as lead ICD.

April 2016

Water leak in ARU 2

71. On 29 April 2016 I received an email from Mr Powrie reporting a water leak in ARU2 which had taken place on 22 April. The leak had been caused by a section of mild steel

piping in the domestic cold water system which should have been made of stainless steel piping. Mild steel corrodes rapidly. I have provided the Inquiry with a copy of a picture of the corroded piping. That can lead to burst pipes and leaks but also provides an ideal environment for bacteria to flourish (including *Legionella* and *Pseudomonas sp.* ("*Pseudomonas*")). I asked Mr Powrie for water testing results from the outlets which this pipe served and was told that none were available.

72. Mr Powrie pointed out that this error could easily have occurred elsewhere, and that segments of pipe throughout the entire water system could have been erroneously made of mild steel. He planned to try and locate them using magnets. In his experience, any fault in the building was usually not a one off and instead was replicated throughout the building.

June 2017

Invasive Fungal Infections in 2A

73. On 7 June 2016 I received an email from Eleri Davies advising me that Prof Gibson was concerned about the unprecedented number of invasive fungal infections in 2A. Prof Gibson felt that the problem exceeded anything she had ever come across previously in her entire career.

74. Dr Inkster asked me to put together a list of ventilation queries for the QEUH in order of priority. I have provided the Inquiry with the list that I prepared which contains ten queries.

July 2016

Fungal growth in 2A

75. By this point Dr Wright was no longer an ICD. Dr Inkster and I were sharing the sector ICD role. Dr Inkster was ICD for paediatrics. Dr Inkster was on holiday at this point and an issue arose in 2A. In her absence it fell to me to cover paediatrics.

76. On 6 July 2016 I was copied into an email from Alex Marek reporting fungal growth (which I believe was *Aspergillus*) in a number of rooms in 2A. Rooms 20 and 23 had already been taken out of use for reasons that I do not know because I was only occasionally covering paediatrics when Dr Inkster was off. Room 24 was taken out of use, cleaned, and resampled, but fungus continued to grow. Alex Marek had discussed the fungal growth with Mr Powrie and, following their discussions, it had been agreed that Room 24 would have revalidation of the ventilation system and following this resampling would be organised.

Water leak in 2A

77. On 8 July 2016, also in Dr Inkster's absence on holiday, I had a conversation with Mr Powrie about Room 25. He had become aware of a leak from the ducting into the room.

78. It turned out that there was a tear in the flexible duct. There were breaches between the ceiling void and the room, at the sprinkler head, the WIFI modem, the lighting unit, and the TV wall mounting bracket. Unfiltered air was able to pass through the ceiling void into the patient's room. In my view the system should have been designed with an alarm to alert staff to this sort of failure in the ventilation for the room. Had it not been for the air sampling these issues would not have detected. Indeed, this example underlines why I am so concerned that air sampling no longer occurs in the Schiehallion unit (which is mentioned below).

Chilled Beams on 2A

79. On 21 July 2016 I was copied into an email from Mr Powrie relating to an incident in 2A on 19 July when 4 single rooms had water dripping down from the chilled beams. I have provided the Inquiry with a copy of this email. Ian said that there was a problem with condensation dripping from chilled beams across many clinical areas. At this time I did not know much about chilled beam technology. I looked into this and contacted Peter Hoffman, who is a Consultant Clinical Scientist at Public Health England and a ventilation expert, for his views. Peter indicated to me that chilled beams should not be used in hospital environments because of infection risk. I subsequently wrote to Dr Inkster to summarise the key issues which had occurred in her absence on holiday to handover to her on her return. I have provided the Inquiry with a copy of this email.

October 2016

80. In October 2016 I was finally allowed to give up my infection control remit. [redacted] transferred from the RAH to the QEUH and [redacted] took over my ICD role. I prepared a handover email for [redacted] to ensure [redacted] would be up to speed with all of the issues I had become aware of in my time as ICD. I have provided the Inquiry with a copy of this email. In this I outlined the ongoing issues which I was aware of.

81. After this date, while I was no longer an ICD, I continued to cover the ICD duties out of hours and at weekends and at times my opinion and input was requested particularly regarding ventilation issues, attendance at meetings, and writing of reports.

January 2017

Mycobacterium abscessus outbreak

82. *Mycobacterium abscessus* is a similar organism to TB. It can cause severe infection in CF patients. There was an outbreak in Yorkhill and Gartnavel Hospitals. Because the patients were now in QEUH I was trying to work out whether the problem with historic or ongoing. I prepared a detailed report, a copy of which I have provided to the Inquiry. I experienced difficulty in getting the information I needed to properly investigate this outbreak from the IC team which I highlighted to Dr Cruickshank in an email (a copy of which I have provided).

April 2017

[redacted]

83. In April 2017 I took over the role of Clinical Lead for Microbiology from Prof Leanord. No handover was provided. Prof Jones asked me to start work on integrating the adult and paediatric Microbiology services which until that point had been run as separate services other than for out of hours cross cover.

84. On 23 April 2017 I was on call at the weekend and covering paediatrics. There were 6 line related bacteraemias in haematology/oncology patients in 3B, 2A and 1D. One of the patients was [redacted]. [redacted] had a gram-negative bacillus. At the end of my shift, I handed all 6 cases over to the paediatric team who were on for the week plus IPCT.

85. Since April 2017, new information which I was not aware of at the time has come to light which may be relevant to [redacted] case. There have been 2 cases of *Stenotrophomonas sp.* ("*Stenotrophomonas*") infections in PICU and NICU and the typing we have received from the reference laboratory where we send bacterial

isolates for typing are clustering with [redacted] typing. Clustering means that they are closely related. Given the intervening time lapse this is a remarkable finding. This is most likely explained by a common source which, given that they are hospital acquired infections, is likely to be a hospital environmental source. This warrants further investigation. To my knowledge until this time [redacted] isolates had been a unique type in the hospital. I have provided the Inquiry with a copy of the result from the typing laboratory. Since the Case Note review was published the Board IPCT, led by Dr Balgrade, have discouraged the Microbiologists from doing typing of *Stenotrophomonas* isolates, and even reporting them when isolated on screening. Further there has been no comprehensive collation of typing results that I am aware of as recommended by the review. In my opinion these links and valuable information will be lost if there is not agreement as to the unifying hypothesis of the water system and environment being linked to cases.

86. In my opinion the only way to get a comprehensive overview of the *Stenotrophomonas* typing history within the hospital would be to independently do whole genome sequencing and analysis of every *Stenotrophomonas* isolate including water and environmental isolates. I am aware that some whole genomic sequencing work has been done by the Board. They have done this on the basis of selective samples, processed without my knowledge even when I was the clinical lead for the department. I doubt that the work has been carried out robustly and openly given my experience within the organisation and discussions with key individuals regarding whole genome sequencing. For this work to be transparent and unbiased it should be given to an independent body to do. I can provide further information about this if the Inquiry wishes to have it.

May 2017

87. On 11 May 2017 I received a copy of a draft tender document for 2A for the remediation of the ventilation in the PPVL rooms to make them into positive pressure rooms. Dr Inkster asked me for my comments. I was not an ICD at this time. I replied with 6

comments highlighting the need for proper commissioning and an alarm system. I have provided the Inquiry with a copy of my email. At the time the paediatric haematology/oncology patients were accommodated in 2A even though they did not have fully commissioned positive pressure rooms. This is an example of my being asked to input into something not within my remit because I was known to have relevant expertise. I was happy assist.

June 2017

Dr Inkster's departure on sick leave

88. In June 2017 Dr Inkster was diagnosed with lymphoma and so had to go on sick leave suddenly. This inevitably caused a significant gap in infection control cover. I was asked if I would take on the lead role for Infection Control which I declined. I already had a significant workload as Clinical Lead for Microbiology. I did not feel Infection Control was a properly functioning team and I did not share their ethos. Prof Jones and I disagreed about how to manage the service in Dr Inkster's absence. Ultimately Prof Jones took on her role.

August 2017

[redacted] *raised by* [redacted]

89. [redacted] took on Dr Inkster's infection control sessions at the QEUH and RHC in her absence, while Prof Jones took on the Lead ICD role. I was [redacted] line manager for clinical Microbiology at that time. Shortly after Dr Inkster went on leave, [redacted] advised me that [redacted] felt that [redacted] was being bullied by Prof Jones, and specifically that [redacted] was under pressure to sign off the adult BMT unit as safe without being provided with the necessary information to allow [redacted] to do so. Prof Jones had come in over a weekend when he was not on duty, but [redacted] was, and had a conversation with him which [redacted] described to me as bullying. [redacted] did not want to follow a formal bullying grievance. I understood this because I had not felt able to do that

either. [redacted] told me that [redacted] had asked for information about water testing and had not been provided with it. As [redacted] line manager, it was my role to support [redacted]. I wrote to Dr Armstrong and advised her that there were continued problems with infection control management. I have provided the Inquiry with a copy of this letter. I wrote to her as the medical line manager for Brian Jones with regard to Infection Control.

90. [redacted] came to me again, this time with concerns about both [redacted] workload and difficulties in getting information [redacted] required from Estates and senior management in infection control, particularly around building works. This led to me writing to Mr Powrie to ask for updates regarding the plans for the PPVL rooms as [redacted] was trying without success to get this information.

91. On 23 August 2017 [redacted] emailed me to request an urgent job plan review with a view to relinquishing infection control sessions. This was because of the lack of leadership in IPC and conflicts with IPC management. [redacted] email was copied into the BMA. I have provided the Inquiry with a copy of this email.

Concerns about placement of high risk patients on 4B

92. On 18 August 2017 it was reported in the South Glasgow (18/8/2017) Friday Report (a copy of which has been provided) that ventilation and ceiling works were continuing on 4B and that patients from 4C Haematology were now in 4B Haematology. This meant that the high-risk patients were being moved into an area where building works were occurring which is exactly the opposite of good practice. I do not know whose decision this was.

93. It was unclear what the scope of the work being undertaken was. I did not know if it was just remedial work, or if the work was being done to upgrade 4B to a proper BMT ward. My immediate concern was for the safety of these high-risk patients. I wrote to Mr Walsh for clarification but he did not answer my questions. I have provided the Inquiry with a copy of my email and his response.

94. On 23 August 2017 Prof Jones chaired a meeting which I was invited to. I raised a number of concerns about clarity of roles. Prof Jones told me that if I had concerns I should write to Dr Armstrong to report them. I have provided the Inquiry with a copy of the letter I wrote to her and her response. She said that Prof Jones was responsible for the ongoing works. She also said she was waiting for a report from HPS regarding the status of the isolation rooms. She also said that if I had further concerns I should raise them through the "appropriate" systems (as opposed to raising them with her). I had only written to her because Prof Jones had denied that he was responsible for this issue when I raised it with him in his capacity as the lead ICD and he had told me to write to her.

95. On 27 August 2017 I went up to 4B and found that there were profoundly neutropenic patients being housed on the ward despite the ongoing building works. I emailed Prof Jones and Mrs Devine to ask about any policy regarding who would be accommodated in 4B. Brian replied and copied in Grant McQuaker, Isobel Neil and Mr Walsh saying that it had been Dr Inkster's decision for these patients to be moved into the ward and that there was no issue with managing these patients or even acute leukemic patients at the site. I have provided the Inquiry with a copy of his email. I was informed that there was no policy and that it was a matter for haematology colleagues. It is my understanding from Dr Inkster that she had not in fact taken this decision. I do not know who actually made this decision.

96. Prof Jones also mentioned that water quality should not be an issue even though I had pointed out that water testing had not been done. I replied pointing out that there was a JACIE standard for bone marrow transplants (Standard B2.1) which provides as follows: "*If non-HEPA filtered rooms are used for lower risk patients or if there is a shortage of HEPA filtered rooms, the SOP's on Infection Control, Biosafety and Chemical and Radiological safety should indicate how allocation of rooms is prioritised. Further auditing of airborne microbial infections in non-HEPA rooms should be performed as part of the QM (Quality Management) Programme".* The JACIE standard also makes provision relating to water quality.

97. I felt that there was an inadequate understanding of the importance of appropriate accommodation for this patient cohort and that this was a risk for the safe management of patients going forward.

Argument with Professor Jones

98. On 28 August I tried to organise a meeting with Prof Jones as Head of Service and with the ICD's. Prof Jones refused to attend a meeting but came to the department and asked to speak to [redacted] alone. [redacted] came to me to say [redacted] was too scared to meet with Prof Jones alone, because Prof Jones was clearly very angry. We assumed this was about the ICD roles and responsibilities issue which I had written to Dr Armstrong about. I emailed Prof Jones to say "*I see you are in the department can we have our meeting*". Prof Jones stormed into the duty room where I was working with our trainees and Dr Wright and Dr Khannah. Prof Jones was shouting and swearing at me, about me telling him what to do and not to send him emails. I was very shaken up by it and afterwards emailed myself notes of what had happened which I have provided to the Inquiry. I believe that letters were written to Dr Cruikshank by Dr Wright, Dr Khannah, and [redacted] afterwards to complain about Brian's behaviour. I do not have copies of these letters.

99. At the same time the staffing in the QEUH in Microbiology was critical and there was no input or help from Brian Jones or any offer of cross cover from north colleagues.

Death of [redacted]

100. I am now aware that on [redacted] died in PICU. I did not have any direct involvement with her care at this time. At this point I was not aware that there had been any deaths directly due to *Stenotrophomonas*. I am now however aware that no water samples were taken at that time which means that although there is no positive evidence of waterborne infection, there is also no evidence to suggest the water was not the cause of [redacted] infection. I am also aware from the evidence given by [redacted] that [redacted] witnessed work being done to the shower heads. If mitigation

measures were taken between the time of infection and the negative water sampling then the results of that cannot be regarded as reassuring. I have heard it postulated that *Stenotrophomonas* could have come in on clothes of relatives. This is a very unlikely hypothesis in my opinion based on the evidence base around outbreaks of *Stenotrophomonas*, the epidemiology on the unit and the clearly documented problems with the entire water system.

September 2017

101. On 3 September 2017 I received a response from Dr Armstrong in respect of my email dated 23 August 2017. Dr Armstrong assured me that the Board were fully aware of what was going on in 4B and told me that Prof Jones was to lead on 4B. I have provided the Inquiry with a copy of her correspondence.

102. On 5 September 2017 [redacted] wrote me a serious email regarding [redacted] experience of working with IPC and the impact this was having on [redacted]. I have provided the Inquiry with a copy of this email.

103. On 6 September 2017 I had a meeting to discuss ICD concerns and cover as Dr Valyraki had gone off sick. Following this meeting [redacted] sent an email to me containing a list of concerns including environmental organisms in 2A, bacteraemia rates in paediatrics, water testing, lack of clarity around processing and environmental sampling in 2A. I have provided the Inquiry with a copy of this email. [redacted] said that [redacted] had spoken to Dr Hood who was unable to comment or help regarding the water testing in 2A.

104. It is important to understand the pressure at this point; Dr Inkster was off sick, Dr Valyraki was now also off sick, [redacted] was having significant difficulties in the ICD role for the reasons already outlined, we had a lower than required number of trainees and we were covering all of the on calls for the absent staff members. We repeatedly asked for locum cover and our requests were refused.

Infections in PICU, NICU and 2A

105. At around this time in September 2017 the paediatric Microbiology team noted bacteraemias in 2A, PICU and NICU including gram negative micro-organisms. I received statistical processing charts for alert organisms in NICU, PICU and 2A from [redacted] who stated that Prof Jones and Mrs Devine were reviewing the triggers. The differences between the neonatal units across the city and the *Stenotrophomonas* in 2A chart were striking and very clearly demonstrated a breach in the upper control limit. This indicated zero cases of *Stenotrophomonas* in 2A over 21 months and then from April 2017 a case in April, May, June and 2 in July 2017. I understood from discussions with [redacted] that Mrs Devine and Prof Jones' view was that Dr Inkster had set the triggers to be too sensitive. I disagreed with this.

106. Around 12 September 2017 I was aware that there were issues surrounding the interpretation of air sampling in 2A that [redacted] was involved in. I emailed [redacted] at this time to advise [redacted] that 2A was not [redacted] remit, that the IC SMT would take responsibility, as this had been agreed with Prof Jones. I was aware that [redacted] continued to have correspondence about this with the staff on ward 2A as an attempt to fill the void where the SMT should have been assisting.

Ongoing departmental issues

107. On 21 September 2017 I emailed Dr Armstrong and advised her that the ICD's were still without a clear structural understanding of their roles and responsibilities, I challenged the idea that [redacted] had been given the information [redacted] needed to do [redacted] job (especially in relation to the sign-off of work in 4B) and highlighted the importance of water safety commissioning. I summarised a number of steps I had already taken to raise the concerns, for example through the IC SMT, the AICC, and Acute Clinical Governance. I have provided the Inquiry with a copy of my email.

October 2017

Whistleblowing Stage 1

108. By October 2017 I was extremely concerned about numerous areas of risk. I had raised all of these concerns repeatedly and I did not feel that they were being adequately responded to. The paediatric BMT patients were particularly at risk, but I was also very concerned about air quality, water contamination, repeated water ingress, chilled beam units, unsealed ceilings, and air sampling results which suggested fungal and bacterial contamination.

109. On 3 October 2017 I emailed the ICT (Susie Dodd, [redacted] and Dr Balfour) regarding a newly diagnosed line infection in a patient on 2A who had *Roseomonas sp.* ("*Roseomonas*"). This is a water-borne environmental organism similar to *Pseudomonas*. Susie Dodd informed me that the Quality Improvement Group would be meeting to discuss the line infections on 2A. I pointed out that the potential clinical consequences of the line infections were dire. I have provided the Inquiry with a copy of my email.

110. Around this time, it became clear from discussions with Dr Redding and [redacted] that we were all of the opinion that patient safety issues were not properly being dealt with and we agreed that the only course of action we had at this point, having already raised our concerns multiple times, was to follow the whistleblowing policy. During our discussions, Dr Redding advised that it would be best to follow the whistleblowing process from step 1. With our support she undertook to contact Dr Armstrong as the director in charge of the area of concern, that being infection control, as per the policy.

111. With input from Drs [redacted] and Redding, I prepared an SBAR at the request of Dr Armstrong and sent it to her. Both Drs [redacted] and Redding approved the final version. The timescale she gave me to produce this was very short given the

complexity of the issues involved. I have provided the Inquiry with this SBAR. A meeting was organised. There are minutes available which I have provided to the Inquiry.

112. This process had been initiated by Dr Redding but she was out of the country in the days prior to the meeting. I was therefore asked to prepare the SBAR.

113. On Wednesday 4 October 2017 I attended the Teaching and Learning Centre of the QEUH at 8am for the meeting instigated by Dr Armstrong. In attendance that morning were Dr Armstrong, David Loudon, Morag Gardner, Mrs Devine, Mr Powrie, Prof Jones, Mr Walsh, Anne Harkness, Jonathan Best, Gary Jenkins, Dr Redding, [redacted], Dr Green, and Ann Lang as minute taker.

114. Initially Dr Armstrong welcomed everyone to the meeting. I was intimidated by the large number of very senior Board employees present. I had expected a smaller group. The tone of the meeting was set when Dr Armstrong cut short my introduction. I said I was Head of Department at QEUH for Microbiology which was the title Prof Leanord had used for the same position. She said "*You are Head of nothing Brian is Head of Service just to be clear*". I found this rude, unnecessary, and belittling.

115. Dr Armstrong then made a reference to emails submitted by the Women and Children Directorate. These emails had not been circulated to us so I was unaware of their content.

116. It was a very controlled meeting where all comments were to be addressed to the Chair and the Chair was quick to cut in whenever we spoke. Dr Redding was asked to go through the SBAR.

117. The first issued raised in the SBAR was patient placement. The SBAR highlighted not only the issues with the rooms but also the dates on which concerns had first been raised. For example, with regards to source isolation of infected patients, we noted that this had been raised in June 2015 through IC SMT and

numerous times since then including at AICC, as well as via a letter from ID Consultants in May 2016.

118. We highlighted that the PPVL rooms were not built to SHTM standards, that it was unclear what remedial work had been carried out and that the ID Consultants were concerned that they did not provide air-borne protection. The interim measures put in place in December 2016 of moving patients to the GRI and Monklands were still in place almost a year later.

119. David Loudon was angry at this suggestion and stated categorically that the PPVL rooms did conform to SHTM standards. He stated that the specification was signed off by the Board and clinical teams. I assumed he meant the ID and ITU teams but I don't know for sure.

120. Mrs Devine noted that the addition of the ID service was a late amendment to the QEUH project. She stated that the issues were discussed with HPS at the time and they agreed to advise the Board of what standard these rooms would need to be. Mrs Devine said they had a meeting with HPS on Monday 2 October 2017 and that the relevant information was expected in the next few weeks. I found it odd that there would be a 3 year gap between a decision to move the ID service and a follow up meeting with HPS which happened a mere few days before this meeting.

121. I highlighted that ID colleagues were concerned that, prior to transfer to other hospitals, ID patients were being seen in A&E where there is no isolation facility, and then were being transferred up through the hospital to ITU.

122. Anne Harkness advised that she had already raised these issues with Directors, and based on external advice, unless the existing rooms could be modified in some way, the only alternative was to build an ID unit which would require significant resource. David Loudon confirmed that changing spec to negative pressure would be reviewed to assess technical feasibility. The minutes stated that it was agreed to await

the response from HPS and deal with any further issues with the AICC but there was no indication that we would get any further feedback.

123. The second point we raised about patient placement related to protective isolation for immuno-suppressed patients. At this time, there were no HEPA filters fitted in the PICU isolation rooms where BMT patients were regularly accommodated. We noted that there was work ongoing to change the PPVL rooms to positive pressure rooms in 2A but there were issues with HAI Scribe. We noted there were no documented or risk assessed placement policies for immuno-compromised patients in QEUH or RHC. Dr Redding pointed out that there were high rates of infection in immuno-compromised patients in 2A and that air quality had been an issue since it opened. She commented that there was an ongoing outbreak of *Aspergillus* in the unit and that the risk continued. I highlighted that both Dr Inkster and I had objected to a public statement in 2015 that claimed there were no issues affecting the paediatric BMT service. Mrs Devine said that there had been 2 cases in March associated with a leak in the ceiling space; this was investigated, the tiles were removed and replaced. There was no engagement with our concerns regarding the air quality. There was conflicting information about whether HEPA filters were going to be installed in the PICU.

124. We then discussed the line infection rates on 2A. Mrs Devine stated that the IPC team were working with Timothy Bradnock on improvement. She noted that there was no benchmark for this area. I replied that they needed to start with establishing the actual rates of line infection but Mrs Devine stated that there was no resource to do that. Dr Armstrong advised us that there was a focused piece of work being carried out in 2A to ensure compliance. The nature of the work was not described, but it was suggested that Iain Kennedy would take this forward. I was unsure why a PH Consultant would take the lead on an essentially IPC area of expertise with regard to environmental risks in a specialist unit.

125. One of the issues I raised was the fact that in the treatment room on 2A I had observed multiple trolleys (up to 7 or 8) set up for giving chemotherapy and antibiotics.

It was very crowded and close to the sinks within what is termed the "splash zone". This room was not HEPA filtered and neither was the prep room which is where you would normally prepare medication to be given intravenously. Gary Jenkins advised that chemotherapy was prepared in a designated area and there was an audit to confirm this. I was not suggesting that the chemotherapy was being prepared in the treatment room but rather the kit for delivering it as well as antibiotics were being prepared there. As the meeting was so tightly managed I was unable to counter this to explain they had missed our meaning.

126. I recommended that there should be a patient placement policy as I had seen in other hospitals that I had worked in. It was agreed I would provide a copy of such a document and it would be discussed at AICC. Dr Redding commented that infection rates were not being monitored. Dr Armstrong did not accept this at all, and said that the Board directors received a weekly report of outbreaks and incidents. I felt that Dr Armstrong was not willing to understand the point we were making which was that not all outbreaks and HAI cases were being identified due to an over reliance on definitions and national alert organisms which did not leave scope for identification of unusual events of the sort that we felt were occurring in 2A. We were not suggesting MRSA and C diff rates were high. The response that they were in control was therefore irrelevant and deflecting from the real concerns. I note that our approach is in keeping with the expert epidemiology report prepared by Sid Mookerjee for the Inquiry.

127. We then moved on to single room accommodation. We highlighted that the air exchange was half of the recommended standard and that chilled beams were collecting excessive dust. We were concerned about the risk of organisms such as *Acinetobacter sp.* ("*Acinetobacter*"), methicillin resistant *Staphylococcus aureus* (MRSA) and other bacteria building up within the chilled beams. We pointed out the need to share learning about all of the building issues with other Boards. Unfortunately, David Loudon narrowed this down to simply discussing chilled beams with Dumfries who also had chilled beams. I had stated that all the relevant relearning from our SBAR concerns should be shared with others including with HFS.

128. Prof Jones suggested that it may be useful to review infection rates. At this cue, Mrs Devine reported that the Point Prevalence Survey showed that the QEUH was under the national average for infections and that all alert organisms were monitored by the IPC team and there were no indications that this site had a higher than average infection rate. I pointed out that the system in place was not designed to pick up the kind of infections we were seeing. I pointed out that the QEUH had a rapid turnover of patients and that post discharge infections would not be picked up by Point Prevalence Surveys which are also limited in their scope. It was the wrong methodology for picking up unusual events. Again, I note that my approach is in keeping with the expert epidemiology report prepared by Sid Mookerjee for the Inquiry.

129. We mentioned issues with cleaning and dishwashers. There was an acceptance that the audit system had missed this problem but the cleaning problem had now been rectified. However, the problem which had been identified was twofold – first, was the cleaning of the dishwashers, and the second was with the audit system which had failed. My request that the new audit system also be reviewed has never been taken forward in so far as I am aware.

130. The next point to cover was water quality. We mentioned that all the taps were fitted with thermal mixing valves, but there was no cleaning and maintenance policy. We also mentioned that water on 4B had not been tested and that delays in water testing were being experienced by the ICDs. [redacted] was very clear that [redacted] had difficulty getting water testing done which [redacted] had asked for because [redacted] thought there was a problem with the environment, but [redacted] had not received the results from Estates. David Loudon responded strongly that there was a Water Board Safety Policy in place that had been approved by the Governance Committee and that there was strict guidance on how to monitor water systems and processes were in place to comply. David Loudon made it clear that he thought we had no business querying anything to do with the water system. As we were seeing clinical cases in haematology/oncology paediatric patients who had enough suffering to contend with

already, I was clear that raising this as a concern was very much within our professional scope.

131. Mr Powrie confirmed that water testing was carried out with only the exceptions (i.e. failures) being reported to the Infection Control Team. The minutes state that it was agreed that the Board were compliant with water testing protocol. However, I was in no position to agree or disagree without the evidence of the actual water testing history which had not been shared. It now transpires that the report from 2015 was in existence and DMA were on site and writing what became the 2017 report. It seems utterly astonishing to me now that the answers we were given at that time were so distant from the reality.

132. We raised a number of other issues regarding the newer surgical block. However, time was running out by this part of the meeting. A key part of what we had put into the SBAR related to the infection control structures and roles, specifically the lack of formal involvement of an ICD in HAI Scribes.

133. We highlighted a lack of communication of important information despite requests for that information. We stated that there was a professional risk of making decisions and giving advice based on incomplete information.

134. I was keen to discuss this as I believed it to be a fundamental problem within the team. I supported Dr Redding when she said that the roles were unclear and I mentioned an unhealthy culture. As soon as I said that Jonathan Best leaned back in his chair so he could see me and said “that is just your opinion and hearsay”. I said it was not just my opinion, there were a number of Microbiologists who agree and that I had the evidence to show this to be the case. At this point Dr Armstrong interrupted and reminded me to address her as the Chair and that this would be dealt with at a separate meeting. That was the end of the meeting. As we got up to leave the meeting Dr Green said to Dr Armstrong “*well that was a lot of fuss about nothing*”.

135. After the meeting [redacted] sent me an email stating that [redacted] wanted an urgent job plan review to have infection control removed. The interim arrangements that had been agreed with infection control SMT and the Head of Service were not working. This led to a Consultant meeting to discuss how infection control could work. I summarised the discussions in an SBAR and sent this to Head of Service on 6 October 2017. I have provided the Inquiry with this SBAR. At this point I highlighted that we were still seeing high rates of line infections in 2A including environmental gram negatives.

Ongoing infection concerns

136. On 10 October 2017 I had a meeting with Susie Dodd where we discussed the continued high rates of infection.

137. On 13 October 2017 I grew *Mycobacterium chelonae* from a shower head in 7D, (a CF ward). I escalated this to Prof Jones, Jackie Balmonroy and Ms Joannidis on 13 October by email copying in the CF Consultants. Prof Jones replied to say that he and the ICNs would take it forward. I can provide a copy of this email if required.

138. On 19 October 2017 I became aware of an issue with air quality within the Teenage Cancer Trust with Dr Balfour writing an email to say that she had assessed previous air sampling results and although fungi had previously been cultured there, there was no obvious record of actions taken to investigate or remedy this. I have provided the Inquiry with Dr Balfour's email to me.

139. At this point there was day to day ICD cover because no one would agree to be the sole ICD for the site. We agreed as a group that as an interim measure to ensure that the duties were covered that we would do it on a rotational basis. I was very conscious that this was far from ideal and in order to mitigate the risks associated with this set up I established a joint inbox and a system of written handover to ensure nothing was missed. I can provide further information about this if the Inquiry wishes to have including a risk assessment sent to Rachael Green and Prof Jones regarding

this set up. At this point we had high levels of gram negative infections in haematology and oncology patients. Prof Leanord was still part of our rota at that point. I remember handing over to him a very high prevalence of infection amongst paediatric haematology/oncology patients. He was definitely aware of the infections we were seeing and he sat as advisor to Fiona McQueen at the HAI policy unit so my assumption was that he would be keeping an eye and communicating with the policy unit, especially as we are the only BMT unit for paediatrics in Scotland.

Prophylaxis Prescribing

140. On 23 October 2017 I was the Microbiologist covering paediatrics. Prof Gibson informed me that there was a plan to introduce antifungal prophylaxis following a recommendation from Prof Jones. This had not been communicated to me by Prof Jones so I wrote to him to clarify. He responded that he would strongly recommend prophylaxis "*given the current situation".* I questioned him about the planned length of time that this prophylaxis would be used as I was concerned about the toxic side effects and the limiting of antibiotic choices for treating infections because of drug interactions. His response was "how long is a piece of string". I have provided the Inquiry with a copy of this email exchange. My understanding was that this recommendation would be in addition to the standard protocolised anti fungal use which is normal practice in this patient cohort.

141. Prof Jones mentioned that having HEPA filtered rooms under positive pressure would help and I said that I agreed and that Dr Inkster and I had been saying that for 2 years. I have provided the Inquiry with my email to this effect.

Further infections in late October 2017

142. On 24 October 2017, [redacted] told me that once again there was mould in samples from 2A including *Aspergillus* and *Mucoraceous* fungi. [redacted] told me that nobody within infection control seemed to know how to interpret these and we still did not know about the ventilation specification. This seemed farcical. Both ICNs and

ICDs had previously been involved in not only writing and running with air sampling SOPS, but even publishing a poster on this in Yorkhill. I can provide the published information, the SOPs and examples of actions taken based on air sampling results at Yorkhill if that would assist the Inquiry. Once again [redacted] asked for SMT involvement. On 26 October 2017 there was a possible case of *Aspergillus* within 2A which was later confirmed.

143. On 30 October 2017 in order to summarise an increasingly complicated situation in 2A I wrote an SBAR specifically for Prof Jones, in which I recommended the need for clear guidance for the safe placement of high-risk patients on the unit. I have provided the Inquiry with my SBAR.

November 2017

144. On 20 November 2017 [redacted], Dr Redding and I received an update following our whistleblowing Step 1 to Dr Armstrong regarding our concerns about the public statements made by the Board in 2015 relating to the haematology/oncology unit. We were informed that the Communications Team had not been briefed on testing at the RHC and that the line that stated that the issues related only to the adult hospital and that the children's BMT was *"separate and unaffected"* related to them not having to relocate. I found it implausible that a public statement like this would not have been signed off by management who were aware of the issues, and in particular by Dr Armstrong. They also did not engage or comment on the additional background information that went with the press release. I would draw the Inquiry's attention to the document titled "BMT Q&A For Possible Supplementary Questions for Discussion" (a copy of which I have provided to the Inquiry), question and answer number 8 in particular, which provides support for our concerns and show why these concerns were not allayed by the explanation we received.

145. On 28 November 2017 Dr Valyraki came to my office. She was very upset. She was worried about the fact she had been sent an HAI Scribe to sign off on work to be planned on 4B. She informed me that Prof Leanord had already signed off on two other HAI Scribes for 4B. However, her understanding was that any works on 4B were the remit of the SMT and specifically Prof Jones who had asked Dr Valyraki to proceed. She explained to me that she did not have the experience or confidence to undertake such a piece of work alone and requested my help. I agreed to do a ward walkaround with her and Jackie Balmonroy. It was unclear what exactly Dr Valyraki was being asked to agree to as there was a lot of work planned.

146. My understanding at this point in time was that 4B was being used as a general ward because adult haematology patients were still at the Beatson. During the walk around I was horrified to discover that in fact high-risk BMT patients had been moved into the ward while a number of works were being carried out.

147. The air was dusty. The area that should be sealed off where the work was being carried out was open to the corridor allowing the dusty air to move freely through the units. It was bad enough to cause Dr Valyraki to have a coughing fit. She escalated this via email to Prof Jones that day. I was copied into the email which I have provided to the Inquiry.

148. It transpired that Dr Valyraki was being asked to sign off on leak testing. Part of the design and validation is to check for leaks. There is an established protocol for doing this. No leak testing had been done prior to the hospital opening. The guidance on how to do this had changed in the interim. The leak testing required air to be drawn through the area which had brought dust through from the ceiling voids and other areas. They should not have done this with patients there. The prep room was not sealed off. This would have been risky on a non high risk ward; on this ward it was particularly bad. As it was now apparently my responsibility to sign off on the scribe, I requested a full set of information from Mrs Devine whose response was inadequate. I have provided the Inquiry with my email and her response.

December 2017

149. On 1 December 2017 I chaired a meeting about signing off the HAI Scribe of the work on the ward. The ICNs refused to organise this meeting. This was unheard of in my experience. I therefore made all the arrangements and took the minutes. Dr Valyraki, Lynn Pritchard, Mrs Devine, Myra Campbell, Dr Green, Alison McCardell, David Bratty, Melanie McColgan, and Grant McQuaker were all present. The purpose of this meeting was to discuss with the key stakeholders the accommodation of high-risk patients in the context of dust generating work, evident confusion regarding the work and HAI Scribes being inadequate.

150. Right from the outset it was evident from the tone, body language and comments from all present other than myself and Dr Valyraki that they were very unhappy to be at the meeting. Dr Green was especially antagonistic. Dr Valyraki and I summarized what had happened and I explained that this posed a significant risk to patients. Myra Campbell indicated that she had spoken to the clinicians caring for the patients and that they were satisfied that there was no risk. However, this was at odds with the information I had been given by the doctors on the ward who indicated that the patients were on Posaconazole prophylaxis specifically for the risk. This would indicate that they were thought to be at risk of fungal infections. Mrs Devine was very unsupportive and informed the group that the movement of patients into the unit was a separate issue and that work had been carried out with full discussion with HPS and HFS.

151. Melanie McColgan said that there was a concern that the works should not be delayed as they wanted patients to be transferred back from the Beatson. The group refused to follow up and Dr Green stipulated that I was not to contact HPS regarding the situation. After the meeting Dr Green took me aside and told me that it had not been a good meeting and that I had not handled it well. I said that I did not think that anyone could have had a good meeting given the attitudes around the table. I took minutes of the meeting and circulated them with a covering email stating that I planned to contact HPS for clarity. I have provided the Inquiry with the minutes and

the covering email. In fact HPS did not know about the work, which is presumably why I was asked not to contact them. My emails to HPS are available if required. On reflection, I suspect this is the point at which I should have contacted the Cabinet Secretary for Health because the Board appeared to be deliberately concealing safety critical information from HPS.

January 2018

152. On 24 January 2018, a couple of weeks after returning from sick leave, Dr Inkster resigned from the post of Lead ICD. Subsequently, I wrote to Dr Armstrong in support of Dr Inkster, advising that I thought the QEUH should try to keep her due to her level of experience and expertise. I am unaware of what discussions took place between GGC and Dr Inkster but subsequent to all of this I understand Dr Inkster took back her role as Lead ICD. At this time, it was my understanding that Dr Inkster shared the concerns of myself, Dr Redding and [redacted] about the building and the functioning of the IPCT.

Cupriavidus infection

153. There had been a *Cupriavidus* case in 2016 which Dr Inkster had dealt with. There had been another case in October 2017 dealt with by Dr Balfour. Another case was identified in January 2018 when I was on the rota when Dr Inkster was just returning to work. I did a PAG and when I looked at the details it seemed to me that the link was not the pharmacy. The first one had been linked to the pharmacy and a sink had been removed as a result. Further testing was carried out and it was determined to be a very wide ranging problem. I have provided the Inquiry with the minutes of the PAG.

154. Around this time, it was agreed that Drs Balfour, Inkster and Valyraki would be the ICDs for the South and the rest of the team would no longer be ICDs.

February 2018

155. Notwithstanding that I was no longer an ICD, I was asked by Dr Inkster to attend a meeting that had been organised with GGC Estates, HPS and HFS to discuss the PPVL rooms and the possibilities for conversion into negative pressure rooms. This meeting took place on 19 February 2018. There was a large group of people in attendance including Annette Rankin from HPS, Ian Powrie and Alan Gallacher from GGC Estates and others, not all of whom I recognised. Malcolm Thomas spoke as well as others.

156. I spoke to Malcolm Thomas after the meeting. I was very interested to speak with him because he is the designer of the concept of PPVL rooms. I asked him if extracts were not in the correct place in a PPVL room, would that invalidate them? He said that it would. From our discussion, it was clear to me that he shared my concerns about the fact that the PPVL rooms in the QEUH had deviated from the exact design specifications as validated and specified in HBN 04 Supplement 1, including in relation to the placement of extracts. I understood from our conversation that he had been invited by Ian Powrie to view our PPVL rooms and to give an opinion regarding their suitability for isolation purposes. Mr Thomas gave an opinion to me verbally that the PPVL rooms deviated from his design. I do not know if Mr Thomas provided an opinion in writing.

157. I prepared a report of the meeting which I emailed to Dr Inkster, copied in Ian Powrie, on 21 February 2018. A copy of this report has been provided to the Inquiry.

158. On 27 February 2018 Susie Dodd sent an email to the ICT and the haematology/oncology Consultants regarding *Cupriavidus* from outlets in rooms 15 and 13 on 2A including from showers. She also informed us of *Pseudomonas* in a water outlet in Room 3. An IMT was to be arranged for 2 March 2018. By 1 March all actions had already been taken and the situation highlighted to HPS as HIATT red. These results had come about following the earlier incident of *Cupriavidus* that I dealt with in January 2018.

March 2018

159. In mid-March 2018 Dr Inkster asked me to undertake the microbiological testing of taps and shower heads from 2A and 4B because Dr Valyraki was unable to do so, specifically looking for *Cupriavidus pauculus*. I was also asked to process samples from detergents, lotions and wipes to detect *Cupriavidus* and *Stenotrophomonas*. I asked a Microbiology trainee, Dr Hannah Sowbery to assist. I did not handle any of the samples or plates without someone else being present. I felt that within Microbiology and infection control there was considerable mistrust of me and I was therefore very aware of the need to proceed in a meticulous manner with regards to the credibility of the results. It felt like a very toxic situation to be in but I also felt it was my professional duty to assist with the investigation, given the clear risks to patients.

160. I wrote a report of my findings (a copy of which I have provided to the Inquiry) and my interpretations. We found not only a *Cupriavidus* but other environmental gram negatives. I highlighted in my report that there had been cases in 2A of bacterium with some of these organisms including *Brevundimonas* and *Delftia* in 2017. I also suggested that *Mycobacterium* colonisation would be a risk with the use of biocide (disinfectant). At this point I had already isolated M*ycobacterium chelonae* as had been communicated to Prof Jones and the ICNs on the water group. I discussed the testing of the taps with Peter Hoffman and he suggested a quantitative method of culture should we repeat the exercise. This was a huge amount of work.

161. On 22 March 2018 I forwarded my reports by email to Dr Inkster and the Technical Laboratory Management Team of John Mallon, Fiona Reynolds, Janet Young and Mrs Higgins. I was not involved in any further work on the taps and received no further feedback. I note that my report 'Report on Environmental Sampling on 2A and 4B' dated 22 March 2018 is included in Bundle 18 – Documents referred to in the expert report of Dr. J. T. Walker, Volume 2 of 2 at page 1016.

162. Also in March 2018, Dr Redding, [redacted], and I drafted a response to a draft action plan sent to us by Dr Inkster in which we highlighted a number of specific concerns about the action plan. However, we did not submit this response and instead proceeded to step 2 of the whistle blow.

June 2018

163. In June 2018 I was informed by Dr Inkster that there was a problem with the drains in 2A. The ward had been closed and they couldn't reopen. During the course of my duties as Microbiologist for 2A it became apparent that the use of prophylaxis was problematic. By this point they had started administering ciprofloxacin prophylaxis. I wrote an email on 15 June to my colleagues outlining the toxicities and risk management needed on a case by case basis. I have provided the Inquiry with my email. My concern related to the failure to keep Microbiology colleagues informed rather than to clinical decisions taken about administration of antibiotic prophylaxis. Each case needed to have the balance of risks carefully weighed in the context of inter current infections and the chemotherapy regimes and plans.

164. As part of the IMT process I was informed that one of their hypotheses for the increased number of infections was over-use of Meropenem and that this was the fault of the Microbiologists. Meropenem is a broad-spectrum antibiotic which can select for resistant organisms. I looked through all 17 patients that were involved in the IMT chaired by Dr Inkster. I reviewed their antibiotic use and found that only one patient with *Stenotrophomonas* had been on Meropenum, the use of which was appropriate. Line removal had been recommended for those patients where the central line was thought to be the source. I advised the team to ensure accurate recording of decisions around the central line and to record the length of antibiotic treatment. Having reviewed all of these cases I formed the opinion that the wider Microbiology team were performing well in terms of antibiotic advice and central line advice. The Case Note Review later commended the team's work in this area.

July 2018

Concerns raised by Professor Gibson

165. In July Prof Gibson requested a meeting with the Microbiology Team and Dermot Murphy because of her concerns about increasing infections. During this meeting she expressed a number of concerns about the type of infections and the antibiotic and fungal prophylaxis used.

September 2018

166. On 19 September 2018 a follow up took place to the meeting initiated by Prof Gibson in July 2018. My presentation to all of the staff at this meeting (a copy of which I have provided to the Inquiry) demonstrated the striking epidemiology of gram-negative organisms. Having had almost a year without finding environmental organisms in patients' blood streams since the move to the RHC, there were notable spikes in 2017 and 2018. While gram positive organisms were dramatically reducing, gram negatives were not and the range of organisms as well as polymicrobial infections and the nature of these organisms all demonstrated an unusual pattern of infection in this patient cohort (haematology/oncology). I also looked at antibiotic use and demonstrated that this had increased in order to treat the increasing gram negative infections. We looked at resistant patterns and whether Meropenum use increased because Tazocin resistance had increased. Meropenum use per gram negative on the unit had in fact reduced dramatically. This meant that the use of Meropenum was not unnecessary – we were giving targeted therapy. Again, the Microbiology team's advice was commended in the Case Note Review. I therefore do not accept any suggestion that an increase in *Stenotrophomonas* cases was caused by over use of Meropenum.

167. On the same date I was informed by Dr Inkster that the paediatric BMT patients would move to 4B and that haematology/oncology would move to 6A. This was as a result of continuing infections on 2A and 2B. My understanding was that this was a recommendation from the IMT but was approved by the SMT within the Board.

168. Over the next two months I was aware from communications with Dr Inkstser that a lot of work was being done on 2A and attempts were being made to change the PPVLs to positive pressure rooms. The Microbiologists were having to cover infection control when there were no ICDs available because of leave or other absence.

October 2018

Dr Kennedy's Report

169. In October 2018 Dr Iain Kennedy's report was published. I had a number of concerns about the methodology and conclusions reached in this report. I can provide detail on this if it would assist the Inquiry.

170. In general terms, I felt that the report was too high level and missed the mark on the key components of the epidemiology which was a striking and deeply concerning rate of gram negative and unusual bateraemias in an immuno-compromised cohort of patients. In my view this epidemiology supported the unifying hypothesis of water and drains being the issue. I have had the benefit of reading the expert epidemiology report prepared by Sid Mookerjee. His report agrees with my concerns at the time about denominators and the specific types of infections in a specific cohort of patients.

November 2018

171. On 15 November I received an update from Dr Inkster saying that the negative pressure rooms in critical care could not be signed off as they did not meet the air change requirements and therefore we still had to direct to another centre.

[redacted] – *Cryptococcus infection*

172. On 26 November 2018 I was copied into an email to Prof Jones sent by a Microbiology trainee informing him of a patient called [redacted] who had *Cryptococcus* in [redacted] blood culture. This is very rare. In fact, I don't recall having ever seen a *Cryptococcus* case in a haematology/oncology patient before, although I had been involved in treating a couple of cases previously in different patient groups.

173. [redacted] was a [redacted] patient with chronic neutropenia being cared for on 4C. Despite being put on Meropenum [redacted] was septic. The positive blood culture was taken on 21 November 2018. When the blood culture flagged up positive, [redacted] was commenced on Fluconazole and then changed to Ambisone once it was known to be *Cryptococcus*. [redacted] seemed to respond to the Ambisone initially. I checked the telepath notes for this patient and I could see that [redacted] was unable to have a lumbar puncture due to low platelet counts; the risk of bleeding was thought to be too great. A CNS infection was not entirely ruled out. While [redacted] had not grown *Cryptococcus* since a blood culture on 25 November 2018 [redacted] antigen test remained positive on 19 December 2018. This would indicate a continued presence of *Cryptococcus*. [redacted] was continued on the anti-fungal therapy.

174. My impression from looking at [redacted] history is that [redacted] illness was compatible with acute *Cryptococcus*, consistent with a hospital acquired infection, given the occurrence of a second case within the hospital within three weeks, the epidemiological rarity in this patient cohort, what we now know to be a major pigeon infestation on site, and a lack of protective isolation specialist ventilation.

December 2018

[redacted] - *Cryptococcus infection*

175. On 18 December my colleague, James Cargill who had at that time recently joined the department told me that there had been a paediatric *Cryptococcus* case within paediatric haematology/oncology unit that looked likely to be hospital acquired. That patient was [redacted].

176. I advised him that there had just been an adult case and that he needed to inform Dr Inkster. We both commented that there must be pigeons somewhere because the connection between *Cryptococcus* and pigeon guano is so well known. He informed Dr Inkster and she organised IMTs.

177. As I was on duty over the Christmas period I was asked by Dr Inkster to follow-up on the cleaning of the plant rooms, because by that time it had become known that there was a serious infestation issue within the plant rooms. My recollection is that an Estates colleague that I spoke to commented that it had taken a team of 11 men to clean up the plant rooms which had all been infested with pigeons.

January 2019

Ongoing issues with Cryptococcus

178. On 18 January Dr Inkster asked me to contact Peter Hoffman for advice regarding *Cryptococcus*, pigeons, plant rooms and how to carry out an appropriate investigation.

179. I visited the plant rooms with Mr Powrie and Darryl Conner with a view to putting together a report for the IMT. This was after the clean-up but there was still evidence of pigeon ingress. I wasn't sure I was being shown the correct air handling units. Estates didn't know which air handling unit was which and they had to phone the office to ask a colleague go to the individual rooms to see whether when we

switched off the air handling unit which we thought related to a particular area it actually went off.

180. I produced a report (a copy of which I have provided to the Inquiry). The photographs within my report were taken by either myself or [redacted]. I now know that at the time of my visit to the plant room, Darryl Conner was in possession of photos that had been taken pre-clean-up and demonstrated heavy contamination. They told me that it had been a very small amount of guano. That night there was a leak. I saw water cascading down from the roof into the plant room. Mr Powrie indicated that this was not a rare event. I thought this could be a route for contaminated water to bring in pathogens including *Cryptococcus*. I emailed Peter Hoffman for advice, and I can provide the emails between Peter Hoffman and myself if they would assist the Inquiry.

181. Colin Purdon told me that the pigeons had got in by crawling under the cladding on the ground floor and working their way up. This now seems plausible given that a couple of years later there was a fire alarm at the QEUH when someone had dropped a cigarette at the bottom of the cladding and smoke had worked its way up through the space between the cladding and the building. This highlighted that there was a gap at the bottom of the cladding. I am aware that there had been a discovery of dead pigeons and pigeons nesting within the wall cavity at ERI because of a similar gap. However there were also other routes of ingress including open doors, and we were informed access could also have been through a louvre without netting.

182. I felt that it was quite plausible for patients in 4C and 6A to be exposed to *Cryptococcus* spores by a number of possible routes all caused by this pigeon infestation and that the key failing was that patients were not in adequate accommodation that would prevent ingress of fungal spores or provide for rapid dilution of fungal spores. Right from the start there was a huge reluctance from Estates' colleagues to accept that pigeons in the plant room could pose a risk. The Estates and Public Health teams continually challenged my views. I detected an undertone of casual sexism when they mocked my views about contamination via the

plant room saying that it was more likely that *Cryptococcus* had come in from the clothes and shoes of visitors. On one occasion at an IMT meeting I am aware that Iain Kennedy openly googled the size of *Cryptococcus* spores in order to erroneously contradict Dr Inkster's statement that the filters were not sufficient to keep the spores out, rather than simply respecting her professional opinion on the matter.

183. I was surprised when a public statement was issued by the Board on 20 January 2019 (a copy of which I have provided) stating that the case of *Cryptococcus* had been reported on 20 January 2019 which I knew to be wrong. I sent an email to Dr Inkster on 21 January 2019 pointing out that in fact Microbiology had reported two cases in early December.

Bathroom mould in 6A

184. Also in January 2019, further problems had emerged on 6A which at this time was housing the haematology/oncology patients. It was found to have mould in the bathrooms. As a result of this patients had to be moved out again. The high risk patients went to 4B and the rest went to a medical admissions area.

Mucor cases in ITU

185. On 21 January 2019 Dr Inkster asked me to chair an IMT on two *Mucor* cases in the adult ITU. *Mucor* is another pathogen known to come from pigeon guano although it also comes from other sources including damp areas. It transpired that there was a leak at the dialysis point. Mrs Devine told me that my epidemiology was wrong as I said they were linked in time, place and person but she insisted in the meeting in direct contradiction to me that being linked in person meant that it was person to person spread. This is a very basic misunderstanding. What it actually means is people with the same characteristics, for example neonates.

186. On 24 January 2019, we had a visit from Katherine Wilson and Cameron Adams of the HSE. I attended along with Tom Steele, Colin Purdon, Dr Inkster, Karen Connelly,

Kenneth Fleming and John Green. Dr Inkster and I reported on what we had found out about the plant rooms and our long-standing concerns about the ventilation in the hospital. Tom Steele stated that he had commissioned a review from concept to build and commissioning to explore why the hospital had not been built to specification. This was the first I had heard of that.

187. We then took a walk to the quadrangle just outside the PSCU where they had just been clearing up pigeon guano and, we discussed how contaminated air could enter through the inlets to the first floor plant room. We then went up to the top floor plant room and saw an opening with daylight coming through – there were slats of a significant size which now had netting over them. We were told that was how the pigeons had got into the plant room. Outside there was more evidence of pigeon guano in the area.

188. On 21 January 2019 an incident occurred between Prof Jones and I which resulted in me being signed off work for 3 months. The incident (which was witnessed by a manager) involved Prof Jones shouting and swearing at me in front of colleagues in a very aggressive manner. At one point I actually thought he was going to physically attack me. His behaviour was totally unacceptable and no sanction was imposed on him for the incident. At this time the department was under enormous pressure. Sometimes we only had two Consultants and a trainee to cover all of adult and paediatric Microbiology, which is wholly unsafe staffing.

First meeting with Jeane Freeman

189. After speaking to Anas Sarwar with Dr Redding in October 2018, and then writing to the Cabinet Secretary for Health, Jeanne Freeman, regarding my concerns about the culture in GGC and how I could go about submitting evidence to the Independent Review without incurring grave consequences in my employment, a meeting with Ms Freeman was arranged by Mr Sarwar.

190. In January 2019, Dr Redding and I met with Jeanne Freeman and Anas Sarwar in the Lorne Hotel in Glasgow. It was an opportunity to discuss in person the history of our concerns and how we were experiencing the situation in GGC. At that time, I was on sick leave due to the extreme stress and bullying that I was experiencing. Jeanne Freeman and Anas Sarwar stated that they were keen to work across parties to improve the NHS culture. Both indicated that the situation was not acceptable with Consultants being afraid to raise concerns in good faith. There was a candid recognition of how difficult and entrenched the problem with culture is in the NHS and I felt that there was a genuine will to take action to improve matters, without any promises being made on the particulars of my case. Overall, I found it to be a helpful meeting. I was impressed by both politicians' attitude, comprehension of the situation, and their compassionate and respectful manner in dealing with us.

191. It was clear that neither politician had the expertise to adjudicate on the details but I was encouraged that they could see the need for independent assessment and that the issue of culture was key. I handed over some documents to Jeanne Freeman to hand to Dr Fraser as the chair of the Independent Review.

April 2019

192. Whilst I was off sick Dr Inkster showed me the 2015 DMA Canyon report. I do not have a copy of this report but I have an incomplete copy of part of the 2017 report which essentially highlighted no change since the first report. She had a paper copy which she had been given by Dr Armstrong. She was given it in June 2018, and found out that Jane Grant had seen it in March or April 2018 whilst the IMT was ongoing. It was not shared with Dr Inkster at that time. When I had asked Mr Walsh for the *Legionella* risk assessments in 2015 and was not given them, these reports were available and should have been shared with me. I now think these reports were deliberately concealed from me. Had I seen the reports in 2015 I would have taken steps to respond immediately to the concerns identified as the risks were not

theoretical, rather in breach of well established standards to protect both patients and staff.

193. Also whilst I was off sick, the interim report from HPS was issued relating to the water. I thought it was limited in its scope and conclusions and wrote to Jeane Freeman about the report. I have provided the Inquiry with a copy of this letter.

194. At this time I also submitted a report to the Health and Sport Committee looking at infection control and built environment. I did this anonymously to the public but openly to the committee having discussed with them the options on how best to submit. My report can accessed at the following link: https://webarchive.nrscotland.gov.uk/20200820031820/https://www.parliament.scot/parliamentarybusiness/CurrentCommittees/111128.aspx. I had read the Board submission which was of a poor standard. I stated very clearly to them the situation I was in. I was told by the civil servant that the committee did not have a whistleblowing function and I recall saying "well you are the best thing I've got right now". By this stage, I had already phoned the GMC, the RCPath, the National Whistleblowing line and the HSE. I knew that HFS and HPS were sighted on many issues. I had written to the Cabinet Secretary and pursued an internal whistleblow. I hoped that the committee proceedings would highlight the gap between the science, standards, and the reality of hospital estate in Scotland. I was very disappointed in the evidence given and the outputs of the committee. However it did serve to put some pressure and shine a light on the subject matter.

May 2019

195. I returned to work at the start of May 2019 following my period of sick leave.

June 2019

Leaking chilled beams

196. On 3 June 2019, I was asked by Dr Inkster to visit 6A to investigate reports of leaking chilled beams. Angela Johnson had received a phone call from a nurse on 6A, reporting drips from chilled beams in six rooms, three in day care and three in patient rooms. The history I got on the ward was that a child had complained of having a cold foot and when the mother felt the child's foot, it was soaking wet. On looking up, the mother had seen dripping water.

197. I inspected the beams in three of the patient rooms and found that they were dirty with water dripping through from the corner. Darryl Conner stated that the boiler had been out of action and that this had meant that the hot water supply pipes had contracted causing leaks to occur at the joints. There had been raised fungal counts in one of the rooms on air sampling. I arranged for an HAI Scribe to open up the ceiling to inspect where the water was coming from. I took photos and I have provided sample photographs to the Inquiry.

198. I was present when Estates opened up the ceiling tiles and I looked up into the ceiling space and I observed water dripping from the connecting pipe into the framework around the chilled beam, which tracked along the metal casing and then dripped on to the floor. I took swabs from the water dripping which were processed in the lab.

199. I wrote an SBAR (a copy of which I have provided) summarising the situation and sent it to Dr Inkster and copied in Darryl Conner and Prof Gibson. The SBAR included seven photographs that I had taken. The photographs clearly show the water on the floor, the dirt that has gathered on the fin, and the water dripping from the pipes and working its way along the metal casing. It is worthy of note that there was no evidence of condensation on the fins.

200. The swabs grew *Kokuria sp.*, *Micrococcus sp.* and *Staph hominis* which is consistent with skin commensal flora collecting on the fin. *Pseudomonas* was also

isolated which is consistent with contaminated water. This *Pseudomonas* was identified as *Pseudomonas olevorans*. Interestingly, the same species of *Pseudomonas* was grown from water samples taken from the chilled beams supply system and processed at the GRI lab in addition to *Pseudomonas aeruginosa*. This would indicate that the water system was contaminated and as far as I am aware there was no system in place up until this point to monitor the water and pick up this sort of contamination.

201. There were further incidents of dirty water dripping into patients' rooms throughout the QEUH which Dr Balfour dealt with and copied me in. I have provided the Inquiry with an example of an email dealing with this.

July 2019

202. On 5 July, Dr Inkster provided me with a handover for infection control as she was going on leave. This handover mentioned that the PICU validation was pending, the neurosurgery theatres needed to be signed off, the 2A upgrade works were going ahead, and that NICU had failed validation of its ventilation system. She informed me that in 6A there was an increase in gram negative bacteraemias. There was a second *Mycobacteria chelonae* case that was thought to be an HAI (the patient was named [redacted]). Dr Inkster noted that there was a plan to increase doses of chlorine dioxide in the water system.

203. At this point, efforts were being made to clarify the status of the ventilation in both the PICU and the NICU. I was asked to attend meetings and to have input into these assessments by Dr Inkster. It was clear to me that there was still a significant level of confusion regarding which rooms were actually validated and fit for purpose. The PICU validation had never been done since the opening of the QEUH in 2015. It failed validation due to the pressure differential not meeting the recommended 10 pascals positive pressure. There was a suggestion for an HAI Scribe to be signed off. Dr Valyraki was covering for Dr Inkster and Dr Hood was also involved but neither felt

that they wanted to take responsibility for an HAI Scribe. I had concerns about the planned fixes and suggested a multi-disciplinary meeting be arranged including clinical teams to discuss with a view to trying to reach a fully risk-assessed decision.

204. On 8 July, I called HSE and spoke to Katherine Wilson to highlight that we currently had patients in settings in the hospital where the ventilation did not meet required standards. There had been coverage in the press regarding the Edinburgh hospital having similar issues. While that hospital was not opened, there did not seem to be a willingness to recognise that in Glasgow, patients were already being treated in a sub-standard setting. Learning from the issues with both hospitals was not being shared nationally when it should have been. It was agreed that the HSE would be in touch and subsequently I received an invitation to provide a statement, which I did. I do not have a copy of this statement but I understand that the police have it.

205. On 10 July, I highlighted to Mrs Devine by email that the PICU HAI Scribe work purported to have been signed off by Dr Inkster but that this was not the case. I have provided the Inquiry with my email. Dr Inkster had left to go on holiday before the validation took place and Dr Valyraki had picked up that no such HAI Scribe had been signed off. This was the second time this had happened; they had previously said that Dr Inkster had signed off 4B when she had not.

206. On 16 July 2019, I was involved in the assessment of accommodation for a patient with chicken pox who was immuno-suppressed on 2C. The patient was being nursed in a negative pressure room that did not have a HEPA supply. They were then moved to a PPVL room without a HEPA supply. There was clearly confusion regarding correct placement and the PPVL room had a pressure of 20 pascals which was out of specification. I raised this with the Estates team and in particular, Darryl Conner. I have provided the Inquiry with my email dealing with this. This had been an ongoing problem since 2017 when I had again highlighted the need for an up to date patient placement policy.

207. Following a meeting on 16 July 2019 to discuss PICU ventilation, I sent an SBAR to Mrs Devine, Tom Steele and Dr Inkster in which I recommended 11 actions based on the information I was given. I have provided the Inquiry with a copy of my SBAR. I had been given a report from Correctair which covered the validation for the PICU. I used this report to assist me in compiling my SBAR. I do not now have a copy of that report from Correctair but the Board will have it. This was as a result of doing the work that was handed over to me by Dr Inkster and covering IPC.

208. It was clear that for 5 years the ventilation had not been properly assessed, despite the reassurances I had been given following the whistleblow. As part of step 2 of the whistleblow I met with Linda de Caestecker who had told me everything was now fixed or had been put on the Board's risk register. I had written back to her to say that I was satisfied and would stop my whistleblow at that point on the basis that the issues were resolved. I have provided the Inquiry with a copy of my letter. Dr Redding was not content and continued to step 3 of the whistleblow. My understanding is the reason for the rush to validate was that the Scottish Government had demanded to know what the air exchanges and pressure regimes were in light of the discoveries in Edinburgh. I can provide more information about the whistleblow process and my involvement in it if the Inquiry wishes to have it.

August 2019

IMT Meeting and Dr Inkster's Resignation

209. Dr Inkster asked me to attend an IMT for 6A on 14 August. It was standard practice in IMTs to invite a Microbiologist who covered the relevant unit. Kathleen Harvey-Wood and I attended.

210. The meeting was chaired by Dr Inkster and right at the start, Tom Steele challenged the minutes from the previous meeting stating that Jane Grant had asked

him to correct the minutes to state that the decision to move to 6A from 2A was not her decision, rather it had been the decision of the Chair of the IMT, i.e. Dr Inkster.

211. I knew the Executive Management had been fully involved in the decision to move and in my experience, an ICD cannot just move wards and whole services around without approval from management.

212. It appeared that there had been a pre-meeting as Tom Steele, Mrs Devine, Iain Kennedy and Chris Deighan seemed to be working off a script and plan. The atmosphere was very aggressive and unsupportive of the Chair. There was a discussion around the epidemiology and Chris Deighan insisted that there was no increase in bacteraemias overall. Kathleen Harvey-Wood and I attempted to explain that the key issue was not overall bacteraemias but the kind of environmental organisms that we were seeing. He said that we were "overreacting" and there was a very derogatory statement to the effect that we didn't understand epidemiology.

213. I recall a discussion about the chilled beams leaking. Tom Steele had said at a previous IMT that the chilled beams did not leak. This was part of the reason why Dr Inkster had invited me to the meeting as I had investigated the chilled beams and she wanted the group to hear from me.

214. I said that I had witnessed the leaks from the attachments to the chilled beams. Tom Steele said "*So you say*", implying that I was lying. I informed him directly that I had the photos and an SBAR that I had written on the day. The SBAR was sent to his team and was not challenged by them with regards to accuracy at the time. Tom then admitted that they were going round upgrading the attachments within the chilled beam system to prevent any more leaks.

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215. That afternoon, I contacted Laura Imrie at HPS about how Dr Inkster was being treated as a lead ICD in a hospital that was already facing scrutiny. I was very concerned that there was a clear and concerted effort to undermine her and to ensure

a formal record of there being no problem, and to ensure that previous decisions were attributed solely to Dr Inkster.

216. Laura asked me to put my concerns in writing and she forwarded it on an anonymous basis to the Board who immediately asked who it was that had contacted them. I have provided the Inquiry with a copy of this document. Laura asked me if she if she could disclose who had been in touch, and I said no.

217. In the aftermath of the IMT on 23 August 2019, Dr Inkster decided to resign from her lead ICD role. She copied me into an email to Dr Armstrong in which she cited the reasons for her resignation as lead ICD, including being undermined and her decisions being disregarded.

218. Dr Inkster and I compiled an SBAR regarding all our concerns about 6A and we recommended a reassessment of the Options Appraisal after discussion at a Consultant meeting. I ahave provided the Inquiry with a copy of the SBAR. All of the Consultants at the QEUH agreed with the contents of the SBAR and indicated via emails to me which I can provide if the Inquiry wishes to have them that the SBAR should be sent to Emilia Crighton. Our secretary, Mary Kennedy (Mackenzie) forwarded the SBAR onto Emilia.

Action Plan response to Whistleblowing

219. About the end of August 2019, Dr Inkster provided me with a copy of an SBAR action plan. I understood this SBAR to be a follow on from the action plan that Dr Inkster had sent Dr Redding, [redacted] and myself in 2018 which was apparently the Board's response to the 2017 Stage 1 whistle blow. It appeared that it had been updated in January 2019. I have provided the Inquiry with the SBAR action plan.

220. Dr Inkster informed me that the document was being sent out for comment to the Board Infection Control Committee. I was extremely disappointed with the document for a number of reasons which I set out in email to Dr Armstrong copying

in Dr Inkster and Linda de Caestecker on 30 August. I have provided the Inquiry with a copy of this email. I have not rehearsed my concerns here for the sake of brevity but they are detailed in the email. I can provide any further information or clarification which the Inquiry requires. I regarded the action plan as wholly inadequate.

September 2019

Meeting with Fiona McQueen

221. On 4 September 2019 Dr Inkster and I met with Fiona McQueen, then Chief Nursing Officer for Scotland. I had previously been in contact with Jeane Freeman, then Cabinet Secretary for Health, to detail my concerns. I have provided the Inquiry with a copy of my letter to Ms Freeman.

222. The meeting took place in St Andrew's House in Edinburgh. Dr Inkster and I were asked to wait in the waiting room and, while we were there, the Chief Nurse for the Board, Mags McGuire, came into the waiting room. We already suspected that the Board knew about our meeting because Mrs Devine had tried to insist on Dr Inkster's attendance at clashing meetings.

223. The meeting was attended by Dr Inkster and I, Ms Shepherd, Fiona McQueen and Jason Birch. Dr Inkster was able to describe the history and the current concerns that she had at that time. Ms McQueen appeared to listen and believe what she was being told. She expressed concerns about the situation and indicated that she would be taking action to try to remedy the situation although it was not clear what this would entail. She indicated that the Scottish Government shared concerns about the Board's infection control management as well as openly saying they knew the culture in the Board was toxic and what we were saying was not a surprise to them.

224. The meeting lasted a few hours and at the time it seemed like a good meeting. I considered this Dr Inkster's meeting but I did back up what she was saying. I felt we

had had the opportunity to directly inform the top person responsible for HAI in Scotland of our concerns and also how long these concerns had been going on for.

Meeting re Whistleblow to HPS

225. On 25 September 2019 I had a meeting with senior management in relation to my whistleblow to Laura Imrie at HPS. Linda de Caestecker had instigated an investigation under the whistleblowing policy and she had an HR director, Barbara Anne Nelson, give independent advice. I was invited to give my perspective.

226. Linda de Caestecker made it clear that she would be focusing on conduct and behaviours and not the actual infection control and estate issues. In my opinion the whistleblowing should have been investigated externally. Once again the Board's management chose to focus on "personality problems" rather than patient safety which is a classic deflection in whistle blowing cases. The process ended with a report by Linda de Caestecker which I felt was very biased and was so poor that we showed it to Fiona McQueen with whom we had a couple of meetings.

227. After Dr Inkster resigned no one was willing to take on ICD responsibility within the team. Management instigated a meeting on 25 September 2019 to try and resolve the problem posed by no one wanting to act as ICD and persuade/ pressurise someone to do it. The meeting was chaired by Robert Gardiner and was attended by Jonathan Best, Dr Green, Prof Leanord, Arwel Williams, Scott Davidson and Prof Jones along with Dr Khanna, Dr Inkster, [redacted], Dr Valyraki, Dr Khanna and myself. Dr Khanna took notes of the meeting.

228. The meeting was tense from the outset. There was unanimous Consultant Microbiology opinion that there were real risks posed by the built environment to patients, and that the working culture was so unacceptable that no one felt able to act as ICD. These issues were clearly relayed to the Chief Operating Officer, Jonathan Best. Notes of the meeting were circulated afterwards. I have provided the Inquiry with a copy of these notes.

Leaking tap in 6A

229. On 27th September 2019 when I was on-call I was contacted about a leaking tap in 6A. The tap was located in the kitchen where patient food was prepared and therefore potentially posed a significant risk. Estates had been alerted to this leak earlier in the day but I could tell from the nature of the markings on the wall that it was a longstanding leak. The longstanding nature of the leak was also confirmed to me by one of the cleaning staff when I attended.

230. I took swabs of the area, and Dr Inkster and I took pictures. I wrote an SBAR in which I stated that it was a longstanding leak. I also highlighted a dead leg. I have provided the Inquiry with a copy of the SBAR. A dead leg is significant because the water stagnates in that area of pipe and can cause *Legionella* and other organisms to grow. Dead legs are known to be a significant risk for *Legionella*. The dampness also posed a risk of mould which could have contributed to the positive air samples in the ward. Jane Grant agreed the terms of the information given to the families on the ward. I gave recommendations about how to manage the risks. This was the ward on which paediatric haematology/oncology patients were being accommodated.

October 2019

231. Communication from the IMTs to the clinical Microbiology teams was grossly inadequate. At no point did Prof Leanord or Prof Jones discuss the clinical Microbiology assessments or Dr Inkster's hypothesis with us, even though we continued to give clinical Microbiology and out of hours IPC advice.

232. I became aware through Dr Inkster that the minutes for an IMT that was held on 8 October 2019 had misrepresented Dr Inkster and myself. Dr Inkster copied me into an email in which she highlights this to the Chair, Emilia Creighton, specifically in relation to case definitions and the reasons for air sampling in the unit. I have

provided the Inquiry with a copy of this email. Dr Inkster also challenged Prof Leanord's use of the term "*pseudo-outbreak*".

November 2019

233. In November 2019 there was media coverage of information that had been shared with Anas Sarwar regarding the water being contaminated before the building opened. There was coverage of Ms Freeman asking anyone with information to come forward. As a result, Dr Inkster and I wrote to her in a joint letter containing a list of issues. I have provided the Inquiry with a copy of this letter.

234. At around this time GGCHB went onto special measures. I believe this was at least in part in response to Teresa and I raising concerns with Fiona McQueen and Jeane Freeman.

Second Meeting with Jeane Freeman

235. As a result of our emails to Ms Freeman, Dr Redding, Dr Inkster and I were invited to meet with Ms Freeman and Ms McQueen in person. Dr Redding and I attended on 5 December. Dr Inkster attended subsequently. The first meeting was with Ms McQueen, Ms Shepherd and Jason Birch. There was another lady there called Josephine who was part of the HAI Policy Group.

236. Once again we updated Ms McQueen about our concerns. At one point she said that she couldn't understand "*why GGC had not just offered the families 50 grand which is a trip to Disneyland, rather than deny that there had been harm caused*". I thought that that missed the point, which is that there was a safety hazard that had not been dealt with and just paying people off would neither fix the hazard nor the organisation's culture in dealing with it. I was appalled by the sentiment because we weren't there suggesting anyone should get compensation; we wanted the problem

to be solved. Once again she appeared to listen however at times she responded as though some of the things we said were news to her, this was not the case, as we had met with her before and told her.

237. After the meeting with Ms McQueen, Dr Redding and I went to the Parliament building to meet with Ms Freeman. She was generous with her time and allowed us to speak freely and certainly seemed keen to take action and resolve the problems in the Board. My impression was that she believed what she was being told and she thanked us for our perseverance. She stated that Dr Inkster and I would be absolutely key in taking matters forward in the Oversight Board. She wanted Dr Inkster and I to be involved at a high level in the Board however it was clear from Ms McQueen that the Board would not agree to this. I did not get the impression that Ms McQueen was keen either. I am aware that Prof Leanord and Ms McQueen had worked together closely for many years prior to this and on reflection I do not think she was supportive of our positions.

December 2019

238. On 11 December 2019 I became aware of a Q & A document which I saw on the Board's website entitled *"Response to questions around Ward 6A, QEUH*". This document contained numerous inaccuracies and had not been discussed with Dr Inkster who had been the lead ICD and key Microbiology water expert in the hospital. I have provided the Inquiry with a copy of this document.

239. I had six major areas of concerns about the Q&A document which I detailed in an email I sent to the Scottish Government. I have provided the Inquiry with a copy of my email. The Q&A document is still on the Board's website and is still inaccurate.

240. On 30 December 2019 I wrote to Ms Shepherd and Ms Bain to highlight my concerns about *Pseudomonas* bacteraemia rates in the RHC. I have provided the Inquiry with a copy of my email. There had been a recent cluster of three fatal cases across the site (including one death of a child). I found that prior to this outbreak there

had only been 8 *Pseudomonas* bacteraemias in the 4.5 years that the hospital had been open by that point, including an additional death in NICU. There had also been 5 *Serratia* cases in the PICU and there was an overall increase in gram negative infections on that unit. Some of these cases had been designated as not being healthcare acquired infections, and I assessed that this was not correct. I was concerned that the lessons from ward 6A were not being learned, and we were seeing increasing patterns of infections which were not being properly investigated because they were being wrongly designated as being "community" rather than "healthcare" acquired.

January 2020

241. On 6 January 2020 Ms Shepherd responded to my email of 30 December 2019. I have provided the Inquiry with a copy of her email. She stated that the Board were disputing my query about whether the recent infections had been community or healthcare acquired. In particular, she said that the child in question already had chest x-ray changes on admission. Dr Inkster checked this and confirmed that the child had a normal chest x-ray on admission and the changes only developed post operatively. Once again I felt that the culture continued to be one of resistance to acknowledging any possible infection control concerns, and that I was being cast as a trouble maker for raising what I still believe were well founded points. The child could not plausibly be said to have a community acquired infection when they had been in hospital throughout and had a clear chest x-ray when they arrived, but when I tried to point this out I met constant resistance.

242. I wrote a further email to Ms Shepherd (a copy of which I have provided to the Inquiry), highlighting all of my concerns and specifically raising issues relating to the public statements made in the press by the Board about the *Stenotrophomonas* cases. Ms Freeman had told me that I should raise concerns directly with Ms Shepherd rather than internally until things were sorted out. The Board had said that it took six week to develop a test. This was not correct. They claimed that 100 tests had been done

which was also not correct. In addition, the Board said that different strains had been isolated which implied that there was no link between the infections. This was not relevant because the working hypothesis was not that there was person to person transmission of the infection. Again, the culture was of a lack of transparency in relation to infection issues and a resistance in acknowledging that concerns might be valid.

Meeting with Ms Bain on 9 January 2020

243. Dr Inkster and I were invited to a meeting with Ms Bain on 9 January 2020. We prepared a powerpoint presentation (a copy of which I have provided) which detailed the history of all of our concerns and we had a file of printed documents to discuss. We distributed copies of the file to those at the meeting; I have provided the Inquiry with a copy of the file of papers. We specifically told Ms Bain that we felt that we were being bullied for trying to secure patient safety. As a follow up to that meeting I highlighted to Ms Bain that I was still waiting for an update from Linda de Caestecker regarding the HPS whistleblow. At this point we were having weekly meetings with her and hoping she would assist with resolving the problems. Ms Bain was not trained in infection control. Over time it became clear that she was not going to be able to tackle the problems. On reflection I suspect she was really just tasked with trying to manage Dr Inkster and I rather than actually fix anything. Of additional relevance is that Ms Bain had a number of meetings with Dr Fraser while he was supposed to be conducting an independent review. Given she was now working so closely with the IPCT, I believe this compromised the independence of the review.

244. On 15 January as a follow up to these discussions with Ms Bain, Dr Inkster raised by email the governance in relation to the Cryptococcus Advisory Group. She was aware that parts of the report had been discussed at Board meetings and submitted to HSE. She pointed out that the group was not independent as several members of the IMT sat on the group although she had been excluded.

245. On 20 January the Board issued a statement about the Cryptococcus Advisory Group's conclusion. I had a number of significant concerns about the statement which I detailed in an email sent to Ms Bain. I have provided the Inquiry with a copy of my email. I have not repeated the concerns here for the sake of brevity. I can provide any further information which the Inquiry wishes to have.

COVID-19

246. At around this time reports were starting to emerge from China of a possible new viral infection in circulation in the community. I did not think that we would be well equipped to cope with a local outbreak and this only added to my concerns.

Other concerns in January 2020

247. In mid-January 2020 we were advised of a gentamicin resistant ESBL organism causing infection in NICU babies in Edinburgh. I asked for screening to be instigated and I was basically told they were aware and so to keep out of it with no explanation of what if any steps would be taken to make sure we didn't end up with a similar outbreak. Babies are transferred between Edinburgh and Glasgow relatively regularly because we offer ECMO which is not available in the NICU in Edinburgh and because of capacity issues. There is a risk of infection in Edinburgh being transferred to our unit and vice versa.

248. At around the same time, PICU saw a cluster of *Acinetobacter* cases. Type matching was sent to IPC. I remained concerned that the organisational view was that these types of infections were inevitable in vulnerable patient cohorts and the infection control team was simply resigned to the infections occurring with no appetite for trying to proactively reduce the risk of infection.

Concerns about patient placement

249. In mid-January 2020 I became aware that ID Consultants were raising concerns about where patients could be safely placed. The policy was that it was for clinicians to decide on patient placement, but the Microbiologists were being asked for advice by treating clinicians who were concerned. I recall getting a call at 3am when I was not on call from Dr Wright who was being asked by the ID Consultants about where to put an infectious patient safely. On 14 January 2020 there was an exchange of emails about this which involved Prof Leanord. I have provided the Inquiry with a copy of the correspondence. There was a further exchange of emails on 15 January 2020 (a copy of which I have provided). I felt that the patient placement policy was still inadequate, despite me having raised concerns about it over many years, including recently following a chicken pox case in RHC in September 2019. Given the increasing risks of a future pandemic which were emerging at this time, I felt this was an urgent problem.

250. Concerns about patient placement persisted during January 2020. On 24 January 2020 I became aware of an immunosuppressed lymphoma patient who had been in a negative pressure room in the ITU for several day when they should have been isolated in a PPVL room. In addition, not all of the ITU rooms were HEPA filtered. When I tried to look into this, I discovered that the on call Microbiologists had not been informed of numerous concerns raised by treating clinicians about patient placement, particularly in light of the developing concerns about coronavirus. I wrote an SBAR (a copy which I have provided), summarising my concerns about this. At this point I was aware of recent or ongoing issues relating to the placement of patients with both HIV and TB.

251. On 31 January 2020 Prof Leanord circulated a patient placement policy by email, which included provision on coronavirus, and stated that ID Consultants would be responsible for patient placement. I responded by email (a copy of which I have provided) raising a number of concerns about the policy, including suggesting that there would need to be a walkaround to check that the ventilation pressure of the rooms was functioning as intended. I believed they were not and that there were only four proper functioning negative pressure rooms in the hospital at that point. I also highlighted that there was a lack of clear understanding amongst clinicians working in

the QEUH about the ventilation properties of the various rooms. I asked if the AECON report which the Board had commissioned could be used to inform patient placement and was told that it could not, until it was placed in the public domain. I thought it was very surprising that a report paid for by the Board on this issue was not going to be used to inform these important decisions.

Environmental screening results

252. On around 10 January 2020 Fiona Reynolds, Laboratory Operations Manager, sent me a set of results from environmental swabs which had been taken from 6A. Fiona sent them to me directly because she noted that I had been excluded from the communications about these results (which included detection of *Cupriavidis* and other environmental gram negatives). I have provided the Inquiry with her email. Normal practice would have been to include me in all of this communication because I was the Clinical Lead at QEUH. I advised the oversight team of these results. They advised me that they had not been made aware of the results by the Board. The set up felt farcical, and I had decreasing confidence in the ability of government set up oversight to have any impact on the core ethos.

253. On 13 January 2020 I told Ms Bain and Ms Shepherd about concerns with isolation rooms on 4B which clinicians on the ward had told me about, but which had not been relayed to me via the normal IPC channels, despite me being the Clinical Lead for the QEUH. Ms Shepherd indicated that they would take this forward and said she was also aware of other issues in 4B including a blocked toilet and a problem with the heating in one of the rooms, neither of which I had been told about.

254. On 20 January 2020 I was asked to give feedback on an environmental sampling policy prepared by Prof Leanord. I gave feedback (a copy of which I have provided) on the policy which in my view was not fit for purpose.

Instigation of the Case Note Review

255. Around 26 January 2020 I became aware that Jeane Freeman was going to commission a Case Note Review. On 7 February 2020 I was asked by Shona Cairns at HPS to provide a list of patients who should be externally reviewed as part of this exercise. These patients were to include those with environmental organisms that had caused infection in the paediatric haematology/oncology cohort. I had some correspondence with Shona Cairns and Ms Shepherd regarding cases. I identified over 100 cases and they ended up looking at 84 of them. I am not sure how the final decisions were made on which patient cases were to be investigated. I recommended that they look at fungi, gram positives, mycobacteria, and gram negatives in order to have a complete picture. I looked at the available laboratory data with Kathleen Harvey Wood including post mortem samples. I suggested that they look at PICU cases as I thought some of the post-mortem results suggested that HAI caused by environmental organisms might have played a role.

256. On 28 January 2020 I became aware that a positive *Stenotrophomonas* case had been identified which matched with another infection from 2018. It is very unusual to get *Stenotrophomonas* types that match because it is such a genetically diverse organism. Therefore matching indicates the strong possibility of a common source which warrants investigation because of the possibility of continued patient exposures to an environmental source. The most likely explanation would be infection from a common water source with biofilm lingering within an extensive water system given the knowledge at that time.

Relationship with Oversight Board

257. Dr Inkster and I were never given the opportunity to interact with the whole of the Oversight Board and it was very clear that the Board would not allow us to have a role in contributing to the way forward in infection control. During meetings with Ms Bain, I recall Dr Inkster raising issues with inaccuracies in Board papers such as the reasons for upgrading the ventilation in Ward 2A.

258. The Oversight Board was meant to be a strategy to incorporate our expertise into the structure of infection control. It failed to deliver that. We were relying on Ms Bain to pass on our concerns about the science when she had no Microbiology qualifications or experience. We had been told by Ms Freeman, Ms McQueen, and Ms Shepherd that we would be part of the Oversight Board. It became clear that the Board did not want that to happen, and the result was that the only involvement we had was via the conduit of discussion with Ms Bain.

Report of Keith Morris

259. On 31 January 2020 I received an email from Dr Keith Morris who had written a report for the Scottish Government HAI policy group. Dr Morris had met with us and he wrote a report which outlined concerns he had about infection control. There was no follow up or action following on from his report, and we heard nothing further from him or about the report. In Dr Morris' report (a copy of which I have provided to the Inquiry), he observed the following:

> "There needs to be a complete overhaul of the IPCT structure and the roles and responsibilities of the microbiologists who provide infection control advice." (at p. 3)

> "The toxic nature of microbiology in GGC has led to individuals being appointed to roles in which they may not be comfortable. The number and severity of infection control incidents has resulted in the advice of the most experienced ICDs to be ignored because the truth is inconvenient. In such an environment there is a risk bullying, mysogeny *(sic)* and nepotism could take place." (at p. 2)

February 2020

260. On 14 February 2020 I was advised that there was a case of *Pseudomonas putida* on PICU with a possible link to a leak from the toilet area of the floor above. The leak had occurred in room 17 where the patient had been.

261. On 17 February 2020 Ms Bain made a number of recommendations as a result of advice we had provided to her. She focused on patient placement policy which everybody recognised was a serious problem by that point. She did not deal substantively with any of the other issues we had raised. I can provide a bundle of correspondence summarising our dealings with Ms Bain if the Inquiry wishes to have it.

262. On 18 February there was a leak into the ceiling of Room 44 (ICU) which was one of the negative pressure isolation rooms designated for the care of any patients admitted with coronavirus. The room was therefore clearly not fit for purpose.

263. On 21 February 2020 an interim patient placement policy was circulated. I have provided the Inquiry with a copy of the policy. At this point 5 rooms were awaiting revalidation but I believe they were still being used.

264. On 24 February 2020 I sent an SBAR regarding the PICU situation (a copy of which I have provided) to Laura Imrie, Ms Bain, and Prof Leanord, also attaching my SBAR from 2019 re ventilation which I have also provided making 12 recommendations. Laura Imrie had asked me to prepare the SBAR. Despite the hospital having been open for five years by this point there were still significant ongoing problems in the PICU with ventilation, repeated leaks, and concerning epidemiology and typing results. The Board had dismissed all of my concerns and therefore missed opportunities for remedying the situation and learning from it.

265. On 25 February 2020 I sent a letter to Ms Bain highlighting a number of concerns including inaccuracies in the Board papers. I have provided the Inquiry with a copy of the letter.

266. On 27 February 2020 I received a letter from Ms Freeman (a copy of which I have provided) indicating that she was pleased to hear that we were working with Ms

Bain and that she looked forward to meeting us when she visited RHC. In fact this visit never happened as a result of the subsequent pandemic.

Plant Room Photographs

267. On 20 February 2020 Dr Hood forwarded to Dr Inkster photographs that we had never seen before of the plant room. These pictures demonstrated extensive guano contamination, dead pigeons and what looked like an attempt to spray the guano affected area.

268. These photos were sent to Dr Hood by Darryl Conner and I was shocked that they had not previously been shared, particularly with Dr Inkster as chair of the IMT or with me when I was investigating the plant room hypothesis. The level of contamination is completely unacceptable. I have provided the Inquiry with the photographs I am referring to. In my view these photographs support the reasonableness of the hypothesis that the *Cryptococcus* cases were probably caused by pigeon guano in the plant room.

269. On 28 February 2020 Dr Inkster and I sent a detailed email to Ms Bain summarising where things were at that point in time and pulling together our ongoing concerns. I have provided the Inquiry with this email.

Coronavirus/[redacted]

270. On 12 February 2020 I circulated a document following a series of emails with Dr Bell which deal with the "Current Knowledge Thus Far" relating to the threat posed by a coronavirus pandemic at that point. As a hospital with 100% single rooms, we should have been able to minimise nosocomial coronavirus infections within the hospital but the subsequent data suggested that in fact there was a lot of transmission within the building. I suspect that was related to the ventilation and a lack of clarity about where to put which patients. [redacted] is an example of a patient who is likely

to have caught coronavirus whilst [redacted] was an inpatient at QEUH and who subsequently died. The Board were slow to implement staff screening on the high risk wards.

271. Around about this time the problem of not being sure about the suitability of various isolation rooms at the QEUH became extremely problematic. The ID Consultant was meeting with colleagues from Estates and having to re-ask questions which I had been asking for years in order to develop a safe pathway for COVID admissions. I offered to go to wards and look at rooms given my knowledge base but Marion Bain told me in front of Dr Inkster that GGC management did not want my input.

March 2020

272. By early March 2020 we had started to receive coronavirus patients but mask testing for staff had not taken place, and there was no clarity on suitability of rooms for accommodating these patients. There was still water ingress in room 44.

273. On 3 March 2020 I wrote to Ms Wallace (who had been appointed to assist/take over from Ms Bain) to highlight that there were no POC filters on the taps in the ITU, and that there was an ongoing leak in room 44. Ms Wallace is a nurse who informed us she had no formal infection control training who had previously worked in Forth Valley. On 6 March 2020 I wrote to her about my ongoing fungal concerns relating to Ward 4C (cases had been reported that day).

274. Jenny Copland had prepared a document logging all of our input. Ms McQueen had informed us of the appointment of two psychologists to work with our team to do organisational development work. Jenny was one of the two psychologists. The emphasis was very much on personality issues and working culture and not on actually dealing with any substantive problems. We thought that the Oersight Board was going to deal with the substantive problems but that proved not to be the case. I was asked to spend a large amount of time with Jenny. I did this and I persuaded all of my team

to take part too; there obviously was a problem with culture which I had repeatedly raised myself and I thought we should enter into the exercise in good faith.

275. In fact none of the issues we were actually trying to resolve were resolved as part of this exercise. I thought Jenny was an external appointment but actually she had been appointed by Jane Grant. I asked for evidence of what was presented to Jane Grant or what Jenny's conclusions were but I was told there was none available. Jenny told me it had all been deleted. We instead had individual feedback on the findings of the work and I recall a major finding was that colleagues considered whistleblowing to be "unprofessional". I think this view still prevails. There was no attempt to validate any opinion other than triangulation, and it ended up being a record of opinions rather than seeking to adjudicate on the safety issues. I believe it was an entirely misguided use of time and money in retrospect.

276. During this time we had also finished giving evidence to the Independent Review (Drs Fraser and Montgomery) which had been a very unsatisfactory process as none of the experts had interacted with us at all and the questioning focused on our supposed lack of credibility. Inaccurate minutes of my evidence were taken. I felt that it was a whitewash. In July 2020, Dr Inkster and I took several steps to try to respond to the Independent Review. These are discussed below.

April 2020

277. On 16 April 2020 I was advised of *Enterobacter sp.* cases on the ITU. I was covering that unit for two weeks at the time. I asked for updates on the outbreak and I was not given them. Throughout April 2020 and into May 2020 there were ongoing issues with this outbreak, with a reluctance by some of my colleagues to accept that these infections were, or might be, HAIs.

278. On 24 April 2020 I sent a detailed email to Ms Bain setting out my concerns at that time and highlighting the ongoing issues. I have provided the Inquiry with a copy of this email.

279. On [redacted] 2020 I became aware that a child on PICU had died of a healthcare acquired *Serratia* and that Dr Inkster was concerned about a lack of candour arising from inferences that the infection was not linked to the hospital.

May 2020

280. A plan was instigated to have weekly buzz meetings (this followed discussion with Jenny Copeland and Ms Wallace). The meetings would involve infection control and Microbiology. The Microbiologists recognised that we needed a way to escalate concerns and have them listened to and acted upon and taken seriously internally so that we could raise concerns without having to take the very unusual step of dealing directly with government. We wanted to improve the relationships between clinical Microbiology, virology, estates and infection control. We were initially told Dr Inkster would go to the meeting but then I was told in fact I would go as clinical lead to bring the Microbiology perspective. Jenny attended the first meetings as an observer. I left the first meeting in tears. I was the only Microbiologist from QEUH at the meetings. Rob Gardiner chaired the meetings. Ms Wallace sometimes attended. This was meant to be the forum for me to raise issues on behalf of all of my Microbiology colleagues in a safe space; observed by a psychologist, who would debrief after the meetings. The meetings were extremely difficult. Prof Leanord would literally laugh at me whenever I tried to speak. On one occasion Jenny actually pulled him up on this and on talking over me in the meeting which was awkward. They did not achieve the desired outcome as I was always in the position of a minority view and the only representative on the QEUH team. No minutes were taken.

281. On [redacted] 2020 I became aware that a patient had died of *Acinetobacter* in the PICU. The clinicians had reported this to the PF as an HAI but it had been

reclassified as not being an HAI even though there was a typing match. Again, I felt there was a clear candour issue. Even if the cause of death was different, this does not mean it was not an HAI.

282. On 19 May 2020 Ms Wallace asked me for a summary of the current issues/concerns which I provided along with a list of historical issues which were of current relevance at the time. I have provided the Inquiry with my response.

283. As mentioned above, Dr Redding continued to step 3 of the whistleblow. I did not do so. However, I was given the opportunity to comment on the report which was produced in response to the step 3. I have provided these comments to the Inquiry. Once again I was unimpressed with the process and the lack of understanding of the facts surrounding the building and its consequences. I was dismayed to see in writing a misrepresentation of the whistleblow to HPS. It seemed to me to be a clear attempt at narrative building once again. I wrote my response to Jennifer Haynes on 22 May 2020.

June 2020

284. On 2 June 2020 I emailed Ms Wallace to point out that the ongoing *Enterobactor* outbreak in the ITU was inaccurately described in Board papers as involving 2 patients when in fact 3 patients had died and one was very unwell. I have provided the Inquiry with my email to Ms Wallace.

285. By this point I felt I had exhausted every possible avenue through which I could raise concerns relating to patient safety and I remained convinced of ongoing risks to patients, and the inability of the Board's IPC team to react appropriately so when I was approached by Lisa Summers from the BBC about doing a Disclosure programme on the QEUH, I agreed to do so, having first taken advice from the BMA. Dr Inkster and Dr Redding also took part in this programme. The Disclosure programme aired in June

2020, following which the parents had meetings with Ms Freeman and she agreed to set up a this Inquiry.

July 2020

286. On 3 July 2020 I wrote to Ms Wallace to advise that there was an inaccuracy in the IMT minutes about a new haematology/oncology *Cryptococcus* case in paediatrics. I have provided the Inquiry with this email. This was an important case because it was not being properly investigated as a healthcare acquired infection. So far as I am aware it has not appeared in any reports.

287. Following the publication of the Independent Review, Dr Inkster and I prepared a response which we sent to the Chairs of the Independent Review in which we explained why we thought the report was wholly inadequate. In summary, we advised that: (i) the review had exceeded its remit by making conclusions on bullying and culture (including sexism). The fact that the report covered these areas was of concern because we had not provided evidence about them because we thought this was outwith the scope of the review; (ii) the pool of people spoken to was concerning. Specifically, the experts had spoken to Microbiologists but had not spoken to myself, Dr Inkster or Dr Redding. The review had also not spoken to key colleagues including [redacted] and Mrs Harvey Wood; and (iii) the report contained clear errors of fact. I have provided a copy of this response dated 2 July 2020 to the Inquiry. The "extensive commentary" on the findings of the Independent Review totalling 33 pages which is referred to in our letter can be provided to the Inquiry if it would assist.

288. In addition, Dr Inkster and I contacted Jeanne Freeman by letter dated 30 July 2020 to alert her to our ongoing concerns including in the relation to the Independent Review. In this letter, we advised that our primary concern was that Dr Inkster and I were not afforded a right to reply as others were. I have provided a copy of this letter and the email enclosure (email chain titled "Responses to Parents Question 6A" dated 11 to 18 December 2019) to the Inquiry.

August 2020

Further paediatric Cryptococcus case

289. In August 2020 there was discussion re the further case of *Cryptococcus* in a paediatric oncology patient that was identified from an antigen test (this is the same case I referred to in my email of 3 July 2020 – see above). Prof Leanord chaired an IMT during which the clinical Microbiology view was that this was a case that needed investigation, but the IMT proposed that this was a false positive result.

290. I had a discussion with Dr Sastry who was the clinician in charge and he indicated that he had been told by Jennifer Rogers to tell the parents that this was a false positive case and that this was not *Cryptococcus*. Three other doctors witnessed him tell me this. Dr Sastry refused to do this and instead informed the parents that the child had *Cryptococcus* and would be treated as such. The child was treated early and recovered. I can provide the patient's details if the Inquiry wishes to have it. As far as I am aware ARHAI were told this was a false positive. It was for Dr Sastry and I to decide whether this was a false positive or not; after discussion with the lab in Bristol we agreed it was not a false positive and we treated it accordingly to good effect.

September 2020

291. On 1 September 2020 a "buzz" meeting took place. Amongst the concerns raised were a case of *Cryptococcus* in Ward 6A, an *Aspergillus* infection in a mediastinal wound in cardiothoracic surgery, and concerns about ciprofloxacin prophylaxis in Ward 6A patients. Prof Gibson had queried its use. We had been informed TauroLock solution was being used in lines instead.

292. On 6 September 2020 I emailed Ms Wallace again to inform her that there was pressure put on a clinician to change the diagnosis when speaking to the parents. There was a lack of dialogue with infection control and Microbiology. I have provided the Inquiry with this email.

293. Information regarding infection risks was given to parents via a Board Facebook page update without any discussion with Microbiology. The update stated that *Cryptococcus* had been isolated on a ward but that there were no cases. I was told that the parents of the child were upset because they had now been informed that their child was being treated for this infection.

294. There had been no discussion about the relevancy of this case in the context of the previous paediatric case ([redacted]). This is a very rare diagnosis to make and having two separate cases is highly unusual and very concerning.

295. We discussed this case in our weekly complex case discussion group and we identified that there were further cases of *Cryptococcus* in adults. Looking back at the cases I noticed that in 5 out of 6 cases there was an epidemiology link to the QEUH. At this meeting a colleague stated that a relative of one of the cases who was treated in another hospital had pointed out that the patient had been in the QEUH previously. I forwarded this information to Dr Hood on 23 September. I have provided the Inquiry with my email.

296. On 7 September 2020 I was made aware of very high TVC counts in water testing. Microbiology had not been informed. I had email correspondence with Phil Raines which included highlighting the ongoing need for POC filters on the taps. I have provided the Inquiry with my email to Phil.

297. On 18 September 2020 I emailed Ms Wallace raising a number of serious issues which were ongoing at the time to highlight to her the inadequacy of the Friday reports as a means of keeping Microbiology informed. I have provided the Inquiry with my email. The Friday reports were weekly updates for the Microbiology and infection

control teams intended to keep everyone updated. They were particularly important as handovers for the on call Microbiologists at the weekend who are not ICDs and therefore may not be in the loop.

298. Dr Inkster and Dr Hood were both involved in meetings with the family of [redacted] at the end of September 2020. Dr Inkster copied me into an email on 1 October 2020 addressed to Dr Hood, copied into Ms Wallace, in which she raised eight serious concerns regarding information shared with the family of [redacted] at the meeting she attended. I have provided the Inquiry with a copy of the email. The concerns are not reproduced here for the sake of brevity.

299. I followed this up with an email response (a copy of which I have provided to the Inquiry) in which I pointed out a number of serious concerns arising.

300. On 23 September 2020 I was told by Dr Inkster that gentamicin resistant MSSA had been isolated and there was a lack of information sharing by IPC about these cases. An outbreak of this infection subsequently developed.

October 2020

301. On 5 October 2020 I was informed of two cases of *Stenotrophomonas* in haematology oncology patients with line related sepsis. There had been a recent case of *Burkholderia sp.* and other gram negatives and I asked if interventional radiology had been checked for possible environmental source of infection. My understanding is that this was not done. I was told they were looking at vascular access teams, which was not what I was suggesting should happen.

302. On 9 October 2020 I received an SBAR from Ms Wallace (a copy of which I have provided) about an *Aspergillus* case in PICU. There was leak in the room. The SBAR concluded that mould from the leak area could not have caused the patient's infection. This was wrong in my view. I responded with a list of actions I would expect to be

taken given that there was a leak and a known case of *Aspergillus* in a high risk unit. I ahave provided the Inquiry with my response. I was aware from Kathleen Harvey Wood that there were ventilation works ongoing in PICU at this time but was given no information on what was being done or why.

[redacted]

303. I am aware that [redacted] was admitted to Ward 4B in the QEUH in October 2020 to undergo an allogenic stem cell transplant (SCT). I was involved in giving Clinical Microbiology advice in relation to [redacted] case as part of my routine rota work at QEUH covering the Critical Care Unit along with other Consultant Microbiology colleagues. I have been asked to comment on [redacted] case.

304. The Telepath entries from October to December 2020 for [redacted] show that a number of Microbiologists gave advice about treating for Aspergillosis following discussion with the clinical teams. There was a consistent view that we were treating a probable Aspergillosis infection post-SCT and COVID pneumonia.

December 2020

305. Sadly, [redacted] died on [redacted]. I was doing the ward round on ITU on the day that [redacted] death was to be reported to the Procurator Fiscal by a Critical Care Consultant. I mentioned to [redacted] that I would let the IPCT know about this as we had been worried about [redacted] being a case of HAI COVID in our team discussions. I felt it was appropriate to let the ICD, Dr Valyraki, know about [redacted] death. I immediately sent an email to Dr Valyraki informing her of the death. I have provided a copy of this email to the Inquiry.

306. In terms of [redacted] being a case of HAI COVID, I am aware that [redacted] tested negative on admission to hospital but became positive for COVID on day 8. According to the national definitions of COVID HAIs, [redacted] was a "probable" HAI case.

However, given [redacted] immune suppressed state and the fact that the majority of cases are positive by day 8 post-exposure, it seemed likely to me that [redacted] had acquired COVID in hospital. I was also aware from Dr Inkster that there were concerns at the time of staff on Ward 4B being infected. As I recall, no respiratory protective masks were being worn at the time by staff, although this was in keeping with national guidance this was a high risk setting and in my view should have been in place.

307. In terms of [redacted] possible exposure, risk of transmission to [redacted] from asymptomatic staff is plausible. Staff testing had been discussed at the "Buzz meetings" with Virology and IPC but it was not clear to me that there was any different or special policy following risk assessment for the BMT unit staff in relation to the frequency of testing or how early in the pandemic it had been implemented. I understand that Dr Inkster received emails in which BMT unit staff raised concerns about IPC for protecting their patients from COVID as she was the BMT Microbiologist at the time. I would expect all this to be recorded in IPC documentation that I have not seen.

308. It is also possible that [redacted] could have acquired COVID before [redacted] admission to the QEUH, with a longer incubation time. Whole genome sequencing information would be helpful in differentiating this to a higher degree of certainty, as well as any epidemiological information regarding positive contacts in previous hospital settings. However, as staff cases were not being systematically considered in IPC outbreak analysis to my knowledge, it would be difficult to reach definitive conclusions regarding a source of [redacted] infection unless they were sequenced and analysed in this context. Again, I have no information about whether [redacted] specific whole genome sequencing result was analysed with regard to relatedness to cases on the ward, in the QEUH or in Edinburgh.

309. [redacted] was also treated for Aspergillosis based on imaging changes in [redacted] chest, failure to respond to broad spectrum antibiotics and a high bio marker – an antigen positive result with a negative baseline level. The decision to treat for Aspergillosis was agreed by several Microbiologists, the Critical Care consultants and Haematology Consultants. At the time, there was a growing awareness of the increase in risks of fungal infections in COVID patients but, irrespective of this, [redacted] was in a high

risk category due to being a SCT patient. [redacted] met the criteria of the European Organisation for Research and Treatment of Cancer (EORTC) for probable invasive *Apergillus* infection based on being in a high risk category (even without the additional risk of COVID), the imaging changes (which were in keeping with invasive aspergillus) and a high level of aspergillus antigen in [redacted] blood. I had no reason to question [redacted] clinical care at all.

310. On reading [redacted] statement to this Inquiry I am now aware that [redacted] had many concerns and interactions with GGC regarding [redacted] placement in multiple rooms, COVID being hospital acquired, and the diagnosis of Aspergilliosis. I was not aware of any of this at the time. My next involvement in this case was in November 2021 which I discuss below.

January 2021

Further cases

311. I continued to have concerns regarding the attitude of Infection Control to investigating hospital acquired infections. The conversations at the Consultant meetings were far from reassuring, for example there was a child with a mould growth on a post mortem sample and initial assessments were that it was either a contaminate, not the cause of death or that the patient definitely caught it somewhere else. A full investigation would have been needed to be able to make these conclusions. I am unaware how that investigation concluded but it was the initial reactions that continued to illustrate a lack of learning.

February 2021

312. On 19 February 2021 I emailed Phil Raines about all of the issues at the QEUH. I have provided the Inquiry with a copy of my email. I had read the draft report of the Oversight Board and had significant concerns about gaps in the report, in particular

because it failed to mention that we had raised issues repeatedly in writing since 2015. The suggestion was that the whistleblowing in 2017 was the first time senior management were made aware of the issues. I did not understand why he had ignored the documents that we had submitted which made it clear that we had raised concerns far earlier. The report was opaque about the process around the decision making of moving 2A to 6A, specifically relating to the involvement of senior management.

313. During this time the Case Note Review was also ongoing. I had mentioned to Phil Raines that neither Dr Inkster nor I had been contacted by the Case Note Review and I found this to be surprising given that I had submitted over 100 CHI's to them and had been told by Ms Freeman and Ms McQueen that we would be involved in the Case Note Review assessment of the cases.

May 2021

314. In May 2021 the Chair of the Case Note Review Professor Mike Stevens contacted Dr Inkster and I to arrange a meeting. The meeting lasted about an hour and a half. Those present were Professor Stevens, Professor Willcox (who was only there for half an hour), Linda Dempster (who is now appointed as an expert to the Inquiry) and Gaynor Evans. It was clear that they were unaware of much of the evidence we had and we did not discuss specific patients in detail.

315. Both the Oversight Board report and the Case Note Review were made public in June 2021 just before the designated period of time before an election which relates to communication sensitivities. I found this to be carefully timed to minimise the risk of us making public statements as we had done after the Independent Review Report came out. I was very conscious that the QEUH problems were easily seized upon by differing political ideologies and I didn't think it would be helpful at that time to make any public statements even though I still had concerns regarding the process and conclusions.

316. Following this, Dr Inkster and I had a meeting with the new Chief Nursing Officer, Amanda Croft. During this we reiterated that our concerns remained. The meeting took place very shortly before publication; the reports must have been largely completed already at that point. I have provided the Inquiry with a copy of my emails seeking involvement in this exercise.

November 2021

317. On 17 November 2021, I was contacted by Dr Aleks Marek, the ICD Lead for Environment. She said that she had been asked to provide information regarding press queries on the [redacted] case and she recalled that I had discussed the case at Buzz meetings. I followed up the call with an email providing the information that I felt was relevant. I have provided a copy of this email.

318. On 18 November 2021, there was some publicity about [redacted] concerns. I wrote to Angela Wallace, as lead for IPC at the time, to highlight the information I had about the case. I have provided the Inquiry a copy of this email. I also mentioned in this email that concerns had been raised about *Aspergillus* cases including a case concerning a child who had been on Ward 4B. I wanted to ensure that this information was not lost or forgotten when the Board responded to the concerns [redacted] had discussed in the press. Specifically, in this email I included the CHI number of the child who had acquired *Aspergillus* on Ward 4B and advised that Aspergillosis had been on the death certificate as a contributing cause.

319. Given the foregoing, I was astonished to read in [redacted] statement that Nicola Sturgeon had told her there was no such case. As a result of reading [redacted] statement, I looked up the case again, but the death certificate is no longer available on the portal. However, my opinion still stands that this case at the time was considered likely to be a Ward 4B acquired Aspergillosis and that this was a

contributory factor in the sad clinical decline of the patient along with underlying disease progression.

320. I am unaware, as Clinical lead for Microbiology at the time of the case, of any reassessment of the paediatric *Aspergillus* case or of the cause of death on the death certificate. No one in GGC or externally has ever approached me to clarify which patient I was referring to in the emails obtained by [redacted] under a Freedom of Information request, or to advise me that there had been a change in clinical opinion on the case. I would have expected the South Microbiology team to be involved in any reappraisal of the case as good practice in communication, peer review and learning. It is possible that alternative and entirely valid views have been presented on the case. If so, this should be done transparently, candidly and with all teams involved.

321. There was a much publicised HIS assessment of *Aspergillus* in QEUH after Nicola Sturgeon intimated a reassurance exercise on the back of [redacted] complaints. I had no involvement or interactions with the inspectors in relation to this assessment, and there was absolutely no communication internally from the IPCT regarding the scope or information shared with the inspectors. I was appalled by the quality of the report issued on 1 December 2022 and wrote a response to it which I shared with another external agency, the Scottish Public Services Ombudsman. In my opinion, the report seemed to have missed both cases on Ward 4B in 2020, and offered no evidence of a careful review as to why they would be excluded. A copy of my response has been provided to the Inquiry.

322. I also repeatedly asked for clarification of the information and HIS process at the local Microbiology Consultant meetings. It eventually transpired that the ICD, Dr Bal, had been involved in the HIS visit. My concerns about the data and the process were not entertained, despite other colleagues also expressing agreement (see copies the minutes of Consultant Meetings).

323. Despite my role as Clinical Lead and my prior involvement in [redacted] case, it was only from conversations with Critical Care consultants in April 2022 that I

became aware that [redacted] case had been internally and externally reviewed. As a result, I wrote to my Head of Service, Dr Mairi MacLeod, to ask about this. She told me she was not aware of any review. I have provided the Inquiry with a copy of my email to Dr MacLeod. However, I was later shown (but not sent a copy of) a document in which my colleague in the North Glasgow team, Dr Laura Cottom, had in fact reviewed the case and given an opinion which undermined the diagnosis of *Aspergillus*. This was not discussed with the team of Microbiologists advising the ITU consultants and Haematologists at the QEUH. I again wrote to highlight this to the Head of Service. I did not agree entirely with the opinion (particularly the likelihood of a false high level positive *Aspergillus* antigen from food, in the gut of a patient who had not been eating). However, the main issue for me was the lack of transparency and the unwillingness to consider the case as a learning opportunity.

324. I am at a loss to comprehend why myself and other Consultant colleagues have been so entirely side lined in the assessment of *Aspergillus* cases that we were involved in the diagnosis and treatment of. There is a deeply uncomfortable air of secrecy and information management around these cases that I do not think fits with GMC guidance on candour.

325. On reading [redacted] statement, it is apparent that [redacted] was not accommodated in the appropriate protective environment for the duration of [redacted] high risk immune suppressed state. I would have expected there to be a risk assessment with IPC involvement as to which locations were most appropriate for an infectious and vulnerable patient. This case perfectly illustrates the need for putting in place a sound patient placement policy. I have been advocating for such a policy since the QEUH opened.

December 2021

Ongoing infections and concerns

326. All of my concerns continued to the extent that I whistleblew again to the Scottish Public Services Ombudsman in December 2021. There were ongoing problems with repeated ingress of water and mouldy ceiling tiles in a neurosurgical ICU, and poorly carried out HAI Scribes.

327. In the lead up to my December 2021 whistleblow I had raised a number of issues with Ms Wallace with regards to 6A, 4B and NICU and did not get a satisfactory response. I have provided the Inquiry with my email to her.

328. Gram negative environmental organisms continue to be a concern for the paediatric Microbiology Consultants, for example there was a death of a cardiac baby on ECMO in [redacted] 2021. This baby had an HAI *Serratia*. Again, the cause of death being another factor is immaterial to the relevance of the HAI given the potential for others to be exposed.

329. The view of the lead ICD at the time (Dr Bagrade) was that they could not categorically say that the *Serratia* was acquired in hospital. The fact that this case met the definition of an HAI bacteraemia and that it was a death means that it requires a red HIATT and a clear IMT process to ensure that all possible measures to prevent such infections are in place. My understanding is that this was not done. I have provided the Inquiry with an email from Dr Bagrade to the pathologist telling her to be careful about mentioning HAI because the hospital was under scrutiny.

330. My understanding is that this *Serratia*, although it did not match another *Serratia* case on the PICU, did match a previous isolate in the hospital. I raised this as evidence of an environmental source on 12 December 2021. I have provided the Inquiry with my email to Linda Bagrade dealing with this.

April 2022

331. In around April 2022 I received an email from [redacted] in which [redacted] asked to meet me. I was very happy to meet with [redacted]. However, I felt such a meeting would be best done with the full agreement of the Board management and clinical teams. I did not wish to undermine the clinical teams in any way. However, I also felt I would be able to give clear information on the diagnostics as well as the history of the BMT accommodation that could be relevant to [redacted]. Unfortunately, such a meeting never took place. I believe the Board and [redacted] were unable to agree the terms on which such a meeting would take place including on the question of proposed attendees.

332. At the time of receiving [redacted] request, I phoned the GMC for advice. I felt a real duty of candour to [redacted], but was keenly aware of the difficulties in going alone and against the Board's wishes – I was already experiencing a lot of difficulties as a result of my whistle blow. More specifically, at that time, I was experiencing what I consider to be aggression and bullying towards me due to my whistleblowing activity.

333. The GMC agreed it was good practice to meet with bereaved relatives if requested to answer questions. However, the GMC suggested that any meeting should be done through the relevant health care organisation first, failing which I could proceed on my own. The GMC were clear that the ultimate decision was a matter for me.

334. Given the difficulties in fixing a meeting between [redacted] and the Board, I was determined to agree a time to meet [redacted] on my own when I was informed by the department which handles complaints that there was now a complaint process in place. I was informed that the complaint had been made by [redacted] but was not informed what it was about. I asked the relevant department for a meeting to understand this process as I had never been the subject of a complaint in relation to my practice before. It was clear that this new process would supersede any previous interactions and I was advised to wait for the complaint process to be completed before taking any further steps in relation to meeting [redacted].

335. I have heard nothing about this complaint since from the relevant department. I can only assume, given the passage of time and the fact I have never been contacted about the specifics of the complaint that it was not about me specifically. I deeply regret not having been able to meet [redacted] to answer [redacted] questions openly – including uncertainties and varying opinions. I think [redacted] deserves to have answers and confidence that nothing is being hidden from [redacted]. Cases of Aspergillosis diagnosis are not straightforward and it is possible for there to be valid differences of opinion. This should all be discussed openly.

336. I would value a full review of the case by truly independent experts, with specific regard to the diagnosis of Aspergillosis and the IPC aspects of both COVID and *Aspergillus*. If such a review were to take place, I would also value the opportunity to interact with the experts to ensure all the relevant details and context are fully considered and discussed. It is deeply unfortunate that defensive positions have been taken that are now difficult to reverse.

March to May 2024

337. As discussed above, in December 2021 I contacted the Scottish Public Services Ombudsman to raise concerns about incidents in Neurosurgery, NICU, the new building and the IPCT approach to refusing to attribute infections to possible environmental sources. In March 2024, I received notification of the Ombudsman's provisional decision to discontinue the investigation into six of my "complaints", primarily because of the passage of time and the overlap between the Ombudsman's investigation with this Inquiry's Terms of Reference. In May 2024 I was advised of the Ombudsman's final decision, which confirmed her provisional decision. In writing about this now, I am waiving my right to anonymity as I believe there is a really serious issue that needs to be resolved in the realm of patient safety in the NHS in Scotland.

338. On receipt of the provisional decision, I was permitted to make comments on it in order that they could be taken into account before the decision was finalised. Amongst other matters, I raised the following, all of which were rejected:

a. I explained that when I first contacted the Ombudsman this Inquiry's Terms of reference were well known and fully discussed. I also explained that I informed the Ombudsman that I had discussed the whistleblowing attempt with the Inquiry, who were in agreement that this was a reasonable course of action for current patient safety issues, given the Inquiry was a long process likely to take years, and was focussed on past events. As the patient issues were (then) acute, included sites of the estate not covered by the Inquiry's Terms of Reference – namely the Neurosurgical Institute and the Neonatal Unit, it was within the remit of the standards of the newly set up INWO whistle blowing provision within the NHS governance systems to investigate these extremely serious concerns.

b. I pointed out that, given the considerable period of time which elapsed since I had first contacted the Ombudsman, if the investigation was discontinued this would result in a waste of the time and resources expended on the investigation to date, all of which were expended in the full knowledge of the existence of the ongoing Inquiry.

339. I will ask for a review of the Ombudsman's decision but my current view is that Scotland lacks a system that is able to respond in a timely, truly independent manner where reasonable safety concerns are raised by experienced clinical staff.

Ongoing Concerns at statement date

340. At the time of the preparation of this statement I have ongoing serious concerns about the risks posed to patients at QEUH and RHC. My recent concerns include the following:

i. HAI SCRIBES which fail to ensure patient safety (recently in Ward 4B and the neurosurgical ITU).

ii. A failure to acknowledge and act on the fact that dirty water ingress and damp material poses a real danger to high risk patients (recently in Ward 4B and the neurosurgical ITU). This concern includes repeated recent incidents of burst plumbing in Wards 4B and 6A.

iii. A failure to respond adequately to gram negative infections and to acknowledge a probable link to the hospital environment (e.g., *Stenotrophomonas* typing indicating possible links and *Pseudomonas* cases in the PICU with matching types).

iv. A lack of communication from IPC to Microbiology.

v. A refusal to report invasive fungal infections in a high-risk clinical environment (recently a fatal case on Ward 4B).

vi. A lack of a proper database for typing results (discussed further below).

vii. Refusal to allow Microbiologists to attend IMTs for units that they are clinically responsible for.

viii. Minutes failing to record concerns raised at meetings.

ix. Uncertainty regarding remedial work being completed.

x. How out of specification water results are responded to especially in high risk areas.

xi. Post neurosurgery infections.

341. I have no confidence that lessons have been learned regarding either the science of infection control or the organisational culture which failed to acknowledge our concerns over many years.

342. There has been no opportunity for the recommendations from the Oversight Board and the Case Note Review to be discussed within the Microbiology team. The process of implementing the recommendations has been entirely hidden from the whistleblowers and the Microbiology team. I discuss the implementation of the Case Note Review recommendations in more detail below.

343. I am aware that numerous organisms have been grown from the water in the years since the establishment of the Inquiry (e.g., *Delftia* and *Roseomonas*) and there have been bacteraemia cases with these organisms .

344. In March 2023 there were leaks in the neurosurgical unit and bits of ceiling fell off into bed space.

345. There is a serious problem of faults with the building, but an even more serious problem of a culture which does not value honesty, does not adequately value patient safety, lacks transparency, and prioritises hierarchy at the expense of integrity and expertise. I believe this is the core issue and the root cause of all the failings.

346. It is my view that, in taking the position in the Public Inquiry that there never has been a risk to patients of increased infections due to the building defects, the Board continue to jeopardise patients to this day. This is despite the findings and recommendations of the Case Note Review.

347. There has been an absence of open monitoring and analysis of typing results, Root Cause Analysis for gram negative bacteraemia and fungal cases. I can provide data that the Clinical Scientist for Paediatric Microbiology used to collate before retirement which may be of assistance to the PI. She kept track of typing matches

which is useful in establishing links and understanding pathogenicity of particular strains.

348. This leaves many of us with real concerns about the possibility that the extent of the risks from the building deficiencies will remain unrecognised. I suggest that in order to appropriately assess the current state of the hospital, the Inquiry needs to examine the following up to and including 2024:

a. all results from patients and water and environmental testing and typing;

b. records of all RCAs of bacteraemias in high risk areas and PAG records;

c. IPC SMT meetings to date;

d. IPC agenda item minutes for Microbiology SMT, MMT, and South and pan GGC consultant meetings; and

e. all Estates logs of works especially leaks in the new build and plant failure.

349. I am left in a position where I have ongoing serious safety concerns and no effective forum in which to raise them that would actually have an impact on the present day patients and their experience and exposure to infection risks.

Implementation of the Case Note Review recommendations

350. As far as I am aware, the recommendations of the Case Note Review were officially accepted in full by GGC. However, nothing has been shared with me about their implementation. I have not been involved in any discussions around the recommendations despite being the Clinical Lead for Microbiology at the time.

351. I have raised different aspects of the recommendations, orally and in writing, at Microbiology Consultant meetings, SMT meetings and with Jamie Redfern. I was informed that the recommendations were seen to be for the IPCT to implement. None of the recommendations of the Case Note Review, the Oversight Board and the Independent Review have been discussed by the Clinical Microbiology Team. Both Heads of Service over the time period since the Case Note Review report, Dr Mairi MacLeod and Dr Abhijit Bal, have indicated to me that they consider these recommendations to be historic matters and of little relevance to the current team. They have expressed their wish to move forward. Until recently, Dr Bal had not read the Case Note Review. Whenever we raise the review at meetings, the GGC management line is that all matters have been dealt with, are historic and the Public Inquiry will adjudicate on whether there ever was a real issue with the environment and infection risk. This approach has made my role extremely difficult and I am not willing to renege on all my previous statements.

352. Due to the lack of involvement of the Clinical Microbiology Team in the discussions around the implementation of the recommendations, some areas of "implementation' have affected our team and my practice adversely. I will mention a few of these areas. First, the recommendations on line removal morphed into the requirement for a Microbiology Consultant to decide on line removal in the case of a blood culture positive and that this would be documented in a data base by the quality team. This has caused significant difficulty for our team. I wrote emails about this which I have provided to the Inquiry. The decision to remove a line is not one for a Clinical Microbiologist to make as we do not actually remove the line. My view is that the recommendation was taken in a very superficial manner, not appropriately discussed and was treated as a tick box exercise. Further, the response has in fact exacerbated the issues around the management of infections by making a multidisciplinary discussion problematic and with the edge of a blame culture.

353. Another issue is that line infections are to be reviewed with a Root Cause Analysis (RCA) performed by the IPCT. I first became aware of this at a Multi-Disciplinary Team meeting. It was clear that the Microbiology advice on probable

source of infection was being overridden by the IPCT because it was that team which was responsible for completing the RCA with no consultation with the Microbiologists. I asked where the recommendations were discussed and discovered a level of governance that Microbiology had been excluded from (see the emails which I have provided to the Inquiry). I asked to attend these meetings. So far, I have been invited to and have attended only one. At that meeting, I was extremely unhappy about the discussions as I disagreed with Dr Bagrade regarding the assessment of the organisms and line infections. I stated that the organism was an "environmental gram negative" and she stated that this was not a recognised entity and was a term that should not be used. Given the recent history of our unit, I was unimpressed. It was at this meeting that I also learned they had stopped air sampling in the Schiehallion Unit, a decision which I consider is unwise. I have provided the Inquiry with the emails I sent to Dr Bagrade about this.

354. The need to keep a proper database of typing results was a clear recommendation of the Case Note Review. I am very concerned that nothing has been done to implement this recommendation for several years now. I raised the issue of a database repeatedly at Buzz meetings, at meetings of the SMT, at meetings of the Microbiology Management Team and Consultant meetings and was assured that Dr Aleks Marek, as the Lead Microbiologist for Built Environment and Deputy Lead ICD, was working on this and that this was not an issue for the Clinical Lead of Microbiology. Eventually, it became clear that there was no such database being kept up to date. In fact, it transpired that IPCT did not take ownership of the database that had been set up, and its purpose was unclear despite the IT staff working very hard on it (I have provided the Inquiry with emails on this point.)

355. Currently, I have no visibility of how typing is being monitored or the adequacy of this. However, it continues to be a serious area of disagreement with pressure being applied by Dr Bagrade and Dr Bal to Microbiology Consultants and Scientists not to get typing done and a view by the IPCT that, if they did not request typing, then they would not deal with the implications whatever our interpretation of those results were. I have provided emails to the Inquiry on this issue. In the past, Kathleen Harvey

Wood kept excellent records of typing. This was discussed as a key element of her role that she handed over to Dr Mairi MacLeod and Dr Bal. However, it has not been replaced or kept up to date as far as I am aware.

356. One example of the difficulties we have experienced in relation to typing results is of a *Pseudomonas* HAI associated death case which occurred in the PICU and which I got typed. The report confirming the matching types was received on 4 July 2023 and I emailed the clinical team and the IPCT with the match. However, by asking for the case to be typed, I was accused by Dr Bagrade at a Consultant meeting of poor practice and of not communicating with IPCT. Dr Bagrade told me that I should have sought permission from her to do so. At this meeting, and in front of all the team, I asked Dr Bagrade whether she would have given permission had I made the request for the case to be typed. She said that she certainly would not have because it was unnecessary. The typing matched a previous case. Whole genome sequencing was done. I do not know to this day where those results are being reported or stored or what communications have taken place despite being the Clinical Microbiologist involved in sending the isolate for typing. This is an important governance issue. I have raised at the SMT the need to record when whole genome sequencing is done and the interpretation for the patient records and for communication to all relevant staff.

357. A further example of the difficulties in relation to typing results is of *Stenotrophomonas* typing results in a CF patient suggesting a clustering of cases over a number of years in different locations at the QEUH. Unfortunately, I was excluded from the assessment despite being the Clinical Microbiologist who has dealt with CF Microbiology since 2015. However, I am aware that two ICDs phoned the reference laboratory in Colindale to question the report which advised of the typing match. I disagree with the conclusion of the QEUH ICDs that there is no issue with this acquisition of *Stenotrophomonas* given the history of the water, the lack of a filter in the outpatient clinic where the patient was seen, and the refusal of IPCT to test that specific outlet for *Stenotrophomonas*. I also disagree with the decision of Dr Bagrade that there is no need for a point of care filter in the CF clinic based on her position that *"the water is safe".*

358. In my opinion, a surveillance system should be sensitive to differences in specific patient groups and take into account the context and history of microbiome and epidemiology of a specific setting. However, no surveillance system is perfect and it is crucial to listen to alerts picked up in these high risk areas by the clinicians and Microbiologists most familiar with the setting. This is not currently happening in GGC and I think there is a huge opportunity for sources of infections to be missed to the potential detriment of current and future patients.

Reporting of Concerns

359. It is a matter of considerable regret to me that I have had to raise such serious concerns, repeatedly and through multiple channels. I have taken no pleasure at all in doing so, and indeed it has come at a considerable cost both personally and professionally and has caused enormous upset to me and to my family over many years. I believe that I should never have been placed in this position by the Board. As a doctor I am duty bound to act in the best interests of my patients, even when to do so is contrary to my own interests.

360. I am aware that others have criticised me for what they perceive to be an excessive reliance on sending emails. I quickly discovered that if I raised issues more informally nothing would ever happen, and so it was my practice to deal with my colleagues in writing to ensure a clear audit trail of what was said and when. As a result of that I am now able to clearly evidence the history of concerns that I raised; had I done this via less formal verbal means I have no doubt that it would be suggested that I had failed to timeously identify the points I am now making.

361. I am aware that others have also criticised me because of a perception that I involve myself in matters that are not strictly within my remit. I do not accept this criticism; I have regularly been asked to provide my input on issues that have arisen relative to my experience and expertise, regardless of whether the issue in question

related specifically to my role and responsibilities. I do not seek out involvement; but I always respond if I am asked to help. Where I have raised new concerns they have been about matters which I have become aware of in the course of my day to day duties, not through snooping in matters that are not relevant to me.

362. I am aware that others may suggest that I have acted as I have out of bad faith, as a result of a desire to seek attention, a lack of willingness to accept that I am wrong, or an inability to accept the views of others. I was, for example, once accused of "*over the top bad behaviour*' by Dr Green for raising genuinely held concerns about safety. I do not accept this criticism. I am aware that I can sometimes be assertive and definitive in my delivery, but when faced with a situation in which I was raising serious concerns about the safety of the most vulnerable patients in our hospital and not being taken seriously I felt that I had no choice but to raise those concerns assertively at times.

363. I would be delighted to discuss my ongoing concerns with the Inquiry or its appointed experts at any time. I consider it to be of critical importance that the Inquiry experts are given a tour of the facilities by someone with ongoing concerns and familiarity with the issues that have arisen since opening.

364. I have attempted to use plain English where possible in the writing of this statement. There are areas in which I anticipate the Inquiry will want more detailed identified input and I would again, be delighted to provide that.

365. I remain concerned that the built environment at the hospital poses safety risks to our most vulnerable patients, and I very much hope that the Inquiry will be a catalyst for positive improvements in that regard. This is not a reflection on the excellence of the care delivered in the hospital by what I believe to be outstanding clinical teams. It is one of the most grievous consequences of the building and IPC issues that staff have had to contend with poor environment and pressures arsing from infections and public scrutiny when they should have been able to concentrate on doing their jobs, aided by a brand new bespoke building. The terrible consequences

for our most vulnerable patients and their families are the reasons I have sought to carry on ensuring learning occurs, and to prevent future repetition of the same problems.

CURRICULUM VITAE

Dr Christine Peters

BSc(Hons), MBChB, DTM&H, FRCPATH

PERSONAL DETAILS

Name: Dr Christine Jennifer Peters **DOB:** [redacted]

GMC Status: Full with Specialist Registration with a licence to practice no: [redacted]

Specialist Register Entry: Medical Microbiology and Virology

Certificate of Completion of Training: 18th November 2011

Address: [redacted]

Mobile: [redacted]

Email: [redacted]

QUALIFICATIONS

- May 2010 FRCPATH Medical Microbiology and Virology *Royal College of Pathologists*
- April 2001 Diploma in Tropical Medicine & Hygiene *Royal College of Physicians, London*
- July 1998 MBChB *University of Edinburgh*
- July1996 BSc - 1st Class Parasitology and Entomology *University of Edinburgh*

PRIZES

- March 2010 Science Technology Engineering and Maths Ambassador (STEM-NET) Best Activity Award
- March 2003 South Glasgow Medical Society Annual Research Prize
- December 2021 Giving Voice Award Royal College of Speech and Language Therapy
- May 2023 Honorary Companionship College of Paramedics

MEMBERSHIP

British Infection Association

Environmental Microbiology Network

ASHRAE

European Biosafety Association

EMPLOYMENT HISTORY

08/12 – Current	Consultant Clinical Microbiologist, QEUH Glasgow
	Additional Roles
	Infection Control Doctor 08/14– 08/16
	Clinical Lead 06/17- 08/22

Cystic Fibrosis Clinical Microbiology liaison

Committee membership

Laboratories Clinical Governance

Antimicrobial Utilisation Committee

Biosafety Group

04/12 – 08/12	Clinical Microbiology Consultant and Infection Control Doctor Crosshouse Hospital, NHS Ayrshire and Arran
07/01/12 – 29/03/12	Clinical Microbiology Consultant Sultan Qaboos Hospital, Muscat, Oman
24/10/11- 05/01/12	Acting Microbiology Consultant Southern General Hospital, Glasgow
01/08/01 – 24/10/11	SpR Microbiology Greater Glasgow and Clyde Health Board
21/08/00- 01/08/01	SHO Microbiology South Glasgow University Trust
01/08/99-01/08/01	Year out -Voluntary work in India and Glasgow
03/02/99- 02/08/99	Pre-registration House Officer in Medicine Edinburgh Royal Infirmary
03/08/98- 02/02/99	Pre-registration House Officer in Surgery St Johns' Hospital, Livingstone

National Work groups

- SMVN CF Microbiology Working Group 2022-2023
- Royal College Nursing Risk Assessment tool for COVID-19 COVID-19 workplace risk assessment toolkit | Royal College of Nursing (rcn.org.uk)
- CAPA member 2021-2023 – COVID Airborne Protection Alliance – working with RCN, BMA, BPEN, and 20 other organisations to advocate for the recognition of airborne SARS-COV2
- Scottish CF Infection Control standardisation group 2018
- Scottish Neonatal Screening Short Life working Group 2017
- HPS- NPGO Steering Group –2016
- Scottish ICD network rep on VHF Response Group – 2015-2016
- RCPath Lahore Infection Control Conference Faculty member 2016
- Scottish HAI Standards development 2014- 2015 as SMVN rep.
- Short Life Working Group HPS – Transmission Based Precautions Posters 2015
- HPS e-bug Project 2015

- SMVN –NHS AAA Microbiology Representative 2013-2014

Courses Attended

2018 – Coaching Conversations – Management Course

March 2014 Good Clinical Practice research and clinical trials web based training course completed

January 2013: Welcome Trust Advanced Course Genomics and Clinical Microbiology

2011NES Management Courses:

Recruitment and Selection

Meetings and Time Management

Information and the Law

June 2007 *Don't Panic! Practical Aspects of Infection Control* Sheffield Teaching Hospitals Trust

October-December 2006 *Epidemiology* – online module, of the Masters in Infection Control from University of Highlands and Islands

November 2006 *Educational Workshop Hospital Acquired Pneumonia* BSAC/HIS/AMM

September 2006 *Medical Statistics* three day course at University of Glasgow

September 2004 *Parasitology* UK NEQAS Training day

November 2000 – April 2001 *Tropical Medicine and Hygiene*: Glasgow Microbiology and Infectious diseases evening lecture series

PUBLICATIONS

Book Chapters

Peters C Brain Abscess, *Chapter in* Problem solving in Infection Dancer S, Seaton A, *Clinical Publishing* 2011

Academic Papers

1. Inkster T, Peters C, Dancer S. Safe design and maintenance of bone marrow transplant units: a narrative review. Clin Microbiol Infect. 2022 Aug;28(8):1091-1096.Inkster T, Peters C, Soulsby H . Potential infection control risks associated with chilled beam technology, experience from a UK hospital. Journal of Hospital Infection 2020;106:613-616

2. Inkster, T., C. Peters, T. Wafer, D. Holloway, and T. Makin. "Investigation and control of an outbreak due to a contaminated hospital water system, identified following a rare case of Cupriavidus pauculus bacteraemia." *Journal of Hospital Infection* 111 (2021): 53-64.

3. Inkster, T., C. Peters, A. L. Seagar, M. T. G. Holden, and I. F. Laurenson. "Investigation of two cases of Mycobacterium chelonae infection in haemato-oncology patients using

whole genome sequencing and a potential link to the hospital water supply." *Journal of Hospital Infection* (2021)

4. Blackstone J, Stirrup O, Mapp F, et alProtocol for the COG-UK hospital-onset COVID-19 infection (HOCI) multicentre interventional clinical study: evaluating the efficacy of rapid genome sequencing of SARS-CoV-2 in limiting the spread of COVID-19 in UK NHS hospitalsBMJ Open 2022;12:e052514

5. Oliver StirrupJames BlackstoneFiona MappAlyson MacNeilMonica PancaAlison HolmesNicholas MachinGee Yen ShinTabitha MahunguKordo SaeedTranprit SalujaYusri TahaNikunj MahidaCassie PopeAnu ChawlaMaria-Teresa Cutino-MoguelAsif TamuriRachel WilliamsAlistair DarbyDavid L RobertsonFlavia FlavianiEleni NastouliSamuel RobsonDarren SmithMatthew LooseKenneth LaingIrene MonahanBeatrix KeleSam HaldenbyRyan GeorgeMatthew BashtonAdam A WitneyMatthew ByottFrancesc CollMichael ChapmanSharon J PeacockCOG-UK HOCI Investigators The COVID-19 Genomics UK (COG-UK) consortium Joseph HughesGaia NebbiaDavid G PartridgeMatthew ParkerJames Richard Price **Christine Peters** Sunando RoyLuke B SnellThushan I de SilvaEmma ThomsonPaul FlowersAndrew CopasJudith Breuer (2022) Effectiveness of rapid SARS-CoV-2 genome sequencing in supporting infection control for hospital-onset COVID-19 infection: Multicentre, prospective study eLife 11:e78427.

6. Stirrup O, Hughes J, Parker M, Partridge DG, Shepherd JG, Blackstone J, Coll F, Keeley A, Lindsey BB, Marek A, Peters C, Singer JB; COVID-19 Genomics UK (COG-UK) consortium; Tamuri A, de Silva TI, Thomson EC, Breuer J. Rapid feedback on hospital onset SARS-CoV-2 infections combining epidemiological and sequencing data. Elife. 2021 Jun 29;10:e65828

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8. Lawton, Tom, Matt Butler, and Christine Peters. "Airborne protection for staff is associated with reduced hospital-acquired COVID-19 in English NHS trusts." *Journal of Hospital Infection* 120 (2022): 81-84.

9. Butler, M. J., et al. "Impact of supplementary air filtration on aerosols and particulate matter in a UK hospital ward: a case study." *Journal of Hospital Infection* 135 (2023): 81-89.

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11. Therapondos G, Plevris JN, Stanley AJ, Peters CJ, Teig M, Hayes PC. Cerebral near infrared spectroscopy for the measurement of indocyanine green elimination in cirrhosis. *Alimentary Pharmacology and Therapeutics* 2000; 14(7):923-928

Opinion Pieces

1. Lawton, Tom, Matt Butler, Christine Peters, Eilir Hughes, Huw Waters, David Tomlinson, and Lindsay Fraser-Moodie. "The BMJ–Opinion: Use of airborne precautions for covid-19 in healthcare settings."
2. "Wearing a mask is not a political statement" - New Statesman
3. Peters, C. and Lawton, T., The BMJ–Opinion: Fresh air unmasked.
4. Peters C, Public Engagement ; The Bulletin of the Royal College of Pathologists 155: July 2011, page 183
5. Peters C, Lawton T, Butler M, et al. Why is respiratory protective equipment still an issue in the NHS? BMJ 2022;377:o1082
6. When it comes to staff safety during the pandemic, the buck stops with the chief executives Kevin Brampton, Prof Raymond Agius, Dr Christine Peters, Rose Gallagher, Barry Jones

POSTERS

1. Langley R, K Dervla, N Mustafa, PetersC, Turton J An in-silico investigation of DNA repair gene variation in the *Mycobacteroides abscessus subspecies abscessus* ST26 clonal lineage 2019 BTS Winter Meeting
2. NgW, Peters C, Analysis of *Pseudomonas aeruginosa* Epidemiology and rising antibiotic resistance among Cystic Fibrosis Patients .
3. Sinha U, Peters C, Mcgregor G, Kenna D Analysis of Pseudomonas Aeruginosa Typing in an adult - CF Centre CF Trust Annual Conference 201
4. Wilson J , Eastaway A, Edwards G, Cosgrove B, Peters C *The epidemiology of MRSA in Scotland* Five Nations Health Protection Conference 2010
5. Peters C, Redding P, Allardice G. *Is the nose enough?* Poster and oral presentation at Federation of Infection Society, Birmingham 2009
6. Peters C, Hassan-Ibrahim M, Aitken C *How useful are Throat swabs in the Diagnosis of Viral Respiratory Tract Infections?* European Society of Clinical Virology, Helsinki 2008
7. Peters C, Redding P *Inappropriate use of Cephalosporins*. SSHAIP Conference: Confronting the Challenge of Healthcare Associated Infection 2003
8. Inkster T, Peters C , McGregor G Epidemiology of *Exophiala dermatitidis* in a Glasgow hospital, potential hospital sources and control measures ICPIC Conference 2022

ABSTRACTS

- J Wilson 1, A Eastaway , G Edwards , B Cosgrove , **C Peters** *The changing epidemiology of MRSA in Scotland Abstract P1067,* European Congress of Clinical Microbiology and Infectious Diseases . Vienna, Austria, April 2010

PRESENTATIONS

Case Study QEUH Problems after the Big Opening – Hospital Infection Society Spring Meeting How Do you build a safe hospital? June 2023

Ventilation Matters Knowlex knowledge Exchange Infection Prevention and Control Conference Edinburgh May 2022

Hospital Building Importance of Comissioning – Environmental Network London Spring 2022 **Changing Microbiology in CF with Modulator therapies** Scottish Cystic Fibrosis Group Annual Education Meeting May 2022

Ventilation Going Wrong Hospital Infection Society London 2022

Following the Science? – Accountability in the time of COVID | Events | Garden Court Chambers | Leading Barristers located in London, UK May 2021

PPVL and isolation facilities Scottish Microbiology Association Meeting 2018

Public engagement Scottish Microbiology Association Meeting 2017

NICU Outbreaks Health Protection Scotland Study Day 2017

Sinks Baffles and Overheating Infection Control Conference, by invite of British Deputy High Commission – Bombay 2016

Infection Control – plenary Speaker at 38th Annual PAP Conference, 3rd joint conference of societies of Pathology in collaboration with RCPath November 2015

Introduction of Bruker Sepsi Typer – clinical importance Scottish Microbiology and Virology Network 2014

Workshop Presentation on **Public Engagement** SAPG 2014

Infection Prevention and Control HAI-SCRIBE– Estates education session NHS AAA2013

Dawn of the post antibiotic Era – Hospital Grand round NHS AAA2013

Thinking inside the box Case presentation Southern General Clinical Society March 2010

Sensitivity of throat swabs for detecting respiratory viruses by molecular methods Scottish Diagnostic Virology Group May 2008

Everything Covered? Case presentation Scottish Microbiology Association May 2007

Inappropriate Antibiotic Use Victoria Infirmary Medical Society November 2006

Inappropriate use of Cephalosporins – an Audit Junior Infection Forum February 2002

Cephalosporins and Clostridium difficile South Glasgow Medical Society November 2003

TEACHING EXPERIENCE

Faculty Member and lecturer for Post Graduate short courses

- Microbiology Boot Camp for Specialty trainees in Microbiology and Infectious Diseases 2023
- Environmental Microbiology and Infection Control GOSH 2023
- Joined ID/Micro Training day on Paediatric infections 2017
- Microbiology Workshop – Lahore Pakistan 38th Annual PAP Conference, 3rd joint conference of societies of Pathology in collaboration with RCPath

- Antimicrobial Susceptibility Testing Workshop Institute of Health Sciences, Muscat, organised by the Oman Medical Specialty Board and Ministry of Health, Sultanate of Oman October 2013

Biomedical Scientist Masters Level Project Supervision:

- *Mycobacterium abscessus* in CF samples – use of agar plates for improved sensitivity
- Carbapenem Producing Organisms in waste water in ITU
- Synergy Testing for *Pseudomonas aeurginosa* in CF patients

Undergraduate medical students:

- 2005-2010 laboratory demonstrator for Microbiology labs in Glasgow University
- 2012 overseeing microbiology special studies module placements
- 2014- 2022 – Lectures for Glasgow Medical School as part of Microbiology course and Problem based learning facilitation.

Foundation year doctors

- 2004 – present: Regular tutorials on antibiotics and clinical case based discussions

Pharmacists

- 2009 – 2021 : Annual lectures on Introduction to Microbiology for Pre - Registered Pharmacists

Science Undergraduates

- 2011: Lecture to Life Sciences students in Glasgow University on Science Communication
- 2009: Supervising an eight week work experience placement for a Glasgow University BSc student

Microbiology Post graduate Specialty Training

- I regularly take part in teaching programmes Higher Specialty Training in Glasgow and Scotland
- 2011 Glasgow, 2012 Oman I organised mock FRCPath exams
- October 2013 I worked with the Oman Medical Specialty Board to organise the first Antimicrobial Susceptibility testing workshop which involved preparing practical sessions for over 60 participants and delivering two lectures.

PUBLIC ENGAGEMENT

Podcasts :

Infection Control Matters: Airborne Transmission - would air filtration reduce a range of infections and why is there reluctance to recognise it? With Matt Butler, Christine Peters and Evonne Curran on Apple Podcasts

Opinions from around the world on contact, droplet, airborne paradigms for IPC - Part 3 (Maria Juraja, Egil Lingaas, Ramon Shaban, Elaine Cloutman-Green, Christine Peters) | Infection Control Matters | Podcasts on Audible | Audible.co.uk

#062 #CovidisAirborne - Panel Discussion - Edifice Complex Podcast - YouTube

NHE365: Building sustainable hospitals fit for purpose | UK Healthcare News (nationalhealthexecutive.com)

Public Engagement Regional Coordinator for Scotland for the RCPath, 2014 and have been a STEM Ambassador for 10 years.

- 2019 – National Pathology day event in Gurudwara to raise awareness of career in Microbiology
- 2015 Arranged for Cabinet Secretary for Health to visit QEUH laboratory and a public demonstration of how antibiotics work as part of Antibiotic Awareness Day, launching Antibiotic Guardian awareness.
- Organised six all-day events at schools, three as part of National Pathology Week involving over 400 children overall. The "Bugs on the Runs" day received the Best Activity Award from STEM Net and I was invited to speak at an event at the Scottish Parliament about the schools work I am involved in.
- Taken part in a "Meet the Expert" session at the Glasgow Science Centre where I set up a stand entitled "Hot on the Trail of Mutant Superbugs"
- June 2011 -microbiology lab for fifth year school pupils in Glasgow University during the Glasgow Science Festival
- Demonstrated at a Parasitology workshop during Science Week February 2011
- 2012 -open day as part of Glasgow University Science Festival at the Southern General Microbiology Lab
- 2012- organised a school event in a secondary school in Kilmarnock with an ICN and Antimicrobial Pharmacist on Antimicrobial resistance – a report of it made it to the local newspaper, the Kilmarnock Standard.
- 2013 made a video with Indian Comedian and You Tube star, Wilbur Sargunaraj about antibiotics not being a good treatment for the common cold - over 3500 views so far
- April 2014 taken part in an Education Scotland Resilience training day for 88 primary school children
- I worked on material about pandemic flu for Education Scotland for an update on their "Ready for Emergencies" web site.

RESEARCH Projects

Addenbrooks Air Disinfection Study AAirDS– inception and Consultant on team: NHSE Funded 2020-2023

***Streptococcus Pneumoniae:* clinically relevant Single Nucleotide Polymorphisms**

Supervisors: Mitchell T, Leanord A, Mitchell A,

Institute of Infection, Immunity and Inflammation, Glasgow University

A six month project which involved testing clinical strains for the presence of previously identified potentially clinically relevant SNPs.

Redding P, **Peters C**, Allardice G, Leanord A. MRSA screening and decolonisation: a retrospective analysis of 1709 patients **SIRN Funded Research Project**

Near infra red spectrometry: a non-invasive method of indocyanine green elimination measurement in cirrhotic patients Department of Medicine, Royal Infirmary of Edinburgh 1997

An eight-week project which involved assessing a novel method for liver function testing in patients with liver disease. The results were presented in poster format at The European Association of Studies of the Liver in Birmingham, October 1997

Concerted evolution of *Plasmodium berghei* EF-1□ genes BSc Project Department of Parasitology, Leiden University, 1996

This four month research project involved using molecular biological techniques to sequence a gene of a rodent malaria parasite which is used as a model for human malaria, the sequencing results have been published in,

Vinkenoog R, Speranca MA, van Breemen O, Ramesar J, *et al*. Malaria parasites contain two identical copies of an elongation factor 1 alpha gene. *Molecular and Biochemical Parasitology* 1998;94(1):1-12.

***Burkholderia cepacia* transmissibility and Cystic Fibrosis** *Scottish Home and Health Department funded* Student Vacation Research Project, Department of Medical Microbiology, University of Edinburgh 1994

Additional Skills

- **Language** – Fluent conversational Hindi and Urdu, basic reading and writing skills in Hindi.

Scottish Hospitals Inquiry
Witness Statement of
Mr Thomas Walsh

1. My name is Thomas Walsh. I have worked in the NHS for 40 years in a career spanning both clinical and managerial roles. I officially retired on 21 March 2021. However, I still undertook some bank work for the Health Board until March 2024. My statement below combines the statement taken by the Inquiry in August 2022 and responses to supplementary points for clarification requested by the Inquiry in May 2024.

   I have been asked to provide further details as to the work I undertake and the basis on which I do so. I have now fully retired from all NHS work. I formally retired from the NHS in March 2021. Between May 2021 and April 2024, I undertook some part-time bank work with the Health Board. Between May 2021 and September 2021, I worked within Corporate Services on legal claims, FOI requests, and complaints. From May 2022 until April 2024, I worked two days per week with the Programme Management Office. My remit was assisting with the sourcing and provision of documentation and information for the COVID and SHI Inquiries and the Police Investigations Operations Koper and Quadric.

Professional History

2. I started my career with the NHS as a student nurse in 1983. Following my qualification as a nurse in 1986, I worked in operating theatres as a Staff Nurse, a Charge Nurse, and then a Nursing Officer until 1994.

3. Since 1994 my career has been focused on management roles. I undertook my first health service management role in 1994 at the Royal Alexandra Hospital in Paisley. In this role, I managed operating theatres, day surgery, pharmacy, coronary care, and intensive care.

4. Thereafter, I became Assistant Director of Nursing at the previous Argyll and Clyde Health Board. I remained in that role until the Health Board was dissolved in 2006.

Following the dissolution of the Argyll and Clyde Health Board, I moved to the Greater Glasgow and Clyde Health Board (NHSGGC).

I have been asked to clarify when my role with Argyll and Clyde Health Board commenced. This was in 1994 when I was appointed to the role at RAH mentioned above.

5. Those who had held management jobs in the old Argyll and Clyde Health Board were required to apply for and were absorbed into the new structure of the Glasgow and Clyde Health Board. All Scottish Health Boards moved to single system working through the integration of health boards and clinical services in 2006/7.

6. When I moved to Glasgow and Clyde Health Board, there were no senior nursing vacancies available at the time. I was therefore appointed as a Planning Manager for regional services. I was in that role for about a year and a half.

I have been asked to clarify when I was appointed as a Planning Manager for regional services, and when I ceased to be in that role. This was from May 2006 until July 2007.

7. From July 2007 to April 2019, I held the post of Infection Control Manager (ICM), for NHSGGC. I held this role for longer than any other in my career. In my role as Assistant Director of Nursing at Argyll and Clyde Health Board, I dealt with infection control as part of my remit. In 2007, the ICM of NHSGGC retired. I subsequently applied for and was successfully appointed to, that role in July 2007.

I have been asked: to provide an overview of my specialism and role; to provide a description of the medical and non-medical facilities within my specialism; to explain the relevance of my role to patients' vulnerabilities/specialist requirements; to provide an explanation of my role in the management of infections at QEUH/RHC in the IMT structure, and to describe who I reported to and who reported to me at QEUH/RHC at all points from January 2015 to date. I have also been asked to describe my role with the Scottish Government (including when I was appointed, the terms of my appointment, how long I was in the role, my responsibilities and areas of work) and my role at HPS

(including when I was appointed, the terms of my appointment, how long I was in the role, my responsibilities and areas of work).

This was a managerial rather than clinical role. The reporting arrangements are covered later in my statement. My job description has been submitted to the Inquiry as has full detail on the Infection Prevention and Control structure. I have never worked for Scottish Govt or HPS, nor was this discussed or suggested by either party during my interview with the Inquiry Team.

8. From 2019 to 2021, I was a General Manager working for the Chief Operating Officer for Acute Services.

9. I retired from the NHS in March 2021.

Role as Infection Control Manager (ICM)

10. When I became ICM for NHSGGC in 2007, it was a new single-system health board and the Queen Elizabeth University Hospital ('QEUH') was in the planning stages. I was originally based in Dalian House in Glasgow, which was the old board headquarters. I think it closed around 2009. Thereafter, Sandra Devine and I were based at the old Western Infirmary, which also subsequently closed. Thereafter, I was based at Dykebar Hospital.

11. The key challenge for me when I first took up the ICM post was integrating the teams. That was a challenge across the whole health board because the North and South Glasgow teams were merging, and Clyde was being brought in as part of the new structure. At this time, a lot of managers, including myself, were focused on integration. At times, there was a requirement to reallocate resources across the new structure.

12. The management structure of the Infection Control Service changed in 2009. This change occurred after the outbreak of Clostridium Difficile at the Vale of Leven Hospital in Alexandria. Following the outbreak, all of the senior staff working in infection control were displaced and had to reapply for our respective jobs. Following this re-application process, I was successfully re-appointed as ICM.

13. Further integration within the IPCT began after my re-appointment. These integration works involved taking teams from diagnostics and facilities and integrating them into one single corporate team, including the staff who were previously in community care, or health and social care partnerships.

14. At that point, I became the line manager for all staff working in infection control. This included all of the nursing staff, administrative staff, and microbiologists for the sessions they provided in infection control as infection control doctors (ICDs). In this role, I did not manage any individual microbiologists. I managed their sessions, and they became part of our Senior Management Team. I directly line-managed the appointed Lead Infection Control Doctor. In 2009, the Lead Infection Control Doctor was Professor Craig Williams. The Lead Infection Control Doctor was the only microbiologist who had a majority of sessions with infection control.

    I have been asked to clarify what this role entailed, including responsibilities, numbers of staff supervised and number of sites. The main points are included in my statement. My full job description and the Infection Prevention and Control Structure have previously been submitted to the Inquiry**.**

15. The leadership of the Infection Control Service within NHSGGC comprised of myself as ICM, Sandra Devine as Associate Nurse Director, and Professor Williams as Lead Infection Control Doctor. There were other ICDs who reported to Professor Williams, but they were also undertaking microbiology roles, in which they reported to the Head of Microbiology.

16. In my role as ICM, I always reported to the Medical Director. My line manager did not change after the Vale of Leven Inquiry. It was a requirement of the Health Department Letters (HDL), which are Scottish Government instructions to health boards, that every health board was required to have an ICM who reported directly to the Chief Executive or an executive member of the health board. In NHSGGC, it was the Medical Director. In other Boards, it tended to be the Nurse Director. HDLs later became known as Chief Executive Letters (CEL). The Medical Director at the time was Brian Cowan, and when he retired, Jennifer Armstrong was appointed to the role of Medical Director.

17. The ICM role was a general management role. In terms of the HDL at the time, it specified that it was a management and not a clinical role. My job was not to know more than the clinical experts, but to coordinate and support the team in performing their roles. In my view, I had two of the best clinical experts in Scotland working for me.

    I have been asked to clarify what time I am referring to when I refer to the 'HDL at the time', who I am referring to when I refer to 'two of the best clinical experts' and what their roles were in working with me. The relevant HDL has been submitted to the Inquiry. I cannot recall the date of issue, from memory, this was perhaps around 2001. This was a Scottish Government document, (Health Dept Letter), to the NHS in Scotland specifying the requirement for, and the remit of, Infection Control Managers for all Boards within NHS Scotland.

    The clinical expert roles are those referred to in paragraph 15 above.

18. I have been asked about decision-making as the ICM. In this regard, I was responsible for ensuring that the team functioned and that we produced policy and guidance. I set the objectives for the infection control service based on national guidance. I coordinated and produced an annual infection control programme which would then set out the objectives for the service. We would deliver those objectives through the clinical teams, and we would monitor compliance regularly.

19. In my role as ICM, I procured an electronic surveillance system so that we knew the rates of infection across the area. The system linked directly to the labs system. It is called ICNET. NHSGGC were the first in Scotland to fully implement ICNET. You cannot have everybody everywhere all the time, so when we had this surveillance going on in the background we knew where to concentrate resources if rates were rising in a specific area. My role was to support the team in delivering the infection control agenda. I reported to the Board Infection Control and Clinical Governance Committees in terms of progress against the annual programme and in terms of surveillance. The team also undertook ward environmental audits and would use results and reports to assist the staff in improving practice or the environment. My role comprised both decision-making and supporting the clinical staff and infection control experts in undertaking their roles.

I have been asked: to explain, broadly, what the the function of ICNET is; what the infection control agenda is; how often I reported to the committees; what this reporting entailed, and whether I can clarify how I provided support to the clinical staff and infection control experts. As described ICNet is an electronic infection surveillance system. The committees received standard reports which have been submitted to the Inquiry, and Infection Control was a standing agenda item at every Infection Control and Clinical Governance committee meeting. My support was mainly ensuring that recommendations arising from policy, audit, and surveillance could be, and were, implemented.

20. In my role, I would require on occasion to escalate decisions that were outwith my budgetary remit or that were going to affect the Board's performance. I would be looking at all the national guidance. The only decisions I did not make were the clinical ones. I took advice from senior clinicians, and we made decisions based on that.

    I have been asked: to clarify when and to whom decisions were escalated; what my budgetary remit was; how escalated decisions would affect board performance; for what purpose(s) I would require to consider national guidance, and to be more specific in relation to the types of decisions I was required to take as part of my role. The NHSGGC Governance structure has been submitted to the Inquiry. Broadly speaking escalation was through the Infection Control Committees to the Clinical Governance Committee and NHS Board. Escalation could also be progressed via the line-management structure to the Medical Director. In terms of budget, I held the budget for all Infection Prevention and Control staff. Frequently infection control recommendations could impact the budgets of other services which is what I was referring to. All national guidance on the Prevention and Control of Infection required to be considered. As above this frequently had cost implications for both clinical and facilities services.

21. In terms of major decisions relating to Infection Prevention and Control, any such decisions would be taken in the context of an annual infection control programme and objective setting. The annual infection control programme would be approved by the Infection Control and Clinical Governance Committees, and the NHS Board. It was a live document. If something new came in, then I would add a relevant objective to the programme.

I have been asked: to clarify what I mean when I refer to ‘major decisions’; who prepared the annual infection control programme; what it consisted of, and for what purpose it was prepared. I have also been asked what I mean when I refer to ‘objective setting’: what objectives, who set them, for whom were they set, what was the purpose of these objectives? I have also been asked: to clarify when in the year the programme would typically be discussed at committee and approved; if I was solely responsible for the programme; whether others had access to it for editing purposes, and at what stage, if any, the document ceased to be 'live'. The Annual Infection Control Programmes have been submitted to the Inquiry. The Annual Infection Prevention and Control Programme exists to co-ordinate and monitor the work of the Infection Prevention and Control Committees and Teams in preventing and controlling infection through effective communication, education, audit, surveillance, risk assessment, quality improvement, and development of policies and procedures. The Programme addresses the national and local priorities for infection prevention and control and extends throughout healthcare, health protection, and health promotion. Operational delivery of the programme is regularly monitored, reviewed, and reported through the detailed work plan. The Annual Infection Control Programme was produced by the Infection Prevention and Control Team and submitted by the Infection Control Manager to the Infection Control and Clinical Governance Committees for approval. Progress was reviewed at the Infection Control Committees as a standing agenda item.

22. The Infection Prevention and Control Team (IPCT) also operated a risk register to manage these matters. When a particular risk was identified it would be entered into the risk register. Entries were then scored for impact and likelihood. I led a group on the risk register and the scoring process. We decided which risks were escalated from our risk register for Infection Control to the Corporate Risk Register.

I have been asked: to clarify what I mean when I refer to ‘matters’ in the above section’; what the function of the risk register was; who had access to it; how additions to it were scored; how decisions to escalate were taken, and for further details on my reference to the ‘group on the risk register’. The Board’s Risk Register Policy and the IPCT Risk Register have been submitted to assist the Inquiry.

The group comprised nominated ICNs and ICDs to review and score existing and new risk entries. The risks with the highest scores would be escalated for inclusion in the corporate risk register as per policy.

23. Infection Control was a high priority at the time. As such, there was a significant amount of nationally directed guidance to which we had access. We translated that national direction into tangible actions within the Health Board. The delivery of those actions was then carried out through the annual work programme.

I have been asked to provide further clarification as to the 'tangible actions' that I refer to above, how those actions were monitored and the function and purpose of the annual work programme. I have also been asked to explain the extent to which infection – whether endogenous or arising from the environment (in or out of hospital) – is always a risk for certain sorts of patients, whether there is a limit to what can be done to prevent this and whether there are certain sorts of infection that can be expected to arise no matter the level of care taken in relation to IPC/hygiene. This was primarily delivered through the Annual Infection Control Programmes and associated work plans. These documents set out both objectives and identified who would lead the delivery of each of the objectives. These documents have been submitted to the Inquiry.
The detailed considerations concerning infection risk will be better addressed by clinical experts.

24. I was a member of the Clinical Governance and Board Infection Control Committees. As part of my role on those committees, I would take the initial objectives paper on behalf of the Medical Director to the relevant Committees. We were provided with bi-monthly updates on progress against the objectives or any changes. We also had a Senior Management Team (SMT) meeting, and this is where any clinical issues could be discussed.

I have been asked to clarify the period in which I was a member of these committes, what my position/role on the committees was and what the 'initial objectives paper' was (including its purpose). I was a member of these committees whilst in the role of ICM. The objectives paper described is the Annual Infection Control Programme.

25. Every geographical area had a Lead Infection Control Nurse (ICN). The other ICDs had sessions that were allocated to a sector. I had an SMT that consisted of our triumvirate and all the lead ICNs, which would be six or seven, depending on how the sectors were defined, and two or three other ICDs.

    I have been asked to clarify what is meant by 'triumvirate'. This is the Senior Manager, Associate Director of Nursing, and Lead Infection Control Doctor. This is set out below in paragraph 28.

26. When I came into the Infection Control Manager role in 2007, it was a changing picture because of the national change in health boards to single system working (i.e. the integration of health boards and clinical services). Within NHSGGC this resulted in the integration of North, South, and Clyde, which at the time became Sectors. At the beginning of the period of integration, and on a temporary basis, they were split into specialist clinical directorates. For example, surgery across NHSGGC was one clinical directorate across all the hospitals that provided surgery. I cannot recall the exact date we moved back to North, South, and Clyde as sectors.

    I have been asked to clarify the precise time period referred to here. I cannot recall precise dates, but the Board has provided this information to the Inquiry.

27. We have always produced a series of reports from Board to Ward, and there is a diagram in the annual reports which shows how we reported at all levels within the organisation. We did not just provide reports. Our remit was also to support the management teams with intelligence on where they were with their ward environment or their infection rates. We worked directly within the sites and sectors. As part of this work, we would utilise an ICD and/or ICN to assist with the interpretation of their reports at their Directorate or Clinical Governance meetings. I took the view that it was not enough to simply provide the reports, we had also to support the interpretation and advise on actions required.

    I have been asked to clarify the purpose of these reports, who they were produced for, how they were considered, and how they were used. I have also been asked to clarify:

who is referred to as 'management teams'; what sort of intelligence is referred to and what purpose it was used for; how infection rates were monitored and how any data was utilised in that respect; how I supported the interpretation and advice on actions and for what purpose, and to whom the interpretation and advice was provided and for what purpose. The board-to-ward reporting structure for Infection Prevention and Control has been submitted to the Inquiry. The reports and extensive evidence have also previously been submitted to the Inquiry.

Relationships within the Infection Control Team (ICT)

28. As noted above there was a triumvirate, with me as ICM, a Lead Infection Control Doctor, and the Associate Nurse Director. The Associate Nurse Director had line management and professional responsibility for seven or eight Lead Infection Control Nurses, who then in turn each managed a team. The Lead Infection Control Doctor had responsibility for the sector ICDs.

29. My engagement with the sector ICDs and ICNs was through the Senior Management Team. We also had Organisational Development (OD) events, but the main route was a monthly Senior Management Team meeting which all ICDs and all Lead Infection Control Nurses from each of the sectors attended. There was not a fixed agenda for the meetings. However, one of the standing agenda items was the provision of updates from the sectors by a doctor or nurse who would provide us with information as to what was happening in their area. It was also open to the doctor or nurse to ask for advice from the SMT or colleagues around the table. So, the SMT was the way for us to engage directly with the broader group. Everyone had a good relationship, and it worked well.

30. However, in 2015, difficulties began to develop between two ICDs. These ICDs were Dr Christine Peters, who had recently been appointed to infection control in the South, and Professor Williams, the Lead ICD.

31. Dr Peters is a very intelligent individual with a lot to offer, but she did not like the way we were set up. Further, she did not appear to be willing to accept the leadership of Professor Williams. While Dr Peters had a considerable amount of theoretical knowledge, it appeared to me that any challenge or questioning of her expertise would

result in her disengaging from recognised processes for dealing with issues or concerns. That made working with her quite a challenge because you were dealing with someone who was then going in several directions and not using any appropriate structure for escalating issues or problems. Consequently, the team became quite fractured, and some aspects of relationships became difficult.

I have been asked: to clarify what Dr Peters' issue was with the set-up of the SMT and what issue Dr Peters had with the leadership of Professor Williams; to clarify what precisely I am alleging that Dr Peters would do; to provide specific examples and explain why this was problematic; what is meant by 'several directions and not using any appropriate structure', and in what way the SMT became fractured, what relationships became difficult, and the significance of that. The full history and background has been submitted to the Inquiry within the whistleblowing reports. These reports reflect my recollection and understanding of the issues.

32. I think the best way I could describe it is there were differences of professional opinion, which can happen anywhere. However, the way that they manifested, and the way that Dr Peters approached those differences, became increasingly difficult to manage. I have dealt with differences of clinical opinion throughout my entire career. Professor Williams and Sandra Devine did not always agree, but there was a way to resolve any issues on clinical matters professionally. However, it was not only the difficulty within the ICDs. Dr Peters also caused significant concern and stress among the senior nurses.

I have been asked if I can be any more specific as to the differences of professional opinion that I am referring to, how Dr Peters was difficult to manage and whether I can clarify in what way Dr Peters caused concern and stress among the senior nurses. This is set out in paragraph 34 below and covered within the whistleblowing reports submitted.

33. As a manager, I tried initially to hold the team together through the SMT. That could be quite challenging, to find common ground and try to build forward. We looked at OD processes and they were generally successful. I met with Dr Peters and Professor

Williams to try and identify what the problems were and settle some of this down. I also engaged with senior colleagues in microbiology.

34. Around the middle of 2015, Dr Peters decided that she did not want to be an Infection Control Doctor anymore. She might describe this as having resigned. However, she just gave up those sessions and reverted to a full-time microbiology contract. Despite this, she continued to take what I would describe as an unnecessary and inappropriate interest in infection control. For instance, Dr Peters demanded updates on infection control. Further, Dr Peters interfered in the running of the Infection Control Service, even though she no longer had any legitimate remit to be involved in such matters. I discussed this with both her professional lead, Dr Rachel Green, and my counterpart in diagnostics, Isobel Neil, who was the General Manager for that area. The purpose of those discussions was to see if we could do something about it. However, even after I left, my observation was that behaviours did not change.

    I have been asked to clarify from whom Dr Peters demanded updates, whether she got them and, if so, on what basis. I have also been asked to clarify how Dr Peters interfered in the running of the infection control service, what the outcome of this interference was and whether I can be more specific as to the basis of my observation that behaviours did not change. This is covered in the whistleblowing reports submitted to the Inquiry. These reports reflect my recollection and understanding of the issues.

35. The different management structures made it more difficult to manage the situation, but I did not have any difficulty in managing Infection Control Doctors until then, and they all had the same structure. I do not think I would pin it on dual reporting alone. It comes down to individual behaviours and the willingness of people to engage in a dual management structure.

Standard Operating Procedures

36. Local infection control policy was very much part of the IPCT objectives until about 2016/2017 when Health Protection Scotland moved to develop a National Policy Manual. Our job was very much about setting objectives and Sandra's role was about expert input to the production of our local policies and guidance. My understanding is

that between Boards, even for outbreaks or infection control, policies would vary slightly in content, and because of this, Health Protection Scotland were asked to develop a national policy manual. Our role moved to monitoring the national policy and its implementation, rather than writing policy. We were still involved in policy, but it was now a different approach.

37. Where the infection control experts were needed was to support staff in implementing the policy. A policy statement to me is what must be done, and you also need something that says; here is how you do it. Our view was that we had National Policy but some of our staff on the ground needed a bit of support for some of those policies. We agreed that we would develop Standard Operating Procedures (SOPs) that would support them in the local implementation of national policy. It was a clinical role to develop SOPs. Sandra would take all the national guidance and work with the IPC policy group in the production of the SOPs.

Role from 2019 onwards

38. I ceased to be the Infection Control Manager at NHSGGC in March 2019. Thereafter, I worked as a General Manager for the Chief Operating Officer of NHSGGC who managed all acute services and all the Acute Directors across NHSGGC. In this role, I did not have any involvement or remit with Infection Control.

I have been asked to specify the timeframe that I worked as a General Manager for the COO of NHSGGC. This was from April 2019 until I retired in March 2021.

ICNET System

39. As ICM, I appointed a Project Manager to set up the ICNET system. Prior to ICNET, the ICNs would physically go up to the labs, see what relevant results were in, and transcribe the information to deal with it later. The team had multiple homespun Excel databases, and it struck me that we needed to coordinate this better. In terms of robustness, ICNET gave a live link to the lab system, and we could decide which key organisms we wanted to monitor, record, and report. It was much more robust in terms of what results were coming in and did not rely on somebody going and looking at the

lab result but fed the results to the ICNs in their office through a live link. The lab data also allowed us to do more surveillance. One of the other developments was to put together a data team, who would then provide the ward, directorate, sector, and ad hoc reports and data analysis. Sandra Devine was instrumental in putting in a quality improvement process that related to surveillance. These are called Statistical Process Control charts (SPCs). Sandra had worked with HPS on these SPCs. ICNet supported this work. With ICNet we then had a database that allowed us to do proper retrospective research or analysis on infections.

I have been asked: to confirm who the Project Manager appointed was; what relevant results I refer to above; to clarify which key organisms were monitored; how they were monitored, recorded and reported; to clarify the type of surveillance carried out in relation to lab data; to clarify what quality improvement process was implemented by Sandra Devine, and to clarify how ICNet supported Sandra Devine's work.

The project manager was Debbie Forsyth, now sadly deceased. Debbie left NHSGGC around 2014. I cannot recall the precise details on organisms and results, and I no longer have access to these reports or resources. Extensive evidence around this has been submitted to the Inquiry.

40. Like any IT system, you cannot buy it off the shelf and expect it to work straight away. The system needed a lot of customisation for our use and practice and that is where the project manager came in. We ran it as a formal project and consulted with all the teams on the functionality of the system. There was a very comprehensive project built around it.

41. If there was an unusual organism or an outbreak, the alert could also come from the labs, the microbiologists, or ICDs. So, the IPCT has ICNET, but there are also the microbiologists in the labs who interpret the results that come in. If they are concerned about something, it can then be added as an alert to ICNET. The IPCT may get intelligence from labs or the nurses on the ward that there is something that needs to be added to the alerts. Therefore, as well as dealing with the immediate outbreak or incident, we can add it as an alert for a fixed period.

Governance Structure

42. When I was in post there was an Acute Infection Control Committee, and there was a Partnership Infection Control Support Group that dealt with community-related infections or those hospitals that have non-acute patients, such as care of the elderly hospitals or those with mental health issues and learning difficulties. Then there was a Board Infection Control Committee. The Partnership Infection Control Support Group and Acute Infection Control Committee report to the Board Infection Control Committee, which reports to the Care and Clinical Governance Committee (which used to be called the Clinical Governance Committee) which in turn reports to the NHS Board. There was a requirement for the Infection Control Manager to report to the NHS board every two months. There was an HAI reporting template issued nationally so that would also go to the NHS Board, Infection Control, and Clinical and Care Governance Committees.

    I have been asked to clarify what the post was that I referred to in my first sentence above. This is not a post. It is an equivalent infection control group for community and mental health settings. This is set out in the governance structure documents submitted to the Inquiry**.**

43. In terms of governance, the Acute Infection Control Committee covers all the hospitals that have patients in beds being treated for acute illnesses, whereas the partnership group is more community based including mental health and care of the elderly inpatients. The role of the Acute Infection Control Committee is to oversee the implementation of policy within Acute Services and to receive reports. They would get all the sector or directorate reports, depending on how they were structured at the time. They would oversee and manage the implementation of infection control policy and monitoring and surveillance across Acute Services.

44. As Infection Control Manager, I sat on that committee as did Sandra Devine and Prof Williams. We were reporting to, as well as advising, the committee. It was usually chaired by the Associate Medical Director. We would report on progress against the objectives that I have described, and where needed we would obtain their support, guidance, and advice. We would consult on any new policies for implementation, and we would also report on infection rates and incidents. The committee would also get

copies of the SPCs, outlining how the key infection rates were going, as well as ward environmental reports.

I have been asked: to clarify which committee I refer to having sat on; what I would have been reporting to and advising on at that committee; to expand on the support, guidance and advice that I would receive from that committee, and what the committee would do in respect of reports of infection rates and incidents. The committees I sat on are referred to elsewhere in my statement and the committee structure has been submitted to the Inquiry. Reporting is also discussed elsewhere, and the board-to-ward reporting model has also been submitted. I cannot recall precise details on committee meetings between 5 and 16 years ago, but all minutes, papers, and reports have been submitted to the Inquiry.

45. I reported to the Board Infection Control Committee. The Committee was chaired by the Medical Director, who was also my line manager. The committees had broadly similar agendas for about two-thirds of the business. In the Acute and Partnership Committees, there would be consultation about the approval of policy and SOPs. The chairs of the Acute Infection Control Committee and the Partnership Infection Control Support Group sat on the Board Infection Control Committee. They led the feedback from their respective committee.

46. The Clinical Care and Governance Committee would get the high-level HAI reporting template and the minutes of the Board Infection Control Committee as part of the standing agenda item. I believe that was a requirement following the Vale of Leven Report recommendations.

HAI Reporting

47. The HAI reporting template was developed around 2009/10. Before this, there was variation in what boards were doing in terms of reporting infections. There was a national consultation, and the HAI Policy Unit within the Scottish Government worked with HPS to devise a reporting template. It specified what information to collect and the format in which this should be presented.

48. The result was that every two months every NHS Board was reviewing the same data for their area. This allowed for national comparison and demonstrated the variability of what was reported. The data team was responsible for making sure the report data was collated, and Sandra Devine and I approved it. Usually, Sandra would provide the final sign-off on the report. We had the standard data set, and then we had to describe any recent significant outbreaks and incidents that would appear in the Healthcare Infection Incident Assessment Tool (HIIAT) reports.

    The Healthcare Infection Incident Assessment Tool (HIIAT) (National Infection Prevention and Control Management - NICPM – Healthcare Infection Incident Assessment Tool (HIIAT) – Appendix 14 – NHS NSS ARHAI - v2.0 – 24 January 2022 - **A49394507 – Bundle 27 (vol 1), Page 662,** is an assessment tool for outbreaks and incidents. During my role as ICM, it would be prepared at the Incident Management Team (IMT) or Problem Assessment Group (PAG) meeting and would usually be produced by a Senior Infection Control Nurse. The standard process was for an Infection Control Doctor or a Consultant in Public Health Medicine (CPHM) to chair these meetings. The HIIAT was reported to HPS. These are national tools, which means everybody was reporting the same information in the same way.

    I have been asked to expand on how the HIIAT functioned and on the purpose of reporting the information in the HIIAT. This is a National tool developed by HPS, (now ARHAI), and is part of the National Infection Prevention and Control Manual.

    All HIIAT reports from NHSGGC have been submitted to the Inquiry.

49. I also sat on the board Water Safety Group. I had two main functions, the first being to make sure our Estates and Facilities teams and Legionella teams were supported by the nominated ICNs and ICDs. The other function was in connection with Pseudomonas. One of the reasons the Water Safety Group was set up was to implement a system for testing and monitoring for Pseudomonas. In general, the Director of Estates and Facilities was accountable and responsible for Legionella, while the ICM was accountable and responsible for Pseudomonas. However, there was a clear crossover between our teams.

50. There is clear policy and process around Legionella, and we had an action plan for implementing the Pseudomonas guidance. Our remit as the IPCT was to support the implementation and the education around the Pseudomonas testing guidance. I cannot recall if my involvement in the group changed after issues started to arise in Ward 2A in 2018. My recollection is that it was being progressed by the IMT outwith the Water Safety Group, which usually only met every two or three months. Things were moving so fast that, if there were Incident Management Team meetings (IMTs) three or four times a week, there would be no time for the Water Safety Group to get actively involved, although there would be reports back to the Water Safety Group. The Water Safety Group's operational role was particularly challenging given the speed at which issues were developing.

    I have been asked: to expand on the Legionella policy I refer to above; to expand on the action plan for implementing Pseudomonas guidance (what the plan contained, how it was carried out and what its purpose was), and what guidance I refer to above. The relevant Legionella and Pseudomonas policy and guidance documents have been submitted to the Inquiry**.**

Involvement of Infection Control in Adult Bone Marrow Transplant Unit

51. When services moved over to the QEUH, Professor Williams was the Lead Infection Control Doctor, I was the Infection Control Manager, and Sandra Devine was the Associate Nurse Director. At that point, Dr Peters was the South sector ICD, while Dr Inkster was the ICD for the North.

    I have been asked to clarify whether, at the point of taking occupation of QEUH/RHC on 26th January 2015, the following wards were fully handed over from Multiplex to NHS GGC: Ward 2A/2B, Ward 4B, Ward 4C, Ward 6A and Ward 6C. I have also been asked to confirm my understanding of the ward specification and patient cohort to be located in each ward, and, if a ward or wards were not handed over on 26th January 2015, or were partially handed over, why they were held back. I cannot assist with any detail on this. Records from the Project Team may be of assistance**.**

52. My recollection is that, shortly after occupation, there was concern about the number of air changes and the absence of HEPA filters in some of the air handling units in the adult BMT unit. This was looked at, and the concerns were taken seriously including, where possible, retrofitting HEPA filters. Thereafter, concerns developed about the design of the isolation rooms in Ward 4B. My understanding at the time was that there was no Scottish building guidance on the specification for a bone marrow transplant unit isolation room. In the absence of that, there was a proposal that the Board could follow the guidance on building an isolation room for multidrug-resistant tuberculosis (MDR TB).

    I have been asked to clarify: why there was concern about the number of air changes and the absence of HEPA filters in the Adult BMT unit; what concerns there were regarding the design of the isolation rooms in Ward 4B, and the basis upon which it was suggested that guidance be followed for the BMT isolation rooms which mirrored those for MDR TB isolation rooms.
    This and other concerns were fully set out in the SBAR and action plan referred to in paragraph 66 below. These documents have been submitted to the Inquiry.

53. Some expert opinions, including that of Peter Hoffman (external advisor from Public Health England), supported doing that. However, Dr Peters and Dr Inkster disagreed. The overall specification was considered below that of the existing unit, which was at Gartnavel. It was again a difference of clinical opinion and interpretation of guidance that did or did not exist.

    I have been asked to clarify: the basis on which Dr Peters and Dr Inkster disagreed with the expert opinions which suggested that the isolation rooms could mirror those for MDR TB; the basis on which it is suggested that the specification for the isolation rooms at the QEUH were lower than those at Gartnavel, and what I mean in the final sentence above regarding a difference of opinion in respect of guidance which may not have existed. This is covered in paragraph 53 above and the SBAR referred to in paragraph 66. The key issue was the absence of a de facto national specification for a BMT unit. In the absence of such guidance differing views existed as to what the specification should be.

54. I believe that Prof Williams moved on from the lead ICD role partly due to issues within the team. Dr Inkster was then appointed Lead ICD in April 2016, and I was part of the appointing panel. Relationships within the IPC Senior Management Team (i.e., Sandra Devine, Professor Williams, and me), were good when Professor Williams was part of the team. Initially, things were good within the team when Dr Inkster was appointed. However, challenges continued with Dr Peters for a period, and Dr Inkster also found some aspects of Dr Peters' intervention unhelpful and challenging. Particularly as by that time, Dr Peters had stood down as an Infection Control Doctor. She continued to ask for information that she did not require in her role as a Microbiologist. Sandra Devine, Dr Inkster, and I all initially got on well and worked as a triumvirate. I certainly noted that, at that time, Teresa and Sandra were making a significant effort to work with each other. That continued until Dr Inkster unfortunately went off on long-term sick leave.

    I have been asked to clarify: what issues within the team I am referring to above; what information Dr Peters was said to ask for which was beyond her remit as a microbiologist, and when Dr Inkster went off on long-term sick leave. I cannot recall when Dr Inkster went on long-term sick leave, but I understand this detail has been submitted to the Inquiry.
    Further details on the interventions and actions of Dr Peters are set out in the Whistleblowing reports submitted to the Inquiry.

55. Things seemed to break down a bit after that. Even before Dr Peters, Dr Inkster, and others were part of the team, the dual reporting management system could be a challenge. I had noticed for some time that our Infection Control Doctors could be pulled in two different directions. The other issue that we recognised was that the sessions were not working. Infections and outbreaks do not always happen when, for example, Dr X is in on a Tuesday morning. They happen when they happen, and we need an ICD to chair the meeting. I consulted with a colleague, Keith Morris, who I think was in NHS Fife. I proposed that we find a way to provide a better, more flexible Infection Control Doctor service without depleting the microbiology service. This was not directly concerning the challenges within the team but for better integration with microbiology colleagues.

I have been asked to clarify what the multiple directions were in which I felt infection control doctors could be pulled. As described, The nominated ICDs could, at times, have simultaneous Microbiological and Infection Control commitments. This is set out in the SBAR document submitted to the Inquiry.

56. In my SBAR on Infection Control Doctor sessions, I suggested that we look at the Head of Microbiology having more oversight in terms of Infection Control. I had discussed this with a colleague, who was also the General Manager covering microbiology.

I have been asked to clarify: what I had suggested the role of the Head of Microbiology be, specifically; what the purpose of this elevated role was, and who the General Manager covering microbiology referred to was? The General Manager at the time was Isobel Neil, now retired.
The SBAR has been submitted to the Inquiry. Essentially the main proposal was that the Head of Microbiology would also be the Professional Lead for Infection Control Doctors providing effective oversight of both functions.

57. I drafted a paper with three recommendations and discussed it with Professor Brian Jones, who was the Head of Microbiology at the time. He agreed with my suggestions. Whilst Dr Inkster was on sick leave, Professor Jones stepped into aspects of the Lead ICD role, particularly around the BMT. Professor Jones perhaps had a degree of preconception about how the infection control team operated. However, when he came to work with us, he saw that it was quite different, in a positive way. He enjoyed working with us, as did we with him. Some of that was around recognising that there were gaps in the system that we currently operated. Brian and the Chief of Medicine for Microbiology were both broadly in agreement with my recommendations.

I have been asked to clarify what the three suggestions were in the paper I drafted and when I drafted it. I have also been asked to clarify: what aspects of the Lead ICD role Professor Jones stepped into, and for what period; who the Chief of Medicine for Microbiology was at the time; how the recommendations that I had made were considered; by whom, and in what forum. Having now retired I no longer have access to the SBAR and cannot recall the full details as requested. More detail was provided during my interview and is set out in paragraph 61 below.

58. We took some actions from the 27-point action plan (which is referred to in more detail below), around the remit of the Infection Control Doctor. Everything that the microbiologists had raised was an important point, and that is why there was a comprehensive action plan on how we would deal with it.

Concerns Regarding the Structure of the Infection Control Team

59. Around this time [redacted] raised some concerns about the structure of the infection control team. [redacted] did not raise [redacted] concerns directly with myself or anyone on the team, and I have not had any direct input regarding this. I cannot offer comment on concerns about Prof Brian Jones' role whilst Dr Inkster was away, other than Brian did an excellent job in difficult circumstances. My recollection is that the Infection Control Doctors in the South sector, primarily Dr Peters and [redacted], had disengaged. They still took some active, but not always helpful, interest in infection control. They set up a generic inbox which caused the clinical teams' operational problems in terms of who was dealing with issues. I would say that there was confusion caused by the actions of the Infection Control Doctors in the South for the whole of the Infection Control team, rather than the other way around. Professor Jones could not cover everything Dr Inkster did. He did not have the clinical sessions or the time. He was there to see that we had enough microbiologists to provide ICD cover and oversee the bone marrow transplant unit refurbishment.

I have been asked to clarify: what time is being referred to in the first sentence above; what issues with the infection control team were raised by [redacted]; who these concerns were raised with; what I mean when I say that Dr Peters and [redacted] disengaged, and how the generic inbox caused the infection control team issues. Much of this is covered in the SBAR, meeting of 4th October 2017 minutes and subsequent action plan which have all been submitted to the Inquiry. I believe these documents to be very important to the work of the Inquiry. In terms of the generic inbox, in the absence of a named individual, the ICNs did not know if, or by whom, an issue would be dealt with when submitting a request for assistance or information via e-mail.

60. I have been asked what became of the SBAR I authored, and whether anything changed as a result of it. Things did change as a result. Further discussions were held with our colleagues in microbiology, including Dr Rachel Green who was the Chief of Medicine, Isobel Neil who was my counterpart as General Manager, and Professor Brian Jones. We agreed that we should look at adopting that structure as described in the SBAR, with the Head of Microbiology taking an active interest in Infection Control. More significantly, although it did not strike me as hugely significant at the time, would be a change of the reporting line for the Lead Infection Control Doctor. This would change to going through the Head of Microbiology rather than straight to the Medical Director, as had previously been the case. The agreement was that we would implement the proposed changes when Dr Inkster came back from sick leave. Her absence was managed through microbiology. My understanding is that it was agreed, and Professor Jones offered to meet with Dr Inkster. I do not know if that meeting took place. I understand that Dr Inkster was unhappy about the proposal as presented in the SBAR and was particularly concerned about the change in her reporting line. She felt that she had not been fully consulted.

    I have been asked to clarify: when I authored the SBAR referred to; the structure described in the SBAR; the precise role that it was envisaged the Head of Microbiology would take on in respect of infection control; why the change in reporting line for the Lead ICD would change, and the purpose of that change; why Dr Inkster was unhappy with the proposal, and how I became aware that Dr Inskter was unhappy with the proposal. Some of this is covered in the preceding paragraphs. The detail requested is set out in the SBAR which has been submitted to the Inquiry.

61. Dr Inkster came back from sick leave in January 2018. However, she very quickly demitted from her Infection Control sessions. I understand that she subsequently met with the Medical Director and agreed to continue in post, although I was not involved in this process.

<u>Awareness of Infections in 2A</u>

62. I am not aware of concerns about organisms in the water beyond what was discussed at the IMTs. That is not to say nobody ever told me, but I have no recollection of that.

Even if I had, I would have looked for expert opinion from Sandra Devine and/or Dr Inkster.

63. I have been asked if I am aware of [redacted] highlighting to Sandra Devine the need to have water testing regarding Stenotrophomonas. I am not aware of that, and I would go further and say that it is not a decision for the Infection Control Nurses. For context, water and ventilation systems are two areas that Infection Control Nurses do not deal with.

64. I have been asked to comment on Sandra Devine's opinion that, whilst Dr Inkster was off sick, she had set the trigger threshold for Stenotrophomonas testing too low. That is purely a clinical decision. I am not qualified to answer that, but I would trust Sandra's judgment on the matter if this was the case.

October 2017 SBAR

65. I have been asked about my recollection of the meeting that was held on 4 October 2017 - **A42959603 – Bundle 4 Hearing Commencing 12 June 2023 – NHS GGC: Situation, Background, Assessment, Recommendation (SBAR) Document – Page 104**. The meeting was chaired by Dr Jennifer Armstrong, who was my line manager and the Board Medical Director. In the build-up to the meeting, some microbiologists raised concerns with the Medical Director about the built environment and the structure of the IPCT, which they have the absolute right to do. The number of concerns reached a point where Dr Armstrong had requested that these be set out in writing. The Microbiologists put together the concerns in an SBAR document, and Dr Armstrong arranged the meeting to respond to the issues identified.

I have been asked to clarify who the microbiologists referred to are; what concerns they had raised; when they prepared the SBAR referred to, and whether the concerns they raised pertained to any wards in particular. I have also been asked to provide as full a recollection as I can of: the discussions which took place during the meeting of 4 October 2017; what issues were discussed in relation to ventilation; what issues were discussed in relation to the water supply and taps; whether I formed any particular views in relation to the issues discussed, and the basis on which any such views were

reached. As mentioned earlier this is extensively covered in documents submitted to the Inquiry. These include the SBAR submitted by microbiologists, the minutes of the meeting held in October 2017, and the subsequent action plan.

66. Along with others, I produced the action plan arising from that meeting. We took the concerns expressed in the SBAR and at the meeting, and we agreed on a number of actions. Not all were for the Infection Control Team; some of them were Facilities or for our OD colleagues. My role was to develop the action plan. Subsequently, there were a couple of rounds of monitoring progress against the action plan with those who were designated to lead each of them. The meeting showed that important issues were being raised, albeit not necessarily always in the right way. The issues were being taken seriously with the aim of reaching a position where, with the microbiologists, we agreed on what we were doing about each of these twenty-seven points. Sandra and I would deliver on the actions for the infection control team, while Tom Steele or a nominated deputy from Facilities would deal with the Facilities' actions.

    I have been asked to clarify: who else was involved in preparing the action plan; what actions were agreed, by whom and when; by what mechanism they were agreed; to whom the action plan was circulated; whether that action plan was amended at any stage; how and by whom the actions were to be implemented; how progress against the action plan was monitored; the outcome of this monitoring; how often progress was monitored; how frequent each round of monitoring was, and what I mean by issues not always being raised in the right way. The action plan, mentioned above and submitted to the Inquiry, sets out the nominated leads for each of the agreed actions together with timescales. Progress against the action plan was noted and reviewed at Infection Control and Clinical Governance Committees. All relevant minutes have been submitted to the Inquiry.

67. The action plan and updates went to the Care and Governance Committee. Dr Inkster was back by this time, and she presented it to the Care and Governance Committee and confirmed she was happy with progress. That is my recollection, but I cannot remember specific dates. It took a few weeks to get the action plan up and running and then there were a couple of rounds of progress updates. The final update went to the Care and Clinical Governance Committee, although I was not at that meeting.

68. I have been asked if, once the action plan was in progress, updates were provided to the group of microbiologists who had raised the concerns in the first place. Dr Inkster did update her colleagues and I know they were involved in further commentary around the action plan.

Dr Inkster's Return from Sick Leave

69. After Dr Inkster's initial concerns, things started well. However, problems resurfaced concerning the IMTs around the water incident and Cryptococcus in late 2018/early 2019. That is where we saw some differences of opinion turning into disengagement and acrimony, and this escalated as time went on. In my opinion, both Dr Peters and Dr Inkster had very strong views, and these persisted, even when their views or hypotheses were quite different. The IMT exists to explore and consider hypotheses and control measures. There were issues with some of the hypotheses from a clinical perspective, but clinical colleagues and facilities colleagues would be better able to comment. For me, the biggest issue was how difficult it was for the IMT members to challenge some of the hypotheses and some of the proposed actions through the IMT Chair.

I have been asked: to clarify what I am referring to by the 'water incident'; to provide examples of instances of differing opinions becoming disengagement and acrimony; to clarify what I mean by there being issues with some of the hypotheses from a clinical perspective (including what the issues were and when they arose); to clarify in what way it was difficult for the IMT members to challenge some of the hypotheses (with examples), and to explain the significance of those difficulties.
The reference is to the IMTs held to review and investigate the potential issues with the water supply. A full timeline, all minutes, and reports have been submitted to the Inquiry. The issues with some of the hypotheses are extensively set out in the Cryptococcus Expert Sub-group and Whole Genome Sequencing reports. Both these reports have been submitted to the Inquiry. The key issue referred to above is that Dr Inkster, as IMT Chair, did not at times appear to welcome or accept any hypothesis that contradicted her own. The reports mentioned above address in detail the varying hypotheses.

Incident Management Teams

70. The process for convening an incident management team (IMT) is set out in national and local outbreak policy. The core members are listed there, and they will depend on the clinical area in which the incident occurs. The National Infection Prevention Control Manual (NICPM) suggests that the chair be an ICD or CPHM.

71. I have been asked what happens if an IMT is not functioning properly. There is an escalation process if an IMT is not functioning well. Usually, for a contentious or major incident, we would have Health Protection Scotland, Health Facilities Scotland (especially if ventilation or water was the problem), and/or Scottish Government present at the meetings. This meant there were independent experts on hand to offer their guidance. Just as I was moving post, the IMT changed the Chair to the Deputy Director of Public Health. Most outbreak policies recommend that a Microbiologist/Infection Control Doctor or a Consultant in Public Health Medicine (CPHM) should chair an IMT. In this case, there was sufficient concern about the way the IMT was functioning, despite the involvement of HPS and the Scottish Government, that the chair was changed. The change allowed the microbiologist who had been chairing to focus better on the hypothesis rather than trying to run the meetings.

72. I have been asked whether someone external, such as someone from Scottish Government or HPS, could step in and stop an IMT. I suppose this is technically possible, but I have never known it to happen. HPS were in attendance as the national experts, and they were also the conduit to the Scottish Government and could have intervened.

    I have been asked to clarify: in what situation someone may wish to stop an IMT; the significance, for the purposes of the above paragraph, of HPS being in attendance, and the role of the Scottish Government. This was my response to a question posed by the interviewers. I cannot add anything as the question is hypothetical and I have never known this to happen. The involvement of HPS in IMTs is covered in paragraph 103 below and described in the CNO Algorithm.

73. I was not involved in the particular IMT where issues developed to the point that a change to the Chair was implemented, as I had changed roles by then, but I was aware that differences of expert opinion persisted.. The Health Board and IMT subsequently commissioned the Cryptococcus Expert Group Report. The Whole Genome Sequencing Report was also produced, which provides more information than was available at the time.

74. I have been asked about the IMT in September 2018 regarding water, which continued much longer than other IMTs. If you review the minutes, almost every meeting or every couple of meetings there were new suspected cases and some reports of unusual organisms, While there were new suspected cases of infection, I would say there is an argument for continuing as an IMT. Equally, Health Protection Scotland could at any time have advised that the IMT could be stood down.

    I have been asked to clarify what unusual organisms I refer to above and on what basis HPS would recommend that an IMT be stood down.
    I cannot recall the details regarding organisms but this information will be set out in the IMT minutes and other data submitted to the Inquiry. The standing down of an IMT is a decision for the Chair and the IMT members. As above this was a response to a hypothetical question posed by the interviewers.

75. I am not aware of anything that has changed in the IMT process, although it is more than two years since I retired and 4 years since I left the Infection Control Manager post.

Issues with Built Environment

76. I have been asked about the choice of site for the QEUH campus. I was appointed as the Infection Control Manager after the planning for the QEUH started, by which point the site had already been decided on as there was already a major hospital there and had been for decades. I cannot see any issue with this. I cannot see any particular advantage or disadvantage in locating the children's hospital on the site. However, as far as the other hospitals are concerned, it makes sense to concentrate critical care and major trauma response on the same site. It is established good practice. Some of the decisions to move subsequently, for example, the BMT, were based on that core of

critical care. Leaving the Beatson (old bone marrow transplant unit) out at Gartnavel became less viable because they did not have intensive care beds or out-of-hours anaesthetic cover. So having that core of critical emergency response care simply made sense.

77. I had some involvement in the planning and design process. The IPCT's role included seconding a Nurse Consultant, Annette Rankin, full-time to the project at the planning stages, to go through the plans. She now works for HPS. We had Infection Control Nurses and Doctors on several of the planning subgroups, such as specialty subgroups. The main conduit between the IPCT and the Project Team was the Nurse Consultant who was seconded to the project team, but still sat in our SMT and gave us regular updates on progress with what was happening. She co-opted other team members as they were needed. The IPCT supported the project with specialists, who signed off on the plans. Following that, after the planning stage, it was too much for one person to cover. As the building started to be prepared for occupation, Infection Control Nurses were involved in the snagging and those were generally the ICNs who were going to be on the new site.

    I have been asked to clarify: my role in the planning and design process; the planning subgroups that the ICNs and ICDs were involved with; who the Nurse Consultant was that is referred to above; who the specialists are that are referred to as signing off the plans, and what the plans are that I refer to? Beyond the secondment of a Nurse Consultant to support the Project Team, I had no direct role in the planning or design process. I did sit in on a few planning group meetings for the configuration of beds in critical care areas. I do not recall the details, but a paper setting out the membership of the various planning groups has been submitted to the Inquiry.
    I have named the Nurse Consultant in the paragraph above and the reference to "plans" is to the design plans at the various stages. The Nurse Consultant signed off on the design plans. I believe the Job Description for the Nurse Consultant has been submitted to the Inquiry.

78. I have been asked what my understanding was of the infection control role in the validation and commissioning process in light of the concerns raised by Dr Inkster and Dr Peters in 2015. We were involved in snagging and looking at the planning and pre-

population audits and environmental audits of the unit. However, the commissioning of ventilation and water systems requires specialist engineering knowledge. That is not to say we did not have anything to do with it, but even now our microbiologists do not have the required expertise or apparatus to test a ventilation system. You need specialist engineering equipment and a specialist engineer to do that as only they can interpret the results.

I have been asked to clarify what unit I am referring to above; what snagging issues I was involved with; the outcome of the pre-population and environmental audits referred to above, and what role I am my team had in commissioning the ventilation and water systems. I believe the interviewer was referring to the BMT unit. Environmental audits have been submitted to the Inquiry. The Infection Control Team had no involvement in the commissioning of the water and ventilation systems other than that set out in paragraph 80 below. (please also see paragraph 81). The responsibility for ensuring the quality of the water and ventilation systems was that of the Project Team, supported by external consultants appointed as part of the NEC3 contract.

79. My recollection is that Professor Williams was involved in the water testing, and I think he also quality-assured the contractors' process for collecting specimens. Along with Estates colleagues, he went through a large spreadsheet of water test results prior to occupation. There were a few areas that needed dosing, but they were within acceptable limits. They measured for total viable counts (TVCs) which involved looking at how many particles were in the water and whether the TVCs were acceptable. My understanding is that a few areas were dosed with chlorine dioxide because of this. This was instructed by Professor Williams in conjunction with Ian Powrie.

I have been asked to clarify the role Professor Williams had in water testing and the areas which required dosing with chlorine dioxide. I cannot add to my recollection above. Extensive data on water testing results have been submitted to the Inquiry.

80. An Infection Control Doctor cannot provide expert comment on the design of ventilation systems. We would comment on the interpretation of results, but in terms of designing how air ducts flow and how the pressures cascade through a unit, you need a specialist

engineer. Infection Control advice would be provided based on derogation from design specifications. The team is not qualified or equipped to test the ventilation systems.

I have been asked to clarify if there were any derogations from design specifications, what those derogations were, when they arose and what action was taken in respect of them. I am unable to assist with this, however extensive detail has been provided to the Inquiry in response to an RFI specific to ventilation.

81. At that time there was no published Scottish Health Building Note (SHBN) or guidance on how to design an isolation room in a bone marrow transplant unit. Several meetings took place to discuss options, although I was not involved in many of them. Prof Williams led on this, and a decision was made in the absence of de facto guidance. The decision was to build isolation rooms using the room specification for MDR TB. Not everybody agreed with this decision. My recollection is that Prof Williams consulted externally as well as internally and the group came to the view that this should be suitable for that type of patient. Whether what was built functioned the way it should is another question altogether. The key point, and one of the key clinical differences of opinion, is what should we have built in the absence of de facto guidance on what a bone marrow transplant unit isolation room should look like. Many people were involved in the decision, and I recall that Dr Peters and Dr Inkster did not agree with the choice of specification.

I have been asked to clarify: what time I am referring to; what a Scottish Health Building Note is; who attended meetings to discuss options for designing a BMT unit; the basis on which a decision was made in respect of the design of the BMT isolation units; who did not agree with this decision, and on what basis they disagreed. A full timeline and extensive detail on the BMT have been submitted to the Inquiry. Health Building Notes are national design specification and guidance documents. These are produced by Health Facilities Scotland.

82. The ICD responsible for the new adult BMT would not routinely do air sampling before the patients were moved in. Prior to occupation, Professor Williams went through the children's bone marrow transplant unit and recognised that some HEPA filters were missing, and this was rectified. My understanding is that air sampling in an empty room

is of limited use; not completely pointless, but it needs the patient population in it to give a proper representation. If you have thirty patients in an old Nightingale Ward, the total viable count in the air of particles or any organism is going to be much higher than if that ward is empty.

83. Migration post-handover was a huge logistic exercise, as clinical services were moving from the old Victoria and the Western Infirmary as well as the existing Southern General Hospital.

84. I am asked if there were any issues detected in the building by the ICDs at this stage. I think that while Prof Williams was on holiday, Dr Peters first raised a concern relating to the ventilation specification in the adult bone marrow transplant unit. For the rest, it was minor snagging - for example, damage to walls, surfaces, or something not done such as a hand hygiene dispenser not fitted in the correct place.

I have been asked to clarify: what time period I am referring to in the above paragraph; whether I can clarify the concern raised by Dr Peters; when he raised such a concern, and how it was raised. I cannot recall the detail, this will be covered in the RFI response and time line on ventilation.

85. I have been asked to describe my general impression of the hospital when it first opened. I have worked in many hospitals throughout my career, and the QEUH is different from any other hospital I have worked in. From an infection control perspective, the most welcome aspect is that it is 90 percent single-room accommodation, and where there is no single-room accommodation, there is appropriate bed spacing. For instance, I had never seen as much as 3.6 meters between beds before. As far as infection control is concerned, it was a big step forward.

I have been asked to expand on my view of the benefits to infection control in having single-room accommodation and increased spacing between beds. Single-room accommodation and adequate bed spacing reduced the risk of patient-to-patient transmission of infection.

86. In terms of issues within the rooms such as televisions not working, I read the papers the same as everyone else. In terms of my role, nobody would come to me regarding that, as it did not directly concern infection control.

Issues that led to IMTs

87. Before the IMT that took place in 2018, I was not aware of any concerns about infections that were thought to be linked to the water. I was aware of the issues with the taps that HPS had been involved with in 2014, but I was not directly involved. The taps referred to were Horne taps, and they were at one time recommended in guidance, then the recommendation changed. There was a meeting to discuss the design of the taps and Sandra Devine invited both HPS and HFS (Health Facilities Scotland) to it. The minutes of the meeting record agreement that the Horne taps could be used as they were specified at the time the relevant guidance was in place.

Stenotrophomonas Incident

88. I have been asked about my involvement in the Stenotrophomonas incident in 2017. If it were just a PAG, I would not necessarily be there. I am not sure if there were any IMTs in relation to it, but there may have been a PAG. Any input I had would be limited. I recognise the name of the organism, but if there was not an IMT that would suggest it was not being treated as an active outbreak.

Water Incident 2018

89. I attended one IMT in March 2018, and several in September 2018, in relation to the water incident. My role in these meetings was no different from any other IMT. I was there to support the team, including the chair, who is usually an ICD. I was also there to make sure that the infection control actions were taken forward. These IMTs were slightly different in that normally I would have a role in communicating significant incidents to Health Protection Scotland and Scottish Government. However, in this instance, they were in the room and HPS took on the role of broader communications with Scottish Government.

I have been asked: to provide further details of the water incident referred to; in what way I would provide the suggested support, and how I ensured actions for infection control were taken forward. This is extensively covered in the RFI responses and IMT minutes submitted to the Inquiry. Actions to be progressed are noted and reviewed through the IMT minutes.

90. The membership of an IMT is set out in the National Manual. There is a core agenda that is followed. The agenda can be varied, and the actions will differ. Generally, the actions look at describing the situation, the clinical condition of the patients, any hypotheses, and then, what mitigating measures, if any, can be taken. It tends to form a structured and standard agenda. We provided the administrative support to the Chair. One of the Infection Control administrators would send out the agenda.

91. I did not attend any IMTs between March and September 2018 because during that time I was dealing with the DMA water reports from 2015 and 2017. The 2015 report had not been escalated through relevant management or governance structure. I was asked by the Medical Director and the Chief Operating Officer to work with the Acting Facilities Director, who was Mary Anne Kane at the time. Three days a week we were looking at a remedial action plan and ensuring delivery of the actions. I was also the single point of contact between the Board, Scottish Government, HFS, and HPS. Everything regarding the water issues had to be channeled through me.

I have been asked to clarify: why the 2015 report by DMA Canyon had not been escalated; what the status of the 2017 report by DMA Canyon was at the time of the referenced IMTs, and, if a remedial plan was prepared, when it was prepared and how it was actioned? The issues and actions around the 2015 DMA report were subject to an internal investigation. The report has been submitted to the Inquiry. For confidentiality reasons, I have never seen the report. The remedial plan and process are described in paragraphs 92 to 95, this too has been submitted to the Inquiry.

92. I do not have definitive dates for this, but looking back at my electronic calendar I can see Monday, Wednesday, and Friday every week I had water report meetings. A group met concerning this, which was chaired by Jonathan Best, Chief Operating Officer. Mary

Anne Kane was dealing with the implementation of the bulk of the actions through Facilities. My role was partly action planning but mostly communications. Jim Leiper, formerly director of HFS, was part of that group as an independent expert advising us on water control systems, and he also looked at some disciplinary aspects of what happened with the reports.

93. Jim Leiper was leading in the interviewing of involved parties. Whether or not he produced a final report, I could not say. It followed a disciplinary process and therefore confidentiality would be restricted to those who needed to be involved.

94. The DMA Canyon report deals specifically with Legionella control. It is about systems, processes, and policy relating to Legionella, and it links to the Health and Safety Executive (HSE) and the regulations in L8. It impacts infection control. There is overlap, but they are not necessarily the same thing. One is looking at preventing Legionella through control of the engineering system and the other is managing infections that may or may not have arisen from the water system. We had no indication there were any cases of Legionella, so they are quite different.

I have been asked to clarify, where I refer to two DMA reports above, which one I am referring to. I have also been asked to clarify: what I mean by ‘L8’; what I mean when I say ‘it impacts infection control’, and what I mean by ‘looking at preventing Legionella through the engineering system’, and ‘managing infections’, This should be plural for the DMA reports.
L8 (Legionnaires' disease: The control of Legionella bacteria in water systems) is a legal document that outlines the responsibilities of duty holders in managing and preventing the risk of Legionella bacteria proliferation. The main methods for controlling and preventing Legionella are through the design and management of the water supply system.
Whilst there have been no cases of Legionella, any cases would require input from both the Infection Control Team and Public Health.

95. If there was more than one IMT or incident we needed to deal with, we would discuss it. Knowing that the Lead Infection Control Doctor was the Chair freed me up to attend to other matters if I was required elsewhere. There was always Infection Control

representation at the IMT. However, all three of us could not necessarily be at them all, even recognising their importance. I was not formally kept up to date with what was going on in the IMTs between June and September, and Sandra Devine stood in for me during that period. Apart from the DMA Canyon reports and actions, I had little to do with infection control for the bulk of that period.

I have been asked to clarify who would discuss more than one IMT or incident. The IPCT Senior Team would discuss and agree on which meetings we would attend if there were more than one IMT at the same time.

96. I became involved again in the latter part of 2018. I was not involved in discussions about the decant from Ward 2A to 6A. Those discussions would have been at a high level operationally. They would discuss how to get the patients and the right staff and skills into the right area. Our role in that was threaded through in terms of inspecting the area, undertaking an audit, and making sure Ward 6A was suitable for the patients and staff to move into. The actual logistics of moving in and ensuring child protection and other arrangements that are required when moving patients out of a paediatric hospital were all planned separately as we could not necessarily take up more of the IMT agenda. It was an operational procedure for the clinical service as opposed to an infection-related issue. The children were moving because of perceived or potential risk of infection. The detailed logistics of moving patients around these areas was something that progressed outwith the IMT, but the IMT was updated on progress. I believe there were papers written about the decant ward and there was a risk assessment around child protection considerations mentioned above.

97. My understanding is that the IMT put together a paper with options for a decant and a recommendation on how that should be affected, or where the best areas were. That recommendation went to a group including the Chief Executive and the Chief Operating Officer who accepted those recommendations.

98. As mentioned above, at the IMTs I attended in September, issues began to arise, such as it being difficult to challenge hypotheses.

IMT Meeting on 28 September 2018

99. I have been shown the minutes of this meeting by the inquiry. I have been asked about comments that Dr Inkster made about governance around this incident, and I do not understand the point that she was making.

100. Dr Inkster considered that other groups were trying to influence the IMT that she was chairing. Dr Inkster had concerns about the Executive Oversight Group. I believe she felt some of her recommendations were not being taken seriously, or that they had been overruled. I am talking more about perception here. I do not remember the governance of IMTs being a particular issue at the time. This was a large, complex IMT, and it is not unusual for an IMT to commission a subgroup to look at something specific (e.g. Cryptococcus). It is not unheard of, or even unusual, when it is complex, and when there are multiple hypotheses. Dr Inkster could comment further on what she meant by her comments in the IMT.

101. Everybody in the IMT was committed to doing the right thing for the patients and getting the actions completed. Some of the hypotheses were in retrospect questionable, and there were challenges around behaviours in respect of that. External experts from HPS and HFS were around the table to support the IMT.

102. It was at this time that the Chief Nursing Officer algorithm was engaged. That is when the incident is of a level of significance that the Scottish Government asks HPS to step in. They had been involved throughout, so the algorithm did not make a difference to the way the IMT was run, but it meant we had expert involvement and there would be a couple of subgroups. We had Scottish Government monitoring us quite closely and HPS were the conduit to them and part of the teleconferences. It showed that the board recognised the significance of the incident we were dealing with. It is my recollection that we invited HPS, but the algorithm would have likely been invoked anyway.

I have been asked to expand on what I mean by the Chief Nursing Officer Algorithm, whether there were a number of sub-groups and what the purpose of those sub-groups was. The CNO Algorithm, (also known as the National Support Framework), National Support Framework 2017 – NHS NSS HPS – Version 1.1 - June 2018 - **A40562750** –

Bundle 27 (vol 1) – Miscelleaneuos Documents - Page 665, is an HPS document that sets out the roles and responsibilities of organisations in the event of healthcare infection outbreaks/incidents, data exceedance, or Healthcare Environment Inspectorate (HEI) reports where additional support to an NHS Board is required.

Communication about Water

103. As chair of the IMT throughout the Ward 2A water incident period in 2018, Dr Inkster offered to follow through in speaking to some of the families and to give them more detail on the infection from an infection expert point of view. However, in general, communication was delivered by the medical and nursing staff looking after the patients. Some of the communication did come through the IMT. Therefore, we did see it, but I was not involved in the delivery of it.

104. In terms of external communications, what tends to happen is someone from the communications team is a standing member of the IMT. If we are doing a proactive press release, and if we scored it in a HIIAT as red, they would draft a press release which would be signed off by the Chair. In this case, most of the press releases probably went to the sector director, if not the medical director, for approval as well.

Risk of Infection from the Water Supply

IMT 5 October 2018

105. This was the last IMT that I attended in relation to the water incident. It was more operational and more routine. I see from my notes that it was de-escalated from red to amber, so we agreed at that time that we did not need Dr Inkster, Sandra Devine, and myself at every meeting.

I have been asked to clarify the reason that the IMT was de-escalated from red to amber. This would be a decision led by the Chair, agreed by the group, and recorded in the minute. I do not recall the specific details, but this will be recorded in the minutes which have been submitted to the Inquiry.

106. I have been asked who would update the Medical Director if she was not at the meeting. If Jennifer Armstrong were not in attendance, an update would usually come from Dr Inkster or Sandra Devine as clinical experts.

Ventilation System

107. Initially, the concerns around ventilation related to the design specification, and the absence of *de facto* guidance on what a bone marrow transplant isolation unit/room should look like.

I have been asked to clarify what time period I am referring to above, who the concerns had been referred to and how they were communicated. I cannot recall the specific timescale. A full timeline and extensive details have been submitted to the Inquiry as part of a response to the specific RFI on ventilation.

108. There was an existing ventilation group, led by Professor Williams, which was a sub-group of the Acute Infection Control Committee, but it was not purely about the new build. We looked at the specifications for air handling units in all operating theatres to see if they were performing to the design standard. It is important to note that the design standard is different across all hospitals depending on the age of the buildings.

109. The ventilation group had all of the operating theatres up to date in terms of knowing where they were with their ventilation parameters and in terms of the planned preventative maintenance. There was a view that that group should look at ventilation systems in critical care areas beyond the operating theatres.

I have been asked to clarify: who considered that the group should look at the ventilation systems beyond operating theatres; to whom those views were communicated, and how. This was agreed upon and overseen by the Acute Infection Control Committee.

110. I remember the isolation rooms in A&E being part of the 27-point action plan and I remember the ventilation group, although I did not sit on it. Dr Inkster will have picked that up when Professor Williams left.

111. I have been asked about Dr Inkster's comment that I proposed several additions to the draft annual verification SOP. I don't recall this and doubt I would have offered much comment on that because I do not have any technical knowledge or expertise on ventilation.

HAI-SCRIBE

112. There were a couple of meetings about the BMT, and I was involved in signoff, but I do not recall HAI-SCRIBE being a huge issue. I believe Professor Jones signed them off. I recall that on one occasion, [redacted] felt that [redacted] was being asked to sign off on something that was beyond [redacted] competence and Professor Jones picked that up. At the time, all of the HAI-SCRIBEs came in a pre-formatted template, and you went through them deleting some parts and adding others. The system is different now.

I have been asked to clarify when the meetings referred to took place, what HAI-SCRIBE is and what Professor Jones is said to have signed off. HAI-SCRIBE is national documentation and guidance for controlling infection in the built environment during construction works. **(A33662208 – Bundle 13 Hearing Commencing 26 February 2024 – Miscellaneous – Volume 3, Page 464)**
Professor Jones signed off the HAI-SCRIBE template agreed with facilities colleagues for the construction work on the BMTU.

113. There was an instance where Dr Inkster's electronic signature or her name on the form had carried over from a pre-populated form. Professor Jones signed that off, but Dr Inkster was exercised that her name had appeared on the initial HAI-SCRIBE document. It was fully explained at the time that this was a purely administrative error, and there was no suggestion that anybody was trying to make it look as if Dr Inkster had signed something off with which she was not happy. She was not involved at all, and Professor Jones signed it off. I can understand Dr Inkster having felt the way that she did. I am not understating it, but it was merely an unfortunate administrative error.

114. I have no recollection of being involved in the review of the ventilation after the decant from ward 2A to 6A. I would have been aware of it, as it would have come up at SMT

and meetings with Dr Inkster, but I do not remember being at any specific meetings about that.

Decant to Ward 6A

115. The recommendations to decant were made at the IMT, and I was part of the group that looked at those recommendations in the context of what we were dealing with. I did not have much input on the rationale for selecting Ward 6A and Ward 4B for the decant. I do not have the clinical knowledge to say where these patients could be best placed. The issue was that we were using part of an adult BMT unit, so it was not like for like. If the whole problem was protective isolation and ventilation, then there are a limited number of places in the adult hospital where this could be provided. As I recall, the adult BMT unit gave up some of their beds to the children for urgent bone marrow transplants. I would have agreed with the logic of some of it, but I certainly could not have offered an opinion on whether it was correct or suggested an alternative option.

I have been asked to clarify my recollection of the rationale for selecting Wards 6A and 4B, despite not having had input. This was discussed at the IMT and a detailed options appraisal was undertaken. I cannot recall the details but both the Options Appraisal and the IMT minutes have been submitted to the Inquiry.

116. There was a broad discussion around the recommendation, as it is not a decision that could have been taken without the clinicians. If the clinicians found the decision unacceptable, then I believe they would have said so. It was perhaps far from ideal, but there were a limited number of alternatives. If the clinicians were unhappy with the treatment they could, and did, suggest during the IMT that specific patients should go to Edinburgh or Newcastle, on a case-by-case basis. If they felt that the area was not appropriate for a group of patients, or even one patient, then I believe they could make that decision and there is evidence that they did.

117. I did not have any concerns about the decisions being made to move to Wards 6A and 4B. Having been at the IMT and read the papers, it seemed perfectly logical in the circumstances. There were also broader considerations for the impact on the programme for adult bone marrow transplants. We are the national centre for bone marrow transplants for adults and accommodating some of the more urgent children

slowed down progress in other areas. However, it made perfect sense under the circumstances. If I had any concerns – and I am not a clinician – it would be more about whether there was an imperative to move out of Ward 2A, or if the patients would be safer staying where they were with control measures.

I have been asked: if, as suggested in the final statement above, I raised any concerns; if so, to whom they were raised and when, and what if any actions were taken as a result of those concerns. This option was discussed both at the IMT and within the Options Appraisal referred to above in paragraph 116.

118. At that time, there was no clear indication that I could see, as a non-clinical expert, that the strains of the organisms in the water were the same as the ones in the patients.

119. I can recall concerns being expressed about discovering mould in Ward 6A after the decant. My recollection is that the infection control team, including Dr Inkster, did a full environmental review of Ward 6A and recommended an action plan of things that needed to change before the children moved in. That was all done, and sometime after that, they discovered traces of mould in some of the showers. The sealing was not complete, and concern was expressed that it could lead to a fungal infection. Therefore, there was a requirement to refit several bathrooms and make sure the floors were sealed. I was aware that remedial action was being taken, and I was aware of the concerns.

I have been asked to clarify who raised the concerns noted above and to whom they were raised. I believe this was Dr Inkster in relation to mould. The environmental audit reports have been submitted to the Inquiry.

Decant from 6A to CDU

120. I attended an IMT on 21 January 2019 in relation to the decant from Ward 6A to CDU. The recommendation to be discussed at the IMT was where the patients or the children could be cared for best. All patients from Ward 6A then went to the CDU and the bone marrow transplant units. There were still patients in Ward 4B but again, that would be a decision made on clinical grounds on the advice of Infection Control and others. The

Women's and Children's team would then have planned how to move patients, staff, and all the other facilities down to that unit. The IPCT were involved in inspecting and evaluating the CDU before they moved in, in the same way that we were when they moved into ward 6A. I do not recall if this decant was approved at Board level, but the recommendation would have come from the IMT based on where the patients could be treated most safely.

121. I do not recall a meeting taking place between Jane Grant, Dr Inkster, and other senior management in January 2019. I do not recall being at the same meeting as Dr Inkster and Jane Grant on any occasion. I may be misremembering, but I do not recall any resistance or disagreement from anyone about the decision to move to CDU. I can see how there may be differing views, but I do not recall anybody saying they absolutely must not do that.

122. I have been asked to comment on the effectiveness of the IMTs that I attended, and in particular the IMT in January 2019 regarding Cryptococcus. Some of the hypotheses as to the origin were disputed by both clinicians and by Estates and Facilities colleagues. Cryptococcus is a very unusual infection to have two cases of, and it was not easy to determine the route of infection. One hypothesis was that the patient acquired the infection through the ventilation system. My recollection is that in some of the scenarios, our Estates colleagues did not believe some of the hypotheses to be technically possible.

123. I recall the Chair being unwilling to accept any alternative hypotheses. However, that is for them to answer. That is the meeting where I was most aware that the hypothesis was considered debatable, but that the debate was unacceptable to the Chair.

I have been asked to clarify who the Chair was; what the alternative hypotheses I refer to were; why the Chair was unwilling to accept alternative hypotheses, and what the hypothesis was that the Chair accepted. The Chair was Dr Inkster. The various hypotheses are discussed in detail in the report mentioned in paragraph 125 below.

124. There was a Cryptococcus expert sub-group convened to work through the hypotheses. They were looking at a difference of opinion, not just within professions but across Estates. Estates could contribute more to this because they were talking about the size of filters relative to the size of the organisms, and the potential routes through the building. Some of the hypotheses did not appear to add up, such as contaminated air being drawn in from under the helipad. There was a non-sequential logic to some of the hypotheses, which is why this became as debated as it was and why the subgroup recognised that they needed to bottom it out. Dr John Hood was a Microbiologist within the Board with extensive knowledge of ventilation systems. He was asked to lead this multi-agency expert sub-group to look at the various hypotheses and any other factors. The report suggested that the most likely route was none of the hypotheses that the IMT considered.

    I have been asked when the sub-group referred to above convened, when it provided its report and what the most likely route proposed by the sub-group was. This is fully covered in the sub-group report submitted to the Inquiry. I did not sit on this group and, having retired, I no longer have access to the report to describe the extensive detail.

125. The fact that the sub-group took so long to reach their conclusion indicates how complex the issues were. The sub-group, to my mind, was required because the IMT could not agree on what the hypotheses were and how possible they were. I was not involved in the sub-group at all. Sandra Devine attended, and my PA carried out administrative tasks for the group. I did not have sight of the report at the time.

    I have been asked when I first had sight of the report and what impressions I had when reading it. I first saw the report late in 2023 and thought it to be thorough in research methodology, and comprehensive and informative in the examination of complex hypotheses.

IMT 18 January 2019

126. I have been asked about the communications and press handling of this IMT in which it is stated that some members of this group may not agree with the press statement. Not

every one of the multidisciplinary colleagues who attended the IMTs will agree with its conclusions. It is about getting the balance correct. It is not unusual for people to have differing views on what should go out.

I have been asked: if I can recall the basis on which some members of the IMT did not agree with the press statement; whether I can clarify when the press statement was issued, and on whose authority the press statement was authored and released. I cannot now recall which press statement this question was referring to when posed by the interviewers in August 2022.

127. I have been asked if it was controversial that the IMT minutes mention two letters being sent out by Jane Grant to the parents of patients without the IMT having sight of them first. I do not know what the content of the letters was, as I was not involved. Looking at the minutes, clearly, some of the clinicians were not happy, and I can perhaps understand that. I am not entirely sure why it needs to be in the minutes, but I can perhaps understand why it was raised as an issue.

128. I have been asked to clarify why some of the clinicians were not happy with the letters. The letters, together with the letters from the clinicians to the CEO have been submitted to the Inquiry. I did not see the letters between the clinicians and the CEO at the time.

129. I am not sure who was on the expert Cryptococcus sub-group, but I was aware it was not just NHSGGC staff as they had an external advisor from NHS England, Peter Hoffman. Interestingly, he also gave Professor Williams some advice pre-occupation, when he was looking at the MDR TB room specification. He has been used as an external expert, sometimes informally, and sometimes more formally by NHSGGC. I expect somebody from HPS formed part of the sub-group as well, but I do not know the full membership.

130. I provided a statement to the HSE investigation into the Cryptococcus incident. There was a BMT timeline that was developed for them by the Board. This formed the basis of the interview. I do not recall giving them anything else.

I have been asked to clarify when this witness statement was provided to HSE. Unfortunately, I cannot recall the date and no longer have access to my NHS diary. I believe it was around May or June 2019 but cannot be certain.

HIIAT Scoring

131. I have been asked what the process is if there is a disagreement at an IMT about a HIIAT score. I recall discussions about the level of whether it is red or amber in any specific category at IMT, not just with this campus, but with other IMTs. People get the opportunity to offer views on the HIIAT scoring and, generally, there is agreement on what it should be and why. The infection control doctor as the Chair is usually best positioned with their clinical colleagues to score clinical incidents and outbreaks.

132. If the score is red, and the IMT prepares a proactive press statement, we need to be sure that we are not just amplifying the public concern by putting another article out there. However, I do not recall it being a huge issue. The Chair of the IMT has the final say on how things are scored, and the subsequent press release.

133. As Infection Control Manager, I had noted the impact that the closures of the wards had on the patients, and it was discussed as part of the IMT. The clinicians are there to look after and promote the interests of the patients. The staff frequently expressed the difficulties both in terms of coping with the current situation and the decants. I was aware of this, but I had no direct knowledge, involvement, or observation of it. As a nurse myself, I can understand some of the concerns. I am aware that they were articulated at most if not all, IMTs. It was a patient-focused discussion, which is entirely appropriate.

Prophylactic Medication

134. Likewise, I have no direct knowledge of any prophylactic medication used. I know what prophylaxis is for. It is medication given to prevent illness but, beyond that, it is a clinician's remit. It is the microbiologists and the individual consultants as prescribers who would decide that because there are pros and cons for prophylaxis.

135. Prophylaxis was starting to be discussed and prescribed around the time of the mucor incident which was on the cusp of when I changed roles. I was certainly aware of some discussion about prophylaxis or antifungal agents.

Communication with Staff, Patients, and Families

136. I have been asked whether I felt that Senior Management or the Communications team were ever dictating what clinicians could say to either staff or patients and families about what was happening with the IMTs. I can honestly say that was never my perspective. We had a Communications team for a reason and sometimes they would advise on the message for broad/media release. I do not see them having any involvement in what was going to parents and patients. I do not recall anyone saying, you cannot say that, or rewrite that. I am not saying it did not happen, but it is not something of which I was aware.

137. Sometimes there is debate about what is sent out. People can read things in different ways and that needs to be explained at the IMT. In my experience, if the Communications team re-phrased something in a slightly different way, they would explain why they did so.

138. As Infection Control Manager, I was not involved in any training regarding communicating with patients and families. It is not my remit. I am a qualified nurse, so I can take a view on whether I am qualified or able to speak to patients and families. If they needed infection control information, this was provided by an infection control specialist.

139. I am aware of the NHS and the Board's approach to the Duty of Candour. My understanding of organisational duty of candour is that we have a duty to our patients and our staff, to be honest with them if a mistake or error has been made, regardless of whether they have brought it to our attention.

140. I do not recall the duty of candour being discussed at the IMTs. However, what the patients and the patient's relatives should be told would have been considered in that

context. The haematologists were clear on the honest message going out, which relates back to the duty of candour.

Whistleblowing

141. I have been asked if I was aware of the procedures to report any wrongdoing in the hospital. I was aware of the whistleblowing policy. I was also aware of the options and advice prior to whistleblowing, including what steps could be taken to raise or try to alleviate the situation within the line management structure before whistleblowing. However, staff obviously have the right to whistleblow from the onset if they choose or feel the need to.

142. I was not aware of any training on whistleblowing, mandatory or otherwise at the time. I would certainly encourage raising concerns via the line management structure and this was widely encouraged within NHSGGC. Certainly, in our team, it was encouraged. I was never discouraged from participating in that process.

Overall Personal Impact

143. It could be a challenging job, and it was difficult because of the competing clinical opinions. As a manager sometimes you could resolve those conflicts. You do not have the expertise, and when the external experts can take so long to report, then you find yourself in a difficult position. It was more difficult for other members of the team, but it was certainly challenging for me. Some individual behaviours were challenging. I think the most difficult thing was being circumvented as a manager, in that people chose to avoid the established routes to deal with matters and report issues and were either going higher in the organisation or to external agencies.

144. It was bordering on toxic for a while, which is primarily why I moved on from the job. It was not because I felt I could not do it, but I had reached a point where I thought we had been doing this for a long time and, unless something changed, we were not going to get any further forward. I take no comfort from the fact that little appears to have changed regarding the behaviours of certain individuals after I moved on.

I have been asked to provide some clarity on why I say it was 'bordering on toxic', how was it so, over what period, and what the 'behaviours of certain individuals' I refer to were. This is set out in the Whistleblowing reports submitted to the Inquiry.

Safety of the Hospital

145. In 2015, HPS carried out a periodic point prevalence study which looked at a range of infections in every hospital in Scotland. They were all audited to the same standard. Both the QEUH and the Royal Hospital for Children, in fact, every hospital in NHSGGC, was below the national average for infections. From this, I infer that there was not a systemic problem in terms of infection control, either in staff, practice, or building environment. There may be pockets of issues, NHSGGC was below the national average. This was measured by independent survey, and every infection in every ward was measured.

146. My recollection is that the national average rate of infection was 4.9 percent and the QEUH was 3.2. If you look at these as the broadest indicators, it does not look unsafe to me in the round. There are no indicators from the external evaluation of our rates of hospital-acquired infection that would make me think there is something fundamentally wrong with the entire building (or any other hospital in NHSGGC).

147. The hospital was sitting well below the national average for infection, as measured externally, at a time when it was in the middle of a crisis. The design is conducive to controlling infection by mostly having single rooms. On that basis, from an infection control perspective, I do not see the hospital as being fundamentally unsafe.

148. I have been asked for my view on the way the Board handled the whole situation. My view is that some of these issues have possibly been blown out of proportion and that there were numerous untested hypotheses. The way it has been managed has been difficult but, despite that, everything that the microbiologists raised has from my perspective been taken seriously. Every attempt was made by myself and others to deal with every concern thoroughly.

149. We got all the concerns on the table in 2017, we developed a 27-point action plan, and we followed it through to the satisfaction of the Lead Infection Control Doctor. Despite the disagreements on the validity of hypotheses, all the actions at the IMTs were followed through. As such, I think that the Board did its best in difficult circumstances to recognise the importance of many of the issues that were raised, and to do something about them.

150. I would not say that there was any suggestion that concerns were not taken seriously. I would offer the opposite view, in that quite often our Estates colleagues were investigating issues they did not deem technically possible, just to test the hypotheses. It showed in the actions in the IMTs that when we came back the next time, almost every action was followed up, even if the hypothesis was not necessarily agreed upon. I think senior people and the clinical staff in the ward bent over backward to try and accommodate all recommendations in order to investigate any potential hypotheses, given the paramount importance of patient safety.

151. I have been asked if the issues had an impact on patient care and whether staff could carry out their role. It is a big question, and for patient care, one that can be better articulated by the clinical teams looking after the patients. For the IPCT, it is one that I think is best addressed by Sandra Devine on how the microbiologists, particularly Dr Peters, had an impact on her and her team because there was significant undermining. That was a separate HR process. It involved the RCN and that is as much as I know about it. Whilst I was there to support Sandra and the staff, I do not have the details, and I do not think it would be appropriate for me to elaborate further.

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

[redacted]

30th July 2024

Annex B

A49394507 – NICPM – Healthcare Infection Incident Assessment Tool (HIIAT) – Appendix 14 – NHS NSS ARHAI v2.0 – 24 January 2022.

A42959603 – Bundle 4 Hearing Commencing 12 June 2023 – NHS GGC: Situation, Background, Assessment, Recommendation (SBAR) Document – Page 104

A40562750 – National Support Framework 2017 – NHS NSS HPS – Version 1.1 – June 2018

A33662208 – 416 SHFN 30 Part B v3 dated October 2014

Annex C

Thomas Walsh - Curriculum Vitae

Retired NHS Senior Manager

NHS Manager with extensive experience in both clinical and managerial roles spanning a 40-year career within NHS Scotland.

Qualified in Nursing, Management, and Project Management. Previous roles and experience include: Board Infection Control Manager, Assistant Director of Nursing, Hospital Manager, Planning Manager for Regional Services, and Clinical IT Project Manager.

Career Summary

General Manager

NHS Greater Glasgow and Clyde
April 2019 to March 2021

Infection Control Manager

NHS Greater Glasgow and Clyde

July 2007 to April 2019

Planning Manager

NHS Greater Glasgow and Clyde

March 2006 to July 2007

Assistant Director of Nursing

NHS Argyll and Clyde

December 2002 to April 2006

Hospital Manager

NHS Argyll and Clyde

September 2001 to December 2002

Directorate Manager

NHS Argyll and Clyde - Paisley

February 1999 to September 2001

Project Manager (Clinical Systems Integration)

NHS Argyll and Clyde - Paisley

January 1997 to February 1999

Additional relevant experience

Currently a Board member for Argyll College and Chair of the Audit Committee

Education

BSc in Health Studies
University of Paisley – Paisley

September 1990 to May 1994

Registered General Nurse
Argyll and Clyde College of Nursing

February 1983 to July 1986

Scottish Hospitals Inquiry
Supplementary Witness Statement of
Laura Imrie

This statement was produced by the process of sending the witness a questionnaire with an introduction followed by a series of questions and spaces for answers. The introduction, questions and answers are produced within the statement.

1. Individual background and overview

1.1. Full name

A Laura Jane Imrie

1.2. Current role description and work history with reference to CV

A Appendix 1

1.3. Outline of professional qualifications

A Appendix 1

1.4. Areas of specialist interests and expertise? How did these develop?

A Appendix 1

1.5. Briefly describe your involvement with infection control in QEUH, what triggered your involvement in the IMTs, and what your role was when the National Framework was triggered - (full statement to be taken in due course)

A Part of the role of NHS Scotland Assure and Antimicrobial Resistance & Healthcare Associated Infection ("ARHAI") Scotland is to receive, review and report infection related incidents across NHS Scotland. As an Infection Prevention and Control Nurse Consultant (IPCNC) within ARHAI part of my role would have been communicating with any NHS Boards reporting incidents into ARHAI. This may have been to request further information relating to the incident, to provide advice/support to the IMT or as part of the ARHAI role to

provide communications to Scottish Government.

Within my role as IPCNC I would attend an IMT on the request of the NHS Board or when supporting the National Framework triggered by either the NHS Board or Scottish Government.

In relation to the Water Related Incidents within the Royal Childrens Hospital and QUEH I supported the IPCNC who was the lead contact for ARHAI. In this incident I attended IMT to cover for leave or in my capacity as Clinical Lead for the Surveillance programme within ARHAI to discuss the data report.

2 Your report – HPS Review of NHSGG&C paediatric haemato-oncology data – October 2019

2.1 How did your report come about? **(Bundle 7, Document 6, page 214)** Is it a requirement when the National Framework is triggered? If so, what are the requirements/ specification for the report?

A Report was commissioned by Chief Nursing Officer (CNO) following the NHS GGC Stocktake Meeting 25th September 2019. Not a requirement of the National Framework.

2.2 If not, was it commissioned, and if so, by whom?

A As above

2.3 Terms of Reference: Were you given these precise objectives, or did you have some leeway?

A The original request was emailed to ARHAI from Chief Nursing Officer Directorate (CNOD) “CNO commissioned HPS to undertake an independent expert review of GGC’s data and then to produce a position statement and status report on the incident, setting out from start to finish: how the incident has developed over time; what measures have been put in place to manage risk; and HPS’ view on whether the ward is safe. This will include a full breakdown of the original and subsequent hypotheses; the work undertaken to investigate them; and the full suite of control measures implemented”. There were several

conversations thereafter with Scottish Government to refine the objectives for the comparison of data mainly the role of the IMT in determining the ongoing controls and patient safety. A separate report: Summary of Incident and Findings of the NHS Greater Glasgow and Clyde: Queen Elizabeth University Hospital/Royal Hospital for Children water contamination incident and recommendations for NHS Scotland situational assessment report produced in response to the National Framework being invoked. **(HPS Report Water Contamination Summary of Incident and Findings – December 2018 – Bundle 7, Document 2, page 32)**

2.5 If the former why did you select these particular objectives?

A The objectives for the report were agreed to focus of the data sets that were informing the decisions of the IMT.

2.6 Did you work alone or part of a team? If in a team, who did what?

A Fiona Murdoch – Epidemiologist Stephanie Walsh – Data Manager Elaine Glass – Data Manager Shona Cairns - Epidemiologist

The data and methods were also reviewed by Prof Chris Robertson Strathclyde University

NSS Public Health & Intelligence Governance Group

2.7 To whom was the finalised report sent?

A Jennifer Armstrong NHSGGC Medical Director Fiona McQueen SG Chief Nursing Officer Josephine Ives CNOD Policy Unit

Lesley Shepherd SG CNOD Policy Unit IPC Professional Advisor Jason Birch CNOD Policy Unit

Emilia Crighton CPHM Chair of IMT Sandra Devine ICM NHSGGC

Scott Davidson NHGGC Associate Medical Director Jacqui Reilly NSS Nurse Director

2.8 What did GGC do with the report?

A I am unaware of what NHSGGC did with the report.

3 Data and Methodology

3.1 The datasets examined were 1) CLABSI for paediatric haematology and 2) ECOSS for the named wards and 3) LIMS..Were any other datasets a) available and if so b) considered? Why?

A These datasets were compared as all three datasets were being used to inform the IMT however there was different conclusions being drawn. SG therefore requested a review to explore each data set and where there were differences to identify what these were and the significance. ARHAI extracted data from ECOSS and the other data was provided to ARHAI by NHSGGC. There were no other data set available.

3.2 You note that of the three sources there are pros and cons to each, and you also note that each data set uses different case definitions and methods, which account for the discrepancies. Would a more integrated system (as recommended by the CNR) be 1) feasible and 2) desirable? Or would more consistent recording of data alone be sufficient to alleviate problems?

A LIMS does transfer data across into ECOSS, with minimum requirements for data transferred agreed with Public Health Scotland, not all data is transferred and indeed different local laboratories across NHS Scotland will transfer different data. There is currently a laboratory improvement project “ECOSS Development Rollout Improvement Programme” (“EDRIP”) looking at the quality and standardisation of local lab data transferred into national systems. The CLABSI data is collected to monitor Central Line Associated Bloodstream Infections and therefore definitions and methodology are designed for that purpose.

A complete national database would be desirable, the feasibility would depend on national funding and IT infrastructure capabilities.

3.3 Can you explain how you developed your overall methodology?

A A plan of analysis was developed based on the commission from SG and follow up conversations. This defined the epidemiological review and was agreed with the ARHAI team supporting the work.

3.4 Did you consider alternative methodologies? How were these discounted?

A Yes however the methods used were restricted given the time available, the limited data and small numbers being reviewed.

3.5 Fungi (all species of the following: Candida; Rhodotorula) were excluded as it could not be established if all positive fungi blood cultures were being processed through ECOSS. What is the reason for this?

A The Cryptococcus and Mucorales data held within ECOSS are not currently suitable to describe the local or national epidemiology. EDRIP aims to address these issues but until such time, the most robust way to describe the epidemiology in NHSGGC would be through local LIMS system along with other local data systems. This would ensure all cases are ascertained and validated providing a more robust epidemiological picture to support investigations. For the same reasons, ARHAI were unable to provide robust national comparison data as the data held at national level are unvalidated and incomplete.

3.6 Case definition **(Bundle 7, Document 6, page 220)**. Why was this used? Were any others considered?

A The case definition was aligned with other national bacteraemia surveillance case definitions, a standard 14 day rolling deduplication was applied to the ECOSS dataset. All positive blood cultures were included with the exception of postmortem blood, any quality test samples, foetal samples or non-human samples.

3.7 Use of SPC charts and methodology. The CNR had reservations about this owing to a) the difficulty to establish a baseline and b) the small number of incidents. To what extent do you agree/ disagree?

A A caveat was included in the report to highlight the limitations and noted that the purpose of the SPC triggers is to identify when it is appropriate to instigate a local investigation into the possible increases in cases. Given the small numbers for the environmental group T- Charts (time between event) were considered, however this would not have accounted for change in activity.

Timescales for delivery of the report were also a factor when considering

methodologies available. ARHAI sought advice from Professor Chris Robertson, Head of Statistics at Health Protection Scotland.

4 Difficulties accessing information and data sharing

4.1 It has been noted by, among others, the Case Note Review panel **(Bundle 6, Document 38, page 975)** that the collection, storage and sharing of data was sub optimal? To what extent did you experience:

a) Data noted with no location or date?

b) Limited organisms being tested for?

c) Inconsistent recording of data – eg IMT minutes not matching sample; information on one system not matching another system

A Re bacterial typing in particular; information had to be collated from several different systems and the numbers of environmental samples were limited and lacking in location information as well as comparisons with other microorganisms. Not enough bacterial isolates were included. There was no database recording all typing data.

ARHAI do not have access to local NHS Board systems and data provided by NHSGGC was provided as an extract, therefore I am unable to comment.

4.2 What do you believe was the basis/cause of these issues?

A ARHAI do not have access to local NHS Board systems and therefore I am unable to comment.

4.3 Did this impact on the preparation of your report? In what way?

A The aim of our report was to compare the datasets being used by the IMT for managing the incident therefore we were provided with these individual datasets, and were not interrogating laboratory systems for data.

4.4 The Case Note Review in particular **(Bundle 6, Document 38, page 1069)** was critical of the fact that there was no electronic database for typing results. One of their recommendations was to develop a “comprehensive and searchable database that allows details of microbiology reference laboratory reports to be compared between samples of the same bacteria obtained from different

patients or environmental sites". Are you able to comment on whether this has been achieved?

A No I am unable to comment if this has been achieved by NHSGGC.

5 Infection patterns

5.1 According to many clinicians and microbiologists, infection rates at QEUH were unusual both in frequency and type. However, it is acknowledged that it was difficult to measure empirically as there was no data readily available for many of the (rarer) organisms. Do you consider that there were:

a) more bloodstream/ patient infections than normal?

A When all bloodstream infections were reported together, then no there was no increase. This was mainly due to the improvement programme to reduce CLBSI which led to a reduction in gram positive bloodstream infections.
However this was not mirrored in the reporting of gram negative bloodstream infections.

b) more unusual bloodstream infections? (we take the point that water sampling/ environmental testing might show up rare organisms that are always present but never tested for)

A Yes, there were more unusual organisms isolated from clinical samples.

c) Multiple bacteriaemia in one sample- Dermot Murphy and Kathleen Harvey-Wood consider this unusual. Do you agree?

A Yes, polymicrobial bloodstream infection are unusual.

5.2 If you do NOT agree, can you venture an opinion as to why this was the perception?

5.3 Are you still involved in Infection Control at QEUH? If so, how are things at QEUH now as compared to the period under investigation? Are you now seeing fewer BSIs, fewer unusual infections and /or fewer samples with multiple infections?

A The role of ARHAI Scotland remains. NHS Boards are still required to report in Healthcare Infection incidents as per NIPCM Chapter 3 National Infection Prevention and Control Manual: Chapter 3 -

https://www.nipcm.scot.nhs.uk/chapter-3- healthcare-infection-incidents-outbreaks-and-data-exceedance/ **(Bundle 27, Volume 4, Document 16, page 165)**

NHSGGC have only reported one incident to ARHAI Scotland within this patient population (paediatric haemato-oncology) since January 2022. This incident was not healthcare associated.

5.4 The Case Note Review **(Bundle 6, Document 38, page 975)** makes the point that GGC introduced significant interventions and control measures (ward closure, POU filters, chlorination) in response to these infections and that they did so with the support of external agencies. They suggest that they would not have done so unless they accepted that there was an environmental link. Do you agree? Or was this solely to address public confidence and no other reason?

A My understanding is that several IMT agreed hypotheses of a potential environmental source and controls were put in place in accordance with reducing the risk of transmission from this source. I have never seen or heard any evidence to suggest these controls were to address public confidence. To my knowledge many of these controls remain in place.

Key Question 4

A question which the Inquiry needs to consider, (as did the CNR) is as follows: *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?*

5.5 Was the question of infection link part of your paper's Terms of Reference? If not did your report address the question to some extent?

A No the papers sole purpose was to explore the three different infection data sets which did not include any environmental samples.

5.6 What do you understand by "infection link"? Is it a causal link, or something less, such as association or contribution?

A Cases that are "linked" are normally linked by pathogen group, time, place or

person. “Linked” cases require further investigation to establish if the link is real and if so what the link may be. Our review of the data did not include mapping of individual patient risks or environmental samples as there was no remit to establish links.

5.7 As you will be aware, the CNR concluded that the vast majority if the cases they studied were either possibly or probably linked to the hospital environment. In very general terms do you agree or disagree with their findings?

A In very general terms, based on the hypotheses generated by several IMT, their investigations and the success of environmental controls, I agree. I have never had any other hypotheses or evidence shared or discussed with me directly to suggest any other hypothesis.

6 Whole Genome Sequencing and Typing

6.1 What typing was carried out within GGC? On the evidence we have seen so far this seems to be confined to cupravidius, stenotrophomonas and enterobacter. Why only these three?

A I am not aware of all the typing that NHSGGC carried out however I am aware of typing being carried out in the organisms listed.

6.2 There is a disconnect between the position put forward by GGC and many of the authors. We have seen the view that while typing can be used to confirm a link, an absence of typing cannot be seen to exclude a link. Where two isolates are not closely linked does this exclude a link? Or merely not confirm one?

A My understanding of the published literature is that due to the complexity of environmental sampling where two isolates are not closely linked, this does not exclude a link.

6.3 The CNR took the view that, even in the absence of typing, it is possible, taking all the evidence as a whole, to identify a “probable” link. Do you agree / disagree? Why?

A I agree, using descriptive epidemiological data persons were linked by time and place to an environment where clinical samples isolated the same organisms as

environmental sources. Environmental controls were widely utilised and are still in place.

6.3 According to one witness outbreaks can have more than one strain, and it is not unusual to see more than one strain of bacteria in a sample. Consequently, the presence of two strains does not rule out a common source, although it may rule out direct transmission. Do you agree?

A Agree.

7 Additional questions

7.1 How common is a breach of the Upper Warning limit?

A If the data falls above the upper warning limit then this is a signal of a special cause variation. If a process is in control and all characteristics of the process are stable, then you would not expect to have points above the UWL.

7.2 What is the consequence of such a breach?

A Areas of special cause variation are a trigger in the context of quality control or improvement endeavours, potentially revealing hidden issues. An SPC chart signal should not be automatically construed as an indicator of a problem, nor do such signals provide insights into the root causes of the variation. Rather, these signals should serve as a catalyst, prompting the user to delve deeper into investigation and analysis.

7.3 On page 23 **(Bundle 7, Document 6, page 235)** you make the following statement “The SPC charts included in this report describe that there has been instances of variation outside what would normally be expected in this patient population” Can you expand on this? Is this with reference to empirical data, or simply an impression?

A This statement refers to Table 4 Summary table listing SPC shifts, trigger points (UWL breach) and outliers (UCL breach) following the move to RHC using HPS data from July 2013 to September 2019 (page 17) **(Bundle 7, Document 6, page 231)** of the report.

7.4 You also say, “The data presented in this report do not provide evidence of

single point of exposure",

a) Can you expand on this? What do you mean by "single point of exposure"?

b) Does this rule out a link between infections and environment, or simply not prove one?

A When individuals are all subjected to a shared source of exposure within a short timeframe the number of cases surges quickly, reaching a peak, and then tapers off. Most of the cases manifest within a single incubation period this was not the case in the incident being investigated. No the report did not rule out this link, it did not prove one as this was not an objective for the report.

8 <u>Comments on your report by others</u>

The following is an extract from the Case Note Review 8.2.3 Review of NHS GGC Paediatric Haemato-oncology data (HPS October 2019)83 **(Bundle 6, Document 38, page 1068)**: "The context for the report is that, having supported NHS GGC in dealing with cases of blood stream infection in patients in Wards 2A and 2B, associated with concerns about the contaminated water supply in 2018, HPS were asked to assist when concerns emerged about a suspected increase in Gram-negative environmental (GNE) bacteraemias in patients on Ward 6A during the summer of 2019.

We had not intended to provide a critique of this report as we saw it as one of a number of previous investigations, the results of which should not influence our own. However, its significance loomed large in our discussions with NHS GGC and we have therefore added this short section summarising our view of the reports findings. The aims of the report were to describe any differences in the datasets being used to explore the situation; to review the GNE infections; and to identify if there had been a change. The principal methodology used was the creation of Statistical Process Control (SPC) charts which were used to explore the data collected from July 2013, before the move of patients to the new site at QEUH/RHC, until September 2019. Changes in hospital activity data for the Paediatric Haematology Oncology service were explored in parallel and, finally, comparisons were made between data for the whole of RHC, for the period June 2015 to September 2019, with similar data for the Royal Hospital for Sick Children, Edinburgh and Royal Aberdeen Children's Hospital. In summary, the report identified periods at which there were upward shifts, trigger points (above

the Upper Warning Limit) and outliers (above the Upper Control Limit) in the SPC plots of bacteraemia identified since the move to the new hospital. Overall, however, patterns showed no consistent trend. There were also differences between NHS GGC and the data from Edinburgh and Aberdeen. This showed higher rates for environmental with enteric bacteria over the whole time period at NHS GGC, but lower rates for Gram-positive and no difference for Gram-negatives and environmentals alone. Various subgroup analyses showed no consistent message.

As far as we are able to ascertain from our own assessment of the data presented in the report, we agree: a) that the dataset used was providing an accurate reflection of the situation at NHS GGC; b) that there were episodes of variation in the SPC data (the latest occurring in September 2019) but that this alone did not provide clarity about its cause or significance; and c) that the caution expressed about small numbers in the analysis of some subsets of the data, is justified. We do not see that this report would have provided any clear message of either reassurance or concern about past events. Nor do we see that it offered a clearly

interpretable and favourable comparison with other Scottish children's hospitals (not least because the size of the paediatric haematology oncology services in these three hospitals varies very substantially – NHS GGC being easily the largest).

From our perspective, the most useful output of the HPS report lies in the clarity of its recommendations for the future, some of which align with our own. We would particularly emphasise the points made that, going forward, interpretation of these data requires the systematic collection of clinical data; must be set in an environmental context; and requires continual monitoring. NHS GGC accepted the need for ongoing monitoring."

8.1 Can you comment on this? To what extent do you agree/ disagree? In particular do you agree that 1) patterns show no constant trends and that 2) the information offers a clearly interpretable and favourable comparison with other children's hospitals?

A 1) I would agree that the comparison of the data sets had many limitations and due to the small number within the cohort under investigation and the short time

period studied there were no clear messages of reassurance or concern. The recommendations within the report were developed in recognition of the gaps in the report.

2) The limitations of the data available for comparison against other hospitals prevents either a favourable or unfavourable comparison to be made.

8.2 In their response to PPP5 -History of Infection Concerns-NHSGGC (at para 4.2 say as follows **(Substantive Core Participant Responses to Provisional Position Paper 5 – The History of Infection Concerns (HOIC) for the Queen Elizabeth, page 25)**:

"Accordingly none of these comparison exercises (of which the review is one) indicates that during the period of which this Inquiry is concerned, there was an increased rate of overall infection or of infection from microorganisms relating to the built environment at the QEUH. Indeed, the ARHAI comparisons with other health boards found that the infection rates at QEUH are as good if not better, than at other Health Boards". Can you comment on this? To what extent do you agree/ disagree?

A The limitations of the data available for use in the report for the purposes of comparison against other hospitals prevented either a favourable or unfavourable comparison to be made. I am unaware of any reports, relating to this incident, produced by ARHAI that concluded rates to be "as good if not better, than at other Health Boards".

8.3 In their report the Oversight Board say (see) 133. **(Bundle 6, Document 36, page 848)**. "However, the Oversight Board does not believe the HPS analysis demonstrates that there was nothing 'unusual' occurring with infection incidents in the RHC and QEUH. The report principally focused on a review of data quality and datasets. While it clearly set out some findings on comparisons with other hospitals, it equally caveated its work by noting the different sample sizes of the patient groups in each hospital (for example, the Aberdeen and Edinburgh hospitals did not have bone marrow transplant units in this analysis). There were numerous 'breaches' of the upper control limits, showing spikes in infection rates throughout the period. Ultimately, the report did not comment on the issue of water contamination, or offer a view about what kind of action

should or should not have been taken in response to the infection incidents being identified." Can you comment on this?

A Agree.

8.4 Your report makes eight recommendations (page 22) **(Bundle 7, Document 6, page 236)**. Other than question five which relates to control measures in force at the time, to what extent have these been implemented?

A I am unable to comment of the recommendations for NHSGGC.

The recommendations for HPS feature on ARHAI Scotland work plans and are ongoing.

ARHAI Scotland will review the categorisation of environmental organisms following the literature reviews for Chapter 4 of the NIPCM.

ARHAI Scotland, August 2023: The water systems literature review is into phase 2 (development of recommendations) and is due to go out to working groups for consultation, with estimation completion date of Spring 2024. Work has also resumed on the ventilation systems literature review, estimated completion in 2024.

ARHAI Scotland will further support the development of an appropriate trigger for ongoing monitoring.

ARHAI Scotland update, August 2023: ARHAI Scotland continue to develop and refine methodologies to monitor and review triggers in surveillance data.

ARHAI Scotland should consider these findings when developing methods to support other boards in monitoring infection risk associated with environmental organisms.

ARHAI Scotland update, August 2023: Development of a proof-of- concept environmental surveillance system has been completed with next steps to undertake a pilot study during 2023/24 financial year.

Declaration

I believe that the facts stated in this witness statement are true. I understand that proceedings for contempt of court may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a

statement of truth without an honest belief in its truth.

Appendix 1

Laura Jane Imrie Clinical Lead

Summary

Clinical Lead with 5+ years of experience leading and managing a national infection prevention and AMR program and services. Sound understanding of clinical governance, effective clinical engagement and priority management. A strong track record of excellent performance in delivery of the national IPC and AMR strategy, managing change and developing response systems to improve clinical quality and patient outcomes. Extensive experience and understanding of policy development and national implementation. NMC registered with MSc in Infection Prevention and Control.

Experience

Clinical Lead NHS National Services Scotland Antimicrobial Resistance and Healthcare Associated Infections (ARHAI) Scotland, NHS Scotland Assure, Glasgow Scotland

2018 – Present

Leads the develop and implementation of appropriate ARHAI Scotland long-term business strategy, working with internal and external stakeholders to ensure ARHAI Scotland strategy delivers what's needed to reduce the burden of infection for the people of Scotland and links with the needs, priorities and policy of Scottish Government.

Develops and supports Scottish Government on long term strategic plans (5 years plus) for specified areas within AMR, IPC and HAI, which impact across the NHS and has implications for associated resources both internally and externally in terms of programme development and delivery.

Anticipates future developments, working on a 5 year planning horizon.

Responsible for prioritisation of clinical resources to ensure open and transparent process for management and delivery of planned and reactive programmes of work in line with NHS Scotland

Responsible for advising and overseeing the development of a portfolio of

ARHAI Scotland Priority Programmes, which impact on the NHS and contribute to the wider UK policy and strategy for HAI & AMR.
Undertakes responsibility for the recruitment, selection and development of senior clinical staff.
An active member of the clinical governance groups with responsibility for escalation and management of clinical risks within the NSS clinical governance framework.
Nurse Consultant Infection Prevention & Control NHS National Services Health Protection Scotland, Glasgow Scotland

2012 – 2018

Provided strategic clinical leadership to Scottish Surveillance Healthcare Associated Programme (SSHAIP).
Produced and published detailed surveillance reports examining, analysing and evaluating variations/exceptions or trends and highlighting and synthesising these with expert knowledge in an appropriate and accessible way for stakeholder groups.
Participated in the consultant daily on call rota for HPS, acting as a national source of information and advice for public health and infection prevention and control related issues.
Developed and maintained close working links with key stakeholders (e.g. NHS Boards, Local authorities, Scottish Government, Academic bodies), providing input to the development and implementation of relevant Scottish and UK Government public health and IPC policy (e.g. through participating in expert national and international advisory groups)
Led in the strategic development, business planning and relevant corporate functions of HPS SSHAIP providing scientific professional leadership and participating in performance management and staff development of the multidisciplinary team working under the post-holder's leadership.
Overseen the development and maintenance of Healthcare Associated Infection surveillance and systems designed to monitor challenges, consequences and the impact on these of interventions.
Provide national leadership to NHS Board support to support outbreaks, infection related incidents and emerging issues relating to IPC or HAI

Lead Infection Prevention & Control NurseNHSGGC West Sector, Glasgow Scotland

2007 – 2012

Senior Infection Prevention & Control Nurse NHS Greater Glasgow Victoria Hospitals, Glasgow Scotland

2002 – 2007

Infection Prevention & Control Nurse NHS Lanarkshire, Monklands Hospital, Lanarkshire Scotland

2000 - 2002

Infection Surveillance Nurse NHS Lanarkshire, Hairmyres Hospital, Lanarkshire Scotland

1997 - 2000

Staff Nurse NHS Lanarkshire, NHS Lanarkshire, Hairmyres Hospital Lanarkshire Scotland

1993 -1997

Qualifications

MSc Infection Prevention & Control University of Highlands and Islands 2007 – 2011

BSc Nursing with Specialist Practitioner Infection Prevention & Control University of Dundee 1999 – 2002

Registered General Nurse Lanarkshire School of Nursing 1990 – 1993

The witness was provided the following Scottish Hospital Inquiry Bundles / documents for reference when they completed their questionnaire statement (Appendix A).

Appendix A – Documents referred to by SHI in this Questionnaire:

Bundle 7
Bundle 6
Bundle 27
Substantive Core Participant Responses to Provisional Position Paper 5 – The History of Infection Concerns (HOIC) for the Queen Elizabeth, page 25):

SCOTTISH HOSPITALS INQUIRY

Bundle of documents for Oral hearings commencing from 19 August 2024 in relation to the Queen Elizabeth University Hospital and the Royal Hospital for Children, Glasgow

Witness Statements – Week Commencing 9 September 2024 – Volume 4

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