SCOTTISH HOSPITALS INQUIRY

Witness Statement of

Dr Iain Kennedy

Personal Details

1. My full name is Dr Iain Thomas Robert Kennedy. My qualifications are MBChB, gained at University of Glasgow in 2006. I also hold the following: BSc (MedSci), which I gained at Glasgow in 2004; Fellow, Faculty of Public Health, 2014; Fellow (Physician), Royal College of Physicians and Surgeons of Glasgow; and Diploma in Tropical Medicine and Hygiene, gained in 2021.

Professional background

2. Following gaining my medical degree, I began my foundation training in 2006 at NHS Greater Glasgow and Clyde, working on rotation at Royal Hospital for Sick Children (Yorkhill), Victoria Infirmary and Southern General Hospital.

3. From 2008 to 2010 I worked as an advisor for BUPA Health Dialogue as part of a medical leadership fellowship scheme. This was facilitated by Liam Donaldson, who was Chief Medical Officer (CMO) in England at the time. I was assigned to BUPA and that was principally about supporting Primary Care Trusts in England, working in healthcare commissioning support data assurance, and telephone based health coaching. I also spent approximately 10% of my time working with the WHO Patient Safety Programme, on a framework for tackling antimicrobial resistance.

4. From 2010 to 2014 I was a registrar on the South London, Surrey and Sussex Public Health training programme. This is the training programme necessary for NHS consultant posts in public health. This involved rotational placements, including to the London regional epidemiology unit, the national Centre for Infections at PHE Colindale, and a three month exchange to the National Health Laboratory Service, Johannesburg, South Africa.

5. Since August 2014 I have been a Consultant in Public Health Medicine, working within the Public Health Protection Unit (PHPU), West House, Gartnavel Royal Hospital, Glasgow. PHPU was headed up by Dr Gillian Penrice until April 2023, when she retired. Since April 2023 I have been in the role of Acting Lead Clinician for health protection. PHPU reports to the Director of Public Health. The Director of Public Health is Emilia Crighton, who took over from Linda de Caestecker in February 2022. The PHPU is part of the Public Health Directorate, which sits within the NHS GGC Corporate Division.

Overview

6. In this statement I will address the undernoted themes:

- The role of Public Health
- Involvement in design, build, specification of Queen Elizabeth University Hospital (QEUH) / Royal Hospital for Children (RHC)
- Issues with Built Hospital Environment
- Involvement in Incident Management Teams meetings (IMT)
- Closure and Movement between Wards
- Infection Control
- Use of Prophylactic Medication
- Evidence provided by patients and families to Inquiry
- Personal and Professional Impact

The role of Public Health

7. Public Health has been defined as ‘the science and art of preventing disease, prolonging life, and promoting health through the organised efforts of society’. Public Health is often described as having three domains. These are Health Improvement, e.g., stopping smoking, health behaviour change, and health education & literacy; Health Services Public Health, which includes screening,

health needs assessment, and, design and evaluation of healthcare delivery; and thirdly Health Protection, which covers the control of communicable diseases, environmental hazards and emergency planning and response. My work is in the Health Protection domain.

8. Each board has a Public Health Directorate, who will have a health protection team within their structure. The Public Health (Scotland) Act places duties on territorial boards for the protection of the health of the population. In NHS GGC, PHPU have responsibility for leading on these duties on behalf of the DPH and the Board. The remit of territorial board health protection teams is detailed in a 2007 CMO letter.

9. Public Health Scotland (PHS) is a separate Special Health Board, formed during the pandemic. One of the organisations that came together to form PHS was Health Protection Scotland. PHS leads on national public health issues, including leading on cross-board incidents, and providing support to territorial board health protection teams on request. PHPU and PHS work closely together. This is a quite different structure from the setup across the other four nations, where local health protection teams are directed by the national Public Health body; in Scotland, we are all embedded in the local NHS structures, and report to the DPH.

10. PHPU is responsible for the local public health response to specified communicable diseases, and environmental hazards, as well as port health, and use of statutory powers under the Public Health Act. In doing so we work closely with many stakeholders, most notably local authority Environmental Health departments. Part of our remit is to provide specialist advice and guidance to staff working in the community; hospitals; local councils and other local organisations and agree how best to deliver health protection at local level. We will investigate and manage a full range of health protection incidents, including outbreaks of disease, and carry out surveillance, co-ordination, support, and the monitoring of certain key national programmes. PHPU is principally a community facing specialty, and although we provide

advice and guidance to hospital health care staff, in a healthcare setting the Infection Prevention and Control Team would be responsible for leading the response to the vast majority of infection outbreaks and incidents.

11. The role of a Public Health consultant in a health protection team is two-fold. We provide strategic leadership and decision making to, and take responsibility for, the health protection reactive service. This includes Public Health response to notifiable diseases, community outbreaks and public health incidents, and provision of advice and guidance to enquiries from other professionals and the public on matters in the scope of public health practice.

12. We also all have a portfolio of proactive work. For example my portfolio includes immunisations, emerging pathogens, port health and CJD. I also provide the link at consultant level between the department and the Infection Control teams. In practice that means I represent the Public Health team on the Board Infection Control Committee and the Acute Infection Control Committee

13. I have been asked by the Inquiry my views on infections and infection incidents at QEUH. My views are included in this statement in relation to the events I was involved with.

14. I have been asked by the Inquiry about my contribution to SBARS and HAISCRIBES. I contributed to the SBAR to reopen ward 6A in Autumn 2019 **(A38694845 - SBAR dated 10 October 2019 - Ward 6A - Situation update - gram negative bacteria - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 4 - NHS Greater Glasgow and Clyde: Situation, Background, Assessment, Recommendation (SBAR) Documentation, document 46)**. I do not recall contributing to other SBARS. I have never contributed to an HAISCRIBE. HAISCRIBES are not in scope of Public Health practice.

Involvement in design, build, specification of Queen Elizabeth University Hospital (QEUH) / Royal Hospital for Children (RHC)

15. I had no role in the design, build, commissioning, or maintenance of the QEUH/RHC. I have not acted nor provided any services as an expert witness or on a consultancy basis in relation to QEUH/RHC or other hospital building projects.

16. My awareness of decisions regards the specification of the water and ventilation systems is limited to what was stated in infection control committee meetings or incident management team meetings.

17. I have been asked by the Inquiry the extent of my awareness of results of testing of the water and ventilation systems as part of the commissioning of the hospital. I was not aware of any of these results at the time. I became aware of the water results only when reviewing the draft Health Facilities Scotland (HFS) technical report. I was surprised at these results, as one of the outlets was positive for *E. coli.* I would have expected that to have been reported through infection control structures at the time, but I do not recall hearing about that result before reading the HFS report.

18. I have been asked by the Inquiry to describe my knowledge of the DMA Canyon reports of 2015 and 2018 **(A33870103 - Report prepared by DMA Water Treatment Ltd titled "L8 Risk Assessment (Pre-Occupancy) NHS Greater Glasgow and Clyde South Glasgow University Hospital" dated 1 May 2015 relating to site assessment concluding on 29 April 2015 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6, Miscellaneous documents, document 29; A33870243 - Report by DMA Canyon Ltd titled "L8 Risk Assessment NHS GGC QEUH and RHC following site surveys in September 2017, October 2017, gap analysis in January 2018 and review date September 2018 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6,**

Miscellaneous documents, document 30). My first recollection of becoming aware of the reports was a conversation with Dr Inkster following a meeting of the Water Technical Group, when Dr Inkster told me she had been asked to look into an external report on the water system that had not been actioned. I understand this to be the 2015 DMA Canyon Report. Dr Inkster told me that she believed she was not the person who should have responsibility for investigating this, and that she felt there was an expectation that her report should place all the responsibility for not actioning the report on Ian Powrie. Otherwise, all my knowledge of the DMA Canyon reports would be their inclusion in external reports such as the HFS technical report, or when mentioned at BICC.

19. There are three principal Infection Control Committees in NHS GGC. There is the Board Infection Control Committee (BICC), which is chaired by the HAI Executive Lead. Reporting into that committee are two other committees, the Acute Infection Control Committee (AICC) which covers the acute hospitals, and the Partnership Infection Control Support Group, which is for community NHS facilities, the health and social care partnerships and mental health. They both report to BICC. Public Health is represented on all three committees. Personally, I am a member of both BICC and AICC.

20. The new building was a standing item on the agenda at the Infection Control Committee meetings, and discussions were often led by the lead Infection Control Doctor at the time, Professor Craig Williams.

21. I joined the membership of BICC in October 2014. I can recall at that time there were several questions being raised about rooms with specialist ventilation in the new build, including where patients with high consequence infectious disease would be placed, and if the designated rooms for multi-drug resistant tuberculosis met requirements. The rooms for adult and paediatric bone marrow transplant (BMT) were also discussed.

22. I have been asked by the Inquiry about the decision to decant the adult BMT ward back to the Beatson. The detail on this decision is included in the minutes of the July 2015 meeting of BICC **(A32222054 – Minutes of the NHS Greater Glasgow and Clyde Board Infection Control Committee held on 27 July 2015 - Hearing Commencing 19 August 2024 - Bundle 27, Miscellaneous Documents - Volume 3, document 16)**, however I was not at this meeting and not party to the discussions on this decision.

23. I recall Professor Williams stating on several occasions at BICC that the new paediatric haematology/oncology ward (RHC ward 2A) was built to the same specification as the old Schiehallion ward. Professor Williams also said this was because there was no national specification for this type of unit, the previous building technical note having been withdrawn and not replaced. I recall Mary Ann Kane making a similar statement at an IMT, in terms of type and number of specialist ventilation rooms and use of HEPA filters being same between the old and new wards. She said that this had been confirmed by her team physically inspecting the old ward.

24. I recall a comment being made at one of the meetings that some rooms should have HEPA filtrations and that the filters had been delivered but not yet installed. I have no knowledge of the outcome of that, but was aware that Professor Williams, Dr Christine Peters, and Guy Jenkins (Director of Service) would be taking that matter further.

25. I have been asked by the Inquiry to comment on the “institutional knowledge” of ventilation systems. NHS GGC have a Patient Placement SOP, which is regularly updated. It contains detail of all rooms with specialist ventilation, and the types of patients who are suitable or not suitable for being cared for in those rooms.

Issues with Built Hospital Environment

26. I have been asked by the Inquiry if I had any involvement in the wards at QEUH or RHC, primarily within the Schiehallion Unit, Wards 2A and 2B. From 2014 to the September 2017 my involvement would have been purely as a member of the Infection Control Committee structure.

27. However, in September 2017 the Director of Public Health, Linda De Caestecker, contacted me and advised me that concerns were being raised from employees at NHS GGC over patient safety issues and the built environment at QEUH/RHC. A meeting was arranged between senior management and the microbiologists to discuss the concerns they had raised in their SBAR. (Situation, Background, Assessment, Recommendations). Professor de Caestecker suggested that either I or my colleague Gillian Penrice attend; however, we were later informed, via Prof. De Caesteker's PA, that there was no requirement for Public Health at the meeting

28. On 26th September 2017, I met with Tom Walsh, then Infection Control Manager (ICM) and Sandra Devine (nee McNamee), at the time Associate Nurse Director for Infection Control to discuss joint working between Public Health and Infection Control. The SBAR by the three microbiologists came up in conversation.

29. My recollection of the conversation is based on a follow-up email that I sent to Tom and Sandra about outputs of that meeting. In that email I noted that there were a number of issues, concentrated on BMT service, and extending to other managerial and infection control issues which lay well outside public health's area of responsibility. However, these issues could knock onto other areas that were at least partly within our purview, such as infectious disease of high consequence, such as Viral Haemorrhagic Fevers (VHF), Middle East Respiratory Syndrome (MERS), emerging infections or significant outbreaks of flu, including a pandemic. In those circumstances it would be important for Public Health to be involved.

30. From my recollection the SBAR covered several different areas. These included the type, location and specification of specialist ventilation rooms, cleaning of environment and equipment, communication with microbiologist, and roles and responsibilities within the infection control teams.

31. The meeting between the microbiologists and senior management went ahead on 4th October 2017. I am aware of this meeting as minutes were circulated to BICC. An action plan was drawn up, and it was reported through Board governance procedures. The lead ICD, Teresa Inkster had responsibility for this action plan, which was brought back routinely to the Board of Infection Control Committee (BICC).

32. One area raised in the SBAR was the use of Positively Pressurised Ventilated Lobby (PPVL) rooms. Negative pressure rooms are at a lower pressure than the corridor, so prevent airborne particles from escaping the room, so are ideal for highly infectious patients. Positive pressure rooms are effectively the opposite, and push air out of the room into the corridor, thereby preventing airborne particles from entering the room. They are therefore suitable for patients requiring protective isolation. The idea of a PPVL room is that you have a lobby / antechamber that is at positive pressure to both the room and the corridor. This creates a barrier, preventing transit of airborne particles in either direction. Therefore, PPVL rooms can be used for both protective isolation and source isolation.

33. PPVL rooms are considered acceptable for isolation of infectious patients. They are included in SHTM, with reference to the English building notes. I understand that the Regional Infectious Disease Unit in Edinburgh uses PPVL rooms. When Prof Williams was Lead ICD, he reported to BICC that the rooms were confirmed as having been suitable for MDR-TB patients, and I was comfortable for their use for short periods for patients with viral haemorrhagic fever. However, there are different views on how suitable the PPVL rooms are. In particular there was later discussion as to whether they

were suitable for MDR-TB patients. An SBAR was written by a Dr Inkster who recommended we have negative pressure rooms, due to this uncertainty. Subsequently some of the PPVL rooms were modified to negative pressure rooms.

34. At the October 2017 BICC meeting Dr Jennifer Armstrong advised that there were concerns over line infections, including a patient death, in RHC. Dr Armstrong asked if Andrew Seaton, infectious disease consultant, and I would review the cases. Dr Seaton indicated that this was not an appropriate task for us to undertake. I agreed that something I could support with would be to review the action plan for Ward 2A, to provide “another pair of eyes”, to potentially suggest any other interventions. Having read the documents, I arranged to meet Lead Infection Control Nurse (ICN) and do a walk round of the wards, to better understand the action plan.

35. On 6th November 2017, I met with Susie Dodd who was the lead ICN for paediatrics at the time and we discussed various action plans that had been drawn up, before I then had a walk round Wards 2A and 2B with Susie and Emma Somerville, who was the Senior Charge Nurse of those wards. This was the first time that I had visited the wards.

36. Later that month I attended the next meeting of the Board of Infection Control Committee (BICC), where Jen Rodgers, Chief Nurse for Paediatrics, gave a presentation on work ongoing within QEUH/RHC **(A32221779 - Draft Minutes - BICC Meeting - 27 November 2017 - Hearing Commencing 19 August 2024 - Bundle 13 - Additional Minutes Bundle (AICC/BICC etc), document 48)**. She asked me for feedback on my walk round of the wards, and I highlighted the only point I had noted, not covered in her presentation, was the presence of an examination couch within the ward prep room on Ward 2A. I was told that when the 2B day ward shut, staff would sometimes see patients within the prep room. I reported my view that this was not an appropriate space. Jen agreed and told me it would be rectified. I had no

further involvement with Wards 2A/2B until the start of the Incident Management Team (IMT) process in March 2018.

37. I have been asked questions regarding ventilation on Ward 4C. I do not recall being involved in any issues regards Ward 4C, so cannot assist the Inquiry on this point.

38. I have been asked a series of questions for my views relating to ventilation on ward 2A, and ventilation systems in general. While Public Health may give advice on appropriate placement of patients with certain infections, including use of negative pressure rooms, we do so based on published guidance. Specialist ventilation systems are outwith the regular remit and scope of practice of Public Health, and I would not expect the Public Health team to be informed of concerns regards ventilation on a hospital site. My understanding of any issues with the ventilation system, not otherwise described in this statement, will be that captured in minutes of IMTs or Infection Controls Committees.

Involvement in Incident Management Teams meetings (IMT)

39. The IMT process is separate to Infection Control Committee structure. The IMT itself is independent from the normal management structures within the hospital; it is multidisciplinary and multiagency. The IMT has the remit to minimise further spread of infection through co-ordination and decision making on investigation, implementation of control measures, and communication regards the outbreak or incident. All members of the IMT have equal status and have responsibility for consensus decision making. Where consensus cannot be reached, the responsibility for decision making lies with the IMT Chair.

The roles of Public Health and HPS

30 Public Health are generally responsible for management of outbreaks and incidents that occur in the community. For hospital incidents and outbreak Public Health's role is supportive, with Infection Control being responsible for leading the response. The Public Health team can provide various levels of support depending on what is needed, due to our experience in incident response and outbreak management, epidemiology, response for specific diseases, or liaising with external agencies to support the IMT chair if required.

31 In NHS GGC, we have a process that if Infection Control have scored an incident as HIIAT amber or red, or are closing a ward to admissions, they will email the Public Health team. With most notifications there is no support from Public Health required. Support from Public Health will be triggered if the notification requests our involvement, if the Infection Control Doctor contacts the Public Health consultant directly – as they may do in more complex situations – or if on review of the information in the email notification the Public Health team believe our involvement would be beneficial.

32 National agencies, such as Public Health Scotland and ARHAI Scotland (previously Health Protection Scotland (HPS)) are there to provide additional support and expertise to local teams when requested, or to lead incident response in specific circumstances, such as cross-board outbreaks or cases of confirmed High Consequence Infectious Disease.

33 When Public Health hold an IMT we always notify PHS, although we may not necessarily request that they attend, depending on the specific situation. It is bringing another expert to the table, who will have experience of incident management in general, and knowledge and experience of specific topics. So, we would expect a different PHS staff member to attend for a gastrointestinal infection versus a respiratory infection for instance, depending on their

expertise. PHS can also help mobilise additional support for larger or more complex incidents and support cross-board communication.

34 Public Health incident management follows guidance in the Scottish national publication “Management of Public Health Incidents by NHS-led Incident Management Teams” (MPHI), and our local Incident Management Plan is principally based on that document, with additions from other national and international guidance and best practice. Under those plans, the Health Board Public Health team has the responsibility for notifying Scottish Government and requesting Scottish Government observers to attend IMTs when these are considered necessary.

35 Healthcare outbreaks and incidents were previously covered by an annex to MPHI, however the guidance document for them is now Chapter 3 of the National Infection Prevention Control Manual (NIPCM) **(A35957621 - National Infection Prevention Control Manual (including appendices showing draft HIIATs etc) - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 44)**. One of the principal differences between HAI and community outbreaks is the reporting chain to national bodies. HAI incidents use the HIIAT and outbreak reporting tools to ARHAI, who then communicate with Scottish Government – there is no direct communication from the Board to Government. Chapter 3 is also not comprehensive, and in my opinion there remains a need to refer to MPHI in healthcare incidents.

36 During the incident response at RHC in 2018-2019, I didn’t feel that HPS/ARHAI representatives worked with the IMT in the way I would have expected, given my experience of working with national agencies in community outbreaks. As described above, I would expect them to be full members of the IMT, taking part in all aspects of the IMT work, including the consensus building. My impression was that they saw themselves more as external observers, there to critique. I did not find the HPS/ARHAI

representatives to be fully engaged or supportive, at times distancing themselves from IMT decision making.

37 The performance of the IMTs was adequate, though not high performing. There were some specific issues that affected that performance. There were too many people in attendance, sometimes 20 to 25, with only a proportion of those actively participating. The meetings themselves went on too long. Some meetings lasted up to four hours, where usually 60 to 90 minutes, even for complex incidents is sufficient. One of the reasons for this was trying to do the investigation during the meeting, rather than taking the time out from the meeting or the use of sub-groups, who then report back into the IMT. Another issue would be the timings of the meetings versus the timings of receiving lab results. Sometimes the results would be “hot off the press” and Dr Inkster would often have handwritten lab results, which were being read out at the IMT, with those in attendance not having a chance to see them beforehand. This made it difficult to follow how the outbreak was progressing. There were also challenges on some days of identifying a suitable room for the IMT meetings to be held in. Individually, these challenges were minor; however, in combination they do impact on the efficiency of the IMT process. The solutions to these issues are generally covered by incident management best practice. As an organisation we have reflected on these issues, and have incorporated updates into the GGC area-wide Incident Management Plan, and that plan has been adopted for use by the Infection Control team. As we went through 2019 the IMTs became less effective. There were more challenges, but there was less clarity on purpose, and less consensus about what the end point of the incident would be.

IMTs Spring/Summer 2018

38 I first became aware of the infection incident associated with RHC wards 2A/2B on 5th March 2018. I attended the weekly national teleconference between HPS and health board Public Health teams. It was noted there by HPS colleagues that a red HIIAT had been submitted by NHS GGC. I do not

believe this assessment had been sent to Public Health, which would be our standard protocol. I contacted the Infection Control team and received a copy from both Sandra Devine and Susie Dodd. I was also sent details of the next IMT, which was scheduled for 6th March. I asked if Public Health support was required, and Susie replied, saying that Public Health did not need to attend the IMT.

39 The first IMT relating to this incident I attended was on 16 March 2018 **(A36690477 - Incident Management Meeting, dated 16 March 2018, relating to Water Contamination in Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 17)**. Public Health were now being copied into the IMT papers. I reviewed the minutes of the previous IMT and saw that the Medical Director and several other senior managers had attended **(A36690457 - 12.03.2018 4. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 16)**. Although there had not been a specific request for Public Health support, my view was that the presence of senior management was an indicator that the incident had increased in severity or complexity, and that Public Health support may be warranted, so chose to attend. I was on my way to the IMT when I received a phone call from the Prof de Caestecker saying that Dr Armstrong had now requested Public Health support, and I confirmed I was already on my way. When I arrived at the hospital, I met Dr Armstrong and Dr Inkster in the corridor outside the meeting room we would be using. Dr Inkster expressed surprise at my attendance.

40 Prior to my attendance at the IMT, and other than described earlier in my statement, I was not aware of concerns about infections from the water.

41 At this meeting Dr Inkster discussed the identification of three new hospital acquired bacteriaemia cases of Stenotrophomonas, in addition to the

Cupriavidus case that had initiated the IMT process. The hypothesis was that direct contamination of water taps was the problem. This hypothesis was reasonable, however, given that water testing had shown positive results from other ward areas, that hypothesis required to be revisited, and Dr Inkster was seeking support from HPS and HFS. I suggested that given there were two organisms it was important not to assume they were necessarily a single incident, as there may have been different sources.

42 Four patients with bacteraemia, with two different organisms, is not in and of itself unusual in a large hospital. The key factors being that these were both gram-negative organisms, previously associated with the water supply, in patients clusters in time, place and person, that make initiation of detailed investigation and outbreak management structures the correct response.

43 As noted in the minutes, I was assigned an action to request mains water testing from Scottish Water. The purpose of this sampling was to rule out the possibility of the mains supply being the source of the bacteria. This is an example of the support Public Health can bring to hospital outbreaks, as Public Health have an ongoing relationship with counterparts in external agencies, such as Scottish Water.

44 I contacted Scottish Water, by emailing James Simmonette, Team Manager, Public Health Science (West), Scottish Water, on 16th March 2018. Sampling took place on the weekend of 17th/18th March 2018 at four properties close to the hospital boundary. Duplicate samples were taken at each location, one set of samples tested at the Scottish Water laboratory, and the other set at the Glasgow Royal Infirmary water lab. The reason for the duplicate samples is that the testing available at the Scottish Water lab is limited to those that are required under water regulations, and would not include speciation of gram negative organisms. The results from the samples tested at the Scottish Water lab were satisfactory. A gram negative (Delftia) was detected on two of the duplicate samples, but at very low counts, and within acceptable limits. These results were reported to the IMT at the meeting on 21st March 2018

(A36690549 - 21.03.2018 8. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 19).

45 In addition to this, Scottish Water publish a rolling 12-month report detailing any water quality failures in each supply zone. There were no failures in either of the two supply zones in the published data. This, along with the results of additional mains testing carried out by Scottish Water gave high confidence that any water contamination problem was not caused by the incoming mains water.

46 Hospital infections linked to water can happen, but the complexity of this outbreak was very unusual, due to the identification of different organisms identified and the positive water sampling results from other parts of the hospital. The source of the contamination was unknown. If it had been something like a contaminated tap, you would expect the infection to be confined to one area, but this was not the case, and this raised the possibility there was a systemic issue with the water within the hospital. This was the first time that I was aware of such concerns.

47 Also at this meeting various several short-term control measures for patients were discussed. Some of these, related to restrictions on the use of water outlets on the ward, had already been implemented. Twice daily cleaning of the rooms with Actichlor, a chlorine-based disinfectant, was instituted. In addition to this, point of use filters were to be fitted on every tap on the effected wards; if there were insufficient filters then Ward 2A should be given priority. This was a formal consensus decision by IMT members. I agreed with this decision, and I also agreed with the decision to prioritise ward 2A, as this is where the most vulnerable patients would be placed.

48 At the IMT on 19th March, the formal consensus decision was that once the filters have been fitted to the taps and a negative result was obtained then the

control measures could be lifted **(A36690507 - 19.03.2018 6. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023- Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 18)**. I agreed with this decision, as the other short term measures, were challenging for patients and staff, and had their own risks, and the filters were a simpler solution which would allow a return to the use of the tap water. The use filters are themselves only a medium term measure, with longer term solutions, such as the introduction of chlorine dioxide dosing required.

49 On 21 March 2018 there followed a further IMT, which I attended, where it was highlighted that there had been no new cases of infections since the implementation of the control measures. Dr Inkster informed the meeting that the National Support Framework algorithm had been invoked, meaning that HPS would lead and co-ordinate all National support activity **(A36690549 - 21.03.2018 8. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 19; A40562750 - National Support Framework 2017 – NHS NSS HPS – Version 1.1 - June 2018 - Hearing Commencing 19 August 2024 - Bundle 27 - Volume 1 - Miscellaneous Documents, page 68)**. The Framework invoked by the Scottish Government HCAI/AMR Policy Unit or by an NHS Board to optimise patient safety during or following any healthcare incident or outbreak. This can be used to assist IMTs when dealing with more complex, serious incidents when additional formal support may be needed.

50 Though after the first few steps the algorithm is the same regardless of how it is invoked, my impression is that there is a different tone whether it is invoked by the board or by Government, with the later implying failure by the board to act effectively, and therefore the intervention is more directive, than supportive.

51 My recollection is that the Framework was announced by the Cabinet Secretary for Health as having been invoked by Scottish Government. However, I recall at a later date, perhaps at a BICC meeting, Dr Armstrong commenting on the announcement, as she had requested the invocation of the framework, but that it had been requested by the Board was not mentioned in the Government statement.

52 From that date the role of HPS within the IMT changed in that they had more oversight responsibility, though I do not believe the specific steps in the Framework were completed. Given that Dr Inkster had already requested support form HPS and HFS, the practical difference to IMT is not clear.

53 Also at this IMT, the chair noted that the assistance of HPS and Public Health with the epidemiology of Cupriavidus and Stenotrophomonas cases had been requested. This is part of the investigation of any outbreak; we will look at the epidemiology, as well as the environmental and microbiological investigations. All three aspects of investigation need to be considered, in combination with the clinical picture, as drawing conclusions from one aspect alone can be misleading.

54 At the IMT minutes Dr Inkster discussed the epidemiology and highlighted that since the opening of the RHC site there have been three cases of Cupriavidus reported. Dr Inkster informed the IMT that it is a rare pathogen which is linked to dialysis lines and water. The view of the chair was that there was a strong link between the patient cases and the positive results from the water outlets. I agree with this statement based on information available at the time – it is a reasonable view to take, as they have identified a patient with the organism and identified a water outlet with the organism in proximity in the ward area, so it is a likely source.

55 At the meeting there was further discussion on water control measures, the use of filters and dosing of the water system. I informed the group that Scottish Water had offered the assistance of their inspection and regulation

team if required – referred to as the Byelaws team. While there was expertise within the IMT, and from external expertise engaged by Dr Inkster, I thought bringing in the expertise of our national water company would have been helpful, and this was my experience from a previous hospital water incident. They would be able to visit the site, and work with the NHS GGC team on reviewing the water system, and suggesting any remediation they thought necessary. Mary Ann Kane, representing Facilities considered that we did not need support from Scottish Water at that time and this was accepted by the group.

56 I can understand the argument that some people may take a view that they would not add to the acute response to the cases of infections, but they ould certainly add to the considerations on longer term control of the water system. Therefore, at the first meeting of the Water Technical Group, I again suggested bringing in Scottish Water for their experience. Facilities representatives expressed the same view as had been expressed at the IMT. Colleagues from Health Facilities Scotland also disagreed with my suggestion, stating that Scottish Water did not have experience of large complex water systems such as in the QEUH/RHC campus. Because of these objections Scottish Water were not asked to support the response. I believe this was a missed opportunity.

57 At the IMT there followed extensive discussions about the efficacy of water filters. That is, very fine mechanical filters that are attached to the tap outlet that would stop any bacteria in the water passing through. The IMT continued to support the use of the filters. The question then became whether to trust the manufacturers' assurances as to the efficacy of the filters, or to carry out local testing before allowing use of the water from these taps. Some IMT members wanted a trial period, with daily water testing before bringing taps back into use. My view was, they had been subject to extensive testing the manufacturer, and were used in other hospitals, so we should trust that they would be effective. In the end the IMT reached a compromise position. There would be ongoing sampling, but the service would not need to wait for results

before using the taps with filters fitted, and Facilities would change the filters every 25 days, rather than every 30 days, which was the manufacturer's recommendation. I was content that this decision, which would allow removal of the water use restrictions, and provide confidence that the filters were effective, was proportionate.

58 I understand that after the meeting Dr Inkster contacted Peter Hoffman, Public Health England and Dr Susanne Lee, Public Health Microbiologist, an international water expert, who both supported the decision to use water filters. I was not involved in those discussions. I believe having the agreement of two independent experts was helpful.

59 The next IMT was on 23 March 2018 **(A36690544 - 23.03.2018 9. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 20)**. At that IMT I presented the epidemiology work I had completed. This was 'descriptive epidemiology' – that is looking at links between cases in terms of time, place and person, and any shared exposures. I will define descriptive epidemiology more fully later in this statement. As there was only one case of Cupriavidus there was really no scope for this type of investigation, as there were no other recent cases to compare to. I was also able to establish the patient with Stenotrophomonas in Paediatric Intensive Care Unit (PICU) was not linked to the three Stenotrophomonas cases in Ward 2A.

60 I was able to provide report of detailed results of my epidemiological investigation into the three cases of Stenotrophomonas, and a further case with faecal colonisation, who had strong links to Ward 2A. All four were inpatients in 2A in two different time periods- mid-February and again in early March, so they had multiple opportunities to interact with each other. Two of these cases had been nursed one after the other in Room 9. Subsequently, the colonised patient and one of the cases were nursed sequentially in Room 12, which is the room where water from the shower had tested positive for

Stenotrophomonas. The third case had been in Room 11 throughout. We therefore had four patients, with the same organism, linked in time, place and person, and the same organism found in a shared environment. On the basis of this information, the most likely source was the shower outlet, and there had then been either direct transmission between the patients, or cross transmission from a health care worker, or a piece of equipment.

61 Later, additional information, the typing results, cast doubt on this explanation. Typing is where additional microbiological testing is used to determine if isolates of the same species are closely related or identical. The Stenotrophomonas isolates were all typed as ‘unique’. Which means not only were they all different form each other but were different from any other isolate in the typing database. This indicates that the cases possibly aren’t linked, which contrasts with the epidemiology. However, the view expressed by water experts, first I believe by Suzanne Lee, was that if there was biofilm in the pipework, you could have multiple different strains present, and therefore based on the number of samples we had, you could not rule out that they came from the same source. There has been further work done more recently in terms of whole genome sequencing (WGS). It is possible to have organisms which do not type together, but WGS shows are related, or have a common ancestor. I would think that if there were multiple strains in the biofilm, they may well demonstrate a common ancestry. My understanding though is the WGS results demonstrates they are very different, so unlikely to be from the same source. This is a good example of the point made earlier in my statement, of the importance of looking at the epidemiology, microbiology and environmental samples as a whole, and no tin isolation.

62 Also at this IMT, Dr Inkster requested that HPS look at the ECOSS system to check if historical patient cases within Ward 2A and Ward 4B could be related to water issues. I have been asked by the Inquiry if I am aware of this work having been completed by HPS. HPS have produced a number of reports related the issues at QEUH/RHC, though I am unsure if this specific task was ever completed. As the months moved on this was raised several times at

IMTs and nothing had been produced by HPS. I had started the task of doing something similar, producing a report using ECOSS data, which I submitted to the IMT. I describe this report in more detail later in my statement. I did discuss the issue with Dr Inkster outside the IMT setting and apologised for the length of time it had taken to produce my written report. She told me not to worry about it and appeared to be more concerned over the length of time it was taken for HPS to complete the task. She felt that HPS were waiting on me to produce the report so they could then copy it or use data from it.

63 I recall Annette Rankin reporting that HPS were asked to do a 'root and branch' review of Wards 2A and 2B, parallel to similar work being undertaken by HFS. This was at the IMT on 5th June 2018. Annette stated that HPS would not begin their epidemiological study until they had conducted the review of Wards 2A and 2B.

64 This 'root and branch' review was being undertaken by Annette Rankin from HPS and would involve a comparison with Ward 2A and the old Schiehallion ward, Yorkhill Hospital. This comparison was chosen as it dealt with mostly the same patient group undergoing similar treatments in environments that should be similar in specification. It would look at the physical environment, domestic and nursing service/hours, change in patient numbers and examination of chilled beams, along with published outbreaks and speaking to staff.

65 Following this review HPS would compile a data comparison where they would extract data of all bacteraemia from 2012 and compare it with the rest of Scotland. It was also suggested by the IMT that Annette should contact Public Health England to see if there have been any similar outbreaks within England and if there are any similar set up of BMT standalone wards within a paediatric hospital anywhere in England.

66 I recall discussion in the IMT where questions were raised over the choice of comparator, as HPS would be comparing quite old hospital wards to a brand-

new hospital ward, a different built environment. There was also the issue of the volume and acuity of patients seen in the Glasgow unit compared to those seen in Edinburgh and Aberdeen. The Glasgow unit staff would be dealing with patients who are more at risk of infections and complications than the groups in those two hospitals. So, when comparing across these hospitals one would expect to see a higher infection rate in the Glasgow cohort than you would in the Aberdeen cohort. My own thoughts were that comparisons should be made to other tertiary centres, such as Great Ormond Street, making the request to contact PHE very important.

67 My understanding is that HPS did not produce an epidemiology report at that time. I am aware of a 2019 report they did produce, which included a comparison of my epi report, a separate report produced by the microbiology team, and HPS own work. The HPS conclusion was that all three pieces of work produced extremely similar results, so they triangulated the epidemiology, which was reassuring.

68 At the IMT meeting on 27 March 2018, we discussed the water situation **(A41890244 - 27.11.2019 IMT minutes Gram Negative Ward 1A PICU - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 90)**. According to the minutes, some water tests were positive for gram-negative pathogens, and there were some high fungal counts, some greater than 100, found in a number of locations in the QEUH and RHC sites.

69 I have been asked by the Inquiry if this was significant and to provide an understanding of what was going on at that time. As these were pre-filter samples, and we knew the filters were effective, this did not represent a direct risk to patients. However, it confirmed that there remained an issue with the water supply and the longer-term solutions needed to be progressed.

70 It was during this IMT meeting that Dr Inkster informed the group that the IMT would be stood down following the meeting. Dr Inkster explained that her

decision was based on all the acute issues having been addressed, an enhanced incident management response was no longer necessary. A separate group, what would become the Water Technical Group, would instead take forward the longer-term actions. This new group would look at the remit of filter placement, instruction on new taps, chlorine dioxide dosing and drain cleaning. In my opinion this was the correct time to move away from an acute response. A debrief, to be led by HPS, was being set up, which is good practice. As the IMT was not planning meeting again, there should have been a review by the IMT Chair that all outstanding actions had been completed, and an outbreak report prepared. I do not know if those steps were completed.

IMTs Autumn 2018

71 I attended an IMT on 14 September 2018 **(A37990970 - 14.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 33)**, at which we discussed the issue with the drains within Wards 2A and Ward 2B, and other parts of RHC, and contingencies for patient care if there was a need to move patients out of Wards 2A. My understanding was that some 'black grime' had been seen regurgitating out of some of the sink drains, and swab tests of the drains had grown a number of different gram negative bacteria. This could potentially present a risk if these bacteria were aerosolised. It had been recommended that some preventative work would be conducted on the drains in terms of replacing components and deep cleaning of Wards 2A and 2B.

72 The Phase One contingency plan put forward involved potentially using the Clinical Decision Unit (CDU) if a patient were to attend either ward to be seen or admitted. I raised a concern that given issues had been identified with some drains outwith Wards 2A/2B, and the initial water issues investigated earlier in the year had been more widespread, there was no guarantee that CDU was free from the drains issue. Therefore, rather than using any bed

space in CDU, specific cubicles should be identified for use of the haematology/oncology patients, and those cubicles should receive the same drain cleaning control measures as 2A/B. My understanding that this action was completed, and the designation of specific CDU beds was included in the patient pathway.

73 In the September IMTs, the IMT agreed to recommend a complete decant of Wards 2A/2B. This would allow more significant works to be undertaken on the wards that would prevent any recurrence of the issues experienced with the water and drains. The IMT had a full discussion of several options, as detailed in the minutes. The conclusion was to recommend decanting the paediatric BMT patients into the adult BMT ward, and the rest of the patients into another ward in QEUH. It was agreed this recommendation would be presented to the executive team.

74 Immediately following the IMT meeting I, along with other senior members of the IMT, attended a further meeting with the executive team, which was chaired by Jane Grant, in which we discussed how the recommendation of the decant could be operationalised. As mentioned earlier in this statement, IMTs are decision making bodies. They also need to be aware of the legitimate bounds of that decision making authority. There are circumstances where the size of the decision, or the knock on effects of a decision mean the IMT should limit itself to recommendations, request decision making from a higher authority. Decanting these wards was complex, impacting on paediatric and adult hospitals, and a national service. Therefore, the decision needed to be made at an executive/board level.

75 From memory the chief executive, the chief operating officer and the sector director were all there. It was a good meeting in terms of the atmosphere in the room. It was a serious situation and there was an appropriate level of concern. The meeting did not make decision whether to follow the IMT recommendation to decant had not been made. The final decision was made by the board, over the weekend.

76 I was not involved in the decision making itself, and I am not aware of anyone else from Public Health being involved, nor do I have any first-hand knowledge of that decision making, or the reporting of the decision back to the IMT on 18th September 2018 **(A36629310 - 18.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 40)**.

77 The reason I was not in attendance at the IMT on 18th September, was because I was attending an all-day public health reform event as a staff side representative. At that event I was spoken to by two HPS staff about the incident at RHC.

78 Laura Imrie, from the ARHAI team, who I believe was Annette Rankin's manager, asked me what the current hypotheses were for the incident, and how the epidemiology work was going. I was surprised by these questions as I would have expected Laura to have been fully briefed by Annette, so could not understand why I was being asked.

79 Later, Dr Colin Ramsay, a Public Health consultant at HPS, asked to speak to me confidentially, about the incident. First I asked Dr Ramsay's involvement and he informed me he was part of an internal HPS committee that had been setup to support Annette. He said that the IMT should make sure it has also looked at ventilation, which I thought was unusual, as we were dealing with issues related to water systems. Dr Ramsay said it was important to demonstrate that we have considered every avenue, and that HPS was going to be positioning itself defensively.

80 I spoke with Dr Inkster that evening by telephone and fed back to her, as IMT Chair, these conversations. I believe the indicated issues with the flow of information between HPS and the IMT.

81 In terms of the time frame from the decision to decant being made, the preparatory work that was necessary and then the decant, it was done in just over two weeks, which was incredibly fast. The risk assessment and action plan for the decant were regularly updated and shared with the IMT.

82 I have been asked whether I agreed with the decision to move the children to wards 6A and 4B. I did agree with that recommendation. 6A had already been remediated when the hospital first opened, so was suitable for BMT patients. The next most viable alternative was decant to the Beaton. However, the lack of PICU and other paediatric services on that site would create an unacceptable level of clinical risk. The decant into QEUH did increase the distance from the haematology-oncology service and other paediatric services, however, they would still remain on the same sit. Given the initial expectation that the decent would be for less than 6 months, then this would be acceptable, though challenging.

83 I was not involved in any communications to staff, or to patients and families. That task would be shared between the hospital management and the clinical staff. They would be supported by the press office, as there would be public communications too.

84 Also at the IMT of 28 September I gave a brief presentation on my epidemiology findings **(A36629328 - 28.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 44)**. There was also discussion about when the HPS report would be ready. I recall Prof Gibson asking how what I reported compared to the presentation that Dr Peters had given at the recent routine haematology-oncology antimicrobial use meeting. I replied that I could not comment as I had not seen Dr Peter's report.

85 At the IMT meeting on 05 October 2018 the discussions were still on the issues of drains, particularly their contents following drainpipe works on Ward

2A/2B/2C **(A36629290 - 05.10.2018 IMT minutes Ward - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 45)**. During these works numerous items including syringes, small toys, and plastic material had been discovered. Dr Inkster stated that this would need to be addressed ahead of planned remedial works otherwise issues would continue to recur. A recommendation was made that both Dr Inkster and I would create a joint communication for all staff and raise public awareness surrounding this. I contacted Lorraine Dick, Senior Communications officer in regards the matter and there were several emails exchanged, from both myself and Dr Inkster, chasing the issue. A meeting for the three of us to meet and discuss was set for 14th December. However, I do not believe that meeting every happened. My recollection was that decision had been made in the Communications team, that due to the multiple complex communications ongoing around this incident, that this specific communication would not be progressed. I am not aware of the issue ever being revisited. It seemed to me that concerns on reputation management were overriding IMT decisions.

86 I completed the first part of my written report, which had the data for the RHC, and submitted to Dr Inkster on 17th September 2018, and then the whole report was sent to Dr Inkster on 29th September 2018. An updated version was also produced and sent to Dr Inkster on 2 October 2018 **(A42362089 - Report by Dr Iain Kennedy - Descriptive analysis of five year trends in bacteraemia rates for selected gram negative organisms dated 1 October 2018 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 27**).

87 Dr Inkster sent an email on 10th October, asking for comments on the epidemiology reports available, prior to working to combine them into a single report. On 11th October Dr Christine Peters replied with a series of comments. Dr Inkster had answered many of the points, but had left those directly related to the method I used in my report. Dr Peters challenged the reliability of some of my work, although she made no comment on the actual results. In doing

so, it felt more like an attempt to dismiss the report, rather than engage constructively with it, and I felt very negative about this.

88 For example, one of Dr Peter's comments was a question I had posed in the report about laboratory methods. Dr Peters described this as "not valid" and requested it be deleted. It is a very valid question, that is part of standard outbreak investigation. That the answer to the question was that lab methods had not changed, does not alter the validity of the question.

89 I therefore did not respond to the email immediately. When subsequently Dr Inkster indicated the plan to arrange a meeting to discuss, I felt best to wait for that discussion, rather than correspond by email. I did take the points on board and included responses to them in the July 2019 update to the report **(A38662683 - Report by Iain Kennedy "Descriptive analysis of trends in bacteraemia rates for selected gram negative organisms" dated July 2019 - Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 28)**. I took advice from Dr Michael Lockhart on the reliability of the ECOSS data. Dr Lockhart confirmed that there was very high confidence in the ECOSS data for blood culture results.

90 The epidemiology reports were discussed at the IMT meeting on 20 September 2018 **(A36629320 - 20.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 42)**. The consensus then was that they be finalised, submitted for comparison and a meeting be arranged with some of the IMT members, Dr Inkster, and Michael Lockhart HPS consultant microbiologist, so that we could go through them in detail. Due to Dr Inkster's and Dr Lockhart's other commitments, we were unable to arrange a meeting.

91 I attended an IMT meeting on 30 November 2018 **(A42909010 - 30.11.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team**

Meeting Minutes (IMT Minutes), document 54). Dr Inkster advised the group that the HPS epidemiology report was still outstanding; however, since patients had been decanted from wards there was a marked reduction in bacteraemia, which fit with the hypothesis. Dr Inkster expressed that as a result of this any future meetings to discuss the report may not be required. The decrease in bacteraemia following the decant does support the hypothesis, and the chosen control measures, though it does not prove it. Often, in outbreaks you can gather significant evidence that supports a hypothesis, but you can rarely prove the hypothesis was correct.

92 I understood that finalising the epidemiology reports was unlikely to make much difference to the control measures in the short term. However, I was disappointed in this decision, as I believe they would add to the understanding of everything that had gone on; that is there were still unanswered questions on how we got to that situation, and how would we avoid it in the future. It was also important from an incident management principles point of view that you need to take epidemiology, microbiology, environmental and the clinical picture as a whole. You should not rely on just one of them and say we do not need the epidemiology anymore, as that is not keeping with best practice.

93 Dr Inkster also explained that Annette Rankin's report would be delayed until the ventilation report had been completed. I am not sure which ventilation report is referred to here; and I do not know who commissioned it.

94 In general, I believe that the IMT was still functioning at this time, though given the outstanding reports that were awaited, there were some loose ends that should have been pursued, rather than dropped.

Cryptococcus

95 I first attended an IMT about Cryptococcus on 20th December 2018 **(A36605178 - 20.12.2018 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 55)**. The

meeting had been called to discuss two cases of Cryptococcus neoformans found in blood cultures from haematology patients. Dr Inkster explained that this organism was rare and not typically hospital acquired. Sporadic community cases were known to occur and Cryptococcal meningitis has been seen in HIV patients. I was aware of Cryptococcus because of its link to HIV but had never come across it in an outbreak incident. I am aware that it can be found in soil and bird droppings, particularly pigeons.

96 As a result of their infection a paediatric patient died on [redacted] 2018. Both patients had positive blood cultures, and the patients had been diagnosed over a [redacted] within two separate wards (Ward 6A and Ward 4C). Dr Inkster had contacted PHE Mycology laboratory in Bristol who stated that we could expect to see community acquired cases but that they had no hospital acquired cases notified to them. Given the information provided by Dr Inkster, my initial thoughts were that the presence of two cases in such a short time potentially significant and required investigation, but I was keeping an open mind, as at this stage there was insufficient evidence to conclude that the two cases were linked, and both were infected in QEUH.

97 Dr Inkster said that she had conducted an initial epidemiology report looking back at how many cases there had been of this organism, which had revealed four cases in blood cultures in the last two years. Three of those were attributed to community acquired cases and the fourth also appeared to be community acquired but required a case note review. I advised the meeting that ECOSS data showed 13 cases in the last 10 years with a cluster associated to the Brownlee Centre and therefore likely to be people living with HIV.

98 I agreed to undertake a more detailed review of epidemiology. The initial report was very brief – just headline figures that could be accessed in the time available before the IMT. A more detailed review would be required to understand the historical cases and identify if any of them might be linked to the current incident or associated with the two recently confirmed cases.

99 In regards the outbreak of Cryptococcus, I have been asked by the Inquiry if the distinction between Hospital Acquired Infections (HAI) and Healthcare Associated Infections (HCAI) plays any part in my role as Public Health consultant. They are generally not a helpful categorisation for most of the incidents Public Health teams deal with, as they are hospital focused, and Public Health focus on community incidents. These are standard definitions which apply nationally as to whether something is hospital acquired or not, which usually is based on how long a patient has been in the hospital before they are diagnosed. If a patient is diagnosed within the first 48 hours of admission then the infection will be community associated, and if more than 48 hours, in general it will be categorised as HAI. However, that is not necessarily straightforward, or appropriate, as many infections have a much longer incubation period, and therefore a longer inpatient stay would be required before assigning as HAI. HCAI is an in-between category, where a patient may not meet the definition of HAI but have had healthcare interaction recently – such as having been discharged within the last 30 days, or recent intervention, such as bloods being taken, or another invasive investigation. This includes anyone with an indwelling line, like many haematology-oncology patients.

100 The definitions of HAI and HCAI are most useful in disease surveillance. In incident management their application needs to be more careful considered, as they are somewhat arbitrary distinctions, and if cases are classified as HAI, then logically any investigation and hypothesis is narrowed to focus only on the hospital as a possible source.

101 I have been asked by the Inquiry if this distinction was appreciated by others involved in the process. I cannot speak to others understanding, but I would say that the distinction between HAI and HCAI is not necessarily intuitive, especially if applied arbitrarily, and it is not necessarily useful. Implications on hypothesis generation if the definitions are applied too strictly was probably not considered by everyone.

102 During the meeting I queried whether, if they were hospital acquired, it was QEUH they were acquired in. One of the patients had been transferred from a hospital in England, so is likely to have had a continuous hospital stay for quite some time. The hospital in England was in a region with a higher incidence of cryptococcal infection. Even though they had been an inpatient in QEUH for three weeks, the long latent period of fungal infections means it may alternatively be an HAI to the English hospital.

103 The other patient was someone who appeared to be getting better, their immune system was recovering, but they then had become unwell. I was aware from community public health of a condition called Immune Reconstitution Syndrome (IRIS). This is where a patient may have an overwhelming response to an infection which has been latent or asymptomatic as their immune system recovers. An example of which would be if a patient has both Tuberculosis (TB) and untreated HIV, who may have few TB symptoms, due to being immunosuppressed. If you start with their HIV drugs, their immune system will recover and they will be extremely ill as it attacks the TB, so the best approach is to start the TB treatment first, wait a couple of weeks, and then start the HIV treatment.

104 I suggested to the group that given the clinical history of this patient, this could be something similar, particularly with a fungus, which could have been sitting dormant in the body. Dr Inkster did not think this was the case as the organism had not been detected in the patient previously, and as they had underlying conditions there was lots of testing going on all the time. After this there was no further discussion of alternative sources that I recall.

105 However, my own thoughts were that we could not say with certainty that either of these cases were both acquired in the QEUH. At this point, to my mind, there was insufficient evidence that either of the patients had caught their infections in QEUH to declare this as an HAI outbreak. That is not to say that the hypothesis put by Dr Inkster was incorrect, but rather there were other

plausible avenues that could have been explored. Assigning both cases as HAI to QEUH at the outset closed the possibility of broader considerations.

106 In outbreak investigation there is a term ‘pseudo-outbreak’. This is not a pejorative term, but a technical one. It refers to two mirror situations – where there is false clustering of true cases; or true clustering of non-cases. Pseudo-outbreaks may still be worth investigating, as they can still generate learning, or be an indicator of other issues where preventative measures may be implemented.

107 I have been asked by the Inquiry if the discovery of Cryptococcus would necessarily have resulted in Microbiology contacting Public Health, and the answer is no. Cryptococcus is not a notifiable disease, and there is no Public Health action, and we would therefore not expect to be contacted by Microbiology.

108 During the meeting we discussed risk management and control measures. As it was suspected that it may be linked to pigeons’ excrement, I had spoken to a contact of mine who was a senior veterinary officer at the Animal and Plant Health Agency, regarding any information around Cryptococcus in birds, and cases of transmission from pigeons to humans. He did not have any knowledge of this issue. I emailed another veterinary consultant Dominic Miller, who works for HPS, to see if he had dealt with cases in the past and similarly, he had not encountered it. There is very little surveillance of disease in wild pigeons as they are usually not much of a risk to humans, and so there was no useful information on Cryptococcus in pigeons in Scotland.

109 At the meeting, the early hypothesis for the Cryptococcus seemed to be that it may be a result of birds roosting within the ventilation plant room. The IMT were presented with evidence that there had been pigeons roosting in the floor plant room, and Dr Inkster suggested that Cryptococcus in the pigeon droppings could be aerosolised during maintenance or cleaning. This was a plausible hypothesis, but at that time I did not think there was enough

evidence to have sufficient certainty, as we were just starting our investigations.

110 Prior to the IMT there had been no previous issues or concerns raised about pigeons in plant room, but I do recall an inquiry about pigeons roosting above a door, which was dealt with by Stan Murray of the Environmental Public Health team. I contacted him later for support in producing an information and advice sheet for occupational health, as they were getting a lot of queries from staff about the impact of pigeon droppings on health.

111 Given the mention of duty of candour at this IMT meeting, I have been asked by the Inquiry my understanding of duty of candour and how it interplays within my role as a Public Health consultant. There is no special or different role for a Public Health consultant compared to any other health professional, and Public Health do not have any specific or additional involvement in duty of candour.

112 Duty of candour can be used to refer to professional duty of communication – our responsibilities to keep patients informed of matters relevant to their health and care. This would include informing them if they have an infection, what actions are needed because of the infection in terms of treatment or preventing spread. In Public Health led incidents, we would also inform the patient if we were investigating other cases and what the purpose of that investigation is.

113 Separate to that there is the statutory duty of candour, where because of some action or inaction by the health service, there has been some harm caused and we have responsibility to investigate and inform patients within strict timetables. This is an organisational, rather than individual, responsibility. If I was concerned that something had happened my service that might trigger the statutory duty of candour, I would be reporting it to my director, and taking advice from senior clinical governance colleagues. The

minutes demonstrate a similar view, with Dr Inkster seeking advice from Dr Armstrong on duty of candour

114 Historically, communication in outbreaks was only proactive if there was a specific action we wanted people to take, or a potential risk we wanted them to be aware of. Modern best practice in outbreak communications is very different. Evidence based best practice guidance is available from WHO, US CDC and European CDC. Important principals include openness, transparency, communicating early, and not being scared to say there are things we don't know. In revisions of the NHS GGC area-wide Incident Management Plan over the last four years, I have expanded the communications chapter to included information and guidance on these principles, and an outbreak communications workshop was included as part of our three-yearly outbreak exercise in Autumn 2023. Though the old fashioned, paternalistic attitude is still sometimes seen, in general the professional communities involved in incident and outbreak response are becoming better at pro-active outbreak communication.

115 I have been asked by the Inquiry if I am aware of the procedures in relation to facilitating disclosure of concerns regards wrongdoing or failure in a service. My first step would be to discuss with my line manager, director, or IMT chair as appropriate. The Incident Management Plan includes a step-wise escalation process for concerns about IMTs. In terms of knowledge NHS policies and procedures, I am aware they exist and would be able to access them through HR website. These policies are included as part of corporate induction, so all staff should be aware of them. Someone working in Public Health would not have any greater knowledge of the procedures than other staff members, unless they had specific whistleblowing responsibilities in their job role.

116 I have been asked by the Inquiry if I am aware of specific changes to whistleblowing policy at QEUH. I am not aware of changes specific to that hospital. However, there are national 'Once for Scotland' changes that have

been brought in, including new whistleblowing champions, and the introduction of a national whistleblowing hotline. These changes were publicised through staff communications.

117 I have been asked by the Inquiry if I had concerns regards workplace culture in relation to communication and duty of candour. Regards the workplace culture in my own department, I have no concerns.

118 I have been asked for my understanding of communications between management and clinical staff at QEUH. My only knowledge will be that recorded at IMTs or Infection Control Committees. I was not party to other communications between management and clinical staff in QEUH. This would be normal, and Public Health would not be involved or aware of any communications that were not processed through the IMT structure. There would be no expectation that all communications would be seen by Public Health.

119 I have been asked by the Inquiry if certain items (number of HAI, decisions on changes to clinical management, decisions on adaptation or refitting buildings), were always notified to Public Health, and if these notifications would relate in communications. This would be out of scope of the remit of Public Health, and I would not expect these items to be notified to us, and we would not have responsibility for communications related to issues related to hospital incidents and outbreaks led by Infection Control teams.

120 Similarly, in relation to communications which I was allocated a role in preparing by the IMT, this would be in respect to helping draft the wording, or reviewing the wording once a draft was prepared. I would have no role in the approval or authorisation of the communications, and very limited role in dissemination (for example, if they needed to go to the on call Public Health team, or to Local authority Environmental Health colleagues). Communications I would have supported would always have been written - for

example staff briefings or media statements. Details of the content are therefore recorded in those statements.

121 In general, IMT protocol is that all communications relating to the incident should be agreed with the IMT Chair. There may need to be other approvals - for example for Public Health incidents in the community, I would always confirm the wording of a press statement with my Director – but the IMT Chair needs to be involved in that process. Indeed, it is a fundamental breech of IMT protocol for information to be shared without agreement of the IMT Chair. There may be occasions where after the IMT has made a decision on communications, someone external to the IMT raised questions, concerns or suggests alternatives – these queries should come back to the IMT Chair for discussion, and not just made out with the IMT structure.

122 At the IMT on 16th January 2019 **(A36690590 - 16.01.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 58)**, Dr Inkster provided results of air sampling from the wards and plant room areas. No Cryptococcus neoformans had been detected. Dr Inkster explained that *C. neoformans* is notoriously difficult to culture, so that was not an unexpected result. However, she explained that another Cryptococcus species, *C. albidus*, had been detected in both the ward and the plant rooms. Dr Inkster explained that this was a different strain from the one isolated from the two patient cases, it was less pathogenic but still a risk to haemato-oncology patients.

123 I informed the group that this species was seen far less often than the *Cryptococcus neoformans*, and local lab data showed it had been reported only once, and that report appeared spurious, as it was later updated to an unrelated, but similar sounding organism.

124 Dr Inkster described the *C. albidus* as a proxy for *C. neoformans*, and therefore given it was found in both the wards and the plant areas, a useful

indicator that there is Cryptococcus coming through the ventilation system. Based on the information available at that time and explanation given by Dr Inkster, it strengthened the hypothesis that there was something coming through the ventilation system from the plant room.

125 Although these results strengthened that hypothesis, it was not definitive, and other hypotheses were also still being investigated, which were looking at how infections from pigeon faeces could enter the building. The question then was what control measures we were going to put in place to address this. The IMT recommended that the plant rooms be cleared, cleaned, and resealed, and other actions to be taken in terms of controlling pigeons on-site. This responsibility would fall to Estates and Facilities. There were other control measures recommended, which included the siting of HEPA filter units and the provision of prophylaxis to patients, I asked at the IMT about the provision of prophylaxis, and was informed that options were limited, and it was only being given in line with European guidelines.

126 I have been asked by the Inquiry whether I had any concerns about the risk of infection from ventilation prior to that point. Specialist ventilation is out with the normal scope of Public Health practice, and would defer to what was led at IMT by Infection Control or Facilities.

127 An action allocated to me from this IMT meeting was to seek feedback from HPS and obtain a national picture relating to Cryptococcus cases amongst humans. I believe I did get a response from HPS however I do not recall that there was anything significant in their reply. We would assess what was being investigated locally against nationally epidemiology to understand whether other areas had seen similar things.

128 A further IMT meeting followed on 17 January 2019 **(A36690588 - 17.01.2019 IMT Cryptococcus Part 1 AM - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 59; A36690599 - 17.01.2019**

IMT Cryptococcus Part 2 PM - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 60), to discuss the Cryptococcus incident, which I attended. At that meeting I provided a written report on historical cases of Cryptococcus from January 2009 to December 2018. This report was compiled by me and one of the Health Protection Nurse specialists, and provided more detail than the update I gave at the IMT meeting on 20 December 2018 **(A36605178 - 20.12.2018 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 55)**. We had reviewed the ECOSS data and electronic patient records of all thirteen cases individually and the key conclusion reached was that none of the historical cases were linked to this incident.

129 This is an important part of outbreak investigation, termed ‘case finding’. To support generation and testing of hypotheses, and decisions on control measures, IMTs need as much information about relevant cases as possible. If there are a large number of unknown relevant cases, then key information may be missing. Similarity, if patients with the infection, who are not part of the outbreak, are included then irrelevant information may be presented to the IMT. In both these scenarios, data could present a misleading picture which could result in the IMT not making the correct decisions in controlling the outbreak. Therefore, having good case definitions and good case finding are important aspects of incident management. The report provided by Public Health gave high confidence that the appropriate cases had been identified.

130 I have been asked by the Inquiry who received this report. This report was presented to the IMT. I do not know who else saw this report. It would not have gone to the Board, and I do not believe it went to an infection control committee. Dr Armstrong would have received a copy, as she was a member of the IMT.

131 On 21 January 2019 **(A36690569 - 21.01.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1**

- Incident Management Team Meeting Minutes (IMT Minutes), document 62), there was another IMT meeting to discuss updates on the Cryptococcus incident. Dr Inkster informed the group that there had been two cases of Mucormycosis within the Critical Care Unit (CCU), QEUH. Both results had been found from respiratory samples. Following the meeting of the IMT it was identified that a leaking dialysis point was likely the cause of the fungal infection. This room had been sealed and Estates were working to rectify this.

132 Several IMT meetings followed as a result of the Cryptococcus incident, throughout January and February 2019. This resulted in further control measures being introduced and the movement of vulnerable patients across wards. On 22 January 2019 the Cabinet Secretary, Jeane Freeman MSP visited QEUH, and it was after this visit she commissioned an external review of the design, commissioning, and maintenance of QEUH, which would be made public.

133 I had no concerns at this stage as to what was being communicated to the staff at IMTs. Additionally, at this stage from what was reported at the IMT there were no issues with communication with the families of the two patients. However, there were concerns reported by Professor Gibson regards communications for families on social media, especially those whose children were not currently inpatients. As far as the role of Public Health, which is support to the IMT, I was not concerned that there was information I should have had but did not. Given the role of Public Health in HAI incidents, I would not expect to be aware of the detail of operational issues in the hospital that were not required for IMT decision making.

134 I have been asked by the Inquiry about actions on communications for staff from the IMTs on 25th January and 28th January 2019. I believe these relate to the same communication. A briefing of staff was prepared by Dr Inkster and Rona Wall, head of Occupational Health. I along with Dr David Stewart and members of the comms team were asked to review. I provided comments on the text. Ally McLaws, then Director of Communications confirmed that day

that it would be a direct briefing to hospital staff, rather than circulated via the all staff Core Brief.

135 Following the IMT on the 28th January **(A36690584 - 28.01.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 66)**, I forwarded this email correspondence to Mark Dell, who was now taking forward the preparation of the document. I prompted him on 30th January for the need for an update at the IMT that day. It was recorded as an action at that IMT that the brief would be sent out by the press office. I do not know if that action was ever completed.

136 At the IMT on 4th of February 2019 **(A36690558 - 04.02.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 68)** I mentioned a factual information sheet that Public Health were preparing. This had arisen as local authority Environmental Health Officer colleagues had received questions from the public about health risks from pigeons and were looking for support. Public Health prepared an information sheet for them to assist them. My recollection is this was based on advice given to previous enquiries received by Public Health.

Review of 2017 cases

137 On 5th March 2019, I was forwarded an email from Jennifer Armstrong via the Director of Public Health asking if I would support response to an issue raised by Dr Inkster and Professor Gibson about whether cases of potential gram-negative bacteria from 2017 had been appropriately identified and dealt with. They had approached Dr Alan Mathers, Chief of Medicine for Women and Children's, as they were concerned about the pattern of incidence of bacteraemia. They wanted to establish if the children had received

appropriate clinical care, and if there had there been issues with procedures and line management within the microbiology laboratory.

138 I subsequently met with Alan Mathers and Sandra Devine. Dr Mathers provided more detail of the background and his conversation with Dr Inkster and Prof Gibson. Dr Mathers was waiting for Professor Gibson to get back to him about reviewing the cases to make sure the children had received appropriate care. I agreed to update the epidemiology report that I had produced at the end of 2018, to include results since the report was completed, and to separate the haematology-oncology patients. Once the report had been finalised the clinical team were going to look at the results, following which myself, Alan, Sandra, and Professor Brian Jones, Head of Service Microbiology, would meet to discuss the results and consider the questions raised about laboratory practice.

139 I submitted that updated report at the end of July 2019, both to Dr Mathers and others investigating the questions raised by Dr Inkster and Prof Gibson, but also to Dr Inkster as chair of the IMT for onward sharing with the IMT. It was not shared at that time **(A38662683 - Report by Iain Kennedy "Descriptive analysis of trends in bacteraemia rates for selected gram negative organisms" dated July 2019 - Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 28)**. My report was eventually shared and discussed at IMT meeting in August 2019, however I was not present at that meeting. It was later in the year that the review of 2017 cases was reported in the press and in Parliament, after it had been passed to the Daily Record and the Scottish Labour Party. At that time, it was a shock that this patient level information was suddenly in the public domain.

IMTs Summer 2019

140 At the IMT on 25th June 2019 **(A36591622 - 25.06.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 73)**, Dr Inkster informed the meeting that there had

been six gram negative bacteraemia positive patients in the last three months. Of the six cases two of them were Hospital Acquired Infections (HAI) and the other four were Healthcare Associated Infection (HCAI). She also advised the group that there had been two cases of Mycobacterium chelonae (M. chelonae) in the last 12 months. The last case was from a blood culture taken on [redacted] May 2018 and the most recent case was from a sample taken on [redacted] May 2019. This case was classed as an HCAI as patient was not an inpatient at time of sample.

141 It was reported at the IMT that in the last decade there had been four cases of M. chelonae reported within the adult population within NHS GGC. All four were haematology patients with links to Beatson and were spread out through numerous years. There had been no paediatric cases reported within NHS GGC in the last 10 years, and now two paediatric cases being reported within 12 months. There was limited epidemiology for this rare mycobacterium and Annette Rankin, HPS, was asked to get a list of all positive M. chelonae cases within Scottish health boards, to allow us to compare figures. I agreed to take an action from the IMT to contact Scottish Water to see if we could obtain water samples from water being sent to QEUH and test in our own labs, which can look for mycobacterium. I arranged this testing with James Simmonette, Scottish Water, by email. It was scheduled to take place on 28th June 2019. As I was about to go on leave, I asked James to liaise directly with the infection control team about the samples.

142 At this time I was beginning to have concerns about the functioning of the IMT. These went beyond the minor issues of efficiency I have mentioned earlier in my statement regards the 2018 IMTs. The IMT was losing focus and direction, and the interactions between IMT members was becoming strained.

Infection Control

143 It was around this time that my working relationship with Dr Inkster began to deteriorate. This followed on from my producing a briefing note for Dr

Armstrong, on the general of mycobacteria in water supplies. The briefing was for Dr Armstrong's use, to support her in discussions with others, such as Board members, and was not intended to be widely shared or published. I was directly commissioned to produce it by Dr Armstrong at a meeting of BICC. I circulated a draft of the briefing to senior IPC team members prior to sending to Dr Armstrong. Dr Inkster replied, she was unhappy about it and was quite critical of the document. Her criticisms were mostly mis-directed, as Dr Inkster misunderstood the purpose of the document. It was not an attempt to summarise the current cases or related factors as Dr Inkster assumed, but more general information. I was, though, still able to incorporate some of Dr Inkster's comments and literature she referenced. Dr Inkster also expressed that she strongly believed I should not have produced the document, asking why she had not been asked to do it. Why I had been asked rather than Dr Inkster would be a question of Dr Armstrong, however the request had come at a BICC meeting Dr Inkster had not attended.

144 Another feature of the breakdown of our working relationship was we would no longer have our informal debriefs after IMTs. These were informal meetings, sometimes in the canteen, sometime just in the corridor. They may have been one-to-one or with other members of the IPC team. We would just chat about the IMT and sometimes other matters. They were a form of peer support. These simply stopped around this time.

145 Disagreement on the progress of the IMT was another area which contributed to the deterioration and was also a demonstration of that deterioration. There were far fewer infections in 2019. I did not think we should be jumping to the same hypothesis or the same control measures, same reactions, and never really finding the underlying cause of the issue. I do not think Dr Inkster and I were aligned with each other on what the direction should be, and I am sure she was aware of this divergence of viewpoints. My contributions would be mis-characterised or dismissed as saying there was no problem or that the cases identified did not need investigation, which is untrue. On one occasion

in the IMT Dr Inkster said I needed to “keep an open mind”, and I felt that I was the only person who was.

146 A good relationship between the Lead ICD and Public Health is important, not just for the smooth operation of the IMT, but across all the areas where we might have shared interests or joint working. I was sufficiently concerned that I raised the issue with Prof de Caestecker. She offered to call to Dr Inkster and set up a mediation between us. I declined that offer, believing that we could still resolve things directly. I contacted Dr Inkster a couple of times by email, to try and set up a time for us to talk, but Dr Inkster was never available.

Meeting 20 August 2019

147 On 20 August 2019 I attended a meeting that had been arranged and chaired by Professor Linda De Caestecker, Director of Public Health NHS GGC, to discuss behavioural issues at a recent IMT meeting on 14 August 2019 **(A36591626 - 14.08.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 77)**. The issues raised included the nature of communication, inappropriate language, confrontational behaviour, and feelings of blame being attributed.

148 Due to a diary error, I had missed most of the IMT meeting on 14th August and only caught the last 10 minutes of it. I can recall walking into the room and feeling the tension within, things did not feel right. When the meeting finished Jen Rodgers and Tom Steel (Estates) spoke to me about how the meeting had gone. They told me that they had found it a bit problematic with some inappropriate behaviour and language by those in attendance, that their expertise was being ignored or disrespected, and they were keen to escalate things.

149 There were broader issues with the relationship between Infection Control and Estates and Facilities that have been brought out in previous external reviews

and some of these issues were obvious in the IMT. For example, during the Cryptococcus incident there was a decision made to get advice from Peter Hoffmann, Public Health England. Dr Inkster arranged for Dr Peters to have that conversation. No one told Estates about the call despite it being about facilities and ventilation, and they felt they should have been involved in that conversation. Then there was tension over who had the conversation and when would the information be shared with Estates.

150 I advised Jen and Tom that as part of Public Health procedures we also had processes for reviewing performance of IMTs. As part of that someone else could take the lead. However, I did not want Public Health to take the lead, IMT do that, and I did not think it was appropriate for us to come into this type of incident. I got the impression that this meeting had been a trigger point for others to say that things needed to change.

151 I decided to raise the issue with Professor De Caestecker who told me that she had heard similar from multiple people who had attended the IMT on that day, either directly or reported to her by Dr Armstrong as the HAI Executive Lead. It was becoming apparent that with these issues the IMT was not performing. As part of the processes and procedures every NHS board has an Executive Officer who is responsible for managing performance of IMTs, within NHS GGC it is the Director of Public Health.

152 The meeting on 20 August 2019 was attended by members of the IMT and other members of senior management. Some had regularly attended IMT meetings, but some had not. At the meeting a number of issues with the IMT functioning were raised, and considerations on improving the performance. We discussed whether it would be helpful to have new leadership within the Incident Management Team and a decision to have a change of Chair was one of the key outputs from that meeting. I recall it was suggested that I might take on chairing the incident. I argued against that position. I felt it should be someone more senior, and if someone from Public Health chaired the IMT, it may wrongly give the impression that Public Health had taken on

responsibility of the management of the incident. I suggested that one of the Deputy Medical Directors would be more appropriate. I recall the draft minutes stated that there would be a conversation with Dr Inkster regards her demitting as chair. The final version of the minutes stated that she would demit.

153 Dr Inkster was off sick and was unable to attend the meeting to discuss IMT performance. Dr Emilia Crighton was asked to take over the Chair of the IMT. I do not know who asked Emilia, or what discussions had occurred in the executive team regards agreeing who should take on responsibility as Chair. There was then confusion at the next IMT on the Friday of that week, and it was unclear whether this was a temporary measure due to Dr Inkster's absence or if Dr Crighton was now formally Chair of IMT.

154 There is not a formal process of appointing the initial Chair of an IMT. For Public Health led IMTs, quite often you take on chairing the IMT simply because you are the duty person the day the incident starts. Alternatively, you may have that type of infection in your pro-active portfolio, so responsibility for leading the IMT may be passed to you. Changing the chair of an IMT is not unusual, and in fact the guidance encourages rotating the chair, especially if it is complex or long running. This is to keep the team fresh and to avoid fatigue. It is also not unusual for someone who had previously been IMT Chair to rotate back into the role – demitting office as Chair is not a barrier to being IMT Chair again.

155 For example, I recall a water incident at the Royal Alexandra Hospital in Paisley in 2006 involving an external water contamination issue where we had to switch off the mains water for five days. We had daily IMTs and went through four chairs in a week, because we rotated it. Whilst this is an extreme example, it does demonstrate the principle.

156 Personally, I think changing the chair was the right decision, but it could have been handled better. I have been asked by the Inquiry why the Chair had not

been rotated previously. I believe that some of the other Infection Control Doctors found the incident too complex. I also think the external scrutiny and media coverage may also have put anyone off taking the post. However, I also think in part it is because Dr Inkster did not want to relinquish the role. I recall having a conversation with Dr Inkster about it once, in 2018. Dr Inkster indicated that she was feeling significant pressure, including from HPS. I said I would have offered to Chair the IMT, except I was about to start three weeks of leave. I am aware, from correspondence included in one of the bundles previously published by the Inquiry, that Dr Inkster takes the view that rotating the IMT Chair is specifically a Public Health thing, and not applicable in Infection Control led IMTs. I disagree with this as the principles of outbreak control are the same regardless of who is leading.

157 It was unfortunate that Dr Inkster was not able to attend the meeting on 20th August. She was invited to it and invited to other meetings with the new IMT Chair but did not attend them. I think this may have given an impression of excluding her when she was not excluded.

158 I am asked if I ever attended an IMT where I felt intimidated or afraid to speak out. I would not say so. I would say that sometimes I felt frustrated that my contributions were not being given due attention, but I never felt that I was not able to make those contributions. As I have previously said, sometimes there were just too many people in the room, with only a small proportion, perhaps three or four, actively contributing. Whether some people did not feel it was their place to speak, or felt they couldn't raise issues, I do not know.

159 My own view on chairing the IMT, from principles of incident management and personal experience, is that chairing an IMT, leading an incident, is an onerous process. Within Public Health our guidance is that when you have a protracted incident you have a second member from whatever speciality the Chair is from, so that the role of running the Incident Management Team and providing the specialist advice does not fall on one person. Whether then the interactions of the IMT between individuals can be productive is a different

question but the decision by Dr Inkster of having another microbiologist in the room is a positive. The responsibility for fostering that collective input will fall to the IMT Chair, ensuring everyone is involved and allowed to contribute; however, there is a responsibility placed on IMT members and expected behaviours that people need to fulfil.

Late 2019 IMTs

160 On 06 September 2019 I attended an IMT meeting where the group discussed points raised on SBAR from microbiologists, detailing issues relating to the fabric of Ward 6A. A number of the points raised related to the use of chilled beam technology **(A36591637 - 06.09.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 79)**. There was discussion and different views on some items that are documented in the minutes.

161 My knowledge and understanding of chilled beams is based on what was discussed at the IMTs and related meetings. My understanding is that chilled beam technology has benefits for environmental comfort and energy efficiency, I also understand that where they are in use, the number of air changes per hour (ach) is reduced from 6 ach to 3 ach. I recall discussion on Chilled Beams when it was mentioned at the Water Technical Group. Dr Inkster stated their use had been approved by IPC for one particular outpatient setting within the new build hospital, but their use had been applied across the whole hospital without being signed off by IPC.

162 At the 6th September IMT meeting there was a discussion on the hypothesis and Dr Crighton asked if we were still working on the assumption that the chilled beams were the source. Tom Steele (Estates) reported that he believed the water drops from the ceiling to be condensation and the leak to have been eradicated as a potential source. However, a new patient case had evolved after these measures were put in place a timeline for the new patient

case and the work conducted by Estates would be created. It was agreed that myself, working with Estates and Jen Rodgers would review this timeline for the IMT. My recollection is that the timeline did not show an association between issues with the chilled beams and patient cases.

163 On 13 September 2019, I attended an IMT meeting where I presented the epidemiology data that had been circulated in August 2019 **(A36591627 - 13.09.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 80)**. This was the first time that I had presented this data directly to the IMT. During this presentation I was assisted with commentary by Professor Brian Jones, National Microbiologist for Haematology and Professor Alistair Leanord, Consultant Microbiologist and Director of microbiology reference laboratories. Neither participated in the preparation of the report, nor had seen it when it had been circulated to the IMT in August. They were there as observers and to comment on what I was presenting from their experiences as senior microbiologists. By this time Dr Inkster had resigned as lead ICD, which was why Alastair Leanord was there. Brian Jones was there because of his expertise in infections with patients with blood cancers; he had been the National Microbiologist for Haematology.

164 The first data introduced was an epi curve of gram-negative bacteraemia (GNB) from blood cultures in paediatric haematology/oncology patients from July 2013 to July 2019, taken from the previously circulated epi report. The chart demonstrated numbers pre- and post- move to the new hospital. The graph was split into non environmental/environmental gram-negative organisms. The epi curve outlined peak positive blood cultures during the water incident in March 2018 and an increase during the drainage incident of May 2018 within Ward 2A, RHC. Since moving to Ward 6A the patterns of environmental gram-negative organisms were the same compared to the counts when the ward was at the old Yorkhill hospital. The second graph was provided by Jen Rogers and displayed ongoing surveillance data outlining the central line associated bloodstream infections (CLABSI) per 1,000 central line

days. This was compared to Great Ormond Street Hospital and Cincinnati Children's Hospital rates, which showed comparable rates. The graph demonstrated a downward trend over the last few years of CLABSI rates.

165 Senior Microbiologists Prof Brian Jones and Prof Alistair Leonard both agreed that in their opinion, from a microbiology point of view, Ward 6A, QEUH was safe at this present time and IMT members accepted this position. I believe they had reached this conclusion based on the data presented, their broader knowledge of infection rates within NHS GGC and their wealth of experience within microbiology.

166 I have been asked by the Inquiry for my view on current infection rates. I have not directly interrogated or reviewed the data since 2019. However, on the basis of the reporting through the infection control committees, I believe there are no issues with the infection rates currently.

167 On 20 September 2019, I joined a teleconference hosted by Dr Emilia Crighton, which followed on from the IMT meeting on 18 September 2019, to discuss the recommendation made at the IMT to lift the restrictions on Ward 6A (**A37992136 - IMT Water Incident Minutes - Ward 6A - Teleconference - 20 September 2019 - Position paper produced by NHS GGC dated 14 December 2022 and supporting documents Bundle, document 92)**. The teleconference participants included IMT members and other consultants. For this meeting Jen Rodgers, Chief Nurse, Paediatrics, and I had put together a PowerPoint presentation, which outlined the current data set around infection rates linked to Ward 6A. This was circulated to those attending the teleconference. The presentation was previously presented data; however, I had made amendments to display the data, rather than just numbers. Following discussions the group sought further additions to the presentation, which would include the different types of infections within the haematology oncology population 2013/14 to present date, and actual numbers of each infection by year. It was agreed that both Jen Rodgers and I would finalise the

presentation and submit to Emilia Crighton for approval before circulation and ahead of the next IMT meeting on 08 October 2019.

168 On 08 October 2019, I attended an IMT meeting where an update on the IMT process regarding water, drains and the increase in Gram negative bacteraemia rates was given **(A36591643 - 08.10.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 83)**. This was to inform Professor Craig White, Divisional Clinical Lead in Healthcare Quality, and Improvement Directorate, who had been appointed by the cabinet minister for Health and Sports and provide him with an understanding of what was going on. Professor White would also function as a single point of contact for families in relation to the infection control measures going on within the hospital and any enhanced safety measures implemented by the board.

169 During this meeting Lesley Shepherd, Professional Nurse Advisor, Scottish Government, told the group that from her observations clinicians seemed to have a lack of confidence in the clinical environment, despite Infection Control measures put in place. There were new cases being reported and she felt there was a dichotomy in the microbiology opinion. I had the impression from the ward team that they were genuinely concerned about the infections, even though the infection rate was back to what we might anticipate for some of these rarer infections. It was reported at that time that the clinical team were being told different opinions by some microbiologists compared to what the IMT were reporting, and this would impact on their confidence.

170 I was challenged by one member of the clinical team that I “didn’t believe them” when they said children had these infections. This was an unfair and inaccurate characterisation. At no time did I dispute that children were getting infections. What I had challenged was the statement that some of these infections had never been seen in their patients before. The infections we were discussing had been seen in Schiehallion patients prior to the move to

the new hospital. While this was rare, with some of the bacteria only having been detected once or twice, this had been previously detected. On reflection I could have done more to bring the clinical team along with me in how I described things and worked to a common understanding, rather than just expecting the data to speak for itself.

IMT 05 November 2019 – Use of Prophylactic Medication

171 I have been asked a series of questions by the Inquiry on the prescribing of prophylaxis, including what was prescribed, the indication for prophylaxis, if I had any involvement in the decision making in the ongoing use of prophylaxis what was communicated around prophylaxis, and if any information around prophylaxis was withheld. My involvement around prophylaxis was very limited, principally related to discussions at the IMT, and therefore I am unable to assist the Inquiry in answering these questions. There were two actions related to prophylaxis I took to support the IMT around this time.

172 On 05 November 2019, I attended an IMT meeting where there was a discussion by the group on the use of prophylaxis medication **(A36591709 - 05.11.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 86**. I took an action to liaise with Public Health Pharmacy around the requirements for use of a Patient Group Direction (PGD) for Taurolock. Taurolock is a substance that goes into the indewelling line and has antimicrobial properties. There was suggestion that Taurolock could be used instead of oral prophylaxis. A PGD is a document that provides a legal framework to allow registered health professionals to supply and/or administer specified medicines to a pre-defined group of patients without them having to be individually named, as an alternative to a prescription. PGDs are probably most commonly used in vaccine clinics. A PGD would make the use of Taurolock much simpler. I did discuss this with pharmacy. Legally only a registered health care professional can administer under a PGD. As the lines

would be being accessed by healthcare support workers and phlebotomists, I was advised a PGD would not be suitable, and I fed that back to the IMT.

173 Secondly, at the IMT on 6th September there was agreement to include support from the infectious diseases team to facilitate decision making on prophylaxis **(A36591637 - 06.09.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 79**. I assisted Dr Conor Docherty, paediatric infectious diseases consultant in this by providing him with the relevant documents from the IMT, and meeting with him to discuss them and answer any questions prior to his chairing the prophylaxis group meeting, so he was up to speed, as he had not been a member of the IMT. I did not participate in the subsequent meetings between ID, microbiology and the clinical team.

My epidemiology reports of October 2018 and July 2019: Descriptive Analysis of Trends in Bacteraemia Rates for Selected Gram Negative Organisms

174 I have been asked by the Inquiry to provide further detail on the preparation of the two above named reports I submitted to the IMT, and my opinion on related matters associated with comments made in the Case Notes Review, and Mr Sid Mookerjee's Quantitative Report commissioned by the Inquiry.

(A42362089 - Report by Dr Iain Kennedy - Descriptive analysis of five year trends in bacteraemia rates for selected gram negative organisms dated 1 October 2018 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 27)
(A38662683 - Report by Iain Kennedy "Descriptive analysis of trends in bacteraemia rates for selected gram negative organisms" dated July 2019 - Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 28)

175 “Descriptive epidemiology” and “analytical epidemiology” are the labels for two categories of tasks that are used in outbreak investigations. Descriptive epidemiology should always be done in any outbreak investigation. Analytical epidemiology is only done occasionally. Although epidemiology can be useful for all steps in an outbreak investigation, descriptive epidemiology is most closely associated with hypothesis generation, and analytical epidemiology with hypothesis testing.

176 Descriptive epidemiology is also sometimes called “data orientation”. It is usually summarised as describing identified cases by time, place and person. It will include description of demographic and exposure information. For example, commonly it will include breaking down the number of cases by age and sex. Other factors that might be included, depending on the nature of the outbreak, occupation, school attendance, travel history, or a food diary. The ‘place’ component may also be complimented by mapping the location of cases or significant exposure sources. The time component can include charts showing changes over time. This may include an ‘epi curve’ which is a histogram with time on the x-axis, and case count on the y-axis. Descriptive epidemiology may also include the calculation of simple rates.

177 Analytical epidemiology refers to the use of formal statistical methods, such as significance tests, or the use of observational studies. In outbreak investigation, these would most often be cohort study, a case-control study or a case-case study.

178 Detailed information on the commissioning and timeline of these reports is included earlier in my statement. In summary, I offered to produce the first report at an IMT as the HPS report appeared to be delayed. That report was sent to Dr Inkster on 17th September 2018, and an updated version sent to her on 2nd October 2018. I do not believe it was ever shared with IMT. The updated 2019 report was started following meeting with Dr Mathers in March 2019, and completed in July 2019, when it was circulated to Dr Mathers and Dr Inkster, as chair of the IMT. At the meeting of the IMT on 1st August 2019, I

requested it was circulated to all IMT members **(A37991876 - 01.08.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 75)**. It was circulated to IMT members on 5th August 2019 **(A37991958 - 05.08.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 76)**. It was then discussed at the IMT meeting on 14th August **(A36591626 - 14.08.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 77)**. Some of the output of the report was also used in the meetings to discuss reopening of ward 6A.

179 I was not set a specific Terms of Reference by the IMT and I prepared the reports alone. The aim of the reports was to describe trends in gram negative bacteraemia. This would support, together with other parts of the outbreak investigation, the objectives of guiding future investigations and control measures, deciding when the incident could be closed, and providing background information for future surveillance.

180 In preparing the method, I reviewed documentation on bacteraemia surveillance systems from HPS, Public Health England, and the US CDC. All results from the ECOSS system that met the search criteria were downloaded. The results were manually deduplicated. The deduplication action was undertaken twice, and results cross-checked to minimise errors in deduplication. The data set was then further refined to provide two different counts – one where any second positive result within 14 days was discounted (the ‘patient count’) and one where a second positive result for the same organism within 14 days was discounted (the ‘organism count’). I did consider which count would be most representative, but concluded it was best to include both, so the IMT had the most information.

181 Monthly rates were then calculated using bed days as the denominator. The denominators were from the available data produced by the NHS GGC business intelligence team, and at that time available on the staff intranet. Bed days are a good denominator, and often the only one available at hospital or ward level.

182 The reason bed days are a good denominator is because it takes account of "person-time at risk". This means that it does not just count the frequency of the occurrence of a potential exposure, but also captures the length of time someone experiences that potential exposure. It is intuitive that an exposure of a few hours is of less risk than an exposure that lasts several days or weeks. This is why count of admissions alone is not a suitable denominator, as it treats a day case as having the same risk as a long inpatient stay. I did, in the updated report, include a combined denominator of total activity in the haematology-oncology service. This is because so much of the activity of the service happens on an outpatient or day case basis. However, that still includes bed days because a simple count of number of admissions would not accurately represent the activity of the service.

183 An alternative to bed days would be line days. That is the number of days that a central venous access line has been in place. This is particularly useful when investigating line infections. However pragmatically this data would be much harder to collate than the bed day data, and so it was not possible to include the work I was doing. Additionally, for the first report, when I was looking at hospital level data it would not have been appropriate, as the majority of patients not in the haematology-oncology service, do not have lines inserted.

184 To ensure relevance to the IMT, my search strategy aimed to include cases that would likely meet the case definition of the IMT. Therefore, Dr Inkster provided me with a list of the organisms that had been found in either patient samples from the patients included as cases by the IMT, or which had been found in the water or drain samples. To increase the sensitivity of the search, I

searched using the genus only. Genus is the first part of the two part name of an organism. By doing this, although it increases the chance of capturing results that are not relevant, it significantly reduces the risk of missing a relevant result. That is, it helps maximise the count of possible cases.

185 I have been asked by the Inquiry if I experienced difficulties in data collection for my report. I had direct access to the ECOSS system, and, as noted earlier, I am happy at the completeness of blood culture data in ECOSS, so did not experience the issues described by the Case Note Review and Oversight Board.

186 I am asked to comment in particular on availability of typing data. I did not use typing data so the reported issues on challenges in getting typing data did not affect me. If I had needed it, I would have expected typing information to be recorded in the local laboratory information system, as part of the record of that sample. If that was not the case, I would be surprised. I am not aware of the outcome of the recommendation to develop a comprehensive searchable database.

187 I have been asked about the recommendation to carry out a formal analytical study of the trends. This was a recommendation to the IMT and not an expectation of further work that the Public Health team or I would be expected to carry out.

188 However, when I came to update the report, I did seek support from our departmental statistician on suitability of analytical techniques. We discussed the use of time series analysis. This is a type of analysis that takes account of the fact that data that is time-ordered can have an internal structure that needs to be accounted. One example would be seasonality. The data is split into segments based on “breakpoints” – that is clear distinctions between one time period and another. These breakpoints should be decided in advance of the analysis (“a priori”) and have a clear rationale for their choice. Not doing this introduces a high risk of bias into the study. We did not have sufficient

such breakpoints in the RHC data, so the use of formal time-series analysis would not have been suitable.

189 In the updated report I also mention “denominator artefact”. An artefact refers to a misleading, confusing or incorrect output that is due to technique, definitions or other factors, other than the real change in that parameter. A denominator artefact may occur, for example when there is a change in how the denominator is measured, but this change isn’t accounted for. In the case of my report, a particular issue was although there had been similar changes in bed days for RHC as a whole and haematology-oncology services, these may occur at different times. Being able to separate out the haematology-oncology service in the second report aides in reducing any potential artefact.

190 On the basis of the work I undertook, I would conclude that there were more bloodstream infections in the second half of 2017 and in 2018 until the decant to 6A, than would be expected. There was an increase in both common organisms, and rarer organisms. There was also at this time more polymicrobial results than usual.

191 The Inquiry’s Terms of Reference include a key question on whether there is a link between patient infections and unidentified features of water or ventilation. My understanding of “infection link” posed in this key question is whether defects in the building systems result in an increased risk of infection to patients, through an increased risk of exposure to pathogenic organisms. My reports do not address that question directly, not least because they contain no environmental data. They could be used, in conjunction with other evidence to describe the situation over time, and support investigations into the possibility of an infection link.

192 I note that in the July 2019 report I conclude the *E. cloacae* rate was still higher than earlier years. I have not reviewed the rates of *E. cloacae* since then, however my understanding is that it is routinely monitored by IPC Team, and I am not aware of any current concerns about the incidence.

193 In the July 2019 report I conclude that the improvements in incidence and absent polymicrobial episodes are due to the many control measures put in place – both structural and to practice, education and surveillance. The principle hypothesis of the IMT had been that the source of infection was the water system, and control measures related to water and line care were implemented. Given the subsequent improvement, it is therefore logical to conclude these control measures were successful. However, when using a package of control measures, it is generally not possible to determine the impact of any individual measure. I could potentially speculate alternative hypotheses for the improvement, but I don't believe they would be evidenced based or credible.

194 I have been asked to comment on some of the conclusions of the Case Note Review (CNR). I have read the CNR Overview Report but have not seen any other output from the CNR **(A33448007 - Queen Elizabeth University Hospital and Royal Hospital for Children: Case Note Review Overview Report dated March 2021 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 38)**. I was not involved in the NHS GGC response to the CNR.

195 CNR includes a statement that the control measures would not have been put in place if GGC did not consider that there was a link with the environment. In essence – yes, and this was the hypothesis of the IMT, and mentioned above is supported by the impact of control measures. However, it is important not to conclude that because control measures were used that confirms an environmental source. In incident response we often apply the "precautionary principle". This principle can be stated that when there is uncertainty around a risk, action to mitigate that risk is taken, even when there is an absence of evidence of the existence or strength of that risk.

196 The Inquiry have asked my view on the conclusion that the "vast majority" of cases they reviewed were classified as possible or probable. It is important to

look beyond that headline. 28% of patients reviewed fell into the “probable” category” and 31% into the “most likely” to be associated with the hospital environment. The detailed narrative of the CNR report contains many caveats, and comments on the nuance of the determination of which category each patient is assigned.

197 Having not seen the specific patient level work of the CNR, I cannot judge the accuracy the CNR estimates. I would make two relevant comments. The first is that the CNR Overview Report does not contain sufficient detail to be certain how any individual case was classified. Though the factors are listed, the criteria for how this impacted the final decision on category are not, and the CNR note that this was a subjective process.

198 Secondly, in terms of use of the terms possible and probable. When we use these terms for case definitions in Public Health response, we often consider a ‘possible’ case as being one where features are compatible, but where other diagnoses are as likely, or more likely. Therefore, I would not combine ‘possible’ and ‘probable’ categories, as the chance of being linked would be quite different in those two groups.

199 I have also been asked my views on the question of the usefulness in typing results, when those results show organisms that do not have a typing match. I have mentioned this briefly earlier in my statement. I agree with the principle stated by others, that in a scenario where there may be multiple strains in an environment, that a lack of typing match does not rule out a connection. However, it does make the probability of connectedness less likely. Similarly, the opposite is true. Matched typing does not by itself prove connectedness, but greatly increases the probability that the two samples are connected.

200 Additionally, when different strains come from the same source, I would anticipate a measure of relatedness between them. It is more likely that the strains have come from the same common ancestor, rather than two completely unrelated strains being introduced to the same environment by

chance. This is where whole genome sequencing (WGS) can be useful. WGS can let you see how closely related organisms are.

201 I have been asked detailed question on WGS by the Inquiry, however they would be out with my knowledge and scope of practice.

202 I have also been asked by the Inquiry if any formal analytical work was done. There was none carried during my involvement, though I understand that both NHS GGC and the Inquiry have commissioned such work subsequently.

Mr Sid Mookerjee's Report

203 The Inquiry have asked me to comment on the report they commissioned from Mr Sid Mookerjee, as it contained direct criticism of my reports.

204 In paragraph 17.1, Mr Mookerjee comments on the time period covered by the reports. The reports were based on most up to date data at time of preparation.

205 In paragraph 17.2, and again in 18.2, Mr Mookerjee questions the deduplication process, suggesting that my method would underestimate the number of cases. Mr Mookerjee has misread the report here – genus was used for extraction, not for deduplication, where organism was used. This would have the opposite effect to that suggested by Mr Mookerjee, by increasing the number of possible infection episodes prior to deduplication. The introduction of a separate "case count" recognises that these are individual patients, not simply counts of positive samples, and is in keeping with the CDC guidance.

206 In Paragraph 17.3, Mr Mookerjee notes my report states "date of result was counted as day 1", rather than sample date. Mr Mookerjee states an assumption that this was done to differentiate between community acquired and hospital acquired infections. This was not the purpose of that designation, which was actually for the counting of the 14-day period for exclusion of

repeat results for the same patient, as described in the immediately preceding paragraphs.

207 In paragraphs 17.4 and 17.5, Mr Mookerjee comments on the source and suitability of denominator data – NHS GGC acute service information team were the source of the data. Mr Mookerjee's assumption that the data must be incorrect as the nationally published data does not distinguish between paediatric and adult is false. RHC specific bed day data was used in production of my report. As the assumption in paragraphs 17.4 and 17.5 is false, Mr Mookerjee's conclusion does not hold.

208 In paragraph 18.1, Mr Mookerjee suggests I have adopted his concept of "admissions". I have not. As described earlier in this statement, a count of admissions does not provide a suitable denominator, as it does not include person-time at risk. The inclusion of a second combined denominator of bed days + day cases + outpatients does not indicate agreement with Mr Mookerjee that count of admissions alone is a suitable denominator but provides some allowance for hospital delivered care that did not result in a countable bed day.

209 In paragraph 18.3, Mr Mookerjee repeats his criticism of denominator choice, based on his incorrect assumption of availability of denominator data I have responded to above. Additionally in this paragraph Mr Mookerjee picks up on the term "selected gram negatives", and incorrectly assumes that there was additional "curation step". As described earlier in my statement, and as described in the report, "selected" refers to the list provided by Dr Inkster and was not further edited by myself.

210 In paragraph 18.4, Mr Mookerjee comments on the lack of definition of "activity". The definition of "activity" I used is on page one of my 2019 report. Mr Mookerjee also comments that the labelling of the chart is confusing. The body of both reports are only about paediatric patients, and to assume that

because a chart does not explicitly state this, the chart must also contain adult data, is illogical and ignores the context of the reports.

211 In paragraph 18.5, Mr Mookerjee makes a complex criticism, with several false assumptions but in short, Mr Mookerjee has demonstrated a lack of understanding of descriptive epidemiology. A deliberate choice was made in this chart to display the two data items separately, this was on the advice of a Public Health statistician. Mr Mookerjee is incorrect to suggest that if activity impacts on incidence, that relationship must be consistent. The suggestion of use of correlation “tools” is concerning as tools implies packages that can be applied without forethought. I will therefore assume that “statistical test” is what is meant here. It would be inappropriate to use correlation here, as it would fail to meet necessary assumptions. Additionally, this is specifically not an analytical report. This failure to understand the purpose of the report suggests a lack of understanding or experience of this type of descriptive epidemiology, and its use in outbreak management.

212 Paragraph 18.6 Mr Mookerjee repeats criticisms on denominator data I have responded to earlier in this statement. Mr Mookerjee’s assertion that admission count data is the most appropriate activity measure is false.

213 In paragraph 18.7, Mr Mookerjee comments that comparison with other centres would be useful. I agree with this point, however it is outside the scope of the reports I prepared.

214 In light of these points, I would again suggest Mr Mookerjee’s conclusion on my work is not relevant.

215 I have been asked by the Inquiry to provide a further explanation on the use of statistical process control (SPC) charts for monitoring infections. These charts are different from the epi curves described earlier. SPC charts originate in industry as a means of determining if variation in a parameter warrants further investigation. They are frequently used in hospital infection surveillance.

There are different ways of doing them with different statistical methods that you can include, but in general, a baseline data set is used to calculate a mean and a standard deviation for that parameter. Then a “control limit” is set, usually three standard deviations from the mean, and often a “warning limit” (two standard deviations) is also set. Prospective data is then plotted on the chart.

216 Parameters, such as number of infections in a given time period, will naturally vary over time. The SPC is there to assist in identifying if that variation is more than just chance. If the data plot crosses the warning limit, then that would be an indication to review that parameter, and if the plot crosses the control limit, it is highly unlikely to be just due to chance. If it is a rate of infection higher than the normal expected background rate for that population then that would meet the definition of an outbreak.

217 A higher than expected rate of infection is one definition of an outbreak. The standard definition of an outbreak are two cases linked by time, place, or person. A single exceptional organism where it is either new to the population or previously eliminated from the population, or has a significant Public Health impact, would also be considered an outbreak. A single case of Ebola, smallpox, polio, and extremely drug-resistant tuberculosis would all meet that definition. All three of these outbreak definitions would be responded to using our outbreak control/incident management procedures.

218 However, as it will only show something might be happening, the reason for the variation needs to be explored. With any surveillance system, there needs to be consideration of the data source, and the methodology. The variation above the control line may demonstrate that there is a problem, such as an outbreak. However, there may be other reasons for the variation, and it could be easy to over-interpret the data. For example, if any increase over the control limit is assumed to be an outbreak, and control measures are implemented based only on the SPC chart, then control measures that are either unnecessary, or not effective might be instituted, which themselves

might cause avoidable harm. That is why it is important not to take the increase at face value without further investigation.

219 The reason that we use variation from the baseline rate of infections, rather than from zero, is that not all healthcare associated infections are preventable. In fact, the idea of getting to zero infections is problematic because it sets an unrealistic goal. There are many types of action that can reduce risk of infection, such as isolation, engineering controls, vaccines, hand hygiene, and personal protective equipment. However, none of these is 100% effective. By layering these actions risk can be reduced further but this cannot stop every infection. Certain patients are at more risk of infection than others due to underlying conditions or treatment, and therefore additional layers of control measures are used – examples of this would include the strict isolation of patients undergoing bone marrow transplant, or the offer of certain vaccines to patients who are immunosuppressed which are not offered to the whole population.

220 There will always be unpreventable infections and you can expect over a prolonged period, within a particular patient group, or particular patient setting with standard control precautions in place, to see some infections. Those numbers are often quite low, depending on the setting and the type of infection, and you can get quite big jumps which are statistical flukes. In the circumstances where baseline numbers are very small, SPC charts may be inappropriate.

221 I have also been asked by the Inquiry if it is appropriate to combine multiple infections, for example all gam-negative bacteria, into a single SPC. In general, my opinion is that it is not appropriate to combine such large groups into single SPC charts. This is because in doing so it may mask significant movements in infections which usually have very small numbers, and the reasons for variation may be different for different infections. This is different to the inclusion of multiple infections in the epi curves described earlier, because is based on the case definition and direction of the outbreak

investigation discussed at the IMT. That is, speaking in general terms, there has already been a determination that they are part of an investigation, rather than a trigger to start an investigation.

222 Above and beyond what happened within QEUH, I think we need to consider how we develop, consult, and approve infection control guidance at national level. It is not the most transparent process, and it has become even less so thanks to changes in the structure of the national bodies. One of the issues that came up through the investigation at RHC, is how you should investigate and handle a situation where you have multiple outbreaks over clusters of different organisms all within the same area? Do you assume they all have the same cause, and are combined rates useful or not?

223 My view is that in 2018 it was useful to do this, as we had patient cases and environmental samples in the same area. But it does not necessarily make sense to use those totals as triggers when you don't have any evidence that anything's going on because you might not be monitoring anything useful. You might miss things, or you might find clusters that are not real. You need to have an analysis process so you can conclude as to whether there are links or not. You lose that if you are just using SPC charts.

Other events

224 I have been asked about my involvement in other events related to water and ventilation. The only event I was involved with not covered by the rest of this statement was the NICU in 2016. I provided some limited support to the IMT, which would be detailed in the IMT minutes.

Evidence provided by patients and families to Inquiry

225 I have been asked by the Inquiry if I followed the evidence provided by patients and families in September. I followed some of the hearings and listened to the patients and families describe, movingly, the events and the

impact of those events. I would not wish to comment on the lived experiences of others.

Personal and Professional Impact

226 I have been asked by the Inquiry if I had any concerns at any point about the hospital environment and it being a risk to patient safety and care. Through the process of the IMT investigation and response, there were aspects of the built environment, construction and the commissioning that were antecedence to the issues that we were having to deal with, but they were being dealt with when they were identified.

227 I have been asked by the Inquiry if I am aware of changes being implemented following recommendations from the independent review and oversight board. I am aware that the Board has had a robust process in place to make the changes recommended by external reports and have done so to the satisfaction of the Oversight Board. In relation to changes within Public Health, I have described earlier in this statement the review and updating of our outbreak and incident management procedures.

228 Other changes in NHS GGC that have been beneficial include the creation of the Infection Control in the Built Environment Group (ICBEG), which now provides a more senior group to bring together Infection Control and Estates. The additional funding provided to upscale public health teams due to the pandemic has allowed us to recruit an epidemiologist and data analyst into my team. I understand there has been recruitment to similar roles in the IPC team. These additional health intelligence colleagues are a great asset in response to outbreaks and incidents, as well as improving our routine surveillance systems.

229 I have been asked by the Inquiry if there has been an impact on myself professionally or personally during this period. From a workload perspective, I would think over that two-year period, there was a time where I was just full-

time on this incident, which is significant, given the public health role is supportive, rather than a leading one for hospital infection. I went straight into the pandemic response, and from there to mpox and then the next outbreak or epidemic. There has been little, if any, time to truly decompress and recharge.

DECLARATION

230 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.

Appendix A

- **A38694845** - SBAR dated 10 October 2019 - Ward 6A - Situation update - gram negative bacteria - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 4 - NHS Greater Glasgow and Clyde: Situation, Background, Assessment, Recommendation (SBAR) Documentation, document 46

- **A33870103** - Report prepared by DMA Water Treatment Ltd titled "L8 Risk Assessment (Pre-Occupancy) NHS Greater Glasgow and Clyde South Glasgow University Hospital" dated 1 May 2015 relating to site assessment concluding on 29 April 2015 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6, Miscellaneous documents, document 29; A33870243 - Report by DMA Canyon Ltd titled "L8 Risk Assessment NHS GGC QEUH and RHC following site surveys in September 2017, October 2017, gap analysis in January 2018 and review date September 2018 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6,document 30

- **A32222054** – Minutes of the NHS Greater Glasgow and Clyde Board Infection Control Committee held on 27 July 2015 - Hearing Commencing 19 August 2024 - Bundle 27, Miscellaneous Documents - Volume 3, document 16

- **A32221779** - Draft Minutes - BICC Meeting - 27 November 2017 - Hearing Commencing 19 August 2024 - Bundle 13 - Additional Minutes Bundle (AICC/BICC etc), document 48

- **A35957621** - National Infection Prevention Control Manual (including appendices showing draft HIIATs etc) - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 44

- **A36690477** - Incident Management Meeting, dated 16 March 2018, relating to Water Contamination in Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 17

- **A36690457** - 12.03.2018 4. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 16

- **A36690549 -** 21.03.2018 8. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 19

- **A36690507 -** 19.03.2018 6. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023- Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 18

- **A40562750 -** National Support Framework 2017 – NHS NSS HPS – Version 1.1 - June 2018 - Hearing Commencing 19 August 2024 - Bundle 27 - Volume 1 - Miscellaneous Documents, page 68

- **A36690544** - 23.03.2018 9. IMT Minutes Water Incident Ward 2A RHC - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 20

- **A41890244** - 27.11.2019 IMT minutes Gram Negative Ward 1A PICU - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 90

- **A37990970** - 14.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 33

- **A36629310** - 18.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 40

- **A36629328** - 28.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 44

- **A36629290** - 05.10.2018 IMT minutes Ward - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 45

- **A42362089** - Report by Dr Iain Kennedy - Descriptive analysis of five year trends in bacteraemia rates for selected gram negative organisms dated 1 October 2018 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 27

- **A38662683** - Report by Iain Kennedy “Descriptive analysis of trends in bacteraemia rates for selected gram negative organisms” dated July 2019 - Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 28

- **A36629320** - 20.09.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 42

- **A42909010** - 30.11.2018 IMT minutes Ward 2A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 54

- **A36605178** - 20.12.2018 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 55

- **A36690590** - 16.01.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 58

- **A36690588** - 17.01.2019 IMT Cryptococcus Part 1 AM - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 59

- **A36690599** - 17.01.2019 IMT Cryptococcus Part 2 PM - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 60

- **A36605178** - 20.12.2018 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 55
-
- **A36690569** - 21.01.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 Incident Management Team Meeting Minutes (IMT Minutes), document 62

- **A36690584** - 28.01.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 66

- **A36690558** - 04.02.2019 IMT Cryptococcus - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 68

- **A38662683** - Report by Iain Kennedy “Descriptive analysis of trends in bacteraemia rates for selected gram negative organisms” dated July 2019 - Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 28

- **A36591622** - 25.06.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 73

- **A36591626** - 14.08.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 77

- **A36591637 -** 06.09.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 79

- **A36591627** - 13.09.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 80

- **A37992136** - IMT Water Incident Minutes - Ward 6A - Teleconference - 20 September 2019 - Position paper produced by NHS GGC dated 14 December 2022 and supporting documents Bundle, document 92

- **A36591643** - 08.10.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 83

- **A36591709** - 05.11.2019 IMT Gram Negative Blood Ward 6A - Bundle of documents for the Oral hearing commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes), document 86

- **A42362089** - Report by Dr Iain Kennedy - Descriptive analysis of five year trends in bacteraemia rates for selected gram negative organisms dated 1 October 2018 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 27

- **A38662683** - Report by Iain Kennedy “Descriptive analysis of trends in bacteraemia rates for selected gram negative organisms” dated July 2019 - Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 28

- **A37991876** - 01.08.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 75

- **A37991958** - 05.08.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 76

- **A36591626** - 14.08.2019 IMT Gram Negative Blood Ward 6A - Hearing Commencing 12 June 2023 - Bundle 1 - Incident Management Team Meeting Minutes (IMT Minutes) (External Version), document 77

- **A33448007** - Queen Elizabeth University Hospital and Royal Hospital for Children: Case Note Review Overview Report dated March 2021 - Bundle of Documents for the Oral Hearing Commencing 12 June 2023 - Bundle 6 - Miscellaneous documents, document 38