Scottish Hospitals Inquiry
Witness Statement of
Kathleen Harvey-Wood

PERSONAL DETAILS

1. My name is Kathleen Harvey-Wood. My contact details are known to the Inquiry.
   This statement was first given on August 2022 with a final review and updated in July 2024.

2. I am a Principal Clinical Scientist in the Microbiology Department at the Queen Elizabeth University Hospital (QEUH), employed by the NHS Greater Glasgow and Clyde (NHSGGC). My role falls under the Laboratory Diagnostics Directorate.

EDUCATION

3. I attended Glasgow University from 1975 to 1979 and achieved a BSc Honours Degree in Zoology (Parasitology). Then from 1979 to 1982, I had a Medical Research Council (MRC) research grant where I worked on a PhD thesis on Murine Malaria, Plasmodium chabaudi.

4. Between 1982 and 1983 I was writing up my thesis and demonstrating to medical students at Glasgow University. Despite completing the write up, I was never given the PhD because I became unwell and never actually submitted it. I was then offered my current role which would take two years training, following which I was given a permanent role.

PROFESSIONAL BACKGROUND

5. I have worked within the NHS Glasgow Greater Clyde (GGC) as a Clinical Scientist since 1983, beginning my career in the Microbiology Department at Yorkhill in the Royal Hospital for Sick Children.

6. I have remained within Microbiology in the Health Board, being promoted through the clinical scientist grades to my current position of Principal Clinical Scientist.

7. Throughout my career I have completed many general audits, clinical trials, meeting presentations and validations. Clinical Scientists do a lot of validation work.

8. Between 1992 and 1997, I completed a five-year study on Toxic Shock Syndrome in children with burns which was a published work. From 1995 to 1996, I completed an audit on Gentamicin levels, which introduced once daily Gentamicin therapy. I performed a further audit involving screening of infections in cleft palate patients between 1996 to 1998.

9. Between 1997 and 2001, I completed a five-year study of Candida species in Paediatric Intensive Care Unit (PICU), and then in 2003 I set up the Molecular Section in the Microbiology Department at Yorkhill. This involved Molecular Polymerase Chain Reaction (PCR) assays on various viruses or bacteria and fungi, which were used quite extensively by the Haematology-Oncology unit as assays were performed in house. PCR is a rapid and more sensitive assay to detect infections compared with traditional culture methods. Can detect microbial DNA in clinical samples at a low level allowing early therapeutic intervention.

10. Consequently, we were completing research in areas such as Cytomegalovirus (CMV) PCR, Adenovirus PCR and Epstein Barr (EBV) PCR, these are all part of regular and routine screening for Haematology-Oncology patients. We also researched and developed Aspergillus PCR and Pseudomonas PCR assays.

GENERAL DESCRIPTION OF SPECIALISM

11. My current role is specialised in paediatrics, and I work in the field of Paediatric Microbiology.

12. I am also the NHSGGC Point of Care Co-ordinator for Microbiology. This involves doing point of care tests with patients at bedside which can be done by a nurse in the ward, but under laboratory control. An example of this work was on RSV which is a respiratory virus particularly in children, which I was responsible for this point of care service from 2003 to 2019.

13. Other examples of my work are, I validated a point of care test for Flu during the H1N1 epidemic, and most recently a fungal biomarker test, Beta-D-Glucan an ELISA test which is an assay to look for fungal infection. I introduced that in March this year to be performed in house at Microbiology Dept. GRI, Glasgow. The fungal biomarker test is important for the investigation of fungal infections in children.

14. Around 25% of my time is meant to be in research, development and audit which is why I am a Clinical Scientist; however, my job also involves clinical and scientific work.

15. I was running a molecular section in 2003 to 2015 whilst also doing Paediatric Virology, giving advice on results from these molecular assays, making sure that the assays were validated, quality controlled (QC) and also that external QCs were completed.

16. I was also doing some clinical work at that time and would be going to the Schiehallion Ward rounds and giving advice on any results. I helped with guidance on interpretation of results and advised which investigations were needed. I also requested additional tests where appropriate and was also involved in testing bacteria for sensitivity to antibiotics.

17. This involved advising on which antibiotics should be used in specific cases, advising on further sampling and giving guidance on specific

infections and best treatment options. In general, I also responded to phone calls if colleagues need advice.

18. In terms of other tasks, I give daily clinical advice and provide clinical lab liaison. This means I will go to the lab to check results to make sure they're all correct and the appropriate laboratory tests have been carried out as per our Standard Operating Procedures (SOP). We also have another grade of staff in the lab called Biomedical Scientists, who do the laboratory work on the benches; they have a separate qualification. I am the link between the laboratory work at the bench and the clinical consultant.

19. I also provide advice for investigations. The Biomedical Scientists will ask for my advice, such as which investigations need to be done in certain situations. I will also get requests from the Biomedical Scientist to check things such as the agar culture plates which have grown bacteria, yeasts or fungi, then to look at the test results performed on the organisms (colonies seen) isolated and advise on further tests to identify what the organism is that has been isolated from the culture plates.

20. I also complete reports and authorise results from the laboratory reporting queues under the paediatric queue. The paediatric samples queue separately because it's a huge hospital site with the QEUH and Royal Hospital for Children (RHC), but the paediatric samples are queued from the large number of laboratory samples that we perform on age of the patient. All samples received from RHC are reported out in the paediatric reporting queue. The Paediatric reporting queue is checked frequently throughout the day and authorised in a timely manner, so the reports are not left on the queue and results are available on Clinical Portal for the Clinicians to read.

21. There is also a rota every day within our small team. We have a Consultant Microbiologist covering for Paediatrics and myself because I'm the only Paediatric Clinical Scientist, although sometimes we also have a Medical Trainee. The rota is made up for the month for each day by the Clinical

Lead, Microbiology Dept. on an electronic excel spreadsheet which gives all the clinical staff and trainees their duties and area of responsibility for each day. The rota also records annual leave, study leave and sick leave. I am always on the Paediatric rota slot. Originally at Yorkhill there were six Clinical Scientists for Paediatrics in the Microbiology Department, however as they left or retired, they have never been replaced, so I am the only Paediatric Clinical Scientist left in post.

22. This situation has arisen because when people left or retired from the laboratory, the workload was then shared between myself and my remaining colleagues. I am unsure as to where the money was reallocated to.

23. Four of the Clinical Scientists moved to the new Microbiology Dept at QEUH site in April 2012, by which point two Clinical Scientists had already left the laboratory for other jobs/ roles and promotions in other laboratories and were not replaced. From the four that moved, three of us were Principal Clinical Scientists and one was a Consultant Clinical Scientist. Currently in Microbiology we don't have any Consultant Clinical Scientists.

24. Regarding the career structure and the appropriate levels of staff, I feel personally that there is only me, and there is no one coming behind me. There is no succession planning. I'm not training anyone to do my job at the moment, and a decision has been made by the Microbiology Management Team (MMT) not to do any higher specialist training of Clinical Scientists in Microbiology.

25. The MMT is representative of Consultants from each of the laboratories, laboratory managers from each of the laboratories and union representation such as UNISON. There is also IT representation, Virology are also involved, and some Clinical Leads. A secretary takes the minutes and there is a chairperson in charge of it for two or three years at a time.

26. Because Microbiology Dept's and the Virology Lab each have an overarching Clinical Lead, a Consultant will only take on that role of chair of the MMT for a certain term.

27. Part of the MMT team remit was to look at the laboratories, the move and the reconfiguration because the hospital build has been going on for more than ten years before it opened. These were Consultants from each of the Microbiology Departments throughout the city.

28. Prior to the merger and the move in 2012, there were Microbiology Departments (laboratories) in each hospital in Glasgow and they had their own Clinical and Biomedical Scientist staff, secretaries and support staff.

29. At the moment the Chairperson is Dr Mairi Macleod who is the Consultant Microbiologist at Glasgow Royal Infirmary and the Clinical Lead for Microbiology and Virology. Above her there are other management personnel and above that there are other laboratory and diagnostics management.

30. The Microbiology Department, Yorkhill moved in April 2012 to the laboratory building at the Queen Elizabeth University Hospital (QEUH), as the main hospital there did not open until June 2015. This meant within the three-year period between 2012 to 2015, any samples that were taken from the Children's Hospital at the Yorkhill site were then sent across the city to the Microbiology Department at the QEUH by van three to four times per day.

31. During that time, I travelled back and forward through the Clyde Tunnel to attend the ward rounds and some of the Multi-Disciplinary Team meetings (MDTs), so between 2012 and 2015, I worked both sites.

32. It was the MMT who coordinated this, they had overarching responsibility for Microbiology throughout the city after the labs were centralised. I have not seen any MMT minutes and I don't know who the chairperson was.

33. The main laboratory at Yorkhill was shut down in April 2012, and all the equipment was moved, but we still had a “hot laboratory” an area where we processed urgent samples such as urgent Cerebro-Spinal Fluid (CSF) cultures and blood cultures for the three years.

34. We were concerned because there wasn’t an onsite full Microbiology service for these three years for the paediatric hospital. The clinic liaison was supported by me, and my 2 Clinical Scientists colleagues travelling to the hospital every day to attend all ward rounds and check the results from the hot lab and RSV Point of Care tests. One of the Clinical Scientists retired in February 2013. We were given mobile phones to provide contact when we were offsite. The Paediatric Consultant Microbiologist and part time Paediatric Consultant Microbiologist who had also transferred from the Microbiology Dept., Yorkhill to the laboratory at QEUH would also travel daily to Yorkhill Hospital to attend ward rounds and give clinical advice.

35. My current line manager is Dr Christine Peters, she is the Consultant Microbiologist and Clinical Lead for this Department.

36. My current role is Paediatric Microbiology, my remit is specifically for paediatric patients and paediatric samples. I have not had training in Adult Microbiology.

37. When I moved to this site, I retained my paediatric roles and responsibilities I had when I transferred. There are differences with my role compared to adult microbiology; children get different infections, and they’re more vulnerable to infection as their immune system hasn’t matured. Also, the antibiotics used to treat infections differ, and certain infections can affect children more than adults.

38. I am part of the clinical team within Microbiology (specifically Paediatric Microbiology) and on the clinical rota as a Clinical Scientist. The rota advises what we are doing daily in the laboratory and I’m in the paediatric

column. I usually work with a Microbiology Consultant who I liaise with all day, and we will review issues we are concerned about.

39. In Yorkhill hospital we had a separate Paediatric Department, and we could specialise in the processing of the paediatric samples. At Yorkhill we did not process any adult samples or anything from General Practitioners (GPs), we only received samples from the Children's Hospital itself, whereas in this laboratory we process all the samples from the QEUH, RHC and all the GPs within a certain area in Glasgow.

40. This has meant our testing and sampling has increased as the labs have become centralised, and we are no longer just specialised in paediatrics. We still get paediatric samples because the Children's Hospital is here, but they are examined and overseen under the paediatric clinical team for children under 16 and from the wards.

41. The request forms with the samples come into the lab with the ward named on the form, so you know which ward it's for. Once processed, the results of the paediatric samples are then automatically sent to a paediatric authorisation queue so they can be checked by the team who are working in paediatrics that day. The paediatric wards get clinical liaison specifically from the paediatric team and I'm the only Clinical Scientist in the hospital doing the job, so it's very important.

42. In terms of my remit, I have no direct patient contact or going to the bedside. If I have to visit the ward to give advice, I will go to the doctor's room to speak to the clinicians, so I don't have any involvement in ward processes.

43. In my clinical role I have responsibility for the haematology-oncology ward in 2A and 2B (RHC), which later moved to 6A and 4B (QEUH). I also help with the renal team in 3C (RHC). I also have responsibility for PICU (Paediatric Intensive Care Unit), NICU (Neonatal Intensive Care Unit) and the Burns Multi Disciplinary Team (MDT) where I specialise. It's a lot of responsibility and I work hard; however, I have a great relationship with the

clinicians, some I have worked with for years. I bridge the gap between laboratory and the clinicians.

44. I liaise a lot with the Infection Control Team (ICT) and I inform them if I am made aware of a result from the laboratory where a culture is identified which I would consider an IC (Infection Control) issue. There is a National Infection Prevention and Control Manual (NIPCM) Feb 2021 Appendix 13- Mandatory NHS Scotland Alert organism/Condition list (available at http://www.nipcm.hps.scot.nhs.uk) (**Bundle 19, Document 24, Page 440)** which lists the infections/ alert organism that are considered an IC issue. At this point I would email them to let them know, for example if patient "B" had isolated an organism on this list from a sample sent to Microbiology, I would ask if they wanted further work done or investigations i.e. if we could do typing on the organism which is where we compare organisms.

45. I am usually in email contact with them daily. I am not involved in IC as such, but my remit is to let them know about results reported out from the laboratory, either from results which I would consider to be an IC issue or anything else they should be aware of.

46. I think my name would be on some minutes of meetings in relation to Problem Assessment Groups (PAGs). Sometimes Microbiology would be invited to attend to bring results, for example if we had a cluster or an outbreak, they would want to know who the patients were and what the results were.

47. The difference between IC and Microbiology and their roles is that the IC team investigate the source of the infection. They look at how the patient got the infection, where it came from, as it could be from within the patient themselves, the staff, or the environment. They also consider whether it could be patient to patient transmission, environment to patient transmission, whether it is a cluster and whether the organisms match. They will ask whether the typing suggests that there's a common organism infecting patients at the one time and consider whether it's to do with the

conditions in the ward, if it's hygiene, if it's cleanliness, handwashing, is it a staffing issue, or a cleanliness in the ward issue.

48. They will consider whether the infection is a Hospital Acquired Infection (HAI). For children, they determine why the child has the infection, if it's normally found in children and if it's a cluster of infections, they will check to see if there is more than one patient with the same organism. Once the source has been located, they work to prevent further transmission. This may be done by reviewing patient placement in consideration of the spread risk and whether they should be isolated.

49. The Infection Control Team have ownership of the HAI process and responsibility for the HAI process and the designation of an infection being reported as an HAI. This will be documented in the minutes of a PAG (Problem Assessment Group). Recommendations and outcome of PAG meeting will decide if an infection control issue is to be raised to the level of an IMT (Incident Management Team). ICT will decide if require to report the HAI issue to HPS (Health Protection Scotland) for intervention or escalation. ICT will also require to feed up to senior management team.

50. My remit is to review the data. For example, I would see three patients with the same bacteria and then check if it's a common bacteria found in human infections. There are bacteria known to cause infections, but you also have other bacteria which are not part of the normal flora of the body, they come from outside of the normal patient infections and can be spread to other patients and so if I see something coming through our results, I will inform Infection Control.

51. Both MRSA and C. difficile are examples of these infections. If I see a C. difficile result which causes diarrhoea, I will let ICT know. If I have a patient who has Tuberculosis (TB), I will let ICT know. MRSA and C.difficile are common hospital acquired infections. However, infections can spread within the hospital, and then we have to make Public Health aware, and we have to be sure that our laboratory is informing the right professionals and

making them aware of our concerns. This would include: Paediatric Infection Control Nurse, Paediatric Infection Control Doctor, Consultant on the ward where the patient/s are in, Health Protection Scotland (HPS) and Paediatric Infectious Diseases Consultant (ID) depending on the type of infection.

52. Additionally, I also inform the reference laboratories throughout Scotland to do further testing. Liaising with the reference laboratories is part of my remit as a Clinical Scientist. They specialise in reference lab work, and they have Clinical Scientists because their work is highly skilled scientific and less clinical. I know the Clinical Scientists in the reference labs, and I phone them to ask their advice and sometimes send samples to them for specialist testing.

53. Throughout the UK, there are reference laboratories. Health Protection England (HPE) have reference laboratories (now replaced by UK Health Security Agency UKHSA in April 2021), so with unusual infections they can do sequencing genetics on the bacteria to find if they are from a common source and if the strains are the same. Reference Laboratories in Scotland also do some detailed testing that we don't perform in Microbiology for example, TB testing or for E.coli O157 which causes diarrhoea, or any organism causing an infection that would be a public health interest. With Public Health Scotland, I email them often in relation to things I'm concerned about. It's within my remit to decide when things need specialist referencing. If the microbiology team come to me to say there's an issue with a pathogen and they tell me they think it needs further testing, and I will make the call and have it sent over to the relevant reference laboratory.

54. The process itself can take a lot of time, so it can take a while before we get the results back, because they're specialist labs and sometimes they batch the results. When you send a sample, you have to record where the sample has gone, when it went, who sent it, and then you have to record the result when it comes back. On receiving the result, you then review the next actions. For example, a reference laboratory result might come back,

and I might think that it needs to go to Public Health or to ICT as they need to know about that result. There's quite a lot of work with sending something off site for further testing, to make sure that the whole audit process is all tied up and accurately recorded from when it was sent and when the result was received back. Any conversations with the reference laboratory are recorded also.

55. Post 2015, the process was timely, however it did have teething problems. When we moved to the new site at QEUH, we did a lot more reference laboratory work in paediatrics than the adult hospital did, but now it seems that we're all doing about the same. I think generally when we moved to the new laboratory, paediatrics was more ahead of the game in such ways because we were specialised.

56. In our previous laboratory set up at Yorkhill we brought everything we did to the QEUH site as we wanted to carry on with that level of specialism. We were concerned that we were a specialist paediatric laboratory, but we were being moved to a large general Microbiology Department. The concern was that the specialism would get lost within that. The equipment at Yorkhill was state of the art and we took it all with us when we moved. Examples of this were our DNA extractions and PCR machines. Some things we had previously weren't in the new lab, so it was good that we brought them from Yorkhill. We did get new equipment when we moved though, such as automated antibiotic sensitivity testing and automated identification testing of bacteria, which was an improvement.

57. Despite the improvement with equipment, the lab is not the size it should be, and to go back to the planning of the laboratory, Microbiology was not initially intended to be on this site. If you look back at the Microbiology Management Team (MMT) minutes over the period of the hospital construction, you will see it was decided that we would be moved to the top floor 4th floor of the hospital laboratory building. Our laboratory is not as big as the other diagnostic laboratories in floors 1-3 and I don't think it's big enough.

LABORATORY ISSUES WITH THE BUILT HOSPITAL ENVIRONMENT

58. In Yorkhill, we had a paediatric laboratory and only processed samples from the Children's Hospital, so everybody in the laboratory was trained in processing paediatric samples. We had a larger clinical team to do the work on number of samples per head of sample, so we had a full time and a part time Consultant Microbiologist and six Clinical Scientists. In comparison to now, that was a larger number of people responsible for the samples. We also did a lot of assays and tests that weren't done in other Microbiology Departments in the city, specifically the virology section at Yorkhill, which was Paediatric Virology.

59. For all the viruses, we did lots of virus culture, and we also did viral serology and the molecular work for viruses and bacteria. Additionally, we did the point of care testing for Respiratory Syncytial Virus (RSV). Because we had a larger number of Clinical Scientists, we were able to spend more time on our work and development and introduction of new assays and clinical liaison. For example, my remit at that time was only for PICU and the burns unit, one of my other Clinical Scientist colleagues looked after haematology-oncology patients. Because that was their remit and main responsibility, was able to put all their time into that role and was also part of the line management team to look after the patient's intravenous line care. Another Clinical Scientist looked after renal unit, paediatric surgery and neonatal unit. Overall, there was more time given to the specialist areas from the clinical perspective.

60. Now, in paediatrics, despite having more patients, we only have, a Consultant Microbiologist and a Clinical Scientist, which is me, and maybe a medical trainee giving help on a daily basis. There is a rota, with the Clinical Scientist and one other medical person doing the role of what was previously done by six Clinical Scientists, a Consultant Microbiologist and a part time Consultant Microbiologist at Yorkhill. This is now my

specialism, with only Biomedical Scientists trained in paediatrics that transferred from the Microbiology Dept, Yorkhill.

61. The Biomedical Scientists that are now in the main laboratory at QEUH working on all the microbiology samples, but they don't all have specialist information or knowledge on processing paediatric samples. They get this now as part of the training, but the workbenches are all of the samples, whereas before we had a dedicated paediatric bench for Paediatric samples (area in the laboratory). When we first moved here, we wanted to have paediatric samples processed separately. It shouldn't make a difference to the quality of the results; they should be the same. I'm not saying it changes the quality, but it changes the amount of time and effort and staff involved in paediatrics. Resource is an issue, the resources put into paediatrics were changed when the laboratory moved.

62. The lab in Yorkhill was an old building across two floors whereas QEUH laboratory is much more modern, more future proof in terms of the way laboratories are going as it has a huge open plan lab. In Yorkhill we had smaller labs in different rooms, with individual labs doing different work. For example, the Virology Section and Molecular Section was in one big lab area, a Mycology Section was in another big area, then we had our category three lab (Containment Level 3 Laboratory CL3) that is a fully contained laboratory used for working on high risk biological agents and pathogen, for example TB, and then our main laboratory.

INVOLVEMENT IN THE DESIGN, CONSTRUCTION AND BUILD OF THE QEUH

63. In terms of the design and planning of the new hospital, I was not involved in the hospital itself, but I was involved in the laboratory with the Microbiology Consultants at Yorkhill. We were all involved in planning the layout and site of this new laboratory department at QEUH once the space was decided, because there was an options appraisal on where the Microbiology Laboratory should be to support the new hospital. That went

on before the final decision was taken to site it in the laboratory building at QEUH and put another floor on the top. I was involved in designing the layout of the laboratory to allow us to move the Molecular Section, which needs specific rooms for different parts of the assay process. Along with one of the Consultant Microbiologists we were involved in some respect with the layout of the laboratory here to allow us to bring the paediatric testing to the site.

64. I was not involved in the actual decision-making process of where the Microbiology Department was going to go. However, once its location was decided, my Consultants at Yorkhill involved the Clinical Scientists in the planned layout of the new laboratory here at QEUH to ensure they had some say in it. They were amalgamating laboratory microbiology departments from all over the city in to one centralised lab at QEUH, so there were a lot of people, a lot of equipment and a lot of things from other laboratories which were coming to the site. Likewise, with Glasgow Royal Infirmary, some of the labs moved to Glasgow Royal, so then we ended up with two Microbiology laboratory sites throughout the city. It was mostly Consultants we were expressing views to or discussing things with and therefore we (Clinical Scientists) had no discussions with architects, designers or planners.

65. We did however see the plans in the department, all laid out on big tables of the new laboratory. We reviewed the design of the laboratory and the location. This was done with our clinical team at Yorkhill, but I was not involved in taking that up with the architects or the designers, I wasn't involved in any way with the hospital design at all. We were asked more about infrastructure of the room, floor area in the new laboratory, and we had to make sure we had the room to put all the equipment and the right sockets. Even the benches had to be strengthened to fit our equipment.

66. There were a lot of general laboratory things and issues which weren't considered, and we needed new cooling air conditioning units on the walls because of the equipment generating heat, to make sure that the machines

did not overheat. We had quite a lot of more technology at the Yorkhill lab than the new site, so it was all part of moving our machinery and our equipment. We discussed the infrastructure within the new lab quite openly with the Consultants and I felt quite comfortable expressing my views, and that my suggestions were implemented. For example, the machinery was moved effectively, and it all went quite smoothly.

67. Initially, before the move, there was discussion that Microbiology might not actually be on the QEUH site with the alternative being a site somewhere else in Glasgow, like a central Microbiology Department or similar, possibly in another hospital. They had not planned the Microbiology service that well, and I remember wondering where NHSGGC were going to put their Microbiology Department in their new state of the art hospital. However, they then built and designed this laboratory on the QEUH/RHC site and it's called the Laboratory Medicine Building. The Laboratory Medicine Building already had plans including floors for Pathology, Biochemistry, Haematology and Genetics and this raised the question of where Microbiology would go. There was a lot of discussion on where to site this department and amalgamate all the labs in Glasgow, which they then closed afterwards. I was then involved in the discussions as to where the site would be. I was at some of the MMTs, and I remember representing the Clinical Scientists, because there weren't very many of us. As a group of staff, we needed to be represented at some of these meetings, so we had the Consultant Microbiologist, Clinical Scientists and we had the Biomedical Scientists. Also union representatives.

68. In the MMT meetings there were Consultants from all the other hospital laboratories who reported to the board. Within Microbiology there was the Clinical Lead for Microbiology and a Clinical Lead for each of the laboratory disciplines. There was also governance management, who are overarching above the Consultant of each department, and there was the overall laboratory diagnostics management system. There were no architects, designers or planners present at the meetings I attended.

69. Regarding Microbiology now being on the top floor (4th floor) of the Laboratory Medicine Building, I was not party to the final discussions where the location decision was made, but I do know the other option was build a new microbiology laboratory off site. This seemed a strange thing to do because it wouldn't have been on the hospital site, and there were issues with transport and such, so that just did not seem the best option. Additionally, the laboratories we had in the other hospitals in Glasgow were in older buildings and they wanted a new state of the art modern laboratory for future technologies. Given that, I feel that the location was probably the best decision, but we don't have the room or floor space that the other labs have who are on the first, second and third floors.

70. In the QEUH hospital laboratory building on the ground floor there is Facilities Management, so estates are on the ground floor. Then we have Biochemistry and Haematology on the first floor, Genetics on the second floor with Pathology on the third floor, and then Microbiology on the fourth floor. It does seem sensible that all the different diagnostics labs are in the same building and all the samples can come to this building for all the different tests that the hospital requires to be done on site.

71. Regarding the fourth floor specifically, there is an issue with spacing. The fourth floor was added to the top of the building, and it doesn't cover the whole of the building footprint, so our laboratory is much smaller than, for example Haematology, Biochemistry or Pathology, and they also have a much bigger laboratory space. This means our own space is more cramped, and to future proof a laboratory for going forward, there is very little room to extend to accommodate the services that maybe required in the years ahead.

72. The molecular section is how laboratories are going to go in the future, using Polymerase Chain Reaction (PCR) and Whole Genome Sequencing (WGS), but the paediatric specialised molecular virology section I had responsibility for was moved in 2012 to the new Microbiology Laboratory at QEUH. When the hospital opened in 2015, they wanted the Virology tests

to be centralised at Glasgow Royal Infirmary, so the whole section and all the equipment was moved and taken away from the department. Along with that, because we did Mycology molecular assays, they moved the Mycology Section at the same time, so we lost our Mycology Section from Yorkhill and also our Virology Section. Now we are only a Bacteriology department, not a full Microbiology department.

73. By definition, Microbiology covers all the specialisms such as viruses, bacteria, fungi and parasitology, however we lost our two specialist sections of Virology and Mycology that we had at Yorkhill when they were transferred to Glasgow Royal Infirmary. Then any samples for testing from the hospital (QEUH and RHC) had to go across the city. That was something I was concerned about, and I felt moving the services was NOT the best thing to do. There were lots of meetings about that.

74. The transfer itself of Microbiology Laboratory from Yorkhill to QEUH went smoothly and was very well organised. All the machinery was moved, and we were the first into the new laboratory. They decided when they closed all the different laboratories throughout Glasgow, that they would move them one at a time into the new laboratory building.

75. Yorkhill moved in first, so the paediatric laboratory at Yorkhill moved into the new building first, in April 2012. We were able to move all our equipment, we got everything organised and then started running our samples. The big machinery was moved, and we had it all reinstalled. The only problem was we were then at QEUH, and the childrens hospital was still at Yorkhill for three years until June 2015, so there was a lot of logistical movement of samples and clinical liaison, which meant a lot of driving back and forward. I sometimes spent most of the day in the car running between the two hospitals going between different wards at Yorkhill.

76. The logistical issues at the new Microbiology laboratory at the QEUH site also affected the sampling because of a delayed turnaround time. There were delays in the sample being received from the Pneumatic Tube System

(PTS), which at this hospital is not fit for purpose. I'm saying that because there have been issues with it, and they are well known and recognised. In fact, some of our samples when we were doing transport by vans three or four times a day from Yorkhill to the QEUH, actually arrived quicker than they did from the adult hospital and we're literally across the road from that main hospital. I have photos of the "pods " (cylindrical containers) used to carry the samples in the PTS all piled up in Microbiology specimen reception as the tube system not working to send the empty pods back to the wards to allow them send more samples. The wards were always phoning looking for pods as had samples waiting to be sent to the laboratory and the PTS was not working.

77. The Pneumatic Tube System was installed as part of the new hospital design. Each ward has a box with the large tubes attached to the wall, and you put a container in it which contains the sample. You screw the lid to secure the container, put it in the box, and you tell the computer programme where the container in the tube and the sample are to go. The tube system runs all-round the hospital, underneath the hospital, up into the lab system and all the different laboratories. This process takes a long time. At Yorkhill we did not have this because the porters brought the samples down to the laboratory because we were on site, and we had daily porter deliveries of samples at least 4 times a day. Now, on this site, the porters still do sample delivery on urgent samples, but the porter needs to be paged and I think the whole thing was to reduce the number of porters or the time involved in porters coming to the lab with samples from the wards.

78. The PTS was put in place to allow samples to transfer from the hospital, both adult and paediatrics, to the different floors in this building for different samples. It's maybe a little strong to say that the PTS is not fit for purpose, however we have had meetings about it and concerns about delays in samples reaching the laboratory.

79. I did an audit on the PTS in 2015, so I do have some supporting evidence for my view. There weren't enough pods as they ran out of them, and the

system also breaks down a lot. PICU raised concerns about the delay in samples and Biochemistry are aware of it as well. In general, if I had any concerns, I would go to the Microbiology Management Team (MMT).
As well as being part of the clinical team, there is also the Microbiology Quality Management Team who are Biomedical Scientists who do quality management and laboratory management.

80. The common issue with the PTS was the delay in receipt of the samples. The delay was caused because of breakdowns in the PTS or the programming or the container in the tube going to the wrong laboratory, like going to Biochemistry instead of Microbiology, or samples seemed to go missing. It was thought there was some kind of a “black hole” somewhere in the system as wards would say they’d sent samples, yet we did not have proof they were sent, and the samples weren’t received. This could result in misdiagnosis, or a delay in reporting of the result. A positive result could be delayed. For example, if a sample gets to the lab on the same day, we work on it within 48 hours. We’ll maybe have a result with culture and sensitivities and an antibiotic result. I can phone it out and discuss it at the ward round. However, if the sample takes two days to get to a laboratory, then you’ve got two days delay in actioning treatment for the patient. Estates were aware of the issues as they are the department responsible for the PTS, and they worked with the contractors who installed the system. I have no specific knowledge of any delays impacting treatment; however, if this happened it would be recorded on the Datix system.

WORK STREAMS

81. Within our Microbiology laboratory, we have the clinical work stream, and we have laboratory technical work stream. We also have a quality management stream and an Operational Manager who is a Senior Biomedical Scientist who operationally runs the laboratory. I'm not answerable to them as far as my job goes because I'm on the clinical team, so as a Clinical Scientist, I work with the clinical team rather than the

Biomedical Scientist technical team. Any concerns I have with laboratory processing, I would take to the quality management team within the laboratory. Any concerns I have raised, I feel are received well and we do all work together. We also have a senior management team within the laboratory which encompasses all the different levels and grades of staff within the laboratory and Microbiology. Below the Microbiology Management Team (MMT), we have what we call the Senior Management Team (SMT) within our department and that team then reports back to the MMT.

2012 TO 2015 – CONCERNS PRIOR TO THE OPENING OF THE QEUH

82. Regarding the causes of concern during 2012-2015, we were effectively working on a construction site for three years because the hospital had not been completed. We worked in the laboratory which geographically is not linked to the main hospital. This is a standalone building across a double road; therefore, it was possible to have this as a functioning building whilst the hospital was being constructed, or the construction was being finalised. However, there were workmen, construction and scaffolding there constantly. They opened a car park to allow us to park and enter safely to and from our work and the basic landscaping was done and roads were all in place. The traffic side was manageable, and everything was a useable site, apart from the main hospital building.

83. In 2015 when the hospital opened, there was concern for support for paediatrics within diagnostics as a speciality, as they wanted to integrate us into the routine laboratory. The other concern was the beginning of the infections in the hospital. There started to be more infections not long after we moved in, and we were aware of it from a laboratory perspective. In July 2015 we had a small outbreak of an infection called Serratia marcescens in the neonatal unit.

84. Serratia marcescens is a gram negative environmental bacterium that is commonly associated with hospital associated outbreaks in Neonatal Intensive Care Units (NICU). Serratia is ubiquitous in the environment. Babies become colonised with the bacteria which may be asymptomatic and can then develop into an infection and cause pneumonia, urinary tract infection, conjunctivitis and more serious septicaemia and meningitis.

INFECTIONS AND INFECTION CONTROL

85. The process of identifying infections comes generally from samples sent to the laboratory. Routine samples are sent weekly from different patients to look for infection, such as regular blood cultures or secretions from the respiratory tract or if they have wounds or lines in situ. There is a general process of culturing and swabbing just for surveillance of the patient. In some of the units, they have on admission screening. When a child comes from another unit, or hospital transferred here into the children's hospital, they obtain screening swabs to look for different bacteria and to look at colonisation that could potentially cause infection in the future, so we know what the risk is of that child becoming infected, it's like surveillance.

86. Part of my other job is what we call "daily macros" of results from Paediatric patients in RHC from our Telepath lab computer system. I gather all the results from the ward for every patient for that specific day and over a number of days. It pulls down all the Microbiology results on to an Excel spreadsheet and I look at these daily so I can see any patterns. It has all the patient names, the date of collection of the sample, what the type of sample is and what bacteria we isolate from that patient. From that, we get an overall impression of what is happening in that ward so we can see the infection maybe moving from patient to patient. If we see that happening, then we email ICT and let them know.

87. Additionally, these spreadsheets are used daily to discuss the results of these patients with the ward clinicians, so that is done daily on the

haematology-oncology ward. Because of COVID we don't go on the ward at the moment, but we do have a daily phone call and an MDT once a week by Teams. Prior to COVID, we were on the ward every day with someone from the Microbiology Department, so we would be on the ward with our spreadsheet discussing the results.

88. Reports are sent to all the IC team; IC Doctor, paediatric IC team, paediatric IC nurses who are trained paediatric nurses and an overarching Lead IC Doctor who looks after the children's hospital. If there are any issues, I would email my results and let them know. Then we would do further reference lab work like typing of the organism to see if it matches previous isolates, if that is requested. Usually if I go through my Clinical Lead, Christine Peters, or through the IC team and they would ask for typing to be performed. We take the results each day to the ward and discuss individual patients and their results. Also, we would phone the clinician and we would email ICT, and everything is documented in our laboratory Telepath notes.

89. Additionally, I do a monthly gather of positive blood cultures for the acute paediatric wards, they are PICU, NICU and the Schiehallion Haematology-Oncology Wards. That gives them a monthly look at and overview of the infections within blood cultures and that's also emailed out to other certain clinicians within the RHC hospital. I do some information gathering as well as part of my remit. That's also what we did at Yorkhill, gathering of information and daily lists of results, we did that as part of our paediatric service in the Yorkhill hospital. When we moved, we continued with that service. That isn't done for the adult hospital, it's only something which is done specifically in paediatrics.

90. Throughout the hospital on a daily basis, I have information at my fingertips about what's happening at the children's hospital. We call these daily list gathers of information results, it's really helpful so we don't miss anything. My remit is to do the paediatric results authorising. I will leave things for the Consultant Microbiologist if I want Consultant led authorisations so that

there is a further level of paediatric authorisation, and then the result goes to a second queue, a senior process called a clinical validation queue, for Consultant authorisations.

91. For something really significant which may have important implications for the child or for public health, the Consultant Microbiologist on that day will authorise that report. I will leave it for them, otherwise I authorise it, but sometimes it goes to a second level report. That is how we see the infections and that's how we monitor it. That's how I know if we have something new that we need to inform the ward, the clinician or ICT and where necessary Public Health.

92. Regarding Public Health, we do have a Standard Operating Procedure (SOP) for what level results are reported at and this is incorporated into the laboratory IT computer telepath system. We also have a Reporting Guideline SOP and a Quality Management SOP to tell us which organisms get reported at which levels. The Reporting Guidelines tell us what goes to ICT, what goes to Public Health, what gets communicated by laboratory staff and by the Biomedical Scientist, and what gets authorised and reported by the clinical staff. A lot of laboratory reports will also be authorised by the Biomedical Scientist and don't go to a reporting queue and will be auto-authorised out by the laboratory telepath system. General reporting, GP results and other results from the bench level will be reported at the bench by a Biomedical Scientist. Other results for clinical authorisation go on to the paediatric queue on our Telepath system and then within that paediatric queue, there's another level above that for Consultant Microbiologist authorisation.

93. There are three levels of authorisation of reporting so that we don't miss things. There is an Infection Prevention and Control Guidelines manual **(Bundle 19, Document 24, Page 440)**, National Services Scotland's guidelines (National Infection Prevention and Control Manual) **(Bundle 27, Volume 4, Document 16, page 165)** and Health Protection Scotland Guidelines on Management of Outbreaks and Clinical Incidents **(Bundle**

19, Document 25, Page 515). They should all be followed. There are also strict definitions of healthcare infections and reporting around Healthcare Associated Infections (HAI). The IC team should follow these guidelines in the management of Hospital Acquired Infections, so there are certain recommendations and good practice points within that document that Health Protection Scotland have produced.

94. Some infections are caused from within the patient's own microbiology/gut flora. If there is an infection in a patient which is thought to be related to the hospital environment rather than from the patient themselves, these other bacteria are associated with water and moist environments, and they are not common. They are also not associated with normal microbiological disease infections.

95. They had two patients close together in September 2016 and December 2016 in Ward 2A, RHC with the same infection and in my opinion that should have been investigated before the third patient infection in February 2017, because we had two patients with the same infection, but they look at separation and in time and space and to determine if the two infections could be correlated or linked. They were both line infections, one in September and one in December, but it wasn't until March 2017 they had a Problem Assessment Group (PAG) about it. **(Bundle 2, Document 8, page 16)** (**Bundle 2, Document 10, Page 22).** Microbiology would have done the testing of blood cultures which flagged positive and Elizabethkingia miricola was isolated from the 3 patients. Three paediatric haematology patients over a 6 month period. This bacterium was originally identified in the International Space Station (MIR space station, Russia in 2003), and it comes from environmental water.

96. I do not think there was a PAG about it at the time because IPCT considered the two infections not to be linked as they were three months apart. However, Eliz.miricola is an unusual, rarely encountered environmental organism associated with water and moist environments, eg condensation, the organism was isolated from the 2 patients Hickman

Lines. I consider this to have a been an early "warning sign" as there have been a few cases reported in the literature.

97. I have encountered Elizabethkingia miracola previously. I remember there was 2 patients with Elizabethkingia spp isolated from blood cultures at Yorkhill Hospital. There was one patient in 2A, RHC (QEUH site) with this line infection in 2017-18. However, this was not a new case as the patient was one of the 3 cases documented from Sept 2016- March 2017 and the same organism was isolated again. One patient, a new case isolated Elizabethkingia spp. from blood culture during the year 2019 - 2020.

98. I receive results from the cultures through my daily list and on the authorisation queue, so that result would have come to the queue, and I would see it. Blood cultures are also on my daily list. We go through the blood cultures daily on the bench because it's a separate bench process and section of the laboratory. They are blood culture samples from the bloodstream with infections so it's a specialist area of the laboratory.

99. The laboratory is divided into sections depending on the sample type. The sample goes to what we call a bench, so for example, faeces and stools, they go to a certain area in a lab and are looked at and examined by a certain team. Then there are swabs, wound swabs and throat swabs which go to a different area. There are also samples like sterile fluids, such as fluids from the brain and abscesses. Then there are blood cultures, which is blood taken from the patient and put into a special bottle of medium where bacteria can grow. This shows if there are bacteria in the patient's bloodstream. These patients also have lines, so the lines can become infected, and that a blood culture with blood taken from the line would also be processed. I do a daily blood culture list, so I would have seen that result twice, from my blood culture list and from my daily Schiehallion list. It would either have come to the authorisation queue or the Biomedical Scientist would put it on the clinical queue for authorisation.

100. All these results that go to the wards have been seen by the microbiology clinical team from our clinical authorisation. When I see something like that,

the first thing I do is phone the ward. We have a daily handover anyway with Schiehallion, it would be communicated right away. After that, the details of the patient and the organism isolated would then be emailed to the IC team and documented in our laboratory Telepath system under the patient notepad. We record the time and date, what was said by the person who entered it, so they know who said what and when. Everything is very well documented, strictly controlled and audited. Any conversation that I have with anyone I spend quite a lot of my time typing this up and documenting, as well as checking on the benches in the laboratory. If I saw anything of concern, I would inform the Consultant who was covering paediatrics for that day, and they would be informed of any conversation that was had around this result.

101. Any result that goes out from Microbiology is actioned in real time as quickly as we can. The paediatric reports get authorised quickly and we are very proactive with our reporting. Any infection is communicated immediately to the right teams.

INFECTION CONCERNS 2012 TO 2015

102. During the period of 2012-2015 at Yorkhill, there was some cause for concern relating to infections. From time to time we did see small clusters of infection, but these were appropriately managed and controlled. There is never ‘zero infection’ from environment or hospital acquired infections, that’s why we have IC teams. However, they were usually closely controlled because we had our paediatric IC team based in the hospital. The IC nurse at that time, Pamela Joannidis, was responsible for paediatrics and used to come to the lab quite a lot. She was very much part of our team and we liaised very closely with her.

103. The set up was slightly different in the children’s hospital at Yorkhill before the move, the paediatric team, Microbiology and IC all worked very closely together. Also at the time, because we were just the one hospital, the IC Doctor for the hospital, the paediatric hospital at Yorkhill was also a Clinical

Microbiologist at the children's hospital, so it was a much closer, smaller team. I think things were managed more carefully then.

104. The clusters were maybe two or three patients with the same organism in a unit, like in, PICU or Neonatal Intensive Care (NICU). That would be communicated to the IC team, and they would look at the reasons for it happening. We did occasionally have line infections in haematology-oncology, but we had a line management team, so we had a Principal Clinical Scientist and a senior advanced nurse who looked after the Microbiology results from the lines. They would liaise weekly on what was happening within the unit at Yorkhill Hospital.

105. The Principal Clinical Scientist in Microbiology who was responsible for the haematology unit retired in February 2013 and wasn't replaced, and then the senior advanced nurse in the ward involved in that line team also retired and wasn't replaced. At that time we did lose some key people with people leaving and not being replaced but for me that was an important part of what happened to my role, because key people in the paediatric service were not being replaced. I presume they weren't replaced because of financial reasons, however that question is one for a higher management level within diagnostics.

106. In July 2015, there were three babies in the Neonatal Unit at RHC on the QEUH site within a space of a week who had Serratia marcescens, this is known to be a problem in neonatal units. We would cover our other Clinical Scientist colleagues work when they were on annual leave or sick leave. My colleague, another Principal Clinical Scientist who had responsibility for NICU, however, was on annual leave at this point, so I was covering their work in addition to my own. I became aware of these three positive results of colonisation and then we had a patient with a positive blood culture. That was taken to ICT at the time and there were a series of meetings which I did not attend. Health Protection Scotland were aware of that also. That all should be documented from the Neonatal Unit between July and September 2015.

107. In that case I could see what we call colonisation, which means the bacteria infection is found in some of the swabs, like mouth, secretions, line sites or a gastrostomy site. It's there if the patient has become what we call 'colonised'. It's around the patient, it's present but it's not invasive. However, what becomes a problem is when that bacteria gets in to the bloodstream or in to the line and then it then becomes a sepsis. This is what you call a bacteraemia or a sepsis, when they require to be treated with antibiotics and that can be quite a severe infection. It's when an organism that's colonising a patient in surface swabs then becomes a true infection in the bloodstream. You could have an organism that's colonising which isn't an infection, but it can tip over to become an infection and the more colonisation you have, the higher the risk of that organism becoming an infection.

108. We don't always treat colonisation, but we let the clinicians know it's there, because if the patient becomes unwell, you know that the likelihood is that organism will be the cause of the infection, so you know you can act quickly to treat that organism.

109. Some of these organisms are bloodstream or line associated and that's what I was referring to with the haematology-oncology patients; they had bloodstream infections, so on the notes it will be blood culture positive, which means they were septic. It means they had the blood infection which was systemic through the body system rather than just having bacteria in their eye or their mouth which was sitting there but not invasive. That is the difference between the severity of infection.

INFECTION CONCERNS 2015 ONWARDS

110. In 2016 there was an increase in the number of positive blood cultures. Evidence of this is seen in the haematology-oncology patients, in the percentage of positive blood cultures, the number of total blood cultures

taken in the ward and the number that were positive with a bacteria organism in them.

111. In 2014-2015, the percentage of positive blood cultures was 9.6%, when really it should be around 5%, so that was before we moved. In 2015-2016, it was 9%, so it was the same as the previous year and Yorkhill was around about 9%. Then in 2016-2017 it jumped to 15.5%, so when you saw a difference in the number of positive blood cultures and the percentage positive.

112. It really started to peak in 2017 which could be viewed on a graph from February 2017 to June 2017. That's general sepsis within the haematology-oncology unit and it was different organisms. The other interesting thing from my perspective was the mixed blood cultures. When you have a pathogen in your blood, it's usually one organism that causes the infection, either from the environment or from your own bacteria. In 2014-2015, 15 of the blood cultures which were taken were mixed with more than one organism in them. 2015 to 2016, the year after the move, there were only 11 with mixed organisms isolated from the blood culture. Then from June 2016 to June 2017, we had 36 blood cultures with a mixed infection and that's not normally what you see. When you have a sepsis, you normally have one bacteria causing an infection. My concern was that we were seeing mixed bacteria, two or three different bacteria in a blood culture. That means that if a patient has three or four different bacteria in their circulatory bloodstream then it's from their line infection. The raw data numbers show it went from 11 to 36 mixed infections from blood cultures. This is not in context but shows the trend.

113. In June 2017- 2018, 40 of the blood cultures taken that year had mixed organisms in them. That's when I felt concerned, because normally in microbiology you have a pathogen, an organism in your blood and you treat that. However, there was another concern in that we saw a change from the gram-positive organisms to the gram-negative organisms. Gram-

negative are the environmental organisms, so we had a change in the type of bacteria we were seeing.

114. This is part of a presentation that I gave to the haematology-oncology unit when I did an audit on the blood cultures and what we were seeing. In April 2018- July 2018, we had a real increase in the gram-negatives again and also the gram-positives, which was Staphylococcus, and also the skin organisms were much reduced, so we were seeing a change in the type of organisms.

115. I performed an audit of blood culture results from June 2014 to June 2018 and gave the presentation on 30 August 2018. This was presented to the haematology-oncology unit. Another point which is relevant is the quality improvement line infection group, called the CLABSI group (Central Line-Associated Bloodstream Infections), which was set up in May 2017 to look at the line infections, as infections started to peak in Feb 2017. I was a member, and my emails indicate that 3 May 2017, seemed to be the first meeting. For the next meeting with the central venous line quality improvement group, I sent the chair monthly results of patients with positive blood cultures. That fits with my observations and the change in the number of positive blood cultures within the patient group.

116. It was the paediatric Haematology/Oncology Clinicians (Schiehallion Unit Ward 2A and 2B, RHC) who asked me to do the presentation. We had already had a year of the CLABSI group, so we went to their regular meetings, and I represented Microbiology and gave results. I would take along some statistics and some figures and then they (CLABSI group) would work out the timeline on the rates of line infections. There was a whole group of staff looking at corrective action, looking at putting line components in trays, line care bundles and improving line management practice. Then we had a new guideline on line management, so a lot of things were put in to place.

117. This CLABSI group was excellent in helping with the issue in the ward to the effect that it really did resolve the infections down to a very reasonable level in the last year, and it was a good proactive group. The presentation was focusing on both line infections, trends in general and positive blood cultures. It was an audit of blood culture results from June 2014 to June 2018 and I did the next audit and presentation in September 2018. That was really when we saw the problem starting in April 2017, as we saw a change in the trend. The presentation was part of the group, but I don't know where the presentation went. I gave it to the Clinical Staff in the Schiehallion unit.

118. Another point of interest to me was the diversity of the organism types. Normally you have certain bacteria that are known to cause sepsis, but the patients were getting unusual organisms, so the diversity and the types were not normal. If you were training someone to do Microbiology, there are certain organisms that are associated with bloodstream infection, E.coli, Kleb pneumoniae, Staph aureus, Coagulase-negative Staphylococci which are organisms you would expect would cause the infection in line infections.

119. Kleb. pneumoniae is part of the Enterobacteriaceae group of bacteria, they are gram-negatives, However the organisms we were finding were not commonly associated with microbiology findings in a sepsis. They were unusual bacteria that even some of the staff would google because they weren't normally found in routine microbiology textbooks.

120. However, there is a bit of an upside to that because our technology had improved. Some people may say that we did not have advanced enough technology to identify these gram-negative bacilli in the past. However, in the past, say ten years ago, anything we were unable to identify further we would have called them gram-negative bacilli, and we would report them out at Yorkhill, or we would send them to a Reference laboratory, which is what we do for further identification. The difference here was the diversity, the range of environmental gram-negatives, also the mixed infection in

lines, as you don't normally find three different gram-negative bacteria in one line infection.

121. We identified a couple of unusual organisms first and then the diversity of them. Then we saw the same organisms were reappearing, then disappearing and coming back again, and then the mixed infections. For me that was a big difference, the mixed infection was important, as was the switch from gram-positive organisms to gram-negative organisms in the blood cultures. Also, one of our indicator organisms which is Stenotrophomonas maltophilia, it was a new find in blood cultures since the new RHC opened, the first isolate of that organism was in April 2017 which ties in with figures that I gave you about the increase in the blood cultures. We isolated Stenotrophomonas.maltophilia in blood cultures from 2017: one patient in April, May and June, two patients in July (5 patients)and one patient in September (second episode) and then it went away again for three or four months.

122. That small cluster of Stenotrophomonas maltophilia organism over the period April to September 2017 also coincided with a general increase in the overall numbers of positive blood cultures. We seemed to see cycles and trends, and then in March 2018 we had three patients with Stenotrophomonas maltophilia in blood cultures, and again that was an indicator that something was wrong. During the period June 2017-18 there were 14 positive blood cultures isolated Stenotrophomonas maltophilia. Then we saw other gram-negatives also. You shouldn't be getting that in a patient's blood culture, that's not a normal infection or something you would expect to find in an episode of sepsis.

123. These trends are like cycles which come and go for a few different reasons. It could be there has been an intervention, I don't have feedback on what corrective actions were put in place, that is one of my issues, I will pass on all my information, but I don't get communicated with, I don't know what has happened or why something has gone away. Basically, I assume the

scenario is that have they intervened based on my information, but I don’t know.

124. The other issue for me is whether the water is at the right temperature. We tend to get what we call a spring bloom and we saw that in the old hospital at Yorkhill. In the spring months when it’s getting warmer and the water’s warmer, the bacteria grow better, and if you don’t keep your cold water cold and your hot water hot, bacteria will grow more easily. That’s something for estates and management to consider because if you don’t have your water hot enough, bacteria grow at body temperature (37 degrees) and some of them can grow at 40 degrees. If the water isn’t not hot enough, it won't stop the bacteria growing.

125. Also, some environmental bacteria grow at cool temperatures, so the water needs to be really cold to stop the bacteria growing and also hot enough to stop the bacteria growing too. But in the warmer weather, the cold water isn't as cold. At Yorkhill we used to have meetings with Estates and I was involved so would get feedback, this hasn’t happened latterly. I'm not going to put a timeline on it, but my general opinion is I don’t always know what’s happening, but then it’s maybe not my remit to know that. Again, my concern is that I'm giving this information, it’s going out in one direction but I’m not getting any information back which may ultimately be useful to inform the process.

126. If information was returned to me, it would help me to understand and predict when this is going to happen, because I have worked in Microbiology for a long time, I'm experienced and I have an insight. I see the patterns in percentages and number of positive blood cultures coming in and I know something is wrong and needs actioned. On 2 occasions during a one month period (April 2017 and March 2018) we had 40 positive blood cultures, ie 40 of them were positive from Haematology/Oncology patients. The percentage positivity rate was 26.7% and 26% respectfully and were the 2 peak months of positive blood cultures. At the moment

we're down at less than three per cent, with 1- 4 positive blood cultures a month so something wasn't right then and something is right now.

PROBLEM ASSESSMENT GROUP (PAG) MEETINGS

127. Once a concern for infection has been identified, the PAG is the first part of the follow up process. During this, they score the risk using a HIIAT score. HIIAT is the Healthcare Infection Incident Assessment Tool. The PAG would be initiated by IC, as Microbiology doesn't have that remit, we are the people who inform IC. IC would have been informed of bacterial infections at the time. If a blood culture flagged positive, and the bacteria isolated was identified as an environmental organism that would have been communicated to the clinical team on the ward, with IC informed also. Even with one infection, it should go to the Schiehallion (SCH) unit for the clinicians to do a risk assessment on the infection and decide if and what further actions need to be taken. Then if there's more than one infection, they organise a PAG. Where there is a larger outbreak or an ongoing outbreak, the next level of IC would be an Incident Management Team (IMT) meeting, and then the issue is taken to a more detailed and with more persons incident management group.

INCIDENT MANAGEMENT TEAM MEETINGS (IMTs)

128. My role at IMTs was providing results, so that is why my name would be on the list of attendees at the meetings. I had the Microbiology results and was involved in informing IC and the ward of concerns of any results that I had regarding infections, for example, Aspergillus. I would report the result and my name would be on the report as authorised to confirm this.

129. IMTs are held due to different types of infections that are considered HAI. I used Aspergillus infection as an example of an infection that would be

communicated to the Infection Control Team. There were Aspergillus infections in SCH unit.

130. In terms of invites to the IMT, the IC doctor would invite me, but at that time the IC doctor was usually a member of the Microbiology Department on this site (QEUH), so they would be working in the laboratory anyway. At Yorkhill it was the same thing, I would be invited by the Clinical Lead IC Doctor as this the Microbiology Consultant. I had probably informed any issues to Dr Teresa Inkster, Lead ICD with some of these results anyway and we would already be working closely together. Sometimes it depended on whether it was relevant for me to be there, so I'm not at all the IMTs. It would depend on my input towards the reporting out of results and the escalation of the results to IC. They may want me to be there to give them the results, or to talk through results, or to talk through whichever investigations I had requested.

131. In general, I found IMTs within the local remit fine, but when it got to a wider IMT which included people outside our department and wards, there were differences of opinion. For example, with Estates and Public Health Scotland, they had a different perspective from people in the laboratory.

132. I can’t remember the date and time, however, there was one particular meeting when I was told that what we were seeing was normal. I’ve used the word ‘normal’ very often just generally, but I was told by someone that 40 positive blood cultures a month was normal, and I said, ‘but what about the diversity of these organisms, that is not normal?’ They were trying to play it down, that was someone in Public Health Scotland. And then estates would say there wasn’t a problem with certain areas where we thought there was. There was a bit of disagreement sometimes with the different specialities around IMTs and what was actually happening.

133. The problems were the increase in the number of positive blood cultures to 40 a month and increase in the type of organisms isolated i.e.

environmental bacteria and also the number of positive blood cultures from the same patient.

134. Also the number of mixed blood cultures with different bacteria. The other concern was the number of line infections. Central line associated bloodstream infections (CLABSI) which meant patients had to have their lines (Hickman Lines) removed and on more than one occasion and were associated with clinically significant illness with some patients requiring intensive care support.

JAMIE REDFERN'S OFFICE MINUTES AUGUST 2016

(background information)

135. This was nearly six years ago, and was the first Incident Management Team (IMT)**(IMT minutes - Bundle 1, Document 6, page 22)** to discuss Aspergillus fumigatus infection in 2 patients in the Schiehallion Unit in RHC, but I would have been involved in some of the reporting and in informing other teams of the results. On the reports, we are authorising results and recommending treatment based on what we grow. So, we look at what the bacteria is, what the fungus is, what the organism is that we've grown from the sample – and then what drugs, antibiotics and antifungal would we recommend for treatment, we list them all on the report.

136. We began to see unusual infections. Different bacteria have different colony formations, and they grow on agar plates and they also look different. Bacteria grow, and they grow in different conditions and different media support them. We put samples up for culture using different conditions to support the growth of bacteria and fungi at 30 degrees, 37 degrees, aerobically, anaerobically, there are different biochemical tests to look for different organisms, this is the nature of Microbiology.

137. We also have an automated identification system called the Matrix-Assisted Laser Desorption/Ionisation Time of Flight (MALDI-TOF) and that is

advanced in identifying bacteria. We have a system of identifying bacteria to give it a name and works on a database from lots of different labs throughout the country. It could give your bacteria a name, but through experience and learning, you know what the name means. Then we get the result back and I ask the questions about why it is growing there, and where it has come from. If I got an E.coli from a blood culture, I would not phone ICT, I would still phone the clinician and give them advice but there are certain organisms where you would alert ICT, because they are not 'normal infections'.

138. So that's really where my job has changed quite a lot and where a huge increase in the laboratory's workload has occurred. From 2016 until now, there has been an increase in our workload in identifying and processing additional samples with infections that we would not normally expect to see. It has been quite a considerable increase, and I don't think the amount of work that the Microbiology Department now have in providing advice and following up results with less staff than ever has ever been raised with the Public Inquiry.

139. I don't know if the issue of staffing levels from ICT and Microbiology have been raised to the Public Inquiry, but this type of situation is not what you would find in a district general hospital Microbiology Department. Also, in terms of what you would expect to find in a laboratory, this is not common Microbiology, and I wasn't trained in environmental microbiology however I have learned a lot in the last seven or eight years because you do learn with experience. Now all the staff here in the laboratory know all the names of all these environmental bacteria. If my name has been on a report that's gone into the patient's notes, I have probably highlighted and raised something at a meeting and Dr Inkster has obviously asked me to attend, because I see she was the Lead ICD (Infection Control Doctor) NHSGGC at that time.

140. The number of blood cultures that were positive on the bench some days was high. One month we had 40 positive blood cultures from the haem-

oncology patients, I have the statistics. At the moment it's one or two a month so if you think of the workload and processing a really complex blood culture result and doing antibiotic sensitivity testing and reporting them out, that is a huge amount of work. Also, for the patient, they're having line infections and additional antibiotics to treat these infections, so these children are getting more antibiotics than they would normally.

141. The other thing is the patients maybe more unwell. We don't know why they're spiking temperatures or why their C-Reactive Proteins (CRP) were raised, so all these patients need a larger number of investigations, what we call differential diagnosis, in order to find out what the problems are. We have to ask why the children's temperatures are spiking, why their inflammatory markers are raised, why they are not responding to antibiotics. We need to escalate, switch antibiotics and do lots of other investigations. That itself has an additional workload, not only for Microbiology but for the staff on the wards taking all these extra samples.

142. When you have a child who is unwell and not responding, you have to look for the reasons as to why the child is not responding, to find what we may be missing, to find the gaps in our antibiotic treatment. We do lots of investigations, and that again takes time. Also, we sent a lot of samples to reference labs, especially the Mycology Reference lab in Bristol, because the Mycology Lab we had in QEUH, Glasgow was moved off site.

143. The Mycology Laboratory was part of NHSGGC. It was originally sited in the Western Infirmary and then transferred to an area in the Paediatric Microbiology Laboratory at Yorkhill. When the Microbiology Dept moved to the new laboratory building at QEUH in 2012 the Mycology Laboratory moved at the same time. In 2015 when the Molecular Section was transferred to Virology, GRI, the Mycology Laboratory was also moved to GRI as some of the Mycology laboratory assays were molecular (PCR). This was a decision made through an appraisal process with management but not with the full agreement of the QEUH Microbiology staff. As the Consultant Mycology Clinical Scientist was not in agreement with this and

did not want to move to GRI, she took early retirement and was not replaced. Samples were sent to Mycology Reference Laboratory, Bristol for more specialist tests/ investigations that were not available in Glasgow.

144. So we lost our Consultant Scientist, who was a Mycologist and retired and was not replaced. All these things have impacted on us and increased our workload in Microbiology.

145. This also impacted upon patients due to the investigations of the infections. They were getting more investigations done and they would be on more antibiotics. This meant you would need to monitor antibiotic treatment with inflammatory markers, and you would need to check antibiotic levels so patients would have more blood taken to look for measurement of the antibiotic in their bloodstream to make sure it was a therapeutic at the right level to treat the infection or if it was sub therapeutic, for example, not enough of the antibiotic, or it was toxic, too much antibiotic . All these extra things need to be done as well along with giving the antibiotics.

146. Antibiotics fall under my responsibility, and I would advise on treatment options and maybe switching to different antibiotics if the patient wasn't responding. Or if they go on first line therapy and then they grew for example Elizabethkingia. miricola, our first line antibiotics would cover what we call normal or common routine microbiology infections, so we would need to change and escalate antibiotics to cover Elizabethkingia miricola infection. Then if there was a fungal infection risk, patients would have to go on another type of antibiotic, an antifungal drug which treats fungal infections, and we would screen for that infection as well.

INCIDENT MANAGEMENT MEETING DATED 5 AUGUST 2016 RELATING TO INCREASE IN ASPERGILLUS INFECTIONS IN WARD 2A (meeting in Jamie Redfern's office) (A37987226 – IMT minutes - Bundle 1, Document 6, page 22)

147. In these minutes it notes, 'Kathleen Harvey-Wood added the patient was admitted to ITU' and 'Aspergillus was attributed to Ward 2A and not ITU'. We must have had the positive results before the patient moved. When a haematology-oncology patient becomes very unwell and requires ventilation as you can see there, they are moved to the PICU for support. There must have been indication that the patient was already positive with Aspergillus before they were moved to the intensive care unit.

148. The minutes also say, 'the patient had been in since 30 May and did not have Aspergillus, as it would have been picked up on screening before this date'. In this situation we would have been asked to screen for Aspergillus. Aspergillus is not routinely checked for every day, but we will look for it if a patient becomes unwell and is not responding to antibiotics.

149. Around midway through the minutes, it appears we have a positive PCR for Aspergillus which has appeared in a BAL (Bronchoalveolar Lavage) and what's being said is that Microbiology want confirmation, which means they would want a further positive result. At that stage we had one positive PCR result but sometimes you only get one, so what's being said is that we would want a second confirmatory test. What they want to see is that the case is a true positive. Aspergillus PCR is a very sensitive assay validated and performed in Microbiology (assay moved to Virology August 2015), so they would want supporting evidence because you need more results for the guidelines for the fungal infections to be proven or probable. They're saying it's a 'probable' case there because they only have one positive result. To make it proven, you need to have another test that would back it up and confirm it.

150. Further on in the minutes, Professor Gibson reported that prophylaxis was discussed with Pharmacy, and it was agreed that would be the preferred

option. It was noted that transplant patients are not routinely screened, and Dr Inkster and Kathleen Harvey-Wood agreed to meet that day to discuss the screening regime for patients. This was to do tests, what we call fungal biomarkers. We do a blood test now to screen for fungal infections, so that was probably the beginning of us doing that. This is all part of doing more tests, more screening samples. Now when we have a patient who is not responding to antibiotics, then we would screen to look for fungal infection being another reason for them being unwell.

151. There was more done prior to that because of the risk to the patients from the environment. They were given antifungal prophylaxis for fungal infections because they are drugs that treat and prevent fungal infections. Also, you're giving them a smaller lower dose so it was agreed that Ambisome would be the perfect option. It's given to provide cover as well as treatment, but also, we need to screen the patients more to look for fungal infection, to treat it more readily and earlier because it implies there was a risk from the environment. Otherwise, why would you give them antifungal prophylaxis and monitoring for fungal infection?

152. I've never had any concerns around the use of prophylaxis, I think it is a good idea, I would support it. But you're giving a patient a drug to prevent infection and they shouldn't need that. You're giving what we call prophylaxis, you're trying to prevent infection, you're intervening earlier, so what you're doing is you're giving antibiotics or antifungals prior to infection to stop infection. You do that on lots of things, in surgery and patients that are going for complex surgery, they might get antibiotics to stop them getting infections, it's called prophylaxis. But why do you need to prophylaxis these patients? You're giving them an antifungal drug to basically protect them from fungal infection. Because a risk assessment has obviously been made, that this is what they think is best to benefit the patient and so they've noted there that eight out of the ten children would be suitable to be given antifungal prophylaxis.

153. Regarding the corrective action portable HEPA (High Efficiency Particulate Air) filters to be placed in the unit, they must have been concerned if they were adding portable filters in to support the environment. Basically, what they're doing is corrective action by taking additional control measures. They are going to take actions, there are three or four things listed that they're doing, including the prophylaxis.

INCIDENT MANAGEMENT MEETING MINUTE DATED 7 MARCH 2017 RELATING TO INCREASE IN ASPERGILLUS INFECTIONS IN WARD 2A (A37989174 – Bundle 1, Document 9, page 35)

154. In these minutes it discusses concerns relating to three Aspergillus cases on the ward, each assessed using the European Organisation for Research and Treatment of Cancer (EORTC) definitions applied to Aspergillus. On the previous IMT, where they had recorded that the Aspergillus PCR was positive and it was a probable case because they did not have any further results to confirm, this is from the European Organisation for Research and Treatment of Cancer, which has a section in it defining fungal infections. This links into the definition of what is a fungal infection and that there are 'probable' cases, 'possible' cases and 'proven' cases. Three different definitions within that criteria depending on how many results you have to support the fungal infection.

155. Some of these can be diagnostic laboratory investigations, some can be radiological findings like x-ray, and can be blood tests like fungal biomarkers. Some can be actually growing the organism from cultures, there's obviously been three cases and again what's been noted as you can see, because we did not grow the Aspergillus from the cultures of all 3 patients (patient 2 isolated Aspergillus from BAL), but it was confirmed by probably radiological findings and from the blood tests that we spoke about earlier. So, there is a classification of a fungal infection. In terms of classifications I use, it's not definitive, I would not make the classification, that would be the Consultant or the IC doctor, but all my results would be

documented to help make that decision.

156. During this process there was a diversity of infections, and some were known. No external guidance was sought from me personally. However, I would imagine the IC team would escalate that to Public Health as part of an IMT. I don't know if you have any of your minutes which have Public Health representation. What would happen is, if the IC team and hospital staff were concerned and after the local IMT was held and issues with the hospital environment were discussed, then IMT would need to raise that and escalate it to Public Health Scotland and that's how I think it was escalated up through Public Health Scotland, and then to the government.

157. That would be through a decision made and actioned at an IMT through scoring it in the HIIAT process. It's from that we would make the decision relating to Public Health, press or the general public involvement. At that point Public Health would then be brought in and then sometimes they would chair meetings, or they would be maybe invited to attend meetings.

158. When it came to identifying the unusual infections from the laboratory, the guidance we had was support from the specialised reference laboratory testing. I would liaise with them and interestingly, from a professional point of view, reference labs mainly are staffed by Clinical Scientists.

159. In a previous situation, Public Health couldn't question the results because the results were there and proven, I think it was the interpretation of the results that was questioned. I think how the results were taken in context by the different management groups was slightly different. What we perceive or I perceived as a Microbiology scientist maybe wasn't how they would see it. But then they were just seeing maybe that one IMT minutes, or that it was one patient and I was seeing overarching issues because I was seeing it every day. I was seeing all the results, whereas they would be focussing on e.g. three cases and to me it was obvious from pulling everything together and seeing the diversity of infections that were coming in.

160. Those working in Estates and Facilities or Public Health Scotland did not offer support or guidance to me directly when discussing the identification of unusual organisms, this would to be at a higher level to ICT. However, I had the impression they did not want to know about it, and I had emails telling me not to email them (Associate Nurse Director, Infection Prevention Control) about things because it was causing a lot of work and they could find things out through other processes. I felt there was negativity towards me highlighting my concerns and the emails were sent to different people throughout the years who were responsible for IC.

INCIDENT MANAGEMENT MEETING MINUTE DATED 4 DECEMBER 2017 RELATING TO ACINETOBACTER BAUMANNII IN WARD 1D (A38172003 – Bundle 15, Document 10, page 696)

161. I can recall this meeting because of a problem in PICU with Acinetobacter. Health Protection England (HPE) performed what we call pulsed-field typing (pulse field gel electrophoresis- PFGE) and 3 of the isolates were found to be the same. I think what Professor Leonard has said, molecular testing, that means whole gene sequencing (WGS). But we don't always do the typing for every organism at that level for whole gene sequencing, and I think the pulsed-field testing is what Health Protection England do generally and that's what we were using throughout the time that you're talking about. That's what we use the HPE Reference Lab for, to send isolates for PFGE. Usually that would be enough to suggest that there was a cluster and that's why they would have held the IMT.

162. Typing means to compare isolates so you have the same species and the same name. The bacteria is called the same species name like Acinetobacter baumannii, but within a species of bacteria with the same name, there can be different colonial variants and there can be different strains. However, the typing shows you whether the strains match and when we send them to Public Health England, we get a report back with what we call the typing result and they then compare them. After that, what

HPE do is that they have a big database of all the isolates of the same species name that we send them, and it comes back with a code.

163. They will then look through all the Acinetobacter's that we've sent them for a number of years, and they look to find if they can match it with a previous isolate and they give it a number so that it's coded with the same number as previous matches. These are all then documented, and these documents are all available in the Clinical Portal with the patients other Microbiology results. Where you see 'sent for typing' that means the isolate was sent for typing as that is what the reference lab (HPE) perform. If they come back with the match, the reference lab give us the laboratory number of the match because it's confidential, they don't name the name of the patient whose isolate it was matched with i.e. a previous one. However, the patient's name is there when the organism was sent along with their CHI number and laboratory number.

164. However, on the report, they give you the laboratory number and their laboratory number of the matching isolates, if they consider it to be the same. You would then go and look these laboratory numbers up and find out who the patient or patients are that are found to have the same typing result. That's where I find that very interesting, because that does suggest there's a commonality between them, because they have been found to be the same strain.

165. But what Alistair (Prof Leonard) is saying there is he wants further molecular testing, which is whole genome sequencing, that looks at the sequence of the DNA of the bacteria. Now that's very detailed and most IC teams will accept the level of typing that the reference labs do with their pulsed-field typing.

166. In reference to Professor Leonard suggesting proving or disproving transmission through typing, he means doing more detailed genetic testing which we don't routinely do. I think that we may have asked for that to be

done but generally for IC purposes, the level we work at is what we call the pulse field typing result that comes back.

167. Health Protection England (now UKHSA) have a laboratory called Colindale in England. It's the big labs like that in England who review things like COVID. They work on all the unusual pathogens and they do typing. We do some local whole gene sequencing in Scotland, basically all our isolates are sent down to England and we get charged for them. It's a very good service but the results take a week or so to come back. My role now has been collating all these results.

168. Professor Leonard went on to report that over a 12 month period, the background rate of Acinetobacter has not changed when compared to previous years. The infection is one of concern in that it shouldn't be in the unit, and it is an environmental Gram-Negative. I don't personally agree with that statement, I might ask where he got the rates, the background rate. Because for me personally, there shouldn't be a background rate. If I was asked to comment on that, that's what I would say.

169. You're comparing a background to previous years, but then it's a hospital environment and comparing with previous years and saying, I'm not sure where he got these figures from. He's talking about the background rate of Acinetobacter there in PICU (1D). That's okay if you get it from time to time, but I think that's changed compared with previous years as 7 cases were being discussed. That would make me ask, 'Well why are you having an IMT then?' If this background rate has not changed from previous years so why have they raised an incident? I note that in Section 3 it is minuted: "It was also noted that trough sinks which were due to be removed and replaced in a more suitable location had not been carried out" and that Section 4 states: "SD will chase progress on replacement sinks". This had not been done by 6 months later - see minutes of IMT 6th June 2018: When more cases of Acinetobacter had been reported.

Also noted that the minutes section 4. Risk Management/ Control Measures is in a different font from the rest of the minutes. Has this been pasted in?

INCIDENT MANAGEMENT MEETING MINUTE DATED 6 JUNE 2018 RELATING TO INCREASE IN ACINETOBACTER WITHIN PICU (A37989601 – Bundle 1, Document 25, page 105)

170. It says that there are six cases in total of Acinetobacter since February 2018 and that typing has come back which indicates there's a predominant strain linked to a previous cluster of Acinetobacter in November 2017 where no source was ever found. Basically, they're talking about predominant strains. It was the previous cluster in October/November, so that would be discussed at the IMT on 4 December 2017 (**Bundle 15, Document 10, page 696)** and they did not find a source. But then they have six cases since February 2018, and they've said that it's a predominant strain linked to a previous cluster, so these six must have matched the previous ones from four months before.

171. On page 24, just under 'Risk Management/Control Measures', 2 General, it says that after the last IMT in PICU regarding the increased incidents, swabbing was done and Acinetobacter was found to be present on a baby bath, but after further investigation it was proven that it was never used on any of the infected patients from the cluster in 2017. These were found because IC go round the ward and do screening swabs of the environment and they are then sent to microbiology for culture to screen for the organism causing the outbreak e.g. to look for Acinetobacter.

172. The water is sent to the water lab at Glasgow Royal Infirmary, so I don't see the results of the water lab, but the screening swabs are sent to Microbiology, QEUH, with a different lab identifier number, different lab number stream, and a code number for the incident. We know there's a ZM number, ZM is a laboratory identifier number which is used for non-patient samples instead of a CHI number i.e. screening swabs or water etc from

the environment, so the laboratory staff know they're environmental samples and they're from whatever site like a bath, sink or tap. I'm not really involved in the processing of samples from that part of the Microbiology laboratory. But if Acinetobacter had been found on a baby bath, I would have wanted it sent for typing. It doesn't say there that they have sent it for typing, but if that was me, I would have wanted that. It never infected patients, but was it sent for typing? That's what I would want to know.

173. It is interesting that all these trough sinks have not yet been removed although this was the plan. The big three trough sinks, in the middle of the ward corridor area of PICU, they use to put waste and bathwater down instead of using the sluice room. The removal of the sinks is probably in response to this. They've been actioned to be taken out, which had not yet been done 6 months later after IMT held on 4th December 2017.
Note minutes Section 2:" KC will follow up with WM (Facility Management – not present at the meeting) - who was dealing with the removal of the trough sinks?

INCIDENT MANAGEMENT MEETING MINUTE DATED 14 AUGUST 2019 RELATING TO GRAM NEGATIVE BACTERAEMIA (GNB) Paediatric Haem Onc (**A36591626 – Bundle 1, Document 77, page 343)**

174. The reason I'm probably at these meetings more is because of my extra responsibility for PICU, this is one of my specialist areas. I phone the ward and speak to them every day, it's one of my responsibilities as a Principal Clinical Scientist. That is why I am often there in the minutes as one of the attendees, because it's probably me that has been issuing most of the laboratory reports, speaking to clinicians daily and attending the paediatric MDTs. That sets the scene of why I'm there, I am the first point of contact in the Microbiology laboratory. Two of the Haem- Oncology patients discussed in the minutes are PICU patients. I am also responsible for phoning out the positive blood cultures from Haem-Oncology patients and gathering monthly data on the number of positive blood cultures from this

patient group. Teresa Inkster was chairing the IMT and has asked me to attend the meeting.

175. The minute says that Chris Deighan pointed out the numbers of bacteraemia have not increased in reference to Iain Kennedy's epidemiology report, and then it says that Dr Inkster and Dr Peters stated the nature of the bacteria were a concern and that we're not seeing the typical pathogens for this patient group.

176. If you look at the last section of that paragraph, 'The organisms we are seeing are environmental in nature and associated with water/soil' it's exactly what I've already said, independent of this information from Christine Peters and Teresa Inkster, I'm saying the same thing as them. I've not seen this document by Iain Kennedy, but I find it very interesting they (Christine and Teresa) are supporting and agreeing with what I've said, the environment and the soil. I have already mentioned the pathogen that we thought was due to rubber tyres. (Gordonia is a gram positive bacteria that can be found in biodegradable rubber and soil)

177. Dr Chris Deighan is not someone I have come into much contact with. He's NHSGGC and Deputy Medical Director of Corporate Management. I did speak to him about the bacteraemias (blood stream infections) I was finding in that meeting. If Dr Deighan wanted to find the number of the bacteraemias and whether there was an increase in the rate, he would go to our system. The system is called ECOSS. That is how all our positive results get sent to Health Protection Scotland. They have a computer system which draws down results throughout Scotland. They can look at epidemiology within the country of increase in infections and surveillance of infectious diseases and hospital acquired infections. That would be done through Public Health, but he is corporate management, NHSGGC and not Health Protection Scotland. I'm not sure where he got that from, he does say he has referenced Dr Iain Kennedy's epidemiology report.

178. Iain Kennedy is Public Health Scotland; he provided the epidemiology report. He got the information for that from the ECOSS results that come through the Microbiology Department. Iain Kennedy's interpretation is different from mine, he was the person that said there wasn't a problem, and I explained the diversity and increase in numbers of bacteraemias. This is where we have a disagreement in where the information and data has come from or collated, in that they're saying there is no increase. However, one Consultant said there had been an increase in infections. I wonder if that was me and this is the meeting I'm talking about.

179. Dr Inkster and Dr Peters said that there was a concern that the organisms were environmental in nature, and this was one of the meetings where Corporate Management and Health Protection Scotland were saying that what we were seeing was normal and there was not an increase in microbiology issues or bacteraemia. However, Dr Peters, Dr Inkster and I, who were all at the meeting, raised a concern that this was not the case.

    I had been recording and auditing trends for years before and had given a presentation to the Haem/Oncology team. Dr Deighan and Dr Kennedy never asked for the presentation or audit results from me. I note that Dr Deighan was appointed as NHS Lanarkshire Executive Medical Director from January 2023 (added as comment Oct 2023).

180. Prior to this meeting I did not have any involvement with Dr Kennedy separate from the IMTs. My audit results and information graphs were all given to Dr Peters who is my Line Manager, so she knows about all the graphs I have produced over the last few years since 2014, because she asked me to go back, basically from 2015 to the present time. I'm still doing it now; she asked me to go back a year so we could have a reference point of the year prior to the move from the old hospital at Yorkhill to RHC, QEUH.

181. All the data is from 2014 to the present time and all information and graphs has been emailed to my line manager, Christine Peters. She has escalated where she feels appropriate to higher management, so that isn't my remit.

My remit is to give results and audits to my line manager who then decides what information to escalate and to who, and you can speak to her about that because she has all the information. That audit was done with Christine, she was at the meeting when I gave that presentation. In fact, she did a presentation also with the blood culture audit. I set the scene for the CLABSI group with my audit, and then Christine spoke to them as well.

182. I have not personally seen Dr Kennedy's epidemiology report. I don't know whether he had shown it, but I don't have it. It would be interesting to ask Christine Peters if she has seen it. I'm assuming the report is in relation to the numbers of bacteraemia in the haematology-oncology unit, because that's what we're talking about, as well as the case definition of a line infection. But the last sentence there is that the CLABSI group's excellent practices have driven rates down, and that's what I remember. I mentioned that earlier, how well their practice and the group had worked in changing the rates of infection, that group has been a really big success, so they've commented here on that already in 2019, so even three years ago we were seeing a difference.

183. But everything Christine and Teresa have said here, I completely support. I've not been party to any other reports from corporate management or from Health Protection Scotland, although they did ask me for results at one point. HPS did actually come to me and, interestingly enough, they emailed me directly without going through due process and through my line manager, asking for all my blood culture results.

184. I straightaway emailed Christine Peters and told her I had been asked to give this information out and asked if she could take it forward. (Christine Peters will have the emails I forwarded to her in support of this). There were a few occasions when they tried to get information from me without going through my Line Manager. I'm sensible, I'm not going to give Health Protection Scotland information from patients in this hospital without going through my Line Manager and Clinical Lead. That is something else to note, I was annoyed at the time with them, when they were doing that. But

they thought they could ask me, and I would give them lots of information just like that. I can't recall having had separate meetings with Health Protection Scotland, and I feel that would have been done through my Line Manager anyway, but there's a slight difference in the interpretation of results and what is seen as" normal" bacterial infections.

INCIDENT MANAGEMENT MEETING MINUTE DATED 6 SEPTEMBER 2019 RELATING TO GRAM NEGATIVE BACTERAEMIA (GNB)-
Paediatric Haem Onc (A36591637 – Bundle 1, Document 79, page 354)

185. This IMT was chaired by Emilia Crighton (PHS). Teresa Inkster had asked me to attend the meeting to take notes as she and Christine Peters were not invited to attend and Teresa was not chairing the IMT. Question as to why Teresa had stepped down as NHSGGC Lead Infection Control Doctor. Of interest Emilia Crighton was appointed as Director of Public Health in August 2023 (added as comment Oct 2023).
There was a significant discussion in relation to chilled beams following the SBAR of 25 August 2019 by the Consultant Microbiologists raising concerns **(Bundle 20, Document 65, page 1471**) and following the issues at the IMT held on 14 Aug 2019 **(Bundle 1, Document 77, page 343)**, whether they were leaking or not and whether they were cleaned. Tom Steele said, no they weren't leaking: in terms of the leak Tom Steele stated "does not believe there was a leak and the leaks would not have occurred from the chilled water circuit. If there was a leak this would have come from the hot water but anything in this would evaporate" and Dr Crighton said that they were acceptable for use in the hospital. My notes taken at the IMT record: "2 times in the same month the boilers were down and temperature trends were monitored - boiler pressure was lost and this caused the increased condensation from the chilled beams. Leaks from chilled beams associated with the duration of boiler failure. Hot water leak due to pressure failure".
Dr Valyraki (PV) informed Tom Steele that Christine Peters had photographs of the chilled beams leaking. Building regulations; chilled

beams should not be used in Haem/Oncol settings. “The American Society of Heating, Refrigeration and Air -Conditioning Engineers (2017) notes that chilled beams should not be used in Intensive Care Units, protective isolation or source isolation rooms, toilets, procedure rooms, due to cleaning difficulties and potential for build -up of contamination. Condensation should not occur on chilled beams as this is a prerequisite for safe monitoring in healthcare.” Reference:T. Inkster et al. Journal of Hosp.Infection 106 (2020) 613-616. Teresa Inkster was so concerned regarding the issues of the chilled beams that when she stepped down as Lead ICD she published this peer reviewed paper. (Of interest Teresa Inkster is no longer employed by NHSGGC – comment added Oct 2023).
I was party to discussions about chilled beams outside of this meeting.
I heard through my line manager, Christine Peters, that when we were at the ward, there were stories of them leaking and dripping on to the beds. Also, that they weren’t cleaned properly. Interestingly, our own Microbiology lab also has chilled beams. Contracted out specialised cleaning staff are here every other week now cleaning them in the laboratory. I don't think there was any cleaning done of the chilled beams before or at the time of this IMT. I have had water drip onto my head from the chilled beams in my office in the Microbiology Dept as recently as May 2023. (comment added Oct 2023)

186. I asked the question as to whether Great Ormond Street Hospital had chilled beams. **(Bundle 1, Document 79, page 354).** The reason Great Ormond Street came to mind was because they are a historical link with Yorkhill Hospital. Yorkhill Hospital was the paediatric hospital for Scotland when we were a standalone hospital and NHS Trust, and we were a benchmark. We considered ourselves the” Great Ormond Street of the north” and with some of the assays I developed I was speaking to and collaborating with Great Ormond Street. Also, during the course of some of my research I went down to Great Ormond Street and I would use them as a comparator.

187. When I was working at Yorkhill before we moved here to the QEUH, I would speak to the Microbiology Dept., Great Ormond Street about any

concerns or for advice regarding paediatrics, because there wasn't another paediatric Microbiology lab in Scotland. There wasn't another paediatric lab in Scotland at that time, the only other ones were in Leeds or in Birmingham Children's Hospital, but Great Ormond Street is the centre of excellence in the UK for paediatrics.

188. Some of our patients go to Great Ormond Street for specialist treatments and for transplants etc. If you're building a hospital or you want it to be good, it's the place to compare, that's why I referenced them, and they don't have chilled beams as far as I can remember. Minutes Section 11. AOCB "and the peer review by Great Ormond Street Hospital carried out "From my notes and not recorded in minutes : " a review by Dr Hartley from GOSH who is a Consultant Microbiologist and Director of Infection Control to visit the hospital was planned." **(Bundle 1, Document 79, page 358)** As far as a I am aware this did not happen.

189. There were disagreements with regards to Dr Iain Kennedy and Dr Chris Deighan's comments about not recognising the increase in infections. My own notes (and not recorded in the minutes) record that I informed the group and Iain Kennedy that the positive blood cultures taken from lines are mixed polymicrobial and the diversity of the bacteria isolated is different from Yorkhill. I think we were concerned that the issues we were raising were not being addressed. For me, it sounded like we were being told, 'no we don't have a problem, so we don't need to fix it.' I was concerned they did not want to admit they had a problem and take action, because if you change and make corrective actions then you're admitting there's an issue.

190. We were getting concerned because this was 2019, and this wasn't an issue we would want to continue. There was a change with our line practice and the CLABSI group, who were doing well, but the environment was still an issue from my perspective, and I did not think that they were doing enough to try and resolve the issue.

191. Estates seemed to be in denial that there was any problem with the temperature of the water however, there was a boiler problem with the hot

water temperature in June 2019 and it is referenced in the IMT 14 August 2019 **(Bundle 1, Document 77, page 343)** and 6 Sept 2019 **(Bundle 1, Document 79, page 354)**. Comment added: the boiler problems were discussed (in my notes taken) but interestingly not recorded in the minutes. Estates were also telling us the chilled beams did not leak. The other issues seemed to be not for their concern, but being Microbiology, we were seeing the results coming through and we were seeing the infections in the patients. There has to be a reason for the patients being infected.

PERSONAL IMPACT

192. No one from Corporate Management came to speak to me, including Jane Grant. Obviously, they would speak to my Line Manager first, so I think most of my issues have been raised with Christine Peters and she has taken them to management herself. In that respect, indirectly, my concerns and her concerns have been raised, but as an individual employee of NHSGGC, no one came to speak to me to discuss my concerns or my feelings. It has been actually quite hard for me, even talking about it today, I do feel affected by it all.

193. During my increased workload I wasn't offered support. I just got on with it really, it was hard. It has been a lot more work on the QEUH site than I did at Yorkhill, it's full on. Because I don't have my colleagues who I used to work with, it's been hard for me personally and even though I don't have any direct patient contact, the fact that you're putting a result out, you know the patient's name, you know the backstory, you know what's happening, it does affect you. Even though I don't visit patients, or see patients or speak to family members, I still have a duty of care, and I have responsibility for patients. That's why I work in Microbiology, despite it being emotionally hard.

194. I have also not been provided support in relation to the personal impact upon myself in my role. I don't have any colleagues to work with within my grade. When we did have one other Clinical Scientist we would work

together. But since my colleague retired and was not replaced then it has only been me. Previously, other Clinical Scientists would have gone to IMTs if it was involving their specialist area. I felt that a lot of work was left to me. I was supported by my Clinical Consultants, and I've had very good support from the Clinical teams in the wards and Medical Microbiology Consultants in the department, but I feel that my profession has not been supported and it's tough when you're on your own doing a job within your own grade.

195. I am part of the clinical team in Microbiology, and I am speaking as how I see things from my perspective rather than overarching department perspective. I have been supported by my Microbiology Clinical Consultants who are basically my line managers and who I work with on a daily basis with absolutely no problems. I'll go to them with issues or problems, like the Microbiology Consultant on for Paediatrics in the rota and we'll chat through things and sort things out. From that perspective I have been supported, but from the organisation I would say maybe not so much.

196. After due consideration I have decided to add additional information regarding the impact this has had on me personally. The rise in the paediatric infections was difficult, seeing the increase in the number of positive blood cultures and the children being unwell with line infections and having to have lines removed with some patients requiring admission to PICU. I found it upsetting and stressful phoning out the results of the ongoing environmental infections to the clinicians in the ward. I retired on 31 May 2023 and have now been retired for a year. I am spending time reviewing and answering comments to my witness statement in my own time with no financial renumeration. Retirement is for spending time with your friends and family and for starting a new chapter in your life and not being reminded of work. The problems with infections in the paediatric patients RHC are still on my mind to this day.

IMPACTS OF EXTERNAL REVIEWS AND INQUIRIES

197. In general, there has been an impact on my ability to do my role due to the external investigations and other processes, it has been very difficult. It has been difficult for me to see things in the press and difficult to read all of the reports prior to the Public Inquiry. Obviously, also the police inquiry and all the things going on between 2017-2019 in the wards with the children that were affected by this and the parents' concerns. There was quite a large amount of public information made available, particularly by one journalist who was excellent and I was aware was a Microbiology Scientist who wrote lots of articles in the Glasgow Herald and Sunday Herald. They were actually very good representations of the concerns we had.

WHISTLEBLOWING

198. I did at one point consider whether to whistleblow because I was very concerned. My opportunity now to speak to you, although it's not what I would normally do, I'm finding it's something I do need to do. When I was asked by the Public Inquiry to contribute to the investigation, I was happy to contribute because I can say from a personal view how I feel about what has happened and also what has happened to me and my profession within laboratory diagnostics. It was a good way for me to voice how I feel.

199. Overall, moving to this current site at QEUH is not what I bought in to, and it has changed my career very much. I am now doing much more clinical liaison, much more routine Microbiology and much more auditing and looking at results that come through. When a blood culture flags positive, I find I now get a sinking feeling as if I don't know where it's all going to end.

200. I wouldn't like to comment further on whistleblowing.

DECLARATION

201. I believe that the facts stated in this witness statement are true to the best of my knowledge, information, and belief. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.