Transcript: Webinar - IPC challenges and solutions

Waterborne infections | 29 September 2021

Watch the webinar

During this webinar our audience submitted their COVID-19 IPC questions to our expert panel:

- Teresa Inkster, Consultant Medical Microbiologist, NHS Greater Glasgow and Clyde
- Daniel Pitcher, Managing Director, Water Hygiene Centre
- Jimmy Walker, Independent Microbiological and Decontamination Consultant, Walker on Water
- Mike Weinbren, Consultant Medical Microbiologist, NHS Scotland Assure and King's Mill NHS Trust

Chair: Eimear Brannigan, Consultant Infectious Diseases, Deputy Clinical Lead, Antimicrobial Resistance and Infection Control Division, Health Service Executive, Ireland

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Eimear Brannigan 0:05

Good evening and welcome everyone to this evening's HIS webinar. We are focusing this evening on waterborne infections. And we have a great line-up of speakers and expertise to guide us through the next hour or so. Before the webinar, we asked you to submit some questions. And these are to put to the panel we have chosen eight questions from among your questions. And these will be the first 40 minutes or so off the webinar. In the last 15 minutes of the webinar, there will be live questions and we'd encourage you to submit these via Slido. I see someone has just put a point about that in the chat to everyone. So we will try and pick that up as the event continues. So once the Slido is registering the event, you'll be able to interact and ask those live questions for the last portion of the webinar. So thanks to our panellists. So I'm going to introduce all of us now. I'm Eimear Brannigan. I'm an infectious diseases doctor and I'm chairing this evening. And I am going to start with introducing Daniel Pitcher and he's going to tell you a little bit about himself. Daniel.

Daniel Pitcher 1:43

Thanks, Eimear. I'm Daniel Pitcher, I act as an authorising engineer water for the NHS, working with many health trusts and health boards in Scotland. I've been providing consultancy, independent consultancy support for the best part of 25 years. And certainly in the last few years, it's fair to say that things have become very interesting, especially in the last two years, the amount of focus on design work, getting it right at the design stage really has stepped up an awful lot, so as well as attending water safety groups developing more safety plans. Certainly, the design element is something that's hotting up very much. Thanks, Eimear.

Eimear Brannigan 2:30

Thank you, Daniel. And thanks for joining us this evening. Mike Weinbern, I'll ask you to introduce yourself please.

Mike Weinbren 2:37

Thank you and good evening. I'm Mike Weinbern and I'm a medical microbiologist I work at Sherwood Forest NHS Trust and NHS Scotland Assure. I've got an interest in water. And I chair the Healthcare Infection Society Working Party on water.

Eimear Brannigan 3:00

Thank you very much, Mike and Teresa Inkster. Could you introduce yourself please?

Teresa Inkster 3:03

I am Teresa and I am consultant microbiologist based in Glasgow and I also work with NHS Assure, and I have an interest in waterborne infections.

Eimear Brannigan 3:13

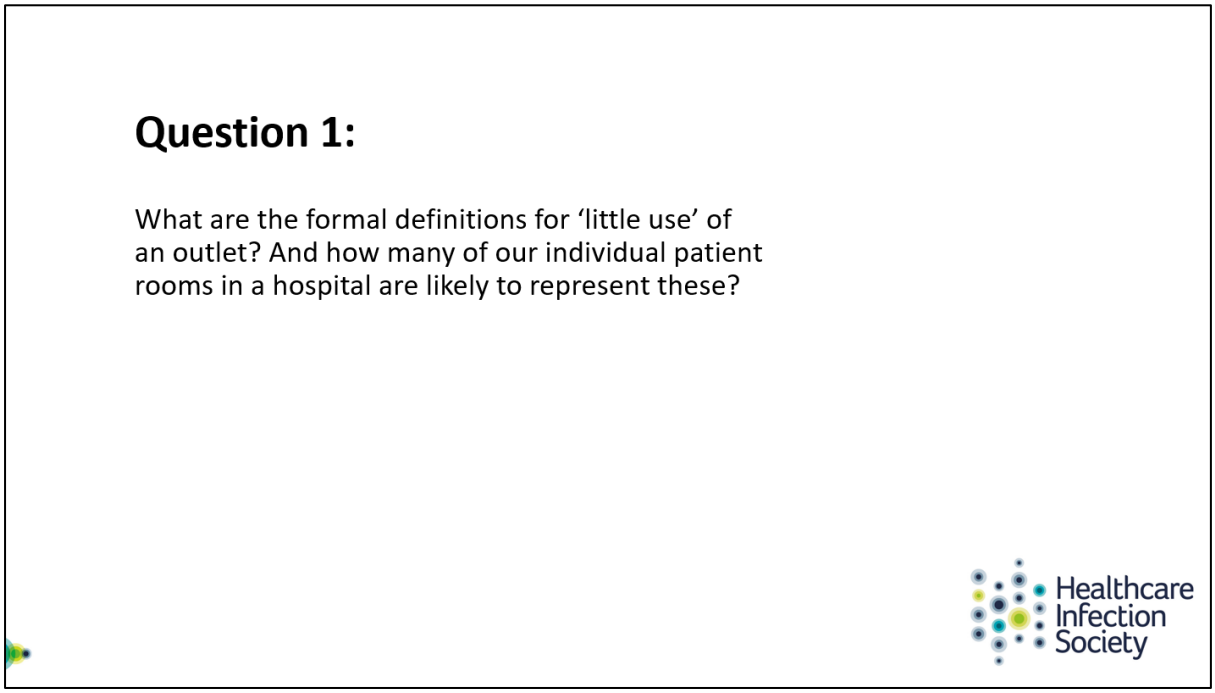
Thank you very much. And finally, Jimmy Walker who's had a busy day today.

Jimmy Walker 3:20

Eimear thank you, you've noticed Yes, busy day at IPS. And in fact, my background is a research microbiologist very much interested in contamination of water very much interested in biofilms and the role that all that contamination and biofilms play in our water systems. And it was very clear today, during the discussions after my presentation, which was the Christina Bradley lecture, which I was very proud to give was it there are still like huge issue in terms of understanding of water systems from a healthcare professionals perspective. But the biggest issue is that interaction at the water safety group level of your healthcare professionals and your estates departments and a) talking the same language and b) understanding where each other need to be.

Eimear Brannigan 4:06

Thank you indeed. So welcome all and we look forward to hearing from each of you over the next few minutes. Thanks Jimmy. So, first of all, we come to our first question, which is from Daniel. And here it comes now. And we're going to start with a little defining. So Daniel, if you could address this question, which is what are the formal definitions for little use of an outlet? And following that, how many of our individual patient rooms in a hospital are likely to be little use outlets? Thanks, Daniel.



Daniel Pitcher 4:45

Okay, thanks, Eimear. So I think first thing we want to just clarify is the term 'little use'. And two little words 'little use' have actually generated a huge amount of reading and just cross-checking things my end. So having looked through current guidance, what I just like to do is just summarise what I found in in current guidance documents using the term 'little use'. So L8, there is no use of the term 'little

use', they have used 'intermittently'. And that's used twice 'HSG 274' part 2, 'little use' is mentioned three times, twice within supplementary control commentary and once within Appendix 2.1 for risk assessment. And again, 'infrequently used' is used six times once within supplementary controls and five within the rest of the document. In HSG274, there isn't a definition for 'little use' or 'infrequently used'. So then we go well we're healthcare so what does HTM-04 part A Part B Part C and SHTM-04 have to say. They don't use the term 'little use'. They use terms such as 'infrequently used outlets', 'infrequently used equipment', 'infrequently used water outlets', 'infrequently used facilities'. And in SHTM-04 it actually uses the term 'sporadically used' outlets on several occasions. So, making sure that I haven't missed anything here I've cast the net a little bit wider. And I've looked at various British Standards, BS 8680 on water safety there's no mention of 'little use' outlets there. 85 sorry, 855468, a guide for flushing disinfection, it talks about hygiene flushing, it doesn't mention 'little use' outlets. And just to make sure it's not historic thing, you know, people have these terms that float around for a long time, I looked at HSG 274, sorry, HSG 70, which was the pre-runner to L8 and that used the term 'intermittently used' outlets. HTM 2040 uses the term 'showers' being used regularly. And in HTM 2040 management policy from 1993, the appendix management checklist 3E it uses the term 'identification of little used outlets and associated pipework'. So just to be clear, the term 'little use' outlet. One one historic reference to it in all the other references that are in all the guidance documents, it's only used three times in HSG 274 part two, the most frequently used term is 'infrequently used' outlet. So to answer this question, what is the formal definition of the 'little use' outlet? I think it should actually be an 'infrequently used' outlet. So what is the formal definition of 'infrequently used' outlet. Well HSG 274 part 2 says 'weekly' or 'as indicated by risk assessment in terms of flushing', a little used outlet or an infrequently used outlet. But it then goes on to say for high risk populations, healthcare homes more frequent flushing may be required as indicated by risk assessment. So in this instance a non healthcare if an outlet is not being used at least weekly, then it would appear that it says it needs to be flushed at least weekly. A week is a long time in healthcare. So noting that HSG 274 Part B says 'weekly' or as indicated by risk assessment. What risk assessment are we talking about? Well, I suppose what we're talking about is a clinical risk assessment to identify our patient cohorts of susceptibility. If we then jump straight to HTM-04 Part C, and I'll start with the easiest bit first. It details infrequently used outlets be flushed daily in augmented care areas. Excellent. We've got a unit of measure already. Now, HTM-04 also goes on to say in healthcare facilities remember Part C looks at augmented care. Healthcare facilities risk assessment as agreed by the water safety group may indicate more frequent flushing than the weekly and draw off should form part of the daily cleaning process. We've got another win there, daily cleaning so daily use, so in my opinion, and I'm sure the rest of the panel might agree with me here, that 'little use' or 'infrequently used' outlets in healthcare setting is an outlet that's not being used at least daily. Daily use of an outlet is essential to minimise the period of no flow or stagnation. Daily use is regular use of the outlet to minimise the risk of microbial growth in a water system. Now, the second part of the question is, how many of our individual patient rooms in a hospital are likely to represent these, this is how long is a piece of string. Not all hospitals are the same. Some are big, some are small, some are old, some are new. And all of the above. The key here is the clinical risk assessment to identify the patient susceptibility cohort, then to determine what is in those patient rooms, and what the use of those services are. So if you've got a bed bound patient in an en-suite facility, it's a given that they're not going to be getting out of bed to use the shower, for example. So this needs flushing and considering my answer the previous element of the question that would be daily. So a bit of a long winded answer, looking at many different aspects, but be clear, 'little use', it isn't used that term isn't used in healthcare guidance, HTM or SHTM 'infrequently used' is, but then what's infrequent? It would appear to be at least daily when we go for what the guidance has to say, on flushing in augmented care areas. And that daily flushing is good for ensuring minimising risk of microbial growth. How's that?

Eimear Brannigan 10:52

Thank you, Daniel, comprehensive skim through the various supporting documents there. So that's great. Do our other panellists have comments that they'd like to add? Mike, do go ahead, please. Thank you

Mike Weinbren 11:10

Its more really from a practical point of view? I think what's quite useful I find is often when you're trying to remove an outlet people often claim they're using it and you often feel actually, that's not the case. So if you want to be sneaky about this, what's quite good is to put a data logger behind the inspection panel, and that will record temperature changes. And then you've got irrefutable evidence that supports yeah, this outlet isn't being used. And I think the other thing is, I think certain parts of the hospital, it's very difficult to if you get somebody to do the flushing to make sure they do it consistently. And I think we're all familiar with those like sheets, which are filled in the night before they're due in. And I think with a new technology, it certainly is a hospital having automatic flushing outlets and can help with to ensure flushing takes place.

Eimear Brannigan 12:04

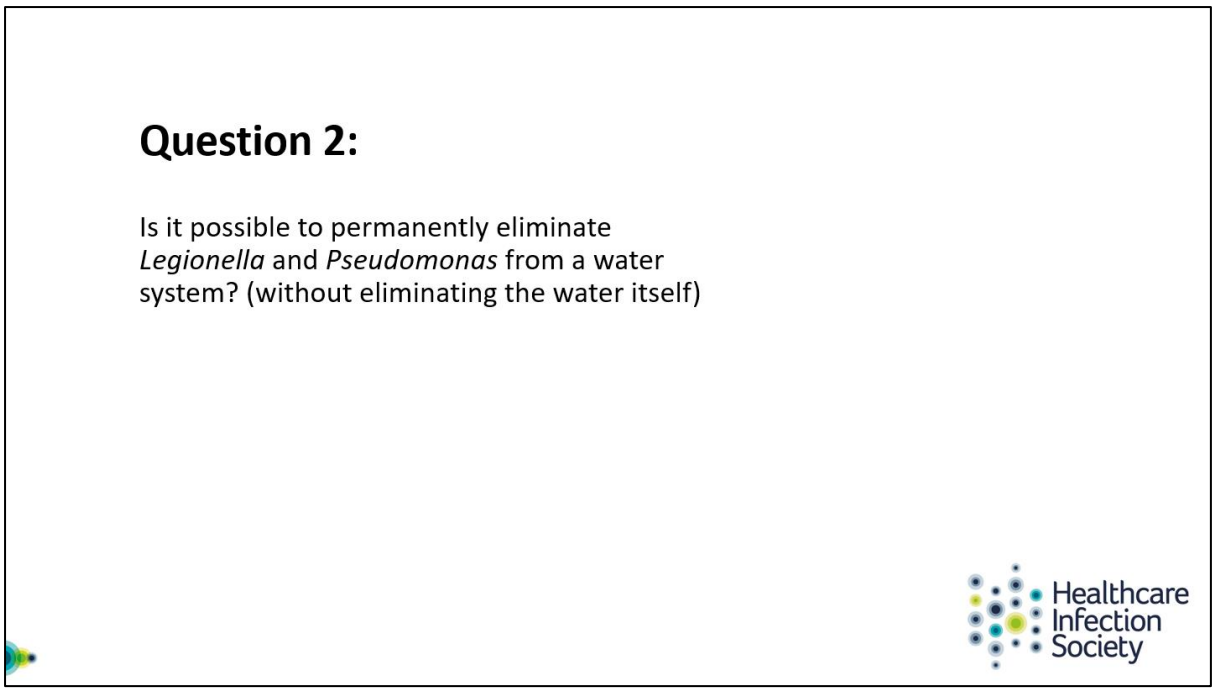
Thank you, Mike. Jimmy, did you want to add to that?

Jimmy Walker 12:07

Its sort of backs upf what Mike was saying some of what he's already said I was going to say but basically it's using a building management system to understand what outlets are actually used infrequently. Rather than just relying, as Mike was saying on somebody with a bit of paper saying flushed it and that old signature being the same from day to day. It was just thinking about how can we use remote monitoring use artificial intelligence that's now coming on stream to better understand the water system to reduce that risk to vulnerable patient.

Eimear Brannigan 12:43

Thank you. Okay, shall we move on to our next question? That was a great start, I think, a bit of food for thought. And we move straight on to another very straightforward question. And this one is for Mike. Is it possible to permanently eliminate *Legionella* and *Pseudomonas* from a water system without eliminating the water itself? Thank you.



Mike Weinbren 13:15

I suppose the answer is it isn't. We've got – in the UK we've got good quality water coming from water treatment works. But unfortunately, this water contains a rich microbial flora. And this includes a number of organisms which undergo go under the name of opportunistic premise plumbing pathogens, and they share in common relatively resistance to chlorine, brown amoebae and maybe they don't need much in the way of nutrients and they have the ability to form biofilm. And these include *Legionella Pseudomonas*, atypical mycobacteria a whole list of pathogens which we're up against, so these will naturally get into our water systems. Suppose the question is, is, is keeping the numbers down, so they're unlikely to cause clinical disease. So if you're looking at water systems, you can broadly divided into two there's a periphery of the system theres the spurs. With a hot water system, we tend to have a recirculating loop. So, the spurs coming off, that is the periphery, that's the main body with the cold water system is less distinct, but we take the main pipes and then spurs coming off that as a periphery. So in the hot system if you have a well designed system, and temperature control seems to be the main way we control *Legionella* in the UK, and it's good for most other organisms. So we want temperatures above 55 on the hot and below 20 on the cold. If you have a well-designed hot water system without any dead links, you should be able to achieve this. Oh, it's quite complex to actually in the subordinate loops to ensure the temperatures are getting through the hot system through all the loops. And again even temperatures but at the periphery of the system. We know at the Spurs we put in materials which are high risk of biofilm formation, put in thermostatic mixer valves, often in areas where you may not require them. And, and so this is an area which is difficult to control. And all the conditions arise from bacteria multiplication. So I think on the whole one should be able to protect the main body of the water system if you don't if you can't control that then you can get quite explosive outbreaks. But getting the periphery of the system free of these organisms is is extremely difficult. And so it's maintaining the water turnover. If you can get rid of thermostatic mixer valves and a risk assessment, this will reduce your risk. The HSE are actually very good in allowing you to do a scored risk assessment to remove these things, keeping the water turnover. So I think the periphery is a problem, you need to clean it TMEs regularly keep the water turnover, change the shower hoses and all these things which eliminate the risk. With *Pseudomonas*, we have other ways that it can enter the system. And we one of the areas we're seeing may actually

occur with *Legionella* - Probably people haven't looked for it is people may wet test components during manufacture. And then you put them straight into water systems so water safety groups should now be making sure, asking the manufacturers are you wet testing them? If they are wet testing them, what are they doing to mitigate the risk because this is bypass or protection systems. But equally at the periphery of the system as *Pseudomonas*, there's a risk of retrograde contamination. So we often think about somebody not cleaning the sink properly. Now clean the drain, then introduce into the way you can get retrograde contamination. And I think we talk about water systems now. And it's very difficult to separate that out from the drainage systems. Because although for example, organisms such as *Pseudomonas*, your water may be clear of *Pseudomonas*, there's well documented spread from drainage systems to patients. So so I think you can't stop these organisms getting in there. They will get in there if you can, but you can do, you can do a lot to try and minimise the risk.

Eimear Brannigan 17:42

Thank you, Mike. Are there comments from other panellists? Okay, well, Oh, here we go, Daniel.

Daniel Pitcher 17:56

I just, I couldn't find the button quick enough. Sorry. Thanks. I can't agree more with Mike on. Its around us. It's about how you control your water system getting that design, right. Even with new designs, you know that the hot returns coming right down within, you know, let's say 500 or 300 mil, that, that's superduper. It's shortening that length, but that last little terminal bit, that outlet can be full of so many jibblity bits that actually it allows so much to cling on, if it's not designed right or if its not the right spec. And then all of that good work with getting that circulation working, falls apart. Equally. The the the commissioning of these water systems, I've recently been involved in project where the hot water system is designed to come right to within 300 mil, superduper. And when I went and checked the building, there were at least 90% of those return loops weren't circulating. But the commissioning agents where they're going, it's fine. It's working like no, no, no. You've got the hot water to the tap, but you're not sending it back. They're all the unknowns. That's it. That's where the problem is. So yeah, it's getting the design. Right, but then making sure that design works correctly on agreement.

Eimear Brannigan 19:20

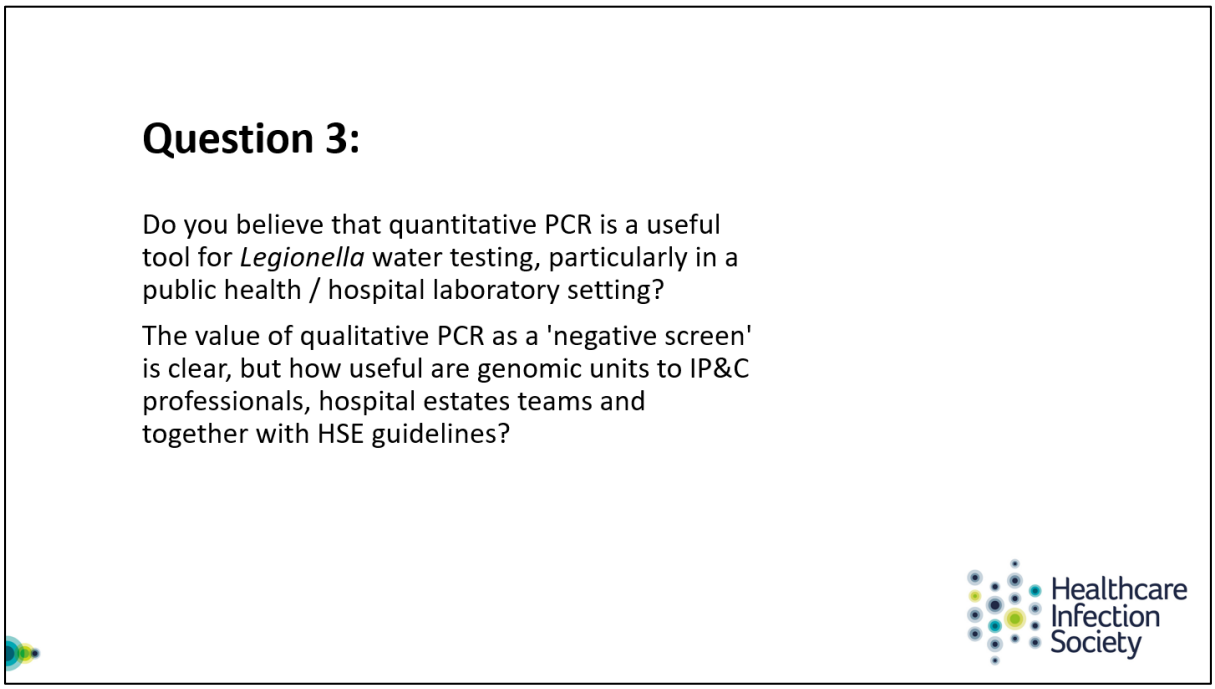
Thank you, Mike, do you want to come back? And then maybe we'll move on to the next question.

Mike Weinbren 19:25

Yeah, I can just echo what Daniel said, I think, with new builds, just to say, the commissioning phase is a very dangerous phase of the water system. If you have not actually, your commissioning phase needs to be decided right at the design phase, not something which is done at the end. But so often nowadays, when we know so much about water systems, we're seeing water systems filled, and nothing put in place, and the contamination of brand new system occurs very early. And once it's contaminated, it's very difficult to eradicate that.

Eimear Brannigan 20:00

Thank you. Well, that's great. And just to, before we move on, just to let people know that Slido seems to be working again. So if you do want to think about some questions that you might ask in the live portion of our webinar, that would be great. So moving on to our next question, which is to do with the use of molecular technology. And this is for Jimmy, who's agreed to address this question. Do you believe that quantitative PCR is useful a useful tool for *Legionella* water testing, particularly in a public health or hospital laboratory setting? And, and along with that the value of qualitative PCR as a negative screen is clear. But how useful are genomic units to IPC professionals, hospital estates teams? And how to think about them together with the HSE guidelines. Thanks, Jimmy.



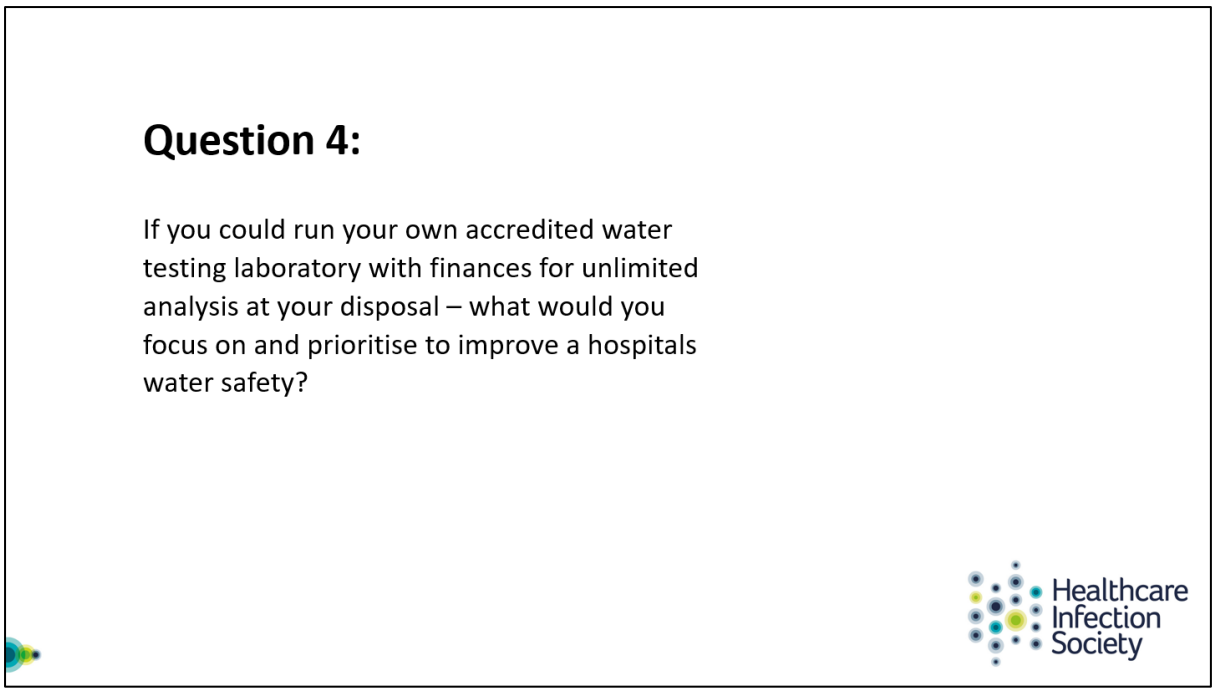
Jimmy Walker 21:03

Well, thank you, I think it was Elise Maynard that might have submitted this question. And I'm very, very pleased she did because we get quite a lot of discussion around the use of PCR. Do I believe that it is a useful tool? Absolutely. I do. Having worked with for many years with a standard plate culture and having to wait 10 to 14 days for a result, to report that back to the hospital is far too long. However, the benefits are immense for PCR for water testing, but it's interesting, it's not really been taken up across the whole healthcare sector. And obviously, there's other organisms as well, such as NTM, non-tuberculous mycobacteria, which grow so slow, that can benefit immensely from the use of PCR. And outbreaks absolutely terrific tool when you're trying to identify where we're that either that building is in the public domain, either or within a hospital where you're trying to match clinical isolates to a patient who has succumbed to Legionnaires disease within a hospital. And you're trying to identify that source. Those sorts of benefits, I think immensely are that that 24-hour turnaround. So the clinical team and the water safety team can then respond to those results. And then it was the second part of the question, about negative screen. This has always been an area of debate. But it has such positive aspects to screening a water system where you can determine whether parts of the building, you're working in are actually clear of *Legionella*. But what we have from that is a presence also of where there may be a positive but there may be free DNA cells, which may be dead, as to getting a positive result. But if those cells have been partly killed and releasing the DNA into the system, you could still have a positive PCR. And that's quite interesting, because what you begin

getting information there is that there has been that that species of that isolate within the water system at some point. And someone may have for example used heat and/or chlorine in order to kill off the *Legionella* that was in the system. Genomic units has always been an area of debate. And this is where we need to work with our different government bodies to try and bring forward the understanding of genomic units. Working with Sam Collins at PHE Sam does some lovely graphs and correlations of genomic units to CFU. But we never really got there at the end of the day, because genomic units are different from colony forming units. It's a different process. And certainly, with a standard plate going culture where you're losing a lot of *Legionella* in the processing. And with PCR you're getting a higher result in terms of genomic units and it's understanding what's going on there because you're not losing those cells within a procedure of a process which you're you're analysing. There are other processes for genomic units and what Sam tried to do was understand what the genomic results means for healthcare. And what we were looking at then was looking at, for example, 1000 genomic units for a healthcare situation. And it's interesting that since HSE, have done a publication, I think it was January this year, when they looked at cooling towers, a very different environment. But that environment being potential for an explosive outbreak of *Legionella*, they're looking at using 5000 genomic units as an indicator of the quality of the water. But what we really need the HSE to do is to bring forward more statements to bring forward more discussion and the guidance. And there'll be a discussion on that the British occupational health society meeting in November, later this year. So that's about me, on that note, quite like to introduce it or invite the rest of the panel to discuss because there's lots of debate around PCR and its effectiveness, but I'm certainly a great proponent of it as I was at PHE.

Eimear Brannigan 25:07

Thanks, Jimmy. So that's the case for. Does anyone want to say something counter to that or or weigh in and support? I'm shaking my head. So shaking heads, we've got a we've got unanimity here. Any other comments from the panellists, please? Okay. all on the same page. That sounds good. Okay, thank you. Okay, so now we have a little bit of wishful thinking. And Teresa's going to take this question. Thank you, which is if you could run your own accredited water testing laboratory with finances for unlimited analysis at your disposal, what would you focus on and prioritise to improve our hospitals water safety? Thanks, Teresa.



Teresa Inkster 25:58

I think there are a number of areas where I would invest the money and the first one being development of lab methodology. So we've got well established protocols for *Legionella Pseudomonas*, *E. coli*. But we don't for the other opportunistic premise pollen pathogens that can cause infections in vulnerable patients. So we were lucky during our Glasgow incident in 2018, that our lab were able to identify those, but we don't know if we had the optimal methodology to identify those organisms. For example, were we using the correct agar plates or the correct incubation temperature, so it would be useful to invest in standardised methodology for those more unusual pathogens. And similar to what Jimmy's already touched on rapid diagnostics. So it would be very useful to have things like selective media chromogenic, agars, and PCR. And I think, one particular area or organism that's challenging, in a water system is your non-tuberculous mycobacteria, because they take a lot of time to grow. So rapid diagnostic tests for those would be on my wish list. The second area is around responsiveness of labs and most accredited labs will have their standard water testing. And that's the bulk of the workload. But when you have an incident or an outbreak, you really need rapid detection, and you need to delineate the extent of the problem. And you may have to test other areas in your hospital to move patients to. So that needs to be resourced. So, you need adequate staffing and skill set. To do that. You need really a lab that can process samples seven days a week, and you need to not be competing with them only to have over the clinical isolates. So, you need enough equipment to do that. So that's another area. And lastly, I think typing. So currently, the guidance tells us that we should pick a single colony off a plate and I think in doing so we will miss lots of other streams and polyclonal outbreaks. So I think we need to increase our typing capacity, particularly in incidents so that we can take at least five colony picks. And it would be useful to have typing more readily accessible during such incidents, access to emerging technologies, such as whole genome sequencing during an incident in real time rather than after the event. So, I think those are the three areas the methodology, responsiveness and typing.

Eimear Brannigan 28:15

That's great. Thank you, Teresa. Thank you very much. Sorry, you broke up there a bit at the end. So I'm just sorry, just stepping in. No, that's great. Would anyone else like to go shopping with Teresa, anything else you'd like to add? Mike?

Mike Weinbren 28:33

Yeah, I just, I think it's interesting what Theresa was saying about polyclonal outbreaks, because I think the temptation is at the moment when we're dealing with patient to patient we tend to think of a single clone going round. But in the environment where there may be a large number of different bits of biofilm in a system. It I think, I think we need to do this to find out how common polyclonal outbreaks are occurring. And whether actually we're missing a lot of transmission events from the environment because we've got this very narrow view of housing spread.

Eimear Brannigan 29:15

Thank you and Jimmy.

Jimmy Walker 29:18

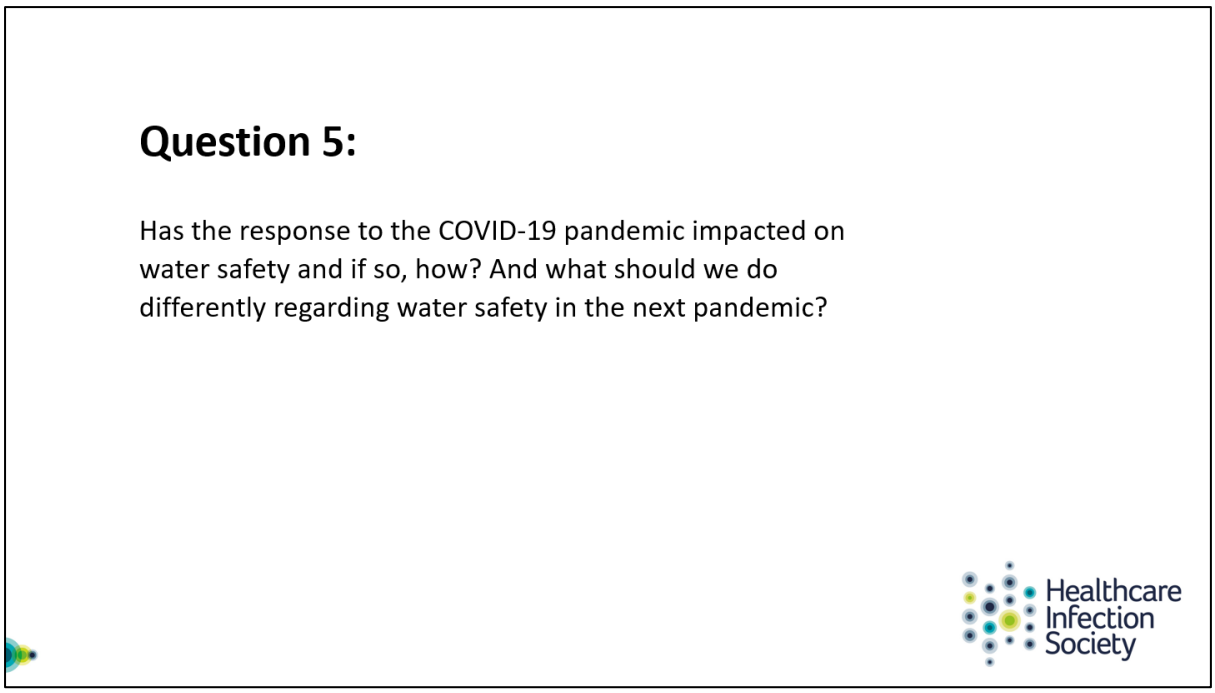
I was just Theresa about the sort of the clinical aspects of molecular testing, and how they can run suites of tests to look for what maybe the patient may be maybe infected with. Do you think there may be room for that within this fantastic new laboratory, you're setting up so we can run suites of tests rather than relying on for example, agar and in your situation you had in Scotland was using agar with total viable counts to look at the quality of the water as well, sort of sort of two aspects of that it's your routine. And then your, your where are we with what's actually in the there in terms of polymicrobial?

Teresa Inkster 29:58

So sorry, do you mean like a multiplex PCR? Yes, sorry. Yes, yeah. Yeah. I mean, I think yes, there would be a role for that. I suppose the only thing is if you had a specific organism that you were trying to detect during an outbreak, because there are other an awful lot of waterborne pathogens there. So I suppose you could have a multiplex PCR for your your usual suspects?

Eimear Brannigan 30:25

Great. It's an expensive shopping trip. I'm liking the ambition. That's great. Thank you, Teresa. Perhaps we'll move on then to, to our next question. And it's a slight change of tack. But this one is, I think, Jimmy, you're going to take this one, which is, has the response to the COVID-19 pandemic impacted on water safety? And if so, how, and what should we do differently regarding water safety in the next pandemic?



Jimmy Walker 30:58

That's another great question. And being at IPS today has raised an awful lot of issues about how the pandemic impacted on an awful lot of people's lives. But certainly, on our water systems, we know that they had to take many hospitals which already, which already were at full capacity, and then deal with the sort of situation where operations weren't urgent and then repurpose parts of the hospital into specialist units for COVID. For example, changing theatres, into areas where they had to house COVID patients. And these are not necessarily set up for hand hygiene for hand wash basins and it's putting in the repurposing of those water systems but ensuring that those water systems are safe. But during the pandemic, was water management at the forefront of everybody's mind, I doubt it very much, I think there were much higher priorities. In China, there were quite a few studies carried out where they looked at the hospital occupation, before and after parts of the highest part of the pandemic. And they were able to demonstrate that the microbiological quality of the water deteriorated to the extent that they had more coliforms, *Legionella*, e-coli, *pseudomonas aeruginosa* in the water, so certainly in a number of hospitals there was an impact on the quality of the water. And that would have had an impact. In terms of patients. We know that there were a number of patients who had co infections with COVID. And also with *Legionella*. Daniel might be able to talk on some of these aspects as well, where there was a number of companies where the water management companies weren't even allowed to have access to take samples at the height of the pandemic, and this was all about protection of workers our own responsibility and due diligence and care. And that would that would have had an impact because if you're not getting the samples taken, you're not getting the results. It's it's some of the things that Mike was talking about earlier on in terms of looking at the use of water. And the cold supply being kept cold at the 12 hours of water in terms of a system and then hot water to try and keep it moving. And then through a number of organisations with a number of microbiologists we were able to work with internationally and through the European study group for the *Legionella*, we were able to write advice for hospitals. And that that that meant we could write advice for current hospitals where we were trying to shut down parts of it. Nightingale, refurbishments who were opening up for new patients, but also for dentists and other healthcare settings because it was really important that they had the risk assessments in place to enable them to understand what to do when they were actually re opening up hospitals. And I think with that, working

together with different collaborators and different microbiologists, we're definitely in a better place now for the next pandemic. And I'd really like to thank all the microbiologists who are involved in that and how much work it was including all the professionals and healthcare professionals who put in an awful lot are working with us to try and ensure the water systems were managed. But there were other priorities. And we I think most people did the best that we could at the time. Thank you.

Eimear Brannigan 34:22

Thanks, Jimmy, for those comments, and well done for keeping going. Daniel, you would you like to follow up there?

Daniel Pitcher 34:32

Thanks. Yeah, Jimmy, Jimmy raised the point about accessing these healthcare facilities for taking samples and during the pandemic, my experience has been either side of being able to being allowed access, we've heard stories of some organisations saying nobody can come in. So the samples, the flushing, the monitoring wasn't being done. But equally, some organisations some healthcare organisations have said, well, actually, we've got a hospital that's really empty, avoid the hot areas, the red areas, you can come in and do the sampling the flushing. So that's an interesting understanding within the different healthcare organisations on how they've actually done that, but equally, the estate's teams and the contractors, their own ability to do work during the pandemic, with people self-isolating, and the impact of service delivery, either in house or externally. Some clients, you know, said, gosh, we've got half the estate's team sick because they're self-isolating, we can't physically get out and flush all of the outlets in 75% of the hospital that's now empty. And then they're calling on contractors who are saying, we've got people are self-isolating, we haven't got the resources available. So it's a really tricky situation. And yeah, sure, learning for the next time around. And I think one of the learnings there is, a hospital and although it was, you know, getting people out and focusing on those repurposed areas, most of the hospitals still remained empty, that then needed looking after, and people could come in and look after it whilst taking appropriate precautions. But the some of the individuals going locking down going, no, you can't come in. It's a hospital. Yeah, some rethinking there.

Eimear Brannigan 36:36

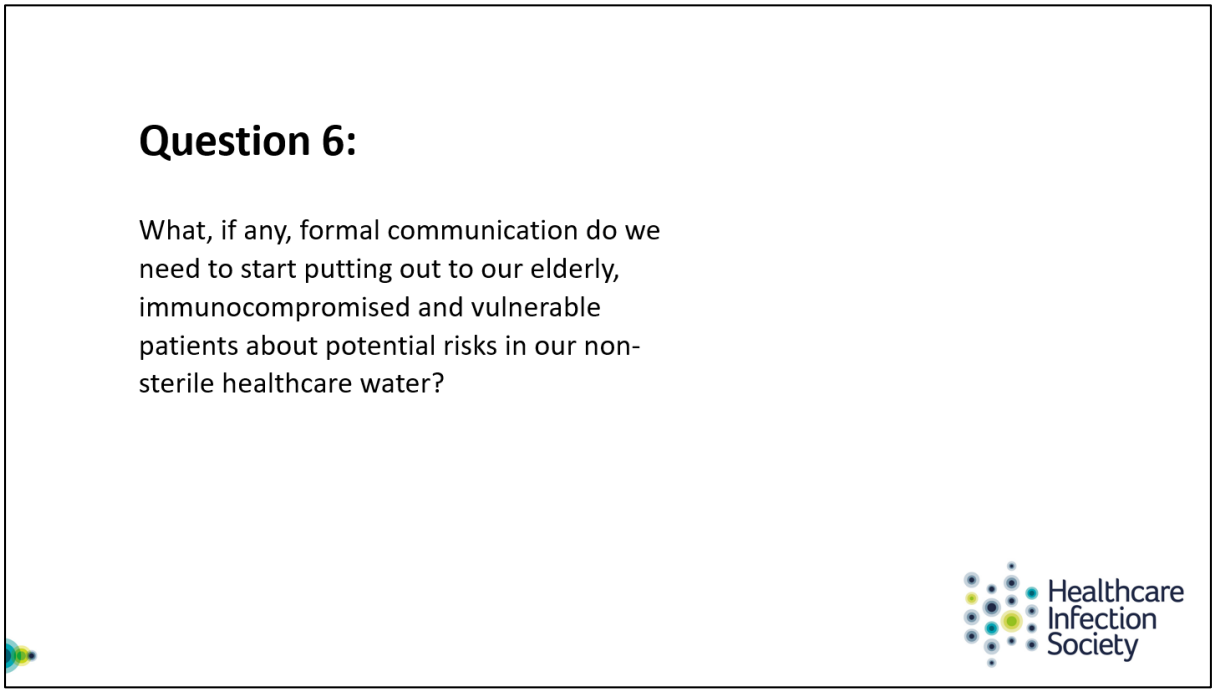
Thank you. And Jimmy, did you want to come back on that?

Jimmy Walker 37:38

Only to come in and think about some of the aspects of water management system we were talking about earlier, talking about automatic flushing, remote monitoring, and how these aspects could help us from a remote distance to manage that water flow, and the safety and quality of that water without having to get on site. It doesn't tell you the microbiology result. But it tells you, your systems being maintained appropriately or not.

Eimear Brannigan 37:04

Thank you, thanks for those thoughts and reflections. I think there's probably a lot that we could discuss further on that but just conscious of time and the three further great questions we have in this part of the webinar. And let's let's move on. And, Teresa, I think you're going to talk to us a little bit about about this question, which is 'What if any formal communication Do we need to start getting out to our elderly, immunocompromised and vulnerable patients about the potential risks in our non-sterile healthcare water?' Thank you, Teresa.



Teresa Inkster 37:39

Thanks. So certainly, I think our immunocompromised and vulnerable patients should be given communication. So in my own hospital, that's the hemat-oncology bone marrow transplant patients who are obviously profanely immunosuppressed and will often have Hickman lines which are a risk factor for from negative bacteremias. So the advice that we would give these patients is to avoid drinking sterile water and to only use sterile water for toothbrushing until their neutrophil count has recovered. In addition to that, things like flushing the shower for several minutes before they go in and covering that line site with a waterproof dressing. So I think that's very important, but the understand the risks from water, they may also visit other areas within the hospital and assume that the water there is safe to drink or use. So. Yep. I think beyond that. It's about trying to get a balance and maybe depends on your own local situation and what the risks are because patient hygiene is very important. We don't want to cause unnecessary alarm to certain patient groups. And I think there is one area where we do need to communicate to all staff and patients and that is around sink hygeine and I think there are two aspects to that. The first is around decanting fluids and objects down drains because that's a source of nutrition for biofilms. You know, dropping objects down drains can lead to obstruction and stagnation so that we need to educate them on the risks of that and also around storing toiletries and cosmetics on the top of hand wash basins. That makes them difficult to clean. These products are also a source of nutrition and they can become contaminated themselves. So I think for infection control teams, there's bespoke advice for your high risk vulnerable group. Also, general advice to all your patients and staff around the aspects of sink hygiene.

Eimear Brannigan 39:23

Thank you, that's great. Does anyone want to add to that? Jimmy.

Jimmy Walker 39:28

Yeah, I was very fortunate as I mentioned, earlier to be speaking at the IPS this morning. And I was about halfway through my talk, when I realised that a number of images (which I had shared from some colleagues). The amount of items on the back of the handwash basin. Why do we have this - what is basically a shelf on the back of the hand wash basin? I think there are some areas we need to think about design of hand wash basins themselves, and I know Mike quite often goes on about the hand wash station design where things are above the hand wash basin. But if we can get away from having this little shelf at the back.

Another person who spoke to today just after me was Joost Hopman and his work on... I think you're going to talk about waterless in a couple of minutes. It's really really interesting - so I'm looking forward to how the next questions are going to be debated.

Eimear Brannigan 40:25

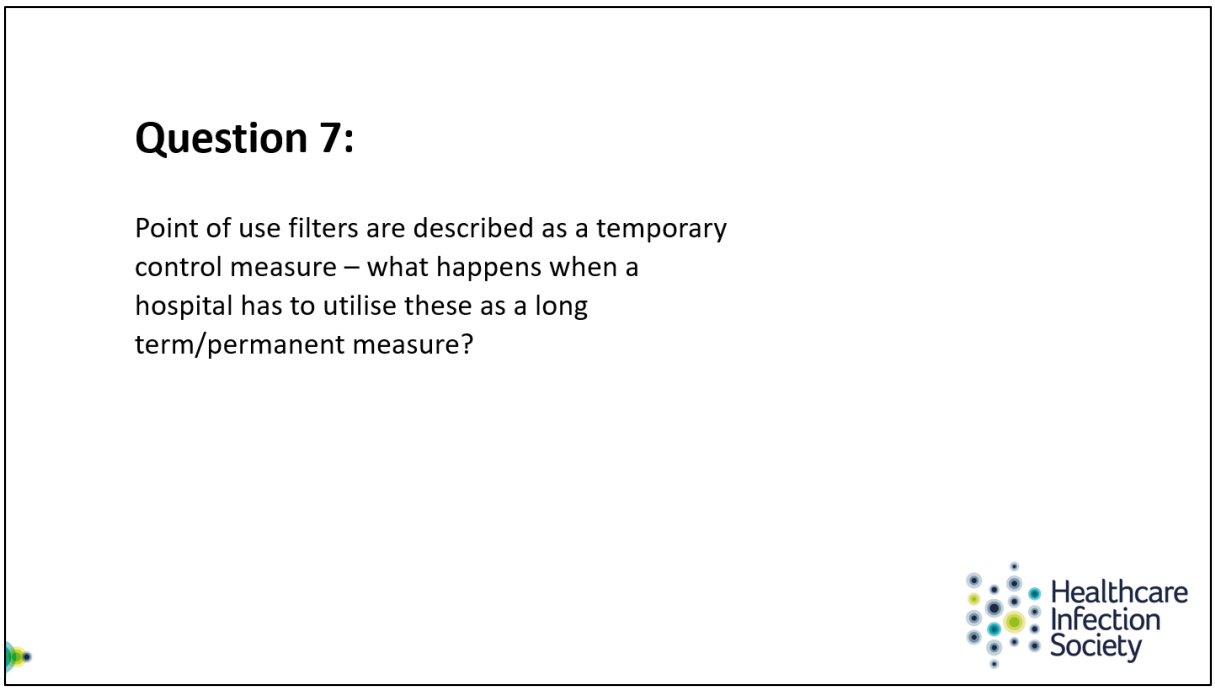
Thank you both, and Daniel do you want to add in?

Daniel Pitcher 40:30

Just a little bit there. When we think about formal communication. You know there is the Water Safety Group and one of the remit elements of the Water Safety Group is communication to the organisation. So the observations and learning from around the estate, what's being seen and sharing across to other departments and getting the feedback, and that information out, it must come out from that Water Safety Group. That Water Safety Group has got all the key players, that's where the brains in the knowledge is, that's where it's got to go out from.

Eimear Brannigan 41:06

Thank you. Now Daniel, we might stay with you then and then move on to the next question, if that's okay . This to do with getting a little bit of control, perhaps, and this is a great point of use filters which are described as a temporary control measure. But what happens when a hospital has to use these as a long term or indeed a permanent measure?



Daniel Pitcher 41:31

Thanks. Well, HTM 4 part B, provides a really nice answer to this. I'm just going to rattle through this and then do some explanation. So, Chapter seven paragraph 45:

> "7.45 Point-of-use filtration
>
> Point-of-use (POU) filtration should be considered and agreed by the Water Safety Group only as an interim safeguard where control measures have been ineffective, prior to and during engineering remedial works, during periods of plumbing refurbishments and maintenance works, and where additional protection is required for vulnerable patients. Continuous long-term use of POU filters is not recommended, except where there is no effective alternative. The WSG should review their continued use and ensure an action plan is created and enacted to make certain they are changed at the intervals specified by the manufacturer."

So, for clarity, point-of-use filters are an interim safeguard where control measures are ineffective or additional protection is required. This continuous long-term use, not recommended, but where there's no effective alternatives – yes.

The installation and use point-of-use filters is one thing that needs to be agreed, they're not just be thrown out there around the facility. They're there for a reason, they only have a limited amount of life - so to put them on and forget about them is going to cause some problems. So, the installation of point-o- use filters should be agreed by the Water safety Group. So there needs to be well defined water safety plan that outlines what remedial actions are required in response to positive water sample results.

So HTM 04 Part B provides details for *Legionella* for example, on positive sample results so in Figure 4 within HTM 04 it's got the action levels for *Legionella*.

- 1, 000-10,000 *Legionella* bacteria (cfu/l) it says:

If a shower (spray outlet) cannot be taken out of use, consider installing point of use microbiological filters on all affected showers

- Greater than 10,000 *Legionella* bacteria (cfu/l)

If the outlet cannot be taken out of use, install a point of use microbiological filter on all affected outlets

So, the installation of these filters is an informed decision.

Now, where water sample results are returning these positives, there will be reasons for the bugs growing in the water. There are going to be multiple favourable conditions that will exist that need to be identified and resolved.

Some of these resolutions might be quick engineering fixes. So the replacement of an old tap with a new tap with an integral blender, is a relatively quick solution, where some engineering fixes may require greater input. Closing of an area, decanting of an area, re-piping a water system. So, how long the water filter is there for depends on how big the problem is and how many things that are wrong. And until that water system is back in control and the water sample results are within tolerable thresholds, the use for point-of-use filter needs to be reviewed with this data. And when there's confidence in that data, then the consideration for removing this point-of-use filters comes about. So, point of use - an interim safeguard when you're out of control. Use that point-of-use filter. But that should only be an informed decision, and find out what the problems are, get them fixed.

Eimear Brannigan 45:06

Thank you. Any additional comments? Jimmy. You're on a roll.

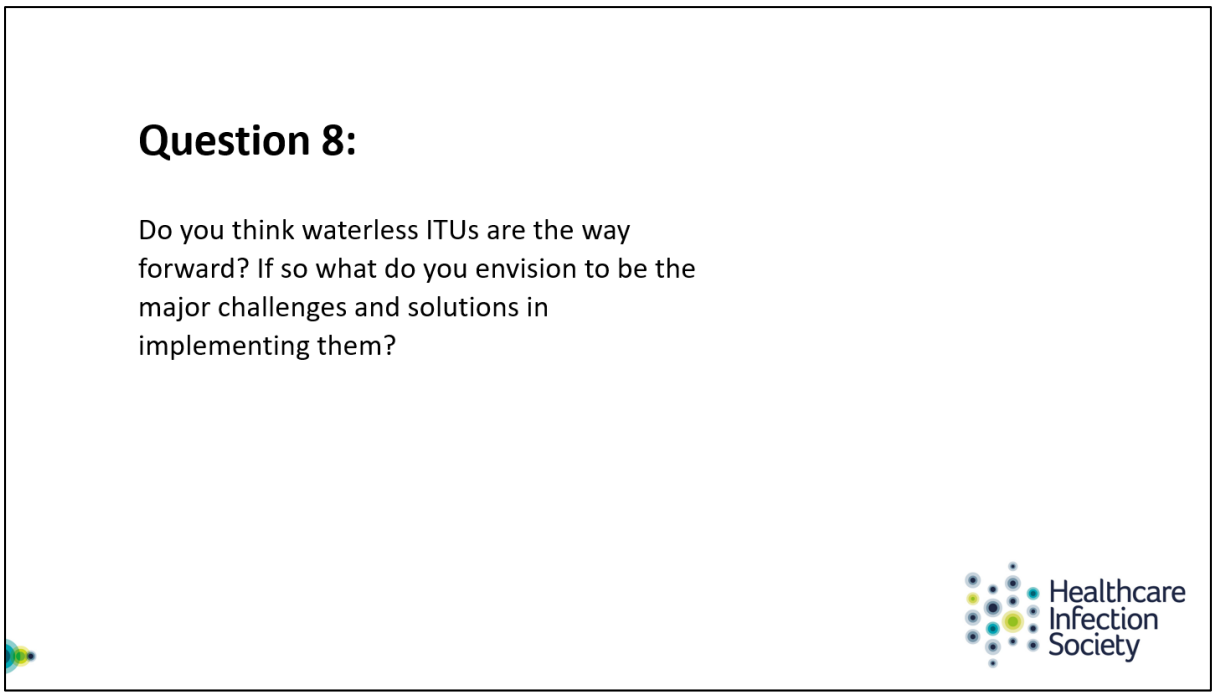
Jimmy Walker 45:22

No, just the point of use filters have a role to play. But from experience, but a number of situations where it's problematic to use one and Mike may want to touch on this as well but if you've got that lack of activity space within a hand wash basin you've added a filter you don't have enough space to wash your hands. Potentially, it's not just the lack of space of washing the hands you're potentially setting up a contamination of the filter from the hand wash basin and breaking that air gap that you've got to protect backflow.

So there's a lot of usage issues you have to look at as well as thinking about the microbial control of the water, which would flow through it, which is what you're trying to control. And I think that we all are all aware now that retrograde contamination from the drain isn’t controlled by the water filter and that's where the whole health care responsibility comes in maintaining and having that planned preventative maintenance programme with those components around that hand wash station.

Eimear Brannigan 46:31

Thank you very much, Jimmy. Okay, I'm conscious that we have a queue of questions we might need another hour guys but anyway, not this evening, it's okay. But conscious of that, we go to our last really straightforward question. I'm looking to Mike to address this question which is, do you think waterless ITU's, are the way forward. And if so, what do you envision to be the major challenges and solutions in implementing them? Thanks Mike.



Mike Weinbren 47:02

Yes, I think there's a strong argument that these are all the way forward for the following reasons.

I think the first area in a hospital, as far as I'm aware, to go waterless was a non-clinical area. And this was the sterile drug preparation area in hospitals, and this followed an outbreak in Manchester in 1995, where they were paediatric deaths linked to contaminated TPN from a nearby sink. Splashing went into it. So, from 1996 onwards the following report came out, and their view is water is so dangerous, you take it out of the sterile preparation area, you wash your hands you can use alcohol gel and then you don't have water. And then, it was a bit later, and Jimmy's already mentioned that I think Joost Hopman in Holland was the first person to develop the concept of a waterless ICU, and we've been to visit it. It's very interesting. And this was introduced, because they had an intractable problem with a highly resistant organism emanating from drains, but the interesting thing was following going waterless, they found there was an overall reduction in transmission of all gram negative organisms.

So, what they were suggesting was that our surveillance is not good, we are missing picking up waterborne transmission events. And I think there is other evidence to support this. In fact Jimmy was one of the authors in a paper looking at four hospitals in the UK, and they looked at for augmented care areas in each of these hospitals, none of them were aware that they had a problem with endemic transmission - but using whole genome sequencing, and they weren't even looking at the drains just the water - they showed that there was ongoing transmission of *Pseudomonas* to patients, which was unrecognised.

There was another study in France, where they looked at ITUs - a national study of multidrug resistant organisms. And what they found was that if you had a sink which was contaminated with a multidrug resistant organism, more than 50% of the splashing was within two metres of a patient, and you weren't using bleach down the drain, you were getting transmission events.

But I think the worrying thing is people are not looking, you should be able to walk into these ITUs and see actually those sinks and all in the right place. And I think a lot of the problem comes from the fact we've never really taught people how to interact properly with water services.

So one study found that in an ICU they put a video camera but the sink, couldn't see the people but they can see what was happening. Only one in 25 visits - that's 24 out of 25 or 96% visits to the hand wash station - were for the wrong reason.

And I think the other thing to say about hand wash stations I don't Jimmy said, that I don't think we've probably got an ideal design, we know sinks with a rear drain are at less risk of dispersed organisms. But, they also run a problem that often drainage becomes impaired because they don't have a sieve.

And I think another area with sinks, which is slightly less recognised, is the use of elbow operated outlets. Studies have found that 90% of people will turn on an elbow operated outlet with their hands, wash their hands, and 70% will then turn the outlet off with a clean hands. So this may be another area for transmission and not just water and drain organisms, but for a variety of organisms because theses have now become highly touched objects and are a risk.

So, I think there is an argument has been the odd paper which said people have found, CPEs down the drains, there's been no transmission, but there's so many variables, nobody's giving us a full information. So, I would say that's the way forward. And I think, you know what CPEs, I think, are showing us or rather other multi drug resistant organisms, it's we don't believe they possess, any special characteristics which allow them to transmit. But, we're much more aware of them, we see them, we don't see the sensitive organisms and. In fact we've got no baseline - in adults, for what is an acceptable level of *Pseudomonas aeruginosa* endogenous carriage on an ITU, and this has caused problems in that I think one Swiss Burn Unit, it took them three years to find that they were getting transmission because they didn't realise they couldn't distinguish whether it was endogenous carriage or acquisition.

So, I would say yes, and especially now when we're trying to, trying to preserve antibiotics. Why wait for a highly resistant organism to come around to show you the deficiencies in the system. So we need to change things.

In terms of moving forward, what are the difficulties? I think you need to win over clinical teams. I think the trick is, if you can do it is to make them think it's their own idea. The great advantage in that is that, if anything goes wrong, they can only blame themselves.

I think people worry about *Clostridium difficile*. But I think its a balance, the number of times you see sick *Clostridium difficile* on most ITU's we've mentioned, I should think is relatively small. We're seeing a lot of waterborne transmission events. You can bring in standalone mobile sinks, I think more research needs to be done, could wipes be just as effective as using water for these resistant organisms? And I think what also brings to the fore is when you no longer have sinks there, you start finding out what people have been doing in terms of disposal. They can no longer pour it down, sink in the room.

So, I think, you know, we need ways of getting rid of fluids in the room, and it may be things like these absorbent granules for small amounts of fluid in a box or a waste. I think there's a lot of potential for this in the future. And as the other thing just to say that a paper has come out, which shows that using non water-based products for cleaning patients seems to be just as good as using water.

Eimear Brannigan 53:15

Thanks, Mike. I won't to take further questions from our panel but let's see if we can fit in a few of our live audience questions. I believe there's a long queue of some, and we should try to choose. So there's

a few at the top here that have been chosen. And the first one is, should monitoring and non-tuberculous mycobacteria and water be mandatory in certain healthcare settings and perhaps which of those settings? This is open to any of you so, do please go ahead.

Mike Weinbren 53:52

We're learning more about atypical mycobacteria causing issues. I think certainly there have been outbreaks in America, hospital with mycobacterium abscessus, so I think in very high risk patient groups, we need to do something about atypical mycobacteria, whether it's monitoring, or whether it's we should be putting in preventative measures, perhaps, before we talk about not using point of use filters, but I think it's an issue we have to address these high risk patients monitoring may be part of it, or we decide to use preventative measures as we learn more about this organism. I think it also a typical mycobacteria. You know we talk we worry about health care. There's certainly there's an element of people in the population, I think Joseph Falcon has done work in the states, which shows that people who are getting chronic lung disease, some of these mycobacteria, you can go back into their own homes and show it's linked to the water system, especially Showers. Showers are becoming more common, so it may be a bigger problem, and we have to address not just with that in the healthcare setting.

Eimear Brannigan 55:10

Thanks, a comment from Jimmy and then we'll move on to another question.

Jimmy Walker 55:14

Thanks. Yeah, Eimear. I was just thinking in the context of Theresa superlab. One of the big issues with non mycobacteria is the fact that we don't really understand enough of the problem, because if you take the mycobacteriam crimea scenario we've had to wait for one and a half to three years before the infection is manifested in those patients. So I suspect there's a huge catalogue of infections that potentially could be occurring that we don't even know about because patients have left the hospital long time before the infection has come back. So I think there's a lot of work still to be done yet, whether it is mandated or not, I'm not sure yet. We're still struggling with *Legionella* I think in some contexts.

Eimear Brannigan 56:14

Thanks, Jimmy, I'm just gonna just in fairness to our audience I'm going to try and get through a couple of questions and I'll maybe get one of you to comment on each one, if that's okay. And so our

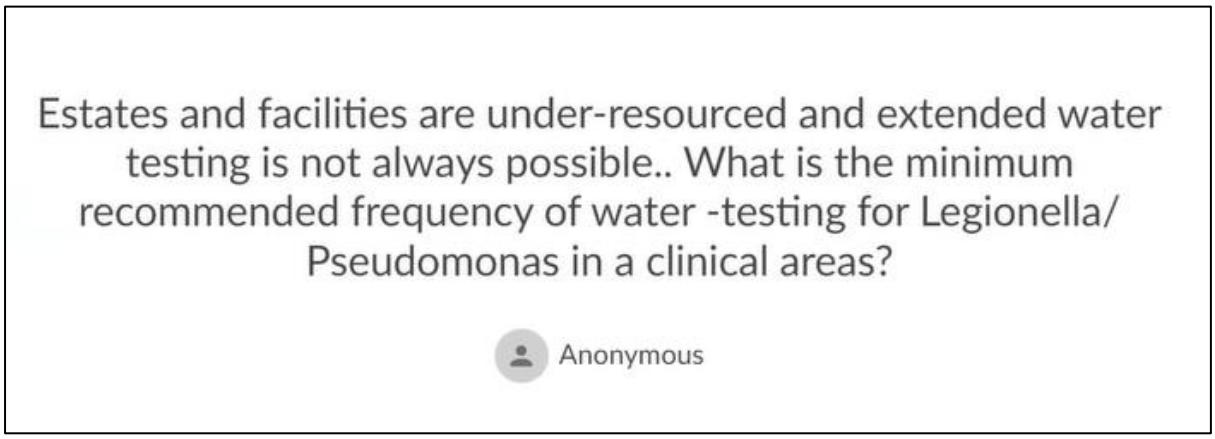
next one is someone describing that they had *Legionella* defect detected in patient bay sink outlets discovered and extended testing on the back of a suspected case, however, the regular Sentinel testing in the preceding months, always shows zero CFU with *Legionella* falsely reassured. And so this is a question about what would you recommend to close this gap. Jimmy,

Jimmy Walker 56:47

I would like to know what the laboratary were doing in terms of testing in the first place. We have a lot of scenarios within the experience of public health england where we would take a litre of water, and someone else would take a litre of water, and we would find a positive, and this other lab wouldn't. Partly sometimes because they'd only be filtering 500-250 mils, because it's quicker. And that's not to denigrate the laboratary, its a commercial entity. They need to get through those samples. And it's where again Teresa's lab comes in, we can make this much more automated and work towards having a more effectively managed laboratory system to get results back to the hospitals which are more, which enable them to do more clinical care.

Eimear Brannigan 57:30

Thanks, Jimmy, Can we see them next question please. Estates and facilities are under resourced. We know that for sure, and extended water testing is not always possible, what is the minimum recommended frequency for water testing for *Legionella, Pseudomonas* and clinical areas. Can't see my panellists in their hands so someone want to just jump in.



Daniel Pitcher 58:03

Thanks for jumping on that one. That's ok. So with the *Pseudomonas*, the minimum frequency testing, HTM-04 details, every six months. If your test comes back negative, don't worry about it for six months. If it comes back positive, then followed up within three days, two weeks, four weeks with retesting. And with *Legionella* it's a bit more of a broad brush there. If we're thinking healthcare guidance says, you know, consider *Legionella* testing reports, individuals so that clinical risk assessment may have got the susceptible individuals, but the *Legionella* testing to go with that really needs to be supported by the routine monitoring data, routine monitoring data proving the water system or the strategy of control temperature, let's take temperatures to traditional strategy that's coming back and it's proving that system is great temperatures, maybe you look to do *Legionella* sampling at a set frequency, and for some of our clients, we've done weekly testing, three weeks and it's come back negatives, we moved to monthly testing, three months negative we then rest at

quarterly as an assistant monitoring and assurance monitoring to that routine testing, but where you have got a problem, then the guidance does say, you know, perhaps look at doing weekly testing until you're back in control, and that control is you've got evidence that your control strategy temperature is working and that you've got the positive, not positive, you've got *Legionella* test that helps prove that the control is there when you're getting negative results.

Eimear Brannigan 1:00:00

Thanks Daniel, I think we have Mike, do you want to come in quickly and then we've got one last question

Mike Weinbren 1:00:01

Oh maybe go to the last question. Okay, great.

Eimear Brannigan 1:00:07

Thank you. Our last question again this is just to be fair to our audience who've submitted loads. And this is to Teresa. Teresa would you choose sterile water over filtered water?

Teresa Inkster 1:00:19

Difficult questions, yes I think I would use Sterile water over filter water, Sterile water is recommended by the WHO for immunosuprised patients, either sterile water or cooled wild water. When you know people's neutrophil count have recovered, and they are due to go home, they're often advised to use filtered water at home provided they change the filter frequently as per manufacturer's instructions but I think sterile water is probably your safest option if you can provide that. We had some concerns during our incident in Glasgow about filter failures on surface contamination of the filter. So I suppose there is a small possibility that filtered water could still become contaminated. I don't know if anyone else wants to say otherwise.

Eimear Brannigan 1:01:16

Okay. Thank you. Thank you everybody. I think that's all the time we have for questions. I'm afraid there are lots more questions and certainly plenty for perhaps another, another session another day. So, in closing, I just like to thank our panellists, we've seen, I think this evening the breadth and depth of their expertise and perhaps in some of the scars of their experience of having to look into

some difficult situations for our patients and our colleagues having to respond to these. So thanks, everybody, and thank you to all our participants thank you for all your questions, and, and thank you to our support from gamma healthcare, who supported this with an educational support grant and certificates of attendance will be available and sent out after the event, and the recording as usual beat will transcript will be available after the event, and hopefully you all already know that our previous webinars are available on the healthcare infection Society website. And I suppose an early flag for your diaries that says coming webinars have been scheduled for the 3rd of November and the 24th of November so do look out for details of the topics, and get your thinking caps on for some great questions, some more great questions. And thank you for submitting questions in advance this evening. Thank you very much.