SPARC
FIGHTING AMR IN HEALTHCARE WASTEWATER

Healthcare Infection Society

10th June 2026

Dear SHTM 04-01 co-authors,

## Re Water Safety Guidance (SHTM 04-01) Draft for Public Consultation

We are writing on behalf of SPARC, a special interest group commissioned by the Healthcare Infection Society (HIS) (see further information Wastewater and AMR Special Interest Collaborative (SPARC)). SPARC has a committee of 14 experts including clinical scientists, clinical microbiologists, IPC practitioners, academics, industry partners, water hygiene consultants and a wider membership of over 250 colleagues from a variety of professions. SPARC works across specialities and sectors, and across HIS, to coordinate efforts to reduce the patient impact of priority healthcare infections caused by wastewater and AMR.

We are writing to provide feedback on the draft SHTM 04-01. We wish to congratulate the authors on the many useful additions and updates in the new version. Members of SPARC have first-hand experience of controlling AMR risks from wastewater and working across professional disciplines to provide water safe care in healthcare institutions. In addition, our technical and academic experts support the growing understanding of these AMR risks and how best to detect and control them.

In light of this expertise, we are writing to share our comments, reflections and suggested amendments to the draft SHTM 04-01. Whilst we recognise that many healthcare organisations are yet to provide an aligned clinical, IPC and estates governance infrastructure to deliver AMR wastewater safety, and water safety, we are confident that inclusion of the following priorities in the new SHTM would escalate the much-needed changes in practice to help protect our patients.

The SPARC group would like to make recommendations in the following 15 key topic areas, the document below provides detail of the SHTM sections relevant to each topic, and we have provided suggested SHTM amendments where possible:

1. Recommendations on safe practices related to wastewater, antimicrobial resistance (AMR), and the wastewater–clinical interface should be embedded more consistently throughout the SHTM 04-01

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Healthcare Infection Society

2. The SHTM would benefit from further guidance on how a 'clinical water safety group' differs from existing groups, giving examples to encourage a robust transdisciplinary model for water and wastewater safety in healthcare

3. The SHTM would benefit from microbiological recommendations to better guide teams on how to identify, understand and mitigate risks from water and wastewater

4. Additional recommendations on the roles and responsibilities of clinical, catering and cleaning teams would help to protect patients from the microbiological risks of water and wastewater

5. Water and wastewater safety could be further improved through guidance and monitoring for infection prevention and control and disinfection practices for estates, engineering staff and contractors

6. The SHTM would benefit from greater clarity on the recommendations for wash hand station location and configuration

7. SHTM users would benefit from recommendations on the approach to risk assessment and governance when statements in pre-existing or co-existing national guidance differ from new SHTM 04-01 recommendations

8. The SHTM could provide greater detail on the correct design, installation and commissioning of above-ground drainage systems, in recognition that pre-installation contamination of pipework is relevant to drainage

9. The SHTM would benefit from precise guidance for practitioners on investigation, disinfection and remediation processes in response to positive water and wastewater samples

10. The SHTM could provide greater detail on risks and proposed solutions to minimise wastewater contamination of clinical environments from sinks and showers

11. Enhance guidance on prevention, recognition and remediation of wastewater backflow, blockages, floods and leaks

12. Provide new recommendations on surveillance, linking clinical sample results to positive water, wastewater and environmental samples

13. Education and training on AMR and how this relates to water and wastewater safety could be recommended for all relevant staff working in healthcare settings, including contractors

14. It is recommended that greater recognition on what is, and isn't known, about the risks from water and wastewater aerosols is included in the guidance

15. Evidence-base of the SHTM 04-01 recommendations: it would be helpful to provide clarity on aspects which are experiential (standard practice) or best-practice based on expert opinion, and which aspects can be supported by published evidence

Many thanks for your kind consideration of these comments and the supporting evidence document, please do not hesitate to contact us for further discussion would be helpful.

**Dr Jessica Martin**

Chair of SPARC and Medical Lead for IPC and AMR, Leeds Teaching Hospitals NHS Trust

**On behalf of the SPARC Committee, Special Interest Group for the Healthcare Infection Society**

# Water Safety Guidance (SHTM 04-01) Draft for Public Consultation

## Healthcare Infection Society (HIS) Wastewater and AMR Special Interest Collaborative (SPARC) Committee comments and recommendations May 2026

### Summary


1. Recommendations on safe practices related to wastewater, antimicrobial resistance (AMR), and the wastewater–clinical interface should be embedded more consistently throughout the HTM 04-01

2. The HTM would benefit from further guidance on how a 'clinical water safety group' differs from existing groups, giving examples to encourage a robust trans-disciplinary model for water and wastewater safety in healthcare

3. The HTM would benefit from microbiological recommendations to better guide teams on how to identify, understand and mitigate risks from water and wastewater

4. Additional recommendations on the roles and responsibilities of clinical, catering and cleaning teams would help to protect patients from the microbiological risks of water and wastewater

5. Water and wastewater safety could be further improved through guidance and monitoring for infection prevention and control and disinfection practices for estates, engineering staff and contractors

6. The HTM would benefit from greater clarity on the recommendations for wash hand station location and configuration

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9. The HTM would benefit from precise guidance for practitioners on investigation, disinfection and remediation processes in response to positive water and wastewater samples

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14. It is recommended that greater recognition on what is, and isn't known, about the risks from water and wastewater aerosols is included in the guidance

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| Statement | Comments and minor recommendations | Major recommendations |
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| 1.<br><br>Recommendations on safe practices related to wastewater, AMR, and the wastewater–clinical interface should be embedded more consistently throughout the HTM 04-01 | • <u>All sections</u><br><br>The recognition of wastewater and the wastewater–clinical interface within "water safety" should be better highlighted in the new HTM, and the importance of this embedded throughout the guidance. In general, all parts A to G contain only limited recognition of the role of wastewater and the wastewater–clinical interface in water safety.<br><br>• <u>Section A 5.8</u><br><br>This section would be improved by the addition of a list of materials generally used for carriage of wastewater. Focus should extend to the wastewater interface, above ground drainage and main body of the wastewater system, and be reinforced here and throughout this updated document<br><br>• <u>Section A 1.18</u><br><br>This section helpfully describes the new challenges related to patient safety in relation to AMR and wastewater, but does not distinguish outbreak and non-outbreak scenarios in the references provided. Not all healthcare providers currently identify AMR risks related to wastewater due to limitations in IPC guidance and surveillance outside of outbreak scenarios, and not all healthcare settings and patient groups are equally as vulnerable to clinical consequences of this risk. It would be helpful to provide the evidence with greater detail to support | • Suggest addition of wastewater to title 'Water and Wastewater Safety Guidance'<br><br>• Given established evidence on the risks of a broad range of bacterial and fungal pathogens including *Pseudomonas aeruginosa* and AMR organisms associated with wastewater, suggest adding a new HTM 04-01 chapter introducing this concept and providing recommendations for water safety groups describing how to introduce wastewater as 'business as usual' for all professional groups involved in management and use of the healthcare environment<br><br>• Suggest policy and regulatory overview amendment to include water and wastewater safety in the healthcare environment<br><br>• Suggest recommendations on which professional groups have responsibility of taking specific actions to control the risk of wastewater pathogens throughout the HTM, recognising that clinical practice is relevant at the wastewater–clinical interface. |

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| | teams to risk-assess existing estate and patient groups. A balanced and well-evidenced detailed narrative would help introduce this concept to professionals who are not infection specialists and would benefit from information on the clinical implications of these risks. For instance, wash water and water jugs are given but are only some examples of possible transmission routes, there is a paucity of evidence of how contaminated wastewater systems impact patients and a full risk assessment of all water uses is recommended (i.e. fixing drinking and wash water may be insufficient in many settings). This section seems incongruous with the rest of the HTM which largely excludes AMR and recommendations on wastewater despite good evidence of this risk.<br><br>• <u>Section A 3.14 and 3.15</u><br><br>Addition of wastewater should be considered throughout these sections. Please provide clarity for Capital Project Teams including material incompatibilities. Section would be enhanced by reference to the involvement of clinical teams (and the care they deliver) and patient requirements (see below).<br><br>• <u>Section A 12.61</u><br><br>○ The description of the splash zone in this section is not correct: the majority of water splash is within 2 metres, some water can exceed this depending on water pressure /outlet design. Bacteriological contamination distances are yet to be confirmed using standardised microbiological processes. Please acknowledge this in the guidance.<br>○ The suggestion for colour coding is a useful example, but may not be realistic given the high number of outlets across | • Suggest add detailed recommendations on above-ground drainage design, selection of materials, safe installation and commissioning in alignment with the detail for hot/cold water systems. The evidence suggests that the relative clinical risk from wastewater is also important, suggest include evidence of this.<br><br>• Section A 3.14 Recommended change to wording "… should be consulted at the earliest possible opportunity, *ideally at the Concept Stage prior to RIBA Stage 1*, to ensure the safe delivery and use of water and wastewater which always reflects the patient's requirements. Where deemed appropriate (e.g. involving a high-risk patient group) a multidisciplinary PWSG *including clinical staff* ..." and change to "the leaching of nutrients from plastic, *resin and rubber* products, use of jointing compounds and the effects of *systemic* water treatment chemicals resulting in corrosion of metals and deterioration of plastics, *resins and rubbers* used for pipework and componentry"<br><br>• Recognition that this guidance is being published at a time where many healthcare organisations have identified the risks from wastewater, but limited evidence is available on solutions (including unexpected impact of mitigations). Suggest that this document provides clarity on what is well-evidenced and recommended, and |

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| | healthcare settings, many of which are within 2 metres of immobile clinical infrastructure. Colour coding could be provided as one possible intervention, others are available, and assessment is required to assess impact on patients with dementia, colour blindness and who live with neurodiversity. A risk assessed and educational approach would help for existing estate accounting for patients.<br>○ It would be helpful to include evidence if splash has been specifically linked to NTM transmission events; prior publications suggest NTM is more likely related to contamination of hot/cold water distribution systems.<br><br>• <u>Section A 13.3</u><br>This section is welcome. It would be helpful to include specific referenced examples of how this relates to HCAI issues, and patient risk factors (e.g. co-location of infectious diseases, outbreaks wards/isolation units with haemato-oncology wards with continuity of drainage biofilm) and parameters to consider in design to reduce the risks e.g. distance from outlets to stack, reducing risk of ventilation via aerosols from sinks etc. IPCT teams may have limited experience in some organisations, please provide links to suitable guidance, education, training or published evidence or resources.<br><br>• <u>Section G Appendix A</u><br>Wastewater/ above ground drainage is not included consistently in the exemplar water safety plan, it would help teams to embed this aspect of water safety if examples included here.<br><br>• <u>Section A Figures 10.4 / 10.5 / 10.6 / 10.7</u> | what is an innovative solution used by some healthcare providers but, as-yet, unproven.<br><br>• Recommend that water plans are now Water and Wastewater Safety Plans, with inclusion of both in terms of maps, risk assessments and mitigations at all stages. Including recognition of the clinical risks of backflow, blockage, leaks and floods from wastewater systems. |

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| | Revision request to support good practice: Update figures to be more representative of trends for risk recognition and water/wastewater presence. Also noting that disinfection selects for tolerant and resistant biofilms which harbour pathogens. | |
| 2.<br><br>The HTM would benefit from further guidance on how a 'clinical water safety group' differs from existing groups, giving examples to encourage a robust trans-disciplinary model for water and wastewater safety in healthcare | • <u>All sections</u><br><br>Typically the wastewater–clinical interface occurs at the drain and u-bend at outlets, where invisible aerosolisation occurs from the main body of wastewater due to system air pressure transients, impacts of slow drainage and blockage enabling splash. The contamination from wastewater organisms requires necessary vigilance in removing all items within the minimum 2 metre splash zone. Clinical education and training is required to address this risk, and patient education for most areas too.<br><br>• <u>Section A 12.63</u><br><br>This section is excellent. Suggest further improve the clarity of message and expectation for the Water & Wastewater Safety Group (WWSG) to address these risks in existing estate, and related to ongoing HCAI/AMR risks and clinical surveillance data. Include examples of WWSG membership including medical and nursing staff from units where higher risk patients are cared for, and requirements for escalation and communication pathways ensuring that estates/engineering staff and AEs are required to respond to clinical risks raised by clinical teams regarding water and wastewater safety.<br><br>• <u>Section G 1.1.</u> | • Recommend addition to this section confirming the need for wastewater to be included in the remit of the Water Safety Group, all ongoing references to "Water Safety" or "Water Safety Group" should be termed "Water & Wastewater Safety" and "Water & Wastewater Safety Group" (WWSG), and follow through the remainder of the HTM to provide clarity and consistency.<br><br>• Recommend that management of the wastewater interface is critical for all WWSG and requires clinical teams and others to be involved in training, monitoring, reporting and preventative and remedial actions<br><br>• Recommend addition to describe examples of robust transdisciplinary working, including appropriate membership of clinical water safety group, water escalation process from ward staff, reporting of clinical, operational and engineering risks relating to water and wastewater as well as compliance with standards.<br><br>• WWSGs should receive reports of clinical data relevant to water pathogens, and receive audit or |

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| | 'Safe and comfortable' risk-assessed environment to include AMR and other pathogenic risks from wastewater environments. IPC teams to tailor their surveillance to detect and respond to these risks. Clinical teams (especially those working with higher risk patients) to be included in clinical WSGs and contribute their expertise to risks and mitigations of risks.<br><br>• Section G 3.4<br><br>"Taps or other water outlets should not be installed if they will not be used regularly, that is, less than twice in a week." Clinical risk assessment should be included in outlet installation and allocation, including review of alternatives for hand hygiene or waste water disposal etc. This statement could be enhanced by including advice on the suggested methodology on how teams can establish frequency of use in anticipation (i.e. prior to water outlet being fitted) or any exclusions (e.g. wards with seasonal use). Suggest amendment to include clinical input in this section.<br><br>• Section G 19.6<br><br>To be meaningful, linkage with clinical data is required for an effective water safety group. Is this a clinical risk assessment or an estates one? Please add detail describing how they differ. | monitoring data to ensure compliance of clinical and non-clinical practices related to water and wastewater (e.g. compliance with tool decontamination, correct placement of POU filters)<br><br>• HTM should suggest models of 'on the ground' visual risk assessment (i.e. ward base trans-disciplinary visits) for higher risk areas to review staff awareness of water and wastewater risks, identification of low use outlets, condition of outlets, effectiveness of drainage, splash risk, washing/catering and waste pathways and assessment of clinical results, estates works and risks from backflow, blockages, floods and leaks. The output to be liaised back to water and wastewater safety group. Recommended frequency – annual visits. |
| | • All sections including Section A 3.10 | • Suggest additional section focused on the broader range of pathogens associated with |

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| 3.<br><br>The HTM would benefit from microbiological recommendations to better guide teams on how to identify, understand and mitigate risks from water and wastewater | The pathogens mentioned in each section are inconsistent, and limited in some respects, which may not support teams to deliver the most effective investigations and responses to water/wastewater risks.<br><br>A wide range of pathogens have been associated with healthcare water and wastewater environments. OPPPs/Legionella sp. /*Pseudomonas aeruginosa* /NTM are most frequently associated with hot/cold water distribution systems whilst others such as Klebsiella sp., Enterobacter sp., E coli, C auris and AMR organisms are more associated with wastewater and outbreak scenarios relating to wet environmental niches. There is overlap between water and wastewater pathogens, but a failure to recognise the differential risks could prevent teams developing the most effective responses. The actions may be different for risks from the water distribution system (e.g. POU filtrations, biocide dosing, temperature controls) compared to those from wastewater (assessment of backflow, blockage, splash risk and equipment contamination, shower checks).<br><br>The HTM should improve precision regarding capitalisation e.g. Gram-negative and Pseudomonas sp, Legionella and use more consistent microbiological abbreviations e.g. Section C 5.1 'atypical mycobacteria' rather than NTM. Lack of precision could confuse non-specialists.<br><br>• <u>Section A 1.5</u><br><br>Why has NTM been singled out as the only clinical risk here? Infections are rare, and NTMs are not notifiable so national | water and wastewater, and the overlaps and differences with current knowledge of teams already aware of risks from hot/cold water systems.<br><br>• Provide consistency on the selection of pathogens throughout HTM, and align capitalisation, abbreviation and nomenclature<br><br>• Provide clarification on the use of the term 'opportunistic' – in clinical terms, this indicates an infection that occurs more often or is more severe in immunocompromised individuals. OPPPs are defined differently. Not all water and wastewater pathogens are opportunistic e.g. Enterobacterales. Please describe how some water pathogens are unlikely to make a healthy person unwell (NTM), whereas others can infect or colonise anyone (Klebsiella sp.), recognising that all infections can be more severe in immunocompromised hosts.<br><br>• An evidence review of the most effective sampling recommendations including target sites, sampling techniques and laboratory processing would be a helpful addition.<br><br>• A recommendation that teams use ward maps to locate clinical cases, positive water/environmental samples and/or leaks and |

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| | surveillance is not available. This is in contrast to other pathogens which are more frequently seen and reportable through the UKHSA data capture system (DCS) e.g. Klebsiella sp., Pseudomonas sp. Suggest if enhanced risk is associated with NTM, should this be a notifiable disease, or a requirement of the national DCS reporting system?<br><br>• <u>Section A 1.5</u><br><br>Please clarify definition: 'pseudo-outbreak' can refer to either:<br>i) Detection of an increased presence of organisms without consequent clinical evidence of infection **OR**<br>ii) Laboratory sample contamination leading to apparent clustering or increase in pathogens<br><br>• <u>Section A 1.10</u><br><br>As above, suggest separate points on NTM, *Pseudomonas aeruginosa* and Legionella sp. to provide sufficient detail for non-clinicians using this guidance. It is important to clarify the pathogens most frequently associated with hot/cold water distribution systems and those more likely to arise from wastewater systems, and the distinctions between in the published literature relating to outbreaks and risks.<br><br>• <u>Section A 1.21</u><br><br>It will be helpful to delineate between outbreak and non-outbreak settings and evidence related to each, and reenforce that good IPC | floods to identify linkage and support appropriate interventions |

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| | practices are needed in addition to measures to control water and wastewater pathogens; they are vitally important<br><br>• <u>Section A 1.24</u><br><br>This section seems a little out of place. It could go at the top of the section, or be amended or removed? The content is not clear for non-specialists (i.e. is AMS and new antibiotic development directly accelerating the spread of AMR, if so please reference how this relates to water and wastewater, and include UK reports), this section could be improved by describing the use of new antimicrobial agents directly as a result of AMR acquisition from water/wastewater OR how AMR wastewater colonisation can occur from colonised patients, and/or the influence on wastewater microbiome. Again, a separate section on AMR/wastewater would be extremely helpful given these concepts are new to many readers.<br><br>"Waterborne pathogens (such as Pseudomonas aeruginosa, Nontuberculous mycobacteria (NTM) and so on" – suggest expand and clarify. These are not the only relevant organisms, outbreaks from drainage include many other pathogens including Klebsiella, E coli, Enterobacterales, *Candidozyma auris.*<br><br>• <u>Section A 3.12</u><br><br>"Outlets, sinks and wastewater drains should be designed to minimise the risk of colonisation and transmission of NTM and other waterborne pathogens and should not have inserts which increase the risk of biofilm formation". It would be helpful to support again why only NTM included here, as incidence very low in the majority | |

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| | of UK health settings and other pathogens are relevant, e.g. *Pseudomonas aeruginosa*.<br><br>The HTM should include greater detail on the design requirements and microbiological testing modalities and evidence that these reduce dissemination of pathogens and protect patients from harm i.e. how is this deliverable, and how will teams know it has been delivered?<br><br>• <u>Section G 17.5</u><br><br>'other similar harmful bacteria' – these will be in TVCs, how can this be operationalised in healthcare setting without access to bespoke environmental laboratories? Please include a recommendation on whether or not samples with high TVCs should have further microbiological testing to establish if pathogenic or non-pathogenic species included.<br><br>• <u>Section C</u><br><br>This section is silent about the matter of sanitation systems being a source of infection transmission, especially waste traps which have been the subject of many independent research studies as a source. Some examples or references would help teams respond to these risks.<br><br>• <u>Section G 1.9</u><br><br>"Clinical problems are only likely to arise if *Pseudomonas aeruginosa* or other waterborne organisms are present in significant | |

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| | numbers in association with biofilms". Please can a definition be provided for the term 'significant numbers', is this statement evidence based on quantitative counts/cfus? Although heavy contamination is likely to be a greater risk, transmission is possible from any contaminated site and would also be affected by type of exposure, and the vulnerability of the patient group.<br><br>• <u>Section G 4.8</u><br><br>"Bacteriological samples should be taken in consultation with the Infection Prevention and Control Team (IPCT)." There is currently no guidance in the four nations' National IPC Manuals or Royal College of Pathologists Standards for Microbiological Investigations to guide sampling in outbreak and non-outbreak scenarios. It would be helpful to recognise this in the document and instead provide a review of the evidence, or a reference list of good practice. Usually a transdisciplinary approach is required to sampling, as knowledge of water and wastewater engineering supports targeted microbiological sampling and processing. | |
| 4.<br><br>Additional recommendations on the roles and responsibilities of clinical, catering | • <u>All sections</u><br><br>Throughout parts A to G there is only limited recognition of the role of clinical staff to optimise water and wastewater safety, despite published evidence that clinical practice will influence the risk of transmission of water pathogens to patients, and that changes to the built healthcare environment (e.g. removal of sinks/showers) will change the way clinical staff provide patient care. Again, the HTM may benefit from a separate chapter for the principles and practice points relevant to clinical teams, as it is unlikely clinicians | • To provide information on the roles and responsibilities to clinical, catering and cleaning teams, including cross-reference to the national standard of cleanliness, national IPC manuals and referring to risks related to both water and wastewater in the daily work of these teams. Describe that design changes should align with practice change to minimise |

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| and cleaning teams would help to protect patients from the microbiological risks of water and wastewater | will read the entire document. The document could emphasise that high standards of water and wastewater safety cannot be achieved without clinical education and good practice.<br><br>Reference to the drains must be included as this is a risk for transmission of pathogens, frequently due to poor user behaviours and inadequate multi-daily cleaning.<br><br>• Section A 1.17<br><br>"Any patient with a long line (such as central venous catheter) in situ." Expand this list. All devices breaching the mucosa pose a risk of invasive infection including extra-ventricular devices (EVDs), chest and abdominal drains, peripheral cannulas. This has relevance to allocation of high-risk clinical areas.<br><br>• Section A 11.23-20<br><br>Amend to further recognise the requirement for education of healthcare staff and patients in requesting the use of water-coolers. Education may be required to establish a shared understanding of the risks, and alternatives that are safer.<br><br>• Section A 12.68<br><br>"Risks from all potential opportunistic waterborne pathogens can be mitigated by designing out all potential sources of exposure to water, sprays and aerosols derived from water." This is really challenging to achieve in practice given limited operational, | the risks from opportunistic water and wastewater pathogens.<br><br>• Suggest addition of other devices that also pose a risk of invasive infection if contaminated by splash from water/wastewater<br><br>• Describe or cross-reference the practical steps to be taken to minimise risk from opportunistic pathogens (suggest remove the word 'eliminated', this could be disincentivising for teams, or lead to extreme measures that are not evidenced and could introduce other harms)<br><br>• Add clarity that drinking water dispensers (chilled) and ice machines are unlikely to be suitable for use in healthcare for patients or staff and there are much safer ways to provide drinking water and ice for patient use/consumption. If used, the risk assessment should consider (not exhaustive):<br>-accessibility to componentry for cleaning<br>-cleanability and maintenance of the machine following a validated and verified SOP<br>-location of drain<br>-direct contact with drain and management of fluids disposed of down drain including splash |

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| | microbiological and clinical evidence that interventions have effectively eliminated the risk and prevented recurrence.<br>Strict 'water free' care has not been introduced in the UK and is rare elsewhere due to introduction of other risks. Instead, trans-disciplinary teams in many centres have mitigated and reduced the pathogen risk from water/wastewater. Design is important, but it is also likely that risk cannot be eliminated without clinical teams also taking action, i.e. correct storage of equipment, correct disposal of wipes to prevent drain obstruction, reporting blocked drains etc.<br><br>• <u>Section G 20.8</u><br><br>Should be expanded to be relevant to all professional groups involved in water and wastewater, and not limited to engineers.<br><br>• <u>Section G 20.10</u><br><br>Healthcare organisation staff that also engage in work which may have a direct or indirect effect on the control of P. aeruginosa or other waterborne pathogens, shall have adequate information, instruction and training to ensure that the British Standards and WSP is applied at all times, and so ensure that healthcare organisations' systems are not compromised. | -regular microbiological testing (e.g. monthly) to confirm ice/drinking water quality (TVC, Coliforms, E coli and Pseudomonas sp.)<br><br>• Strict adherence to disposal of unfinished or unwanted waste fluids is required, and to prevent tipping of fluids down the vending machine drain. Multi-daily cleaning is often required to reduce risk of contamination from the drain and its components.<br>• Section A 11.29 addition -"Water coolers under no circumstances should be located in units caring for highly immuno-compromised patients, patient care areas, laboratories, toilets, theatres and should be located away from heat sources, direct sunlight and in areas that could cause an obstruction. A facility must be provided close-by for collection of unconsumed waste fluids to avoid poor user behaviours of emptying down the machine drain." |
| 5. | • <u>All sections</u><br><br>Throughout parts A to G there is only limited recognition of the requirement of estates and engineering staff adhering to National Infection Prevention and Control Manual (NIPCM) standards of practice when in clinical spaces to reduce risk of organism | • Suggest enhanced recommendations to highlight that all estates/engineering teams and contractors must be trained and regularly assessed on standard infection prevention if attending clinical areas (even if temporarily |

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| Water and wastewater safety could be further improved through guidance and monitoring for infection prevention and control and disinfection practices for estates, engineering staff and contractors | dissemination from themselves, water and wastewater, including AMR. Principles of IPC include assurance processes as advised in the national board assurance framework, and for estates teams relevant domains include training and education, hand hygiene, equipment cleaning, source isolation practices etc..<br><br>• <u>Section A 3.22.</u><br><br>Traditional plumbing trade skill set may not be sufficient for high-risk healthcare environments. While it is not the role of SHTM to define detailed scope of plumbing training, consideration should be given whether additional healthcare-specific competencies should be identified in order to support:<br>• contamination-free installation practices for both water and wastewater systems;<br>• development, standardisation and recognition of dry testing methods for systems traditionally commissioned wet (for example cold water distribution systems);<br>• hygienic construction methods aimed at preventing contamination during transportation, storage and installation.<br>Above competencies extend significantly beyond the scope of traditional plumbing training but bring to attention the need for the enhanced awareness/skill set requirements associated with healthcare environments that are not met by current training schemes<br><br>• <u>Section A 3.39</u> | unoccupied), including enhanced aspects relevant to their practice such as equipment cleaning, understanding risk of microbial transmission through water/wastewater, source isolation practices, waste disposal and hand hygiene.<br><br>• Suggest addition that during works, adequate site support close to the build activity for provision of toilets, lunch/rest areas, ensuring any site bins are regularly emptied, that the working environment encourages good behaviours<br><br>• Education and training on AMR would be helpful for teams to gain an understanding of the risks from wastewater<br><br>• All recommendations on disinfection of equipment/items (e.g. tools) requires clarity on choice and dose of disinfectant and contact time, it may be beyond the remit of the HTM to specify which product to use, but it would be reasonable to add these parameters as part of the responsibilities of the WSG, and to be added to each organisation's WSP.<br><br>• Section A 4.18, suggest clarification on additional secondary disinfection, this is not |

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| | Expand - and include the importance of the site providing adequate support for contractors. Add an additional bullet point<br><br>• <u>Section A 16.3</u><br><br>Contractors need IPC training and competency 'water safety' is not sufficient. They need to know that biofilm/AMR wastewater a risk to patients and be familiar with relevant sections of NIPCM.<br><br>• <u>Section A 20.1</u><br><br>'suitability assessed' – how do we know colleagues are competent, should their be peer assessments (as is consistently used for facilities/cleaning audits)<br><br>• <u>Section G 3.6</u><br><br>"Management Team Duty Holders and their staff should also be alerted on awareness and actions to minimise the risk of *Pseudomonas aeruginosa* and other similar harmful bacteria in the use of equipment, transmission routes and requirements (such as in the use of hand wash stations and wash basins)."<br>*This requires greater detail on what exactly teams are being asked to do, or cross-referencing with other lists of action.*<br><br>• <u>Section A 4.18</u><br><br>Clarify. This paragraph reads as if additional secondary disinfection treatment at the healthcare facility point of entry is inevitable, which is not the case. Increasingly the link between disinfection and | always required and can encourage resistance/tolerance of waterborne pathogens<br><br>• Suggest clarify and provide supporting advice for 'Remedial actions'. Actions for water outlets testing positive for Pseudomonas aeruginosa, or sinks where wastewater transmission is implicated in outbreak pose a risk of transmission of microbes through direct contact (parts left on sink surfaces), and indirect contact (aerosolisation, hand transfer, contaminated tools). Add supporting advice on how to minimise these risks, and detail that cleaning is required prior to clinical use of any asset or space where works have been undertaken. |

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| | resistance/tolerance of waterborne pathogens is recognised - and therefore a focused risk assessment should be undertaken prior to any continuous secondary disinfection being introduced.<br><br>• Section A 5.29<br><br>Free from waterborne pathogens, describe detailed sampling strategy and acceptance criteria.<br><br>• Section G 10.11<br><br>Specify 'high concentration' of chlorine solution – what is the dilution in ppm and contact time required, is this the only disinfection regime allowable.<br><br>• Section C Figures 5.2<br><br>Reference D22 seems to be missing. This section could be improved with more detail on remediation and moving away from activities just aimed at achieving negative results. Instead, teams should focus on investigating causation of outlet contamination. Suggest assess evidence of contamination of water distribution (i.e. other outlets positive), sink drainage, splash risk, cleaning methodology, clinical practices. Failure to establish causation can lead to repeat positives. *Pseudomonas aeruginosa* is an aerobic organism and can be prevalent in above ground drainage systems | |
| 6. | • Section A 3.9 | • Suggest addition "Where risk assessment allows, these basins (and therefore their wastewater interfaces) should be situated |

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| The HTM would benefit from greater clarity on the recommendations for wash hand station location and configuration | Further clarity and detail would be helpful in this section. WHO supports the use of antimicrobial hand-rubs. However, very few units across the UK have taken steps to reduce handwash basin availability after the introduction of hand rubs into practice 20 years ago. Hand rubs are mostly additional (e.g. end of beds) to hand wash basins. Is the new HTM recommending removal of water outlets and replacement with hand rub stations? Please clarify and provide examples on when this is, and isn't, appropriate.<br><br>Low use outlets are very common in healthcare and these are often present due to ongoing compliance with existing health building notes - a process supported through WSGs. Many groups do not yet have executive support and governance structures to move away from HBNs to an operational risk assessment. Outlet sites should be assessed by the activity in the clinical space, only clinical and non-clinical teams will have this awareness. This section would be strengthened by recognising the need for trans-disciplinary assessment of usage and outlet requirements, and by supporting a stronger governance process that allow WSGs to go against recommendations in HBNs (pending their update) to reduce outlets given there are safe alternatives to hand decontamination (see section 7).<br><br>• <u>Section A 3.10</u><br><br>Waterborne pathogen (such as *Pseudomonas aeruginosa*, Nontuberculous mycobacteria (NTM) and so on). Please clarify pathogen risks, this is also about AMR in wastewater. | outside the patient care area (such as in a lobby or corridor) rather than within the patient's room or treatment area."<br><br>• Suggest addition of greater clarity regarding "the WSG should agree the details of the wash hand station arrangement, including (but not limited to) the soap dispenser and hand towel locations." See comments.<br><br>• The British Standard (BS 8580-2: 2022) has good supporting information for this and could be referenced. Whilst not being prescriptive, many WWSG will not adequately see the risks without some descriptive or visual guidance on "what good looks like" such as template drawing showing an appropriate arrangement. There is risk that the ease of installation logistics for placing all dispensers on the IPS above the wash hand basin will prevail, leading to contamination of the tap outlet, paper towel fibres blocking the drain, and the PPE dispenser placed in the 2M splash zone.<br><br>• Suggest optimised models for single-occupancy rooms to reduce risk, included suggested alternatives to ensure NIPCM compliance for hand hygiene. |

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| | There is an assumption in this section that outlets in ensuites are less of a risk than outlets in patient bedrooms. Please provide evidence to support this. Practically, it seems possible that patients will come into contact with water, splash and aerosols in ensuites more than from clinical handwash basins.<br><br>When replacing outlets in single-occupancy rooms with hand-gel dispensers, wipes are also required in the event of unexpected contamination with blood or body fluids as hand gel is only appropriate for physically clean hands. Alternatively, a requirement for non-touch door opening mechanisms can allow staff to leave the room with contaminated hands then hand wash in the corridor. Please clarify.<br><br>• <u>Section A 3.11</u><br><br>Given the current operational complexity and high bed-occupancy across NHS healthcare providers, there is a possibility of any single occupancy room receiving a high-risk patient. However, common reasons to also use these rooms would be C. difficile infection and norovirus infection for which antimicrobial hand rub may not be effective at reducing transmission. An alternative would be to replace this statement with the following wording: 'for clinical areas where the majority of patients are higher risk (e.g. ICU, neonates, renal, burns and haemato-oncology units)'<br><br>It would be helpful to recommend that the PWSG should include clinical teams working in the area, if outlets are removed then teams will need to assess water use and provide training on alternative ways of working safely whilst maintaining compliant IPC practices. | • Please align recommendations on 'high risk' single occupancy rooms to better reflect the use of bed spaces in busy hospitals, and prioritise the water safe changes on units where the majority of patients are high risk |

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| | • <u>Section A 12.57</u><br><br>Suggest review and correction. There are statements made which are not evidenced and may be misleading; suggest amending to factual statements only. It is lending a bias for TMV controlled outlets for effective handwashing, which may be well managed at non-TMV mixer taps. More importantly, handwashing is undertaken at designated handwashing only basins. Also contradicts statement in 3.9.<br><br>• <u>Section G 17.5</u><br><br>Please provide clarity on guidance on soap dispensers – drip trays get dirty and develop biofilm and are not standard in most healthcare providers, drip on sink not advised and can encourage biofilm, drip on floor is slip hazard. Please provide detailed advice. Also, please use consistent language for hand rub through HTM – either alcohol-based hand rub (ABHR) or antimicrobial hand rub (AHR). Thank you. | |
| 7.<br><br>HTM users would benefit from | • <u>All sections</u><br><br>• Current health building notes, national guidance, clinical knowledge/practice and health technical memoranda may not align with more recent updates in this SHTM04-01 document. | • The HTM would benefit from recognising the impact of the requirement of teams to adhere to all guidance in a number of ways, including:<br>  • Education and training to develop teams who have competency, and not just compliant |

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| recommendations on the approach to risk assessment and governance when statements in pre-existing or co-existing national guidance differ from new HTM 04-01 recommendations | • Section A Note 3: There are numerous other statutes and legal requirements that NHS Scotland organisations, supporting professionals, contractors and suppliers my comply with. These are covered in the respective Health Building Notes (HBNs), Health Technical Memoranda (HTMs), Scottish Health Planning Notes (SHPNs) SHTMs, Scottish Health Facilities Notes (SHFNs), Statutory Compliance Audit and Risk Tool (SCART), Health and Safety Executive (HSE) requirements and the Property and Asset Management Strategy (PAMS). In the event of a conflict between older and more recent guidance, the latter will take precedent? | • Evidence summaries/references to support local risk assessment<br>• Development of a trans-disciplinary team of individuals competent in clinical, operational and engineering risk assessment<br>• Enhanced input from ward-level clinical and non-clinical colleagues who have a good understanding of the use of water in their units to support risk assessment<br>• A framework to support organisations in the event that individuals are resistant to change, in which case older documents will be used to support their position/choices/risk assessment/compliance.<br>• Recommendations on how to best ensure that the most recent guidance, best practice and evidence is used to support patient safety including evidence which may not have been written at time of publication whilst maintain compliance – i.e. the development of a 'living water and wastewater safety plan' |
| 8.<br><br>The HTM could provide greater detail on the correct | • <u>Section A 5.38 and the section on Cleanliness and Hygiene</u><br><br>The materials of construction for the wastewater system should be included here. Important points are the jointing compounds – too much resin leading to pooling of waters. Above ground materials are typically plastic. However, some experts have trialled copper u-bends with tortuous pathways. The wastewater system is a critical component of water safety within healthcare facilities and this | • Suggest additional section with more detail on recommendations on the materials used for the carriage of wastewater, and include aspects of safe practice to mirror the detail provided for hot and cold-water distribution systems including design, installation and commissioning |

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| design, installation and commissioning of above ground drainage systems, in recognition that pre-installation contamination of pipework is relevant to drainage | section should be included even if there is limited or elderly guidance only available currently. It is also an opportunity to ensure risk assessment is undertaken before placing the wastewater interface in any patient care areas<br><br><u>All Sections</u><br><br>As above, a section dedicated to works on wastewater and above ground drainage would be helpful to provide clarity on key principles for practice. For instance, in the ambition to reduce water outlets, good practice includes taking steps to minimise risk of wastewater biofilm contamination, reduce dead-legs, record changes to drainage networks and prevent unintended consequences at other parts of the above ground drainage system (e.g. aerosols, splashes, blockages)<br><br>• Suggest add detail that healthcare facilities are significant sources of antibiotics and pharmaceutical residues originating from patient excretion, disposal of unused medicines, laboratories, and clinical processes. Conventional hospital drainage arrangements and municipal wastewater treatment plants are generally not specifically designed to fully remove these micro-pollutants. As a result, residual antibiotics can enter downstream wastewater systems and the natural environment. The presence of antibiotics within wastewater networks and treatment processes creates favourable conditions for the selection and propagation of AMR bacteria.<br><br>• <u>Section 18.44</u> | • Suggest additional detail – the drain, u-bend and wastewater system should be freely flowing and have no debris / rubble, no burrs, no excessive sealant and not demonstrate any backflow, pooling or blockage which could result in contamination of sinks, basins, wet room floors or shower trays. Plumbed equipment that has predictable blockages must have swept bends installed, not 90 degree bends. Waste stacks should be installed straight. Above ground drainage must have the correct and supported camber. Access for inspection or rodding should not be in patient care areas. Cameras can be used to inspect the drainage and wastewater system as part of commissioning to evidence clean state and/or investigate needed corrective actions (which would be documented and included in the handover pack)<br><br>• The reference to BS EN 12056-2:2000 introduces limitations:<br>- Excludes pumped and vacuum type drainage. Proposal: change wording to design in accordance outlined in Scottish Building Standards Technical Handbook (Section 3)<br><br>• Consider adding more emphasis on options including wastewater treatment to take into |

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| | Structure change for paragraph B: suggest that the drain, u-bend and wastewater commissioning has its own dedicated section. Its impact on patient safety is critical and therefore recognised in its own right as opposed to a sentence under commissioning the hot and cold water systems. For correct management of the risks, further detail and best-practice advice is essential here.<br><br>• <u>Section A 13.1</u><br><br>Drainage systems should be designed to British Standard (BS) EN 12056-2:2000 but should also consider the added sensitivities of the healthcare setting as evidenced in published literature. Onward drainage systems are not mentioned, no follow up action identified beyond initial design, this would indicate a fit and forget service, is this a true reflection of sanitation in operation?<br><br>• <u>Section A 13.24</u><br><br>The system venting arrangements must comply with BS EN 12056-2:2000 and local building standards. Preference should be given to using open ended vent pipes, which terminate external to the building in preference to air admittance valves<br><br>• <u>Section A 18.2</u><br><br>Please expand and clarify, there should be sufficient detail for consistency between operators across sites and services, this is currently open to interpretation.<br><br>• <u>Section A 18.11</u> | account inclusion of wastewater pre-treatment systems designed to capture residual antibiotics and other pharmaceutical related substances, before discharge into the wider drainage or municipal wastewater network.<br><br>• Termination of ventilation pipes – add specification/minimum distance between roof terminated vent pipes and air intakes to prevent cross contamination<br><br>• Suggest amended words for Section A 18.2 'The water and above ground wastewater systems should be regularly checked. Checks should also be made to ensure that lead solders are not being used, and any jointing compounds agreed and permitted are used sparingly and have appropriate WRAS approval as a minimum.'<br><br>• Suggest amended words for section 18.11 "The system should be initially filled with disinfected water (following a risk assessment for compatibility of materials in contact with the chemical, agreed concentrations, contact time, target parameters, positive pathogen selection and testing assurance) and disinfected water allowed to sequentially flush through to all outlets and plumbed equipment |

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| | Commissioning disinfection and flushing best practice to be reinforced and strengthened here. It should not be inferred that biocides are needed to continuously disinfect, this may not be necessary and has implications for the risks for costs, AMR selective pressure and patient safety. | from source to furthest points as per the agreed commissioning plan. Once evidenced that there are no leaks or weeps to the hot and cold water systems, the entire building volume of water must be flushed sequentially at each and every plumbed outlet or equipment. During flushing, evidence should be sought to confirm that there are no leaks or weeps, or water pooling in basins or shower trays, or blockage of the drain connection, u-bend or above ground drainage at any fittings or plumbed equipment. Once filled, the hot and cold systems should be managed as per normal steady state operation, as agreed in the PWSP and commissioning plan (e.g. temperatures), with evidenced flushing of one building volume of water (e.g. hot water volume within calorifier(s), piped system and fittings + cold water storage tank(s), piped system + fittings) of hot and cold water flushed via each outlet or plumbed equipment on a daily basis." |
| 9<br><br>The HTM would benefit from detailed guidance | • Section A 5.39<br><br>"All pipes, fittings, valves, sub-assemblies, calorifiers, cisterns etc intended to form part of the hot and cold water service installation should be supplied to site cleaned, free from waterborne pathogens, particulate matter, and other residues" Please clarify the evidence that would need to be provided to confirm free from waterborne pathogens, and whether or not this includes | • Suggest additional advice regarding remedial works for positive outlets, it should be clear that robust investigation and elimination of the risk is more important than simply achieving negative water results, and this includes investigating causation of outlet contamination and understanding if previous |

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| for practitioners on investigation, disinfection and remediation processes in response to positive water and wastewater samples | microbiological sampling and assessment. And more importantly, suggest steps to be taken if assurance cannot be provided.<br><br>• <u>Section G 10.11</u><br><br>Specify the concentration of chlorine solution and contact time.<br><br>• <u>Section C Figures 5.2</u><br><br>Reference to D22 seems to be missing. Further details on best-practice for remediation would be helpful given differing interpretation across organisations and providers. It should be made clear that robust elimination of the risk is more important than achieving negative water results, and this includes investigating causation of outlet contamination and understanding if previous positive samples from the same outlet, if wider concerns in that area or patient samples positive. Suggest assess sink drainage, splash risk, cleaning methodology, clinical practices and level of harm. Failure to establish causation can lead to repeat positives and false reassurance with negative sampling from a single outlet. *Pseudomonas aeruginosa* can be present in above ground drainage systems, and control of this risk may be crucial for longer term success.<br><br>• <u>Section A 6.15</u><br><br>This section is important but also suggest inclusion of risk recognition: How will clinical communication be shown to have been effective to prevent harm to patients, especially neonates. Including provision of alternatives. It is increasingly recognised that | positive samples from the same outlet, if wider concerns in that area or patient samples positive. Suggest assess sink drainage, splash risk, cleaning methodology, clinical practices and level of harm.<br><br>• Add clarification that due diligence in risk assessing the use of any biocide in an engineered water system should consider the impacts of bacterial tolerance and resistance, and positive selection for waterborne pathogens |

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| | disinfectant residuals can promote tolerance in bacteria and a resistant biofilm, providing a beneficial habitat for pathogens to colonise and proliferate. Prioritise the need to avoid highly colonised systems, as biocide use has limitations. | |
| 10.<br><br>The HTM could provide greater detail on risks and proposed solutions to minimise wastewater contamination of clinical environments from sinks and showers | • <u>Section A 12.61</u><br><br>The description of the splash zone is overly prescriptive - the majority of splash is within 2 meters for many sinks - but there can be splash beyond 2 meters depending on the outlet/tap/water pressure etc.<br><br>It would be helpful to add learning from previous misinterpretation of "splash screens" by architects and design teams, it would be prudent to confirm that "mobile" splash screens are not appropriate, and nor are ones which are very short, offer surfaces which staff balance IV lines or other items on. Infection prevention can be controlled best if no ledge for either dust or the potential to place items, and effective cleaning and decontamination of splash screens should be part of their suitability (i.e. including who/how cleaning will be completed)<br><br>• <u>Section A 12.68</u><br><br>See prior comments. This is over-simplistic and generic and does not provide design, engineering, microbiologists or clinical teams with sufficient detail to translate to practice. Opportunistic pathogens cannot be eliminated from healthcare environments if water outlets are present, and water-free care is used in very few units currently (none in the UK, these are all water 'light', or water 'safe' and | • Suggest additional recommendation on splash screens, including good and bad practices relevant to infection prevention and control.<br><br>For example, "If a 2 metre zone is not possible, the use of fixed splash screens should be considered. Effective splash screens include full height return walls of easily cleanable materials, which should be extended to deflect splash effectively from the patient care or working areas"<br><br>"… for effective hand-washing and showering (for example, using minimum safe distances of 2 metres clear from the outlet, positioning of adequate height and width splash screenage)"<br><br>• Suggest more detailed recommendations to support teams where a 2m splash zone is not achievable, not just using splash screens, but proactive consideration of alternatives. This could include removal of storage/shelving from splash zone (and provision elsewhere), |

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| | include some outlets on units). It is important to recognise that pathogens can travel from water/wastewater via equipment, hands, cleaning items etc.<br><br>Suggest expand to include wastewater / drain and also ensuring that the flow from the shower does not hit the drain, nor does the patient stand on the drain - even though included in section 13, suggest to also include here (or cross-reference). Describe detail of the camber of the floor and design to minimise the risk of flooding or pooling of water, and drain design to minimise the risk of blockages.<br><br>• <u>Section A 3.12</u><br><br>"Wastewater drainage systems are designed so there is no potential for standing water or backflow onto shower trays/ floors and basins and sink"<br><br>This is incredibly challenging as blockages may arise from elsewhere leading to backflow, evidence on this is lacking and so further detailed recommendations are required. Suggest change 'no' to 'minimise' – or give detail on how to be achieved (e.g. water less traps where backflow cannot occur?).<br><br>This section should also include advice for patient use i.e. flushing showers may not lead to standing water, but deflection of water from patients during showering often does and need to refer to camber of floor or tray to ensure good flow/drainage. Storage in patient bathrooms is not required and can limit cleaning efficacy, similarly storage should not be encouraged in dirty utilities | closing bed spaces near sinks in high risk units, sink removal following risk assessment. Noting evidence that reduction in sinks may have associated benefits in reducing the incidence of Gram-negative infections.<br><br>• Some amended statements could include<br>-the flow of water from the shower should not hit the drain<br>-the drain should be positioned away from the patient showering<br>- the floor should have sufficient camber to avoid the patient standing in a pool of water<br>-risk assessment prior to showering may be required for some patients (i.e. immunocompromised, with lines and/or skin wounds/disease). Noting that protective isolation will be employed for the most vulnerable patients, offering access to en-suite facilities so patient involvement is required<br>-enhanced cleaning regimes in areas caring for patients who are at higher risk<br>-assurance that towels/flannels are single-use only, patient personal items are not left in splash zone of handwash basin or en-suite outlets<br>-storage of clean equipment and personal items in separate protected areas |

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| | • <u>Section A 3.12</u><br><br>This section would benefit from numbers/letters as for other longer sections.<br><br>“All outlets and sanitary fittings are designed and fitted to minimise the risk, as far as possible, from splashing whilst maintaining sufficient flow for effective hand-washing and showering (for example, using safe distance (>2m) splash screens.” Please expand and provide examples, many HTM users will be limited by room size and procurement opportunities. Please describe the design features recommended (e.g. fin or no fin on the sink), fitting instructions, splash assessment and/or microbiological methodology that would provide evidence that one design is safer than another. Is there evidence that specific design and installation practices reduce infection risk, or could simple advice re distance from other sanitary ware/storage/patient spaces offer more clarity for teams pending further published evidence on this topic?<br><br>“There is sufficient space to enable the safe set-down of contaminated articles (for example, bedpans)” This should be expanded for clarity or cross-referenced to NIPCM on waste disposal (liquid waste should be disposed of in toilet or macerator). Contaminated equipment should be immediately disposed of, providing shelving encourages poor practice and risk of spill, contamination and environmental transmission. If insufficient macerator capacity etc, then a second macerator is preferred to stacking up dirty items. | -design and engineering recommendations to prevent backflow, blockage, floods and pooling.<br><br>For example "Shower drains should be positioned at the furthest practical point so that patients do not stand or sit directly over or close to them, particularly in augmented care settings, to reduce the risk from splash-back and environmental contamination."<br><br>• Suggest minimise horizontal surfaces and storage areas in dirty utility, and if unavoidable, storage should be closed cupboards only<br><br>• Suggest remove clean utility – as should not require water outlets<br><br>• Suggest strengthen advice on shower hoses, given the risks, to suggest clinical risk assessment including information on clinical activity, patient vulnerability, number of patients with disability and alternative options for washing so that hoses are only used when absolutely essential.<br><br>• Suggest clarify steps to prevent shower head contamination from wastewater, and notes regarding pre disinfection. |

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| | "Separation of dirty equipment (such as wheelchairs, commodes, drip stands, and so on) before cleaning and for storage of clean equipment in separate areas". Again, further detail is required to support safe decontamination and storage of items. Is this in the remit of the HTM?<br><br>Regarding bullet point 6<br>• Suggest remove "clean utility" - risk recognition that it is not appropriate to have water sources and their associated drainage within clean utilities and/or drug preparation areas. This would apply to any patient group. A facility to wash hands should be close by outside, with the use of hand rub, antimicrobial wipes and gloves adopted for practices within.<br>• Add statement indicating that storage should not be placed in dirty utilities due to the risk of contamination. If unavoidable, all storage should be behind closed cupboard doors. New pulped sanitary products should not be stored in dirty utilities routinely.<br>• Suggest adding comment on nurse stations in this section - frequently see clinical wash hand basins at nurse stations with everyone/thing positioned in the splash zone.<br>• Suggest clarity that corridor sinks should not be placed near corridor storage (e.g. linen trollies, resuscitation trollies, near kitchens where catering trollies stored outside).<br><br>• <u>Section A 13.9</u><br><br>Section 13 is excellent. Expand section 13.9 to include patients standing or sitting - if there is a patient shower chair - fixed or non- | |

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| | fixed - it should not be positioned over the drain. Also need to account for the camber of the floor if a wet-room, or risk of splash outside the shower tray if used (especially with patients in situ, not representative if shower flushed without anyone in it).<br><br>• Section G Table 10.1<br><br>"Dismantle, clean and de-scale shower heads and hoses/ or replace with new disinfected Shower Head and Hose (to be recorded on form 005B)" Please provide examples or parameters on cleaning and disinfection regimes and methodology that ensures heads are not contaminated in the process of disinfection (i.e. by wastewater splashes, by clothes, tools or hands of team members)<br><br>• Section G 3.41<br><br>"Check that the new clean disinfected head and hose package is intact" etc. As above, how to complete procedure ensuring new shower head is not contaminated at the point of installation (e.g. not holding new head near drain to flush). Clarify defining characteristics of 'disinfected head'<br><br>• Section G 3.41<br><br>Ensure the length of shower head hose is as short as possible, is adequately clipped and cannot syphon water from the shower tray. Risk assess for fixed head showers based on patient population re: if patients may be requiring disability access showering, and consider alternatives (e.g. one per ward, rather than all showers having a hose). 'Adequately clipped', shower tethers should be | |

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| | robust and patients need advice on not unscrewing shower heads on shorter hoses and untethering. This is a very frequent finding and the risks will not be known or understood by patients or ward staff currently.<br><br>• <u>Section G 13.1</u><br><br>"Showers and other water outlets which are rarely used should preferably be removed or, if retained, flushed to waste at intervals for a 3-minute period." Suggest amend working, this could be misinterpreted that shower needs to be flushed near wastewater drain which risks contamination.<br><br>• <u>Section G 17.5</u><br><br>Item 'DD' Again, please clarify. Is it not possible to have taps, shower heads and hoses and so on 'pre-disinfected' in the supply from manufacturers - disinfection will have to rely on normal flushing and disinfection protocols that would apply to any new installation. | |
| 11.<br><br>Enhance guidance on prevention, recognition and remediation of wastewater | • <u>All sections</u><br><br>Clinical practices (e.g. incorrect disposal of caps, wipes, packages, any small medical equipment items) can lead to slow-draining sinks, backflow and blockages. Suggest add definitions that support clinical understanding of the risks, and outline the responsibilities of all teams in healthcare to prevent blockages, and ensure all sites have a rapid response early reporting system that all staff are aware of (24/7). As above, a separate section with advice for all healthcare staff on water and wastewater safety would be helpful. | • Sealants should be used carefully and sparingly, without excess to ensure no drainage water hold up, pooling or accumulation of debris leading to slow flow and blockage risks, or the opportunity for the development of biofilm. Prior to installation of an asset, manufacturers instructions should be checked to ascertain if sealant needed (e.g. sink installation does not always require sealant) |

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| backflow, blockages, leaks and floods | Healthcare organisations should employ feedback between estates/engineering teams and clinical teams so incorrect disposal leading to harm is not a repeated event.<br><br>Drainage maps are required to fully assess and safely respond to backflow, blockages, floods and leaks. All healthcare buildings should have up to date maps, which are amended when works are carried out (e.g. sink removal).<br><br>• <u>Section A 13.12 and 13.10</u><br><br>Expand - to avoid overuse / excessive use of sealants and describe adhering to manufacturers instructions to avoid pooling in the drainage connections and harbour biofilm, including AMR. Some designs of sinks can be fitted without sealants.<br><br>• <u>Section A 3.23</u><br><br>Delete – the HTM should not recommend that water cooler dispenser devices are suitable for installation within healthcare facilities, whether by approved contractors or not. As a minimum it should recognise the well-known and frequently published risks of waterborne pathogens from such devices and the impacts of poor user behaviours, particularly around the drain.<br><br>• <u>Section A 13.8</u><br><br>Clarify – more explicit regarding no use of right-angled bends in the waste to avoid predictable blockages | • Drainage should not include right angled bends in order to avoid predictable slow flow and blockage<br><br>• In process of resolving blockages/leaks Cleaning of the tools should be undertaken, and records kept of this. Tools should not be placed or stored on dirty surfaces (such as the floor, clinical wash hand basin or neighbouring bin lid)<br><br>• Each WWSG should include a process for reviewing wastewater incidents and review for patterns and root causes of slow flow, backflow, blockage, leaks and floods and provide information to relevant teams to prevent future incidents.<br><br>• Recommend advice on the procedures for decontaminating clinical areas following an incident, or cross-reference appropriate guidance (e.g. national standards of cleanliness). Where removal of u-bends and wastepipes have been required in order to apply corrective action and mitigate slow flow and blockage, deep cleaning is likely to be required. |

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| | • <u>Section A 13.10</u><br><br>"Clinical basins have an outlet, which is not in the direct line of water flow." Please clarify for all areas including staff, kitchen, dirty utility and cleaner's rooms. It is important, however, that the design and installation does not encourage ponding of water. This should involve discussion with the manufacturer and care in the methods of sealing drain outlets. The drain outlet should be seen to drain freely from the wash hand basin, and the water is not backing up as this can lead to splashing and contamination to surrounding areas<br><br>• <u>Section A 3.26</u><br><br>This section is excellent. However, additions would be helpful to ensure that there are governance structures for these practices. How will executives know that teams are following this advice? What audit and assurance are required for disinfection protocols and training, hand hygiene, maintaining up to date SOPs?<br><br>• <u>Section A 13.23</u><br><br>Clarify/Enhance – these should be separate points. The capping of drains is critical to prevent site debris and rubbish disposal during construction and installation. This is a separate critical point to the use of clean tools.<br><br>Tools are often found placed on the floor or other dirty surfaces during installation – this should be included here to support good user behaviours. Concentration of chlorine, disinfection contact time and more detail on frequency of cleaning and disinfection | |

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| | around any handling of water and wastewater system. Expand to support good user behaviours and patient safety, look again at how executives will be assured this practice is occurring.<br><br>• <u>Section A 13.32</u><br><br>Expand – to support good user behaviours (e.g. risk assessing patient evacuation from area) and describe the risk of poor behaviours (e.g. transmission of AMR using plungers, lack of disinfection protocols for tools/plungers used in blockages, inconsistent approaches to cleaning after leaks/floods and blockages.)<br><br>• <u>Section A 10.47</u><br><br>Adequate sub-metering of water supplies should be provided so that supplies can be monitored for individual heavy-use departments. Such monitoring will assist in the detection of leaks or abnormal water demands. Water meters can be connected to an automatic monitoring system such as a BMS, which can identify anomalous consumption and lead to the early detection of leaks | |

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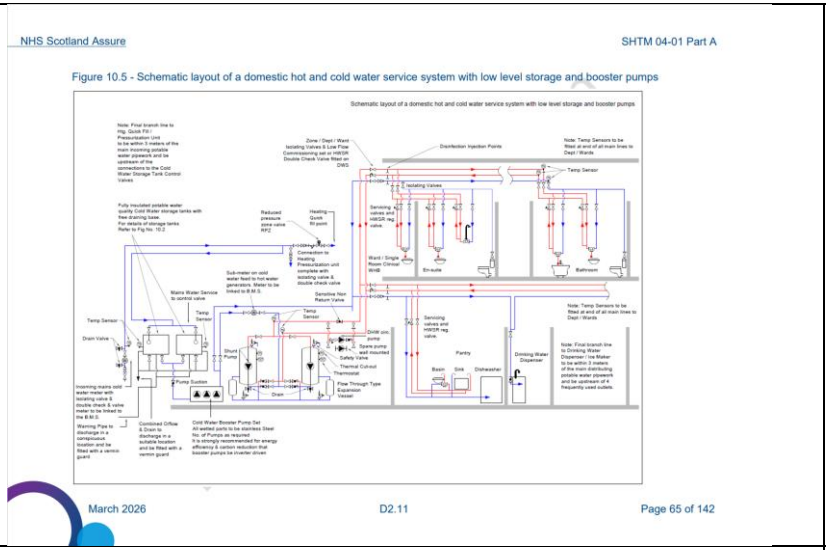
| |  | |
| 12.<br><br>Provide new recommendations on surveillance linking clinical sample results to positive water, wastewater and | • <u>All sections</u><br><br>The backlog for estates maintenance and lifecycle works for healthcare buildings across the UK is significant, many teams work daily in areas with sub-optimal clinical and non-clinical environments. It is not likely to be possible for all clinical areas to be achieve the standards outlined in this HTM and progressive improvement plans will need to be agreed based on a careful review of clinical, operational and engineering risk assessments. A trans-disciplinary approach for this is recommended.<br><br>For existing estate, a visual assessment of risk from the built environment, including water and wastewater, is required. To prioritise clinical areas requiring adjustments towards greater water | • Recommendation for each healthcare provider to introduce a process for reviewing clinical cases of waterborne pathogens at WWSG (as a minimum *Pseudomonas aeruginosa*, NTM, linked AMR isolates (e.g. CPE) and Stenotrophomonas sp. in augmented care areas), and performing risk assessment in the context of positive water samples, recent estates works, failure of controls (biocide/temperature), blockages, leaks and floods<br><br>• procedures for decontaminating patient care areas (such as a deep clean by the domestic |

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| environmental samples<br>factors relevant to water/wastewater | and wastewater safety, it should be recommended that clinical water and wastewater safety groups use clinical trans-disciplinary ward reviews, and local surveillance data linking clinical results to positive water samples to further understand the local risks. Poor environmental set up, recent blockages leaks and floods, outbreaks or a spike in clinical cases may trigger urgent actions. In response, clinical areas with the ongoing water/wastewater risk can be prioritised for capital projects and lifecycle works.<br><br>• <u>Section C 2.1</u><br><br>This is really helpful, it could be enhanced by recognising that not all sampling is water from outlets, and the other samples cannot be processed using UKAS accredited approaches. It may be helpful for teams to agree an approach to stock environmental isolates (e.g. *Pseudomonas aeruginosa* from water), for a fixed period to allow for typing to establish linkage if any clinical cases occur. It should be mandated that laboratories testing clinical water samples should be able to provide the isolate for further testing, i.e. susceptibilities and molecular typing/whole-genome sequencing.<br><br>• <u>Section C 2.10</u><br><br>This is also helpful, suggest that results should be reviewed in the context of the presences of high risk individualised and analysed with the surveillance data from patients' clinical samples.<br><br>It may be helpful to describe the role of outbreak groups/incident management teams who may advise the water/wastewater safety | housekeeping teams) where removal of u-bends and wastepipes have been required in order to apply corrective action and mitigate slow flow and blockage<br><br>• Suggest clarify definition of 'heavy-use' departments, term is currently open for different interpretations.<br><br>• Water meters have a crucial role in water consumption measurement or water stagnation monitoring therefore should be positioned clearer in the document, to cover strategic locations. e.g. consider a BREEAM approach which specifies that: All water consuming systems or building areas that are expected to account for more than 10% of the buildings total water demand must be considered when determining significant water uses. Water meters are not shown on ZONE, DEPT, Ward, valve arrangements - add water meters. |

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| | group of additional investigative sampling approaches, or request expertise for local risk assessment, sampling and interpretation.<br><br>• Section C 5.4<br><br>Suggest add kitchens to this list<br><br>• Section C General<br><br>As above – microbiological testing is silent about the matter of sanitation systems being a source of infection transmission, especially traps which have been the subject of many independent research studies as a source, and various sampling techniques.<br><br>• Section C 5.10<br><br>This is helpful but requires clarity. Recommendation that agreed standard operating procedure to share information on clinical surveillance with water safety group and vice versa.<br><br>• Section G 17.5 J<br><br>"For applications involving high risk clinical areas (as defined by the Water Safety Group (WSG)) there is particular guidance (which should be good practice elsewhere) to ensure engineering and cleaning protocols are achieved and manufacturers' instructions are followed." Again, assurance data should be provided for this at the WSG, how will executives know that these measures are in place for all works, i.e. including contractors. | |

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| 13.<br><br>Education and training on AMR and how this relates to water and waste water safety could be recommended for all relevant staff working in healthcare settings, including contractors | • <u>All sections</u><br><br>The new HTM has introduced helpful elements related to the risks of water and wastewater, the mitigations are relevant to diverse professional groups. Standard education about water and wastewater is limited often to hot/cold distribution and Legionella, Pseudomonas aeruginosa and NTM, and may not include core aspects of traditional infection prevention, or information on newly identified risks on AMR, HCAI and wastewater.<br><br>• <u>Section A 3.37</u><br>"To ensure the delivery of safe wholesome water at all outlets and prevent contamination which may lead to a healthcare-associated infection, it is recommended that healthcare organisations implement a water hygiene training scheme which utilises local content where possible and the information is appropriate for the target audience." This is a new and ambitious requirement. The majority of both estates/engineering teams and clinical healthcare workers will have little understanding of the linkage between water/wastewater and healthcare associated infection. An exemplar of how this could be achieved would be helpful.<br><br>• <u>Section A 3.38</u><br><br>"Consideration should also be given to integrating a health screening element into the training to help ensure those undergoing the training are not carriers of any waterborne diseases on the date of training" | • Suggest organisations provide education and training to support successful implementation of the new HTM, including information about wastewater, key learning from recent high-profile events (Glasgow/Papworth/Belfast) and information about AMR, outbreaks and HCAI and how related to water and wastewater.<br><br>• Recommend water and wastewater safety training is bespoke to professional groups including (but not limited) to infection specialists/microbiologists, estates and engineering teams, cleaners and catering teams, clinical teams and senior leaders and relevant to practice. |

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| | This is difficult to understand from a clinical point of view. Staff should not be a risk of contaminating systems from their own microbiome (NTM, Pseudomonas aeruginosa, Legionella sp), and unless requiring treatment for an active infection, would not know whether they were colonised with these organisms. Which pathogens are of consideration here?<br><br>• Section A 15.32<br><br>Clarify – to support the third party contractors who mainly have little understanding of water hygiene or pathogens, or what is meant by a commissioning plan (rather keep sending through a programme of works and missing the critical points). How will organisations provide assurance that activities of contractors will not put patient safety at risk? | |
| 14.<br><br>It is recommended that greater recognition on what is, and isn't known, about the risks from water and wastewater | • Section A 6.13<br><br>Water services can generate aerosols from the process of water splashing onto wash-hand basins, sinks, and baths, in shower cubicles and when flushing toilets. Equipment that uses or is cleaned by water should be assessed for its potential to produce aerosols both in normal and abnormal (for example during maintenance) operating conditions. Establishment of 'aerosol' zone is not yet in practice.<br><br>It would be helpful to add that aerosols are also a risk associated with backflow, blockages, floods and leaks. And that the risks of aerosols can be related to the drainage design, connectivity and | • Please describe the practicalities of assessing, mitigating and providing assurance around the risks from wastewater aerosols. If not available, then please state this (it is reasonable to describe risks of aerosols without solutions in the HTM pending further evidence).<br><br>• Suggest addition regarding the management of the wastewater interface is critical for the WWSG to address. Typically this interface reflects the drain and u-bend at outlets, where invisible aerosolisation occurs from the |

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| aerosols is included in the guidance | drainage ventilation. Only limited evidence is available on the degree to which this route contributes to transmission risk, and the most effective solutions.<br><br>How will assurance be provided that aerosol dispersal has been risk assessed and mitigated. Are there practical recommendations e.g. keeping high risk patients away during cleaning processes that could aerosolise, closing doors to protect patients. Assessing the risk of aerosol contamination after blockages, backflow, floods and leaks and evacuating high risk patients? | main body of wastewater due to system air pressure transients, impacts of slow drainage and blockage enable splash contamination from wastewater organisms and requiring necessary vigilance in removing all items within the minimum 2 meter splash zone. |
| 15.<br><br>Evidence-base of the HTM 04-01 recommendations: it would be helpful to provide clarity on aspects which are experiential (standard practice), expert-opinion, and which aspects can be supported by published evidence | • <u>All sections</u><br><br>Further consideration – references which provide evidence for content of this guidance are few. Most focus is on other guidance and standards, though cross-referencing is not comprehensive and this could also be enhanced.<br><br>Is this guidance intended to be "Evidence" based? If some aspects cannot be, provide the origin of statements so readers are aware which interventions have been evidenced to reduce microbial risks, and which are expert opinion, and which are 'standard practice'.<br><br>As risk assessment and competency-based approaches (as opposed to compliance only) becomes more dominant in water safety, practitioners will need information on the origins of recommendations to support their assessments. | • Suggest amending recommendations to provide information on:<br>  • Published evidence to support recommendation<br>  • Cross-referencing of all relevant guidance and standards<br>  • Technical guidance – standard practice<br>  • Technical guidance – expert opinion |

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| END | | |

Additional recommendations – including minor comments and corrections.

Section A 8.2 Hardness is due to calcium and magnesium salts in the water and is expressed in terms of milligrams per litre as calcium carbonate (CaCO).

Additional support: Add a map of the United Kingdom which illustrates areas (in overview) relative to their water hardness. Hardness also impacts scale formation in the wastewater system. This would help WWSGs to understand the variance of water hardness across the different geologies. Is there a UK version of the DWI map? https://dwi-production-files.s3.eu-west-2.amazonaws.com/wp-content/uploads/2021/10/11171047/hardness-map.pdf

**Suggest to add a UK map of water hardness**

Section A 8.7 Water softeners containing ion-exchange resins may be subject to bacterial contamination if not adequately maintained in accordance with the manufacturer's instructions (these may also require periodic disinfection).

Clarification / Additional supporting text: I have experience of water softeners also being contaminated with filamentous fungi as well as bacterial contamination. Contamination may be on receipt of the new equipment, and the manufacturers instructions are inadequate to support good water hygiene practices. Paragraph (8.7) has 2 distinct topic areas within – I suggest splitting the contamination part from appropriateness for drinking part. In addition, these paper/reference may be helpful for risk assessing any water softening approach

- Tang C, Rygaard M, Rosshaug PS, Kristensen JB, Albrechtsen HJ. Evaluation and comparison of centralized drinking water softening technologies: Effects on water quality indicators. Water Res. 2021 Sep 15;203:117439. doi: 10.1016/j.watres.2021.117439. Epub 2021 Jul 15. PMID: 34399249.
- Li C, Liu C, Xu W, Han Y, Gao Z, Bing Y, Li Q, Yu J. Control approach and evaluation framework of scaling in drinking water distribution systems: A review. Sci Total Environ. 2024 Oct 20;948:174836. doi: 10.1016/j.scitotenv.2024.174836. Epub 2024 Jul 17. PMID: 39029761.

**Suggested text:** Water softeners containing ion exchange resins may be subject to bacterial and fungal contamination on installation, commissioning or if not adequately maintained. In addition to the manufacturer's instructions, these may require periodic testing, cleaning and disinfection. Appropriate and hygienic sampling points immediately upstream and downstream may support timely maintenance regimens.

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Section A 8.8

Softeners using salt-regeneration ion exchange resins increase the sodium content of the water during softening, and this may be undesirable for young children and infants (including the making up of babies' bottles) and anyone on strict salt restricted diets. Patient groups more commonly prescribed or advised for low salt diets include those with hypertension (high blood pressure), heart failure, kidney disease and individuals with fluid retention and oedema. These concerns can be avoided if water intended for drinking and cooking is not softened.

Section A 10.6 10.7

Thank you so much for including these statements. The typical usage data for storage calculations is vastly inaccurate vs actual current "per bed" findings. CIBSE (Guidance G) allows for a daily demand of 250 L/day per 'bed' for a surgical ward which we have found to be too high (more than double actual usage). Frequently the daily usage following full occupation of a new building is less than that seen during commissioning. Double jeopardy with too many installed outlets and less than half of the designed for total throughput

Section A 2.10

Clarify that HAI legionella requires reporting (reads as all HAIs require reporting which is not strictly correct)

Section A 11.29

Language could be improved 'highly immunocompromised units' – change to 'clinical areas caring for immunocompromised patients'

For all HTM sections

Suggest referring to definitions of immunocompromise. For instance in The Green book of immunisation - chapter 7 - Immunisation of immunocompromised individuals

Section A 12.63

This is excellent content to include. There appears to be a full stop instead of a comma, and the risk assessment should consider the aspects of low use and highlight the exposure from wastewater organisms in order to best support a review of appropriateness for installation (or not).

Section G 17.5

N and AA are the same, suggest delete AA. BB ‘consider replacement rather than cleaning’ – what does this mean, please clarify.

General

It may be helpful to recognise that infection control doctors may be trained infectious diseases physicians or clinical scientists, not all are clinical microbiologists. For the HTM actions designated to consultant microbiologists, could wording be changed so that infection control doctors and clinical scientists are included.