

## Document Control

Date	Version	Status	Change Status	Author or Reviewer	Consultation & Action Group	Owner
14/04/2022	0.1	Draft				Tommy Logan
20/09/2022	0.2	Draft				Tommy Logan
29/09/2022	0.3	Draft				Tommy Logan
30/09/22	0.4	Draft				Tommy Logan
20/10/22	1.0	Final				Tommy Logan

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## 1. Introduction and Scope

The scope of this document includes guidance on the routine **surveillance** through microbiological sampling of water quality specifically and **only in augmented care areas** and only from outlets where water is obtained for clinical purposes i.e. ingestion, patient bathing or other clinical procedures in NHS Lothian with specific reference to Total Viable Counts (TVC).

It provides guidance on actions required in response to elevated counts to mitigate risk to patients in **the absence of any clinical infection concerns** associated with water exposure.

Investigation, additional sampling and remedial actions required in response to any hospital acquired infections (HAI) or any TVC testing that is done as part of commission of a new build or refurbishment would be subject to a new procedure therefore is out of scope of this document and would be guided by collaborative discussion with clinical management team whose service uses the area, infection prevention and control and a consultant microbiologist. Staff should refer to the NHS Lothian guidance for the investigation and management of possible water related infections.

NHS Lothian performs surveillance of Total Viable Counts (TVC) in water outlets in augmented care areas as part of the maintenance of a safe patient environment for critically ill or vulnerable patients (where tap water may be used for a variety of clinical purposes). This is to prevent hospital acquired infections from water associated environmental micro-organisms. Chapter 3 of the National Infection Prevention and Control Manual (NIPCM) currently advises that, on investigation of an HAI in an augmented care area, due to such water related environmental micro-organisms that an assessment of TVC levels should be undertaken. By performing surveillance of TVCs in augmented care there is baseline data and an understanding of water quality from outlets should they become the subject of an investigation into HAIs in the unit as well as providing opportunity for intervention to improve water quality and prevent HAIs should they be found to be consistently high on surveillance testing.

## 2. Measures to Maintain Good Quality Water in Augmented Care Areas

- When TVCs are found to be significantly raised, the most probable explanation is that there is an issue at the outlet itself. There are several root causes that could be working in combination to result in poorer quality water, and each should be reviewed and explored:
- Is the outlet being used? If it is being used, how often is it used on a daily basis? If the outlet has a low throughput of water, then there is more time for organisms to grow and proliferate at the level of the tap/shower. (This is why a **post flush** sample should be used for TVC assessment.) A review of the usage of the outlet should be undertaken in conjunction with the clinical service team to identify why the outlet is not being used. This may be due to bed closures or outlet inaccessibility and a decision should be made as to whether the outlet should be retained with more flushing or removed.

- Is the outlet being cleaned and maintained? Any residue accumulating at the outlet will enhance growth of micro-organisms and lead to water contamination. If the outlet shows evidence of degradation, swarf, or low flow rates, it may need replaced to improve the water quality. If it is in good condition it may require chemical disinfection as per SHTM 04-01 Part C. A review that the outlet cleaning frequency and methodology is appropriate should also be undertaken.
- Are water temperatures within the expected ranges? Micro-organisms will generally grow best at temperatures close to body temperature. Outlets which discharge “blended” water to minimise scalding risk are at particular risk of facilitating growth of *Pseudomonas aeruginosa* and other similar organisms which form a TVC count. **It may not be possible and may not be necessary to achieve very low TVC counts from such blended outlets depending on how the water is being used.** If such outlets have persisting raised TVCs despite applying measures to reduce them, then there should be discussion with clinical users of the water, IPCT, microbiology and estates team regarding further options which might include review of whether blended water is required, whether water for clinical care can be obtained from a non-blended outlet, patient vulnerability if exposed to water related environmental organisms (e.g. multiple skin breaches from wounds, burns or devices), whether there have been HAIs detected with a possible water link etc. **Point of Use filters may be considered but should be a last resort with the intention of being a short-term measure while awaiting a more definitive intervention.** Point of use filters are not a long-term solution to compensate for design limitations within the plumbing or infrequent use of the outlet.

**Note any corrective plumbing work to be performed on outlets will require completion of a HAI Scribe document in advance of the work starting. The nature of the work intended in an augmented care area will create clinical risk to patients and so the HAI Scribe must have the input of the charge nurse (or deputy) with responsibility for the clinical area and the Infection Prevention and Control Team before any work starts.**

Neither currently recognised operational guidance (SHTM 04-01) or advisory bodies (NHS Assure) in Scotland provide information or guidance on appropriate actions or control measures to reduce the infection risk when elevated TVCs are detected, or appropriate remedial actions to either control or remove the contamination. The purpose of this document is to provide **interim** guidance to facilities management teams working with properties with augmented care areas in NHS Lothian who undertake surveillance sampling, until such time as clearer national guidance is issued. The guidance set out here is derived principally from the experience gained from previous water quality investigations and reflects control strategies agreed at various water safety meetings or incident meetings involving Estates, IP&C, Clinical Leads and other stakeholders.

### 3. Significance of Raised TVC Results

There are currently no defined TVC threshold levels that indicate when water is unsafe in a healthcare setting. Previous TVC thresholds advised by WHO relate to a drinking water standard. In augmented care areas though the clinical risk from water is not primarily from ingestion of water but from exposure to a microbiological hazard by vulnerable patients or entry of micro-organisms within the water to body cavities which should be sterile, leading to significant infections e.g. bloodstream infections or device related infections that may be difficult to treat and may be life threatening. Such patient infections can arise from exposure to micro-organisms at lower levels than the threshold used to assess drinking water quality so as a minimum standard it is intuitive to aim to achieve a drinking water standard from non-blended, cold-water outlets. The previous WHO standard for drinking water was 10 cfu/ml at 37°C culture and 100cfu/ml at 22°C culture. It is recognised that these levels may not be achievable from blended outlets where the goal should be to consistently achieve consistent results as low as possible and monitor the trend in TVC. If the trend remains static the next step will be for the clinical team, IPCT and consultant microbiologist to review how water is used from the affected outlet to reach a position of a mitigated and monitored microbiological hazard. If there is evidence of rising TVCs when previously they have been stable and lower, then further investigatory work and corrective plumbing work will be required to understand why there has been a change and reverse the increase. Similarly, if patients are identified as having developed HAIs from water related organisms in proximity to outlets with raised TVCs from cold, hot or blended water outlets further investigation and clinical risk mitigation measures will be required and likely guided by collaborative, multi-stakeholder incident management teams.

### 4. Sampling Methodology – Augmented Care Only

- Outlets within the augmented areas will be sampled 6 monthly for both *Pseudomonas aeruginosa* and TVC within the augmented areas. Such testing is only required from outlets where the water is used for the delivery of clinical care. For each augmented care area, a plan of which outlets are “in scope” for this testing should be agreed in advance by the charge nurse with responsibility for the area, facilities management team, infection prevention and control team and a consultant microbiologist to avoid unnecessary testing. Outlets with a history of delivering poor water quality should not be missed. It is important to establish before testing which outlets have water supplied via Thermostatic Mixing Valves i.e. blended water to assist interpretation of the TVC count.
- The samples for TVC’s must only be **Post-flush** (i.e. flushed for at least 2 minutes prior to collection) into an approved container provided by an analysing laboratory.
- The samples will be taken by the appointed NHS Lothian supply partner following agreed sampling methodologies aligned to the process described in SHTM 04-01 Part C.
- The samples should be delivered to the (UKAS Accredited) analysing laboratory within 4 hours of the sample taken; the sample shall be refrigerated until received by the laboratory.
- Reactive sampling can be arranged on request if there is concern either by users of the water regarding taste or smell of the water or IPCT when investigating HAIs.

## 5. Action Level for TVCs when there is no clinical infection concerns

TVC @ 37°C		TVC @ 22°C		Action
Cold/Untempered Hot (cfu/ml)	Blended Water (cfu/ml)	Cold/Untempered Hot (cfu/ml)	Blended Water (cfu/ml)	
<b>&lt;10</b>	<b>&lt;200 but as low as possible</b>	<b>&lt;100</b>	<b>&lt;500 but as low as possible</b>	Continue monitoring to assess trends over time. Alert IPCT and charge nurse to which blended outlets have counts between 10-200 cfu/ml @ 37°C and 100-500@ 22°C.
<b>&gt;10 &lt;500</b>	<b>&gt;200 &lt;600</b>	<b>&gt; 100 &lt;500</b>	<b>&gt;500 &lt;750</b>	Alert IPCT and charge nurse within 24 hours as to which outlets are in this category. Increase to daily flushing, Retest after 3 days
<b>&gt;500 &lt;1000</b>	<b>&gt;600 &lt;1000</b>	<b>&gt;500 &lt;1000</b>	<b>&gt;750 &lt;1000</b>	Alert IPCT and charge nurse as to which outlets are in this category within 24 hours. Compile HAIScribe tailored to the clinical risks in the area. Once HAI Scribe approved, Strip Down outlet, Disinfect/ Replace as per SHTM 04-01 Part C and retest after 3 days
<b>&gt;1000</b>	<b>&gt;1000</b>	<b>&gt;1000</b>	<b>&gt;1000</b>	Alert IPCT and charge nurse as to which outlets are in this category within 24 hours. Compile HAIScribe tailored to the clinical risks in the area which outlines the nature of the corrective plumbing work that is intended and the timeframe for such work  Point of Use Filter Required *to mitigate risk while HAIScribe is being reviewed for approval.

\*Point of Use Filter Required where outlet tested is in a pre-determined Clinical Area only.

## 6. Return to service after elevated TVCs

- Facilities management team will confirm and demonstrate completion of remedial actions aligned within Table 4. This shall include checking of water temperatures, dismantling and cleaning of the outlet, thermal disinfection, chemical disinfection, or other corrective plumbing including possible replacement of the affected outlet and potential point of use filter installation.
- On completion of all remediation works, within the impacted outlets repeat sampling will be taken and results shared and recorded.
- If thermal or chemical disinfection was performed, re-sampling should not be taken any sooner than three days after disinfection.
- TVC results from 3 time points taken a minimum of 7 days apart (to establish a trend) will be obtained and a multistakeholder discussion between ward clinical team, IPCT, consultant microbiologist and estates team take place as to whether all aspects of water quality have been achieved.
- If POU filters are used, the manufacturer’s instruction for use must be followed for the type of POU filter in place. Of note the date the POU filter was attached should be clearly marked on the filter and clinical teams and domestic teams should be made aware of how to use and clean them safely.
- A register of POU filter locations must be implemented and shared with IPCT and Clinical areas. The register will confirm the filter type, lifecycle of filter, date attached and engineer details. Date attached must also be printed on the filter for local ID use.
- In the event of the POU filter being removed for any reason, it shall be replaced with new filter and the register updated as per manufacturer’s instructions.

## 7. Augmented Care List

St John’s Hospital	ITU (Red) SCBU Renal Dialysis Unit Wallace Burns Unit Edinburgh Cancer Centre Ward 20 (Green ITU)
Western General Hospital	Ward 2 (CAU) Ward 1 Ward 3 Ward 4 Ward 6 Ward 11 Ward 20 Ward 52

	<p>Ward 54  Ward 58  Ward 58  Satellite Renal dialysis Unit  Dermatology (ward75)(RVB)Ward 15  Ward 7  Ward 8</p>
Royal Infirmary Edinburgh	<p>Labour Ward  Neonatal (110)  Ward 111  Ward 112  Ward 114  Ward 116  Ward 117  Ward 118  Ward 204  Ward 206  Ward 206 Transplant  Ward 215  Renal Dialysis Unit</p>
RHCYP/DCN	<p>Ward 230 (Neurosurgery) – L2  Dalhousie Ward (Paediatric Medical In Patient) –C11  Lochranza Ward (Paediatric Haematology – Oncology  Borthwick Ward (Paediatric Neurosurgery)  Dunvegan Ward (Burns and Plastic inpatient)  Paediatric Critical Care &amp; Intensive Care (including Neonatal Unit)  OPD 12 – Plastic Dressing Clinic  Ward30 (DCN Acute Care)  Clinical Research Facility</p>

Note: The Augmented Care sampling programme is on a 6 month basis, where all outlets are sampled for *Pseudomonas aeruginosa*.

## 8. Associated Documents

NHSL - Water Safety Management Policy

NHSL – Facilities Water Safety Assurance Procedure SOP

NHSL – Water Safety Plan

**SHTM 04-01** – Water Safety for Healthcare Premises.



**HSE L8** – Legionnaires’ Disease – The control of legionella bacteria in water systems.

**HSG274** – Legionnaires’ disease – Technical guidance

**Health Protection Scotland** – Guidance for high risk unit in Scotland to minimise the Risk of Pseudomonas aeruginosa infection from water.

## 9. Review

Document to be reviewed whenever any relevant changes in legislation or local policies and procedures occur.

## 10. Contact List

### Contact List for Augmented Care & Area Managers

Area Manager – West Lothian	<a href="mailto:Robert.stewart8@nhslothian.scot.nhs.uk">Robert.stewart8@nhslothian.scot.nhs.uk</a>	07977 287050
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