

<b>Water Quality Management Policy (including Legionella and Pseudomonas aeruginosa and other opportunistic pathogens).</b>	<b>Type:</b> <b>Register No:</b> <b>Status:</b>	<b>Policy</b> <b>09038</b> <b>Public</b>
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<b>Consulted With</b>	<b>Post/Committee/Group</b>	<b>Date</b>
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## 1.0 Purpose

- 1.1 Mid Essex Hospitals Services NHS Trust (the Trust) has responsibility under the Health and Safety at Work Act 1974 and the Control of Substances Hazardous to Health Regulations 2002 (as amended), to take all reasonable precautions to prevent or control the harmful effects of contaminated water (i.e. Legionella and Pseudomonas aeruginosa) to patients, staff and other persons working at or using its premises.
- 1.2 The purpose of this policy is to ensure that adequate and appropriate systems and procedures are in place to provide, manage and maintain water supplies and systems as required for patient and medical use at the Trust in accordance with statutory requirements - ACOP L8 (4<sup>th</sup> edition 2013) and HTM 04-0 and addendums.

## 2.0 Background and Introduction

- 2.1 “Legionnaires disease” is a potentially fatal form of pneumonia which can affect anybody, but which principally affects those who are susceptible because of age, illness, immunosuppression, etc. It is caused by the bacterium “**Legionella pneumophila**” and related bacteria. Legionella bacteria can also cause less serious illnesses which are not fatal or permanently debilitating. The collective term used to cover the group of diseases caused by Legionella bacteria is “**Legionellosis**”.
- 2.2 Pseudomonas aeruginosa is a Gram-negative bacterium, commonly found in wet or moist environments. It is commonly associated with disease in humans with the potential to cause infections in almost any organ or tissue, especially in patients compromised by underlying disease, age or immune deficiency. Its significance as a pathogen is exacerbated by its resistance to antibiotics, virulence factors and its ability to adapt to a wide range of environments.
- 2.3 The aim of this Policy is to introduce to the Trust, a structured procedure and reporting schedule, for the management of water supplies and the control of Legionellosis including Legionnaires’ Disease and Pseudomonas aeruginosa in compliance with current guidelines - HTM’s and Model Engineering Specifications, the Approved Code of Practice (ACoP) L8, Guidance HSG 274 and any other relevant legislation.
- 2.4 The Trust regards health and safety as matters of prime importance which are to be given an equal priority with other business and operating objectives. As such, the Trust will ensure, so far as is reasonably practically possible, that the safety of employees at work, patients and other persons are not adversely affected, by any of the Trust’s operational activities. The Trust as an employer, so far as is reasonably practicable, will comply with its legal duties and responsibilities for the control of legionellosis throughout its premises.
- 2.5 The Trust is committed to the safe operation and control strategies of all the water and ventilation systems for which it has a responsibility by implementing the recommendations of:
  - the HSE document Legionnaires disease: the control of legionella bacteria in water systems ACOP and guidance of regulations 4<sup>th</sup> edition 2013
  - the Health Technical Memorandum 04-01: The Control of Legionella hygiene, “safe” hot water, cold water and drinking water systems (be it part A: Design,

installation and testing or part B: Operational management, for Healthcare Premises and addendums).

- 2.6 The Trust will continue to promote and develop a proactive safety regime by providing information, training and instruction for employees who are required to repair, service, maintain or clean water distribution systems and ventilation systems where the legionella and pseudomonas bacteria might be present.
- 2.7 The policy effectiveness requires comprehensive procedures being written and adopted dealing with the design, operation and maintenance and cleaning of water and ventilation systems. It is recognised that the methods of controlling legionella and pseudomonas can vary from site to site depending on the circumstances encountered. Any written procedure shall take into account any considerations required dependent on the findings at individual sites.

### **3.0 Scope**

- 3.1 This policy applies to all Trust premises and the guidance and procedures contained therein should be applied where reasonably practicable to non NHS community premises where NHS services are delivered.
- 3.2 This policy applies to all the Trust sites:
- Broomfield Hospital
  - St Peter's Hospital
  - Fairfield Centre
  - Braintree Community Hospital
  - St Michaels Birthing Unit
- 3.3 This policy is also applicable to all staff and independent contractors working in and on the Trust properties.

### **4.0 Roles & Responsibilities**

- 4.1 The approach used in HTM04-01 is to identify the designated staff functions of key personnel involved in the operation, maintenance and infection control of water systems in respect to water quality. The titles are therefore generic and describe the individual's role in connection with legionella and pseudomonas management, but are not intended to be prescriptive titles for terms of employment.
- 4.2 A person intending to fulfill any of the staff functions should be able to prove that they possess sufficient skills, knowledge and experience to be able to perform safely the designated tasks.
- 4.3 The Trust Water Quality Management Structure is identified in Appendix 5.

### **4.4 Management**

Management is defined as the owner, occupier, employer, general manager, chief executive or other person who is ultimately accountable for the safe operation of healthcare premises.

#### 4.5 Executive Director of Strategy & Corporate Services

- The Executive Director of Strategy & Corporate Services is the Executive Director responsible for the Trust's health and safety and will implement and ensure that trust's premises comply with all statutory requirements
- The Executive Director of Strategy & Corporate Services retains ultimate responsibility, including allocation of resources and the appointment of personnel within the Trust, for the implementation of this Legionella Management Policy
- Functional responsibilities are delegated by the Executive Director of Strategy & Corporate Services to persons who may be involved in the use, installation and maintenance of water and ventilation systems. The extent of this delegation is set out below

#### 4.6 Director of Infection Prevention Control (DIPC)/Infection Control Officer

- The Director of Infection Prevention Control (DIPC), Infection Control Officer, or Consultant Microbiologist, if not the same person, is the person nominated by management to advise on infection control policy and to have responsibility for the maintenance of water quality.
- The policy is accepted by the DIPC who must agree any amendment to this policy.

#### 4.7 Responsible Person (Water)

4.7.1 A Responsible Person (Water), possessing adequate professional knowledge and with appropriate training, is appointed in writing by management to devise and manage the necessary procedures to ensure that the quality of water in healthcare premises is maintained. The Responsible Person is required to liaise closely with other professionals in various disciplines. In addition, the Responsible Person possesses a thorough knowledge of the control of *Legionella* .

4.7.2 This role, in association with the Infection Control Officer and maintenance staff, involves:

- advising on the potential areas of risk and identifying where systems do not adhere to this guidance
- liaising with the water undertakers and environmental health departments and advising on the continuing procedures necessary to ensure acceptable water quality
- monitoring the implementation and efficacy of those procedures
- approving and identifying any changes to those procedures
- ensuring equipment that is to be permanently connected to the water supply is properly installed; and
- ensuring that adequate operating and maintenance instructions exist and adequate records are kept.

4.7.3 Implementation of an effective maintenance policy must incorporate the preparation of fully detailed operating and maintenance documentation and the introduction of a logbook system. The Responsible Person should appoint a deputy to whom delegated responsibilities may be given. The deputy should act for the Responsible Person on all occasions when the nominated person is unavailable.

- 4.7.4 The Responsible Person should be fully conversant with the design principles and requirements of water systems and should be fully briefed in respect of the cause and effect of water-borne organisms, for example *Legionella pneumophila*. The appointment of an engineer is appropriate in that the role can extend to the operation and maintenance of associated plant. It is recognised that the Responsible Person cannot be an expert on all matters and must be supported by specialists in specific subjects such as water treatment and microbiology, but he/she must undertake responsibility for calling upon and coordinating the activities of such specialists.
- 4.7.5 The Responsible Person should be aware that manufacturers, importers, suppliers, installers and service providers have specific responsibilities that are set out in the Health and Safety Commission's (2013) Approved Code of Practice L8.

#### 4.8 **Maintenance Technician**

A maintenance technician is someone who has sufficient technical knowledge and the experience necessary to carry out maintenance and routine testing of the water, storage and distribution system. This role is provided by contract personnel at the Trust.

#### 4.9 **Tradesperson**

A tradesperson is someone who is appointed in writing by the Responsible Person to carry out, under the control of the maintenance technician work on the water, storage and distribution system. This role is provided by contract personnel at the Trust.

#### 4.10 **Installer**

An installer is the person or organisation responsible for the provision of the water, storage and distribution system.

#### 4.11 **Contractor**

A contractor is the person or organisation designated by management to be responsible for the supply, installation, validation and verification of hot and cold water services, and for the conduct of the installation checks and tests. In relation to the control of *Legionella*, it is essential to ensure that potential contractors have suitable qualifications (for example companies/individuals who are members of the Legionella Control Association).

#### 4.12 **Contract Supervising Officer**

The person nominated by the management to witness tests and checks under the terms of the contract. He/she should have specialist knowledge, training and experience of hot and cold water supply, storage and mains services.

#### 4.13 **Infection Prevention & Control Team**

The Infection Prevention & Control Team advise on the clinical aspects of this policy and are involved in the production and implementation of procedures for the control of legionella and pseudomonas aeruginosa in clinical areas. The

Infection Prevention & Control Team are advised of, and have input to, periodic audits of the water quality management system.

#### 4.14 All Managers

All managers must inform the Estate Department when areas are to lie vacant for more than 5 working days. This will allow the Estates Department to take some action in respect to the required legionella precautions. Where longer periods of this are envisaged the areas will be shut down. However, it is imperative that **ALL** managers report this in a timely manner.

### 5.0 Statutory Requirements

5.1 It is the responsibility of the owners and occupiers of premises, general managers and Chief Executive, to ensure that their premises and the activities carried out within them comply with all statutes.

5.2 The following - whilst not exhaustive, are the main and most important statutory requirements relevant to Legionella and current in October 2012. (Users must also check for more recent new publications or updates to those quoted here).

- Health & Safety at Work etc. Act 1974
- HSE Legionnaires' disease; The control of Legionella bacteria in water systems - ACoP L8
- Management of Health and Safety at Work Regulations 1999
- Public Health (Infectious Diseases) Regulations 1988
- Water Supply (Water Quality) Regulations 2000 (Amendment Regulations) 2007
- Food Safety Act 1990
- Water Supply (Water Fittings) Regulations 1999
- Workplace (Health, Safety and Welfare) Regulations 1992
- Provision and Use of Work Equipment Regulations 1998
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
- Personal Protective Equipment at Work Regulations 1992
- Control of Substances hazardous to Health (COSHH) Regulations 2002
- HSE EH40/2005 Workplace exposure limits
- Pressure Systems Safety Regulations 2000
- Manual Handling Operation Regulations 1992
- British Standards

#### 5.3 Health & Safety at Work etc. Act 1974

Employers have a general duty under this Act, so far as is reasonably practicable, to ensure the health, safety and welfare of their employees, residents and visitors to their premises. These duties are legally enforceable and the Health & Safety Executive have successfully prosecuted occupiers of premises under this statute. It is incumbent upon both owners and occupiers of premises to ensure that there is a management regime for the proper design, installation and operational management of plant, equipment and systems.

#### 5.4 HSE Legionnaires' disease; The control of Legionella bacteria in water systems - ACoP L8

5.4.1 This code applies to the risk from Legionella bacteria (the causative agent of legionellosis including Legionnaires' disease) in circumstances where the Health and Safety at Work etc. Act 1974 applies.

5.4.2 To comply with their legal duties, employers and those with responsibilities for the control of premises should:

- identify and assess sources of risk - this includes checking whether conditions are present which will encourage bacteria to multiply, e.g. is the water temperature between 20-45°C; there is a means of creating and disseminating breathable droplets, e.g. the aerosol created by a shower or cooling tower; and if there are susceptible people who may be exposed to the contaminated aerosols
- prepare a scheme for preventing or controlling the risk
- implement, manage and monitor precautions - if control measures are to remain effective, then regular monitoring of the systems and the control measures are essential. Monitoring of general bacterial numbers can indicate whether microbiological control is being achieved. Sampling for legionellosis another means of checking that a system is under control
- keep records of the precautions
- appoint a person to be managerially responsible
- The Code and guidance also set out the responsibilities of suppliers of services such as water treatment and maintenance as well as the responsibilities of manufacturers, importers, suppliers and installers.

## 5.5 Management of Health and Safety at Work Regulations 1999

The core requirements of the regulations are that employers make a systematic assessment of risks in relation to the health and safety of their employees and others arising from work activities.

## 5.6 Public Health (Infectious Diseases) Regulations 1988

The Public Health (Infectious Diseases) Regulations 1988 require that a properly appointed officer shall inform the Chief Medical Officer for England or for Wales, as the case may be, of any serious outbreak of any disease that to his/her knowledge has occurred in the district.

**Note:** the Health and Safety Commission's (2000) Approved Code of Practice L8 (see paragraph 2.1) contains further advice and guidance on communication and co-operation with the consultant in communicable disease control (CCDC), and arrangements for support of the CCDC and for him to have access to provider units, including NHS Trusts.

## **5.7 Water Supply (Water Quality) Regulations 2001**

The Water Supply (Water Quality) Regulations 2001 apply to water supplied to any hospital which is used for domestic purposes such as drinking, washing or cooking. Two additional sources of advice on drinking water quality are:

- the director of public health;
- the World Health Organization's (1993) 'Guidelines for drinking water quality'.

The Private Water Supplies Regulations 1991 cover private water supplies such as boreholes and wells.

## **5.8 Food Safety Act 1990**

The Food Safety Act 1990 covers water used for food preparation or food manufacture and also includes water used for drinking. The Food Safety (Temperature Control) Regulations 1995 and the Food Safety (General Food Hygiene) Regulations 1995 are also relevant.

## **5.9 Water Supply (Water Fittings) Regulations 1999**

The water undertaker responsible for water supply has a statutory duty to enforce the Regulations for the prevention of waste, undue consumption, misuse and contamination of water supplied in its area. In 1999 the Water Supply (Water Fittings) Regulations came into effect. These Regulations are set out – along with the Department for Environment, Food and Rural Affairs' (Defra) guidance on the Regulations and the water industry's recommendations for fulfilling these provisions – in the 'Water Regulations Guide' published by the Water Regulations Advisory Scheme ('WRAS'). WRAS provides advice on water fittings regulations on a national basis and administers the scheme, which tests and lists water fittings and materials for compliance with the Regulations. The 'Water Fittings and Materials Directory' contains information on suitable fittings and materials and is updated every six months.

## **5.10 Workplace (Health, Safety and Welfare) Regulations 1992**

Most of these regulations are to ensure a safe physical working environment, for example adequate lighting, ventilation, space to perform maintenance tasks and adequate access routes.

## **5.11 Provision and Use of Work Equipment Regulations 1998**

The aim of these regulations is to ensure safe work equipment and safety in its use. It includes "any machine, appliance, apparatus or tool", and clearly covers domestic hot and cold water pipeline installations and equipment. It applies to all equipment for use from 1 January 1993.

## **5.12 Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013**

The regulations (RIDDOR) impose duties to report accidents resulting in death or major injury. For example, exposure of patients to the legionellosis bacteria arising from a pipeline, spray, shower, tap or whatever hazard(s).

### **5.13 Personal Protective Equipment at Work Regulations 1992**

Managers should assess the risk associated with the operation of water systems, be they hot or cold water for example the provision of gloves for handling liquid samples into containers and eye and other protection.

### **5.14 Control of Substances hazardous to Health (COSHH) Regulations 2002**

Used in conjunction with the HSE EH40/2005 Workplace Exposure Limits these regulations apply to substances that have been classified as being very toxic, toxic, harmful, corrosive or irritant. Specific duties are placed upon employers and employees in relation to these substances.

The specific responsibilities for employers include assessment, protection and control, monitoring, health surveillance and information and training.

The COSHH regulations apply to water system(s) in that inhalation of legionellosis bacteria may occur and it is the manager's responsibility to ensure that a proper system of assessment, protection and monitoring is implemented in order to comply with the regulations. "Risk assessment – control of exposure to possible toxic/harmful agents" and both the 'Design and Operational considerations' of the HTM 04 in respect of these possibilities should be implemented as a matter of priority.

### **5.15 Pressure Systems Safety Regulations 2000**

5.15.1 These regulations apply to all steam systems and systems in which the pressure exceeds 0.5 bar g; they therefore can apply to water systems - calorifiers.

5.15.2 Where existing plant and systems are operating satisfactorily and can be shown to be in a safe condition, then only minor changes may be required in order to comply with the overall objective of the strategy within this policy. This will be the case where the water systems comply with the recommendations in this document.

5.15.3 The regulations define and extend the role of a "competent person". The competent person is required to draw up or to certify a written scheme of examination. This should cover the whole of the water system, not merely the pressure vessel(s).

5.15.4 A written scheme of examination as specified by the 'Pressure Systems Regulations 2000 and Transportable Gas Containers Regulations 1991 should be drawn up for all pressurised water systems. For new installations the consulting engineers may prepare the written scheme. An appropriate competent person should implement the written scheme and carry out the examinations required. For pressure vessels, this would normally be carried out by an appropriate insurance company with specialist expertise in this field.

### **5.16 Manual Handling Operation Regulations 1992**

- These regulations impose health and safety requirements with respect to handling loads by human effort.
- They apply to the handling of pipework during cutting and blanking off or the

installation operations of pipework and valves etc. The mass of the load handled is not the only source of risk, the temperature and other factors during removal or installation should also be taken into account.

- Management is responsible for assessing all the risks to avoid injury.

## 5.17 British Standards

- BS EN 806: Specifications for installations inside buildings conveying water for human consumption
- BS 1710:1984 is the British Standard specification for identification of pipelines and services.

## 6.0 Operational System

### 6.1 Risk Assessment: Legionella

6.1.1 A suitable and sufficient assessment is maintained to identify and assess the risk of exposure to Legionella bacteria from work activities and water systems on the premises and any necessary precautionary measures. The assessment is carried out by or on behalf of:

- the employer, where the risk from their undertaking is to their employees or to others; or
- the person who is in control of premises or systems in connection with work where the risk is present from systems in the building (e.g. where a building is let to tenants but the landlord retains responsibility for its maintenance)

6.1.2 The risk assessment will assess sources of risk. This includes checking whether conditions are present which will encourage bacteria to multiply. A number of factors are required to create a risk of acquiring legionellosis, including, but not limited to:

- the presence of legionellosis bacteria;
- conditions suitable for multiplication of the organisms e.g. suitable temperature (20°C-45°C) and a source of nutrients e.g. sludge, scale, rust, algae and other organic matter;
- a means of creating and disseminating breathable droplets e.g. the aerosol generated by a cooling tower or shower; and
- the presence (and numbers) of people who may be exposed, especially in premises where occupants are particularly vulnerable, such as patients in hospitals.

6.1.3 As part of the risk assessment process in complex systems or premises, a site survey of all the water systems is carried out and includes an asset register of all associated plant, pumps, strainers and other relevant items. This includes an up-to-date schematic drawing/diagram showing the layout of the plant or system, including parts temporarily out of use.

6.1.4 Where a risk of bacteria contamination is established, work shall be carried out immediately to decontaminate the system by a specialist Contractor who shall provide evidence of decontamination by means of certification.

- 6.1.5 Where the assessment demonstrates that there is no reasonably foreseeable risk or that risks are insignificant and unlikely to increase, no further assessment or measures are necessary. However, should the situation change, the assessment needs to be reviewed and any necessary changes implemented.
- 6.1.6 Any moderate or high risk that is deemed impossible or impractical to manage by the Estates and Facilities directorate, then the Executive Management team must be notified. This must also be reported to the Health and Safety Group and the risk included in the relevant Risk Assurance Framework.
- 6.1.7 The assessment is reviewed regularly and, whenever there is reason to believe that the original assessment may no longer be valid.
- 6.1.8 The Trust is required to consult employees on the identified risks of exposure to legionellosis bacteria (deemed a significant risk) if identified in their work areas whilst measures are undertaken to control the risk. The employees should be given an opportunity to comment on the assessment and control measures and the Estates department has to take account of these views.
- 6.1.9 This policy sets out the procedures to be followed in the event of an emergency.

## **6.2 Prevention**

- 6.2.1 Where the assessment shows that there is a reasonably foreseeable risk, the use of water systems, parts of water systems or systems of work that lead to exposure has to be avoided so far as is reasonably practicable.
- 6.2.2 Where this is not reasonably practicable, there is a written scheme for controlling the risk from exposure which is implemented and properly managed. The scheme specifies measures to be taken to ensure that it remains effective. The scheme includes:
- an up-to-date plan showing layout of the plant or system, including parts temporarily out of use (a schematic plan would suffice);
  - a description of the correct and safe operation of the system;
  - the precautions to be taken;
  - checks to be carried out to ensure efficacy of scheme and the frequency of such checks; and
  - remedial action to be taken in the event that the scheme is shown not to be effective
- 6.2.3 For legionellosis bacteria to develop there must be a number of connected circumstances to exist. To break the connection and reduce the risk of legionellosis, strict procedures for management of the water supply are essential. Simple precautions, listed below, form the basis for the control of legionellosis bacteria growth in Trust premises.
- All taps and outlets and associated pipe work which are not needed, due to disuse or underuse, shall be removed as far back to the main pipework runs as is possible to avoid any dead legs remaining in situ with the risk of the content of any water.
  - Hot water from calorifiers shall be maintained at or above 60°C and water in the

- circulation pipe work and return to the calorifiers will not fall below 55°C.
- Pipe work carrying blended water shall be kept under a maximum length of 2 metres.
  - Dead legs and spurs from the main hot water circulation system shall be kept as reasonably short as possible, but under a maximum length of 3 metres.
  - Water stagnation shall be avoided and systems flushed on a regular basis in accordance with HTM 04 or more regularly if required.
  - Regular planned preventative maintenance shall be carried out on all systems.
  - Storage tanks and cisterns shall be kept clean and sealed from extraneous matter and maintained at a temperature at and/or below 20°C.
  - Where maintenance involves the draining of water systems, disinfection and cleaning of the system shall take place before the system is returned to operation.
  - Where systems are known to be of uncertain quality or where consistent problems have been identified, additional water treatment measures may be necessary.
  - Where areas are closed for more than 5 working days, the Responsible Person (Water) should be notified and twice weekly flushing shall be maintained by the Estates department until the area re-opens or the system is drained and/or isolated as far back to the main pipework runs as is possible to avoid any dead legs remaining in situ with the risk of the content of any water.

6.2.4 In addition to this the Trust will undertake further proactive measures to ensure a greater level of control by periodically sampling water and testing for general bacterial numbers (viable count). Additional testing will include:

- Water sample testing from where water is distributed to - any faucets (taps), showers, kitchens, bathrooms etc. Samples will also be collected from the main water tanks and main supply.

6.2.5 This routine sampling is undertaken by a specialist appointed contractor and the samples are assessed by an approved specialist who will establish levels of any variant forms of the bacteria and required action to be taken by the Estates Department following their result(s). All results are logged into an event log and action plan as necessary.

6.2.6 Action will be defined as the necessary steps to be taken to ensure the levels of any legionellosis bacteria are taken routinely to ensure that the levels of bacteria are maintained within minimal risk limits.

6.2.7 Detection of legionellosis must be escalated using the Escalation Process for legionellosis identified in Appendix 2 and Appendix 6.

6.2.8 As part of the Trust Water Quality control measures Chlorine Dioxide dosing is utilised at the Broomfield Retained Estate and at St Peters.

- 6.2.9 Chlorine Dioxide (ClO<sub>2</sub>) levels are maintained at a maximum level of 0.5mg/l ClO<sub>2</sub> as prescribed in ACOP L8. It is important to recognise that these are recommendations for operational levels of ClO<sub>2</sub>. This maximum level and site monitored ClO<sub>2</sub> levels are measured in mg/l and must be converted (divided by a factor of 1000) to compare with maximum recommended levels noted below and hence the maximum ClO<sub>2</sub> level as prescribed in ACOP L8 and the level to which the Trust operates to is 0.0005mg/m<sup>3</sup>.
- 6.2.10 For the purposes of guidance for safe maximum levels the HSE EH40/2005 Workplace Exposure Limits (forming part of the Control of Substances Hazardous to Health (COSHH) Regulations 2002) gives maximum exposure limits for Chlorine Dioxide as 0.28 mg/m<sup>3</sup> for Long Term (8hr) exposure and 0.84 mg/m<sup>3</sup> for short term (15 minute) exposure. Further to this the World Health Organisation Report (World Health Organisation Concise International Chemical Assessment Document 37 Pub 2002) states that for Oral Exposure: "The available measured occupational exposure data (in the United Kingdom) and the exposure levels predicted using the Estimation and Assessment of Substance Exposure model indicate a maximum likely exposure of 0.1 ppm (0.28 mg/m<sup>3</sup>), 8-h TWA. Comparison of this exposure level with the no-observed-adverse effect level (NOAEL), which is derived from very limited data, suggests that there is no cause for concern in relation to the development of irritation of the respiratory tract or of the eyes in workers occupationally exposed to chlorine dioxide."

### 6.3 Clinical Control/Ward Measures for Legionella

- 6.3.1 **Admission of known or suspected case:** No special precautions are required when a known or suspected case of Legionella is admitted to Trust hospitals. Legionella is not transmitted by patient-to-patient contact.
- 6.3.2 **Case reported after admission:** The incubation period for Legionella pneumonia is 2 – 10 days. Any case developing 2 days post admission is assumed to be hospital acquired unless investigations prove otherwise. In the event of a case of hospital acquired Legionella then this must be escalated to the Director for Infection Prevention and Control (DIPC) immediately and the following actions taken.
- A Datix incident report form must be completed.
  - A single case of Healthcare Associated Legionnaires Disease should be reported to the HSE via RIDDOR (Reporting of Injuries Diseases and Dangerous Occurrences Regulations 1995) by the Health & Safety Manager.
  - An outbreak of Legionnaires Disease is defined as two or more confirmed cases of infection occurring in the same locality within a six month period and will be escalated to the Health Protection Agency by the Director of Infection Prevention and Control.
- 6.3.3 **Isolation:** Cases of known or suspected Legionella pneumonia do not require isolation. No precautions other than standard hygiene precautions are required.
- 6.3.4 **Disposal of waste:** No precautions over those normally taken are required.
- 6.3.5 **Transfer of patients between departments:** There is no restriction on the transfer of patients with Legionella pneumonia within the hospital. However, as with other

transfers, the receiving ward should be informed of the current status of the patient. No patients will be transferred into the ward suspected of transmitting Legionnaires Disease until it is deemed safe to do so by the Director of Infection Prevention and Control (DIPC).

**6.3.6 Transfer of patients to other hospitals:** Transfer to other hospitals should not be restricted if clinical need requires it.

**6.3.7 Birthing Pools:** Trust birthing pools are as identified in Appendix 4 and are confirmed as being supplied through the fixed domestic hot and cold water services with no ancillary pumps and/or heaters. Birthing pools must be filled immediately before and drained after each use.

## **6.4 Outbreak Investigation**

6.4.1 Infection Prevention Team, Public Health and Environmental Health Officers will search for the source of the organism responsible for the infection. The Responsible Person (Water) will ensure that no draining or disinfecting takes place before samples have been taken. They will also give specialist information on the water supply system and indicate where samples can be taken. The investigation will concentrate on:

- The domestic hot water and cold water system distribution.
- Showers and spray washing equipment.
- Drainage systems and traps.
- Humidifiers and ventilation systems.
- Cooling coils in air supply systems.
- Fountains, sprinklers and water display equipment.
- Fire hose reels.

6.4.2 The Responsible Person (Water) must provide:

- Details of all associated equipment, location, technical information, operating maintenance, and spares information on all areas being investigated.
- A list and location of all medical equipment used for dental care and respiratory therapy.
- Information on any local excavations or earth moving work, alterations to water supply and drainage systems or any other factors which may have a bearing on the site.
- Details of cleaning, maintenance, modifications and all control measures taken.

6.4.3 The Director of Estates and Facilities Management will arrange to have any remedial work(s) deemed necessary to be carried out on any system which the investigation team feels is necessary and will represent the Trust with the DIPC if an outbreak requires it to be convened.

## **6.5 Risk Assessment: Pseudomonas aeruginosa**

6.5.1 To assist with understanding and mitigating risks associated with bacterial contamination of water distribution and supply systems and associated equipment, that

Trust has a water safety plan which provides a risk management approach to the microbiological safety of water usage, distribution and supply.

6.5.2 The risk assessment identifies potential microbiological hazards potential microbiological hazards caused by *Pseudomonas aeruginosa* and other opportunistic pathogens, and the hazardous events and risks that may arise during storage, delivery, and use of water in augmented care settings.

6.5.3 Potential hazards and hazardous events identified and the severity of risk are assessed so that priorities for risk management are established. The risk assessment considers the likelihood and severity hazards and hazardous events in the context of exposure (type, extent and frequency) and vulnerability of those exposed. Although many hazards may threaten water quality, not all will represent a high risk. The aim is to distinguish between high and low risks so that attention can be focused on mitigating risks that are more likely to cause harm to susceptible patients who are experiencing augmented care.

6.5.4 They identify actions to minimise these risks and ensure that appropriate sampling, monitoring and clinical surveillance arrangements are in place.

6.5.5 Risk assessments are led by the DIPC, a consultant microbiologist or the Infection Prevention & Control Team representative and consider:

- The susceptibility of patients from each type of water use (including ice);
- Scalding risks;
- Clinical practice where water may come into contact with patients and their invasive devices;
- The cleaning of patient equipment;
- The disposal of blood, body fluids and patients' wash water
- The maintenance and cleaning of wash-hand basins and associated taps, specialist baths and other water outlets;
- Change I use (for example, clinical are changed to office accommodation or vice versa) due to refurbishment or operational necessity;
- Other devices that increase/decrease the temperature of water (for example ice-making machines, water chillers) which may not be appropriate in augmented care settings;
- Engineering assessment of water systems including correct design installation, commissioning, maintenance and verification of the effectiveness of control measures (see also the Water Supply (Water Fittings) Regulations);
- Underused outlets;
- Flushing policy;
- The unnecessary use of flexible hoses and any containing inappropriate lining materials;
- Sampling, monitoring, and testing programme that needs to be put in place;
- The need for outlets at wash-hand basins that use sensor operation and TMVs (remote/integral); and
- Education and training.

6.5.6 The likelihood of hazardous events is influenced by the size and complexity of the water system and can be exacerbated by poor or over-complicated design, construction, commissioning, operation and maintenance.

6.5.7 When the risks have been identified, an action plan is developed with defined roles and responsibilities, and agreed timescales to minimise these risks. The action plan should include:

- Appropriate remedial actions, monitoring details and schedules for validation that show remedial actions are effective and subject to on-going verification. Completion dates should be defined; and
- Any training and competency issues required to ensure compliance with this guidance.

6.5.8 Detection of Pseudomonas must be escalated using the Escalation Process for Pseudomonas identified in Appendix 3 and appendix 7.

## **7.0 Permit to Work**

7.1 A permit-to-work must always be issued before any work is carried out on any of the water systems. The purpose of such a permit is to identify the work to be carried out and to provide documentary evidence that a system is only taken back into use when all tests have been satisfactorily completed.

7.2 The permit-to-work procedure is one of the responsibilities of the Estates department and **only** they can issue the permit to work on a system. The Responsible Person (Water), who has day-to-day responsibility for the control of water hygiene is responsible for the implementation of the permit-to-work procedure in accordance with the Trust's Contractors Permit to Work Policy and Control of Contractors Policy.

7.3 The permit-to-work procedure is applicable to the servicing, repair, alteration and extension of existing water systems throughout **all** the premises, and, any action, such as the closure of an isolating valve, which stops the supply. This means that permits should also be used before any major item of central plant, is isolated prior to servicing, repair or overhaul.

7.4 The permit will remain in force until the work is completed and the water system is taken back into use, in accordance with the procedure. The purpose of the permit issued under this permit-to-work system is to safeguard the integrity of the water system. It is not intended as a permit to protect the safety of staff.

7.5 In some cases there may be additional safety procedures to be followed under the Health and Safety at Work etc. Act 1974 or the Trust's safety policy or COSHH.

## **8.0 Systems Maintenance**

### **8.1 Maintenance Regime**

8.1.1 The Trust operates a Planned Preventative Maintenance Regime for regular maintenance duties through the use of internal directly employed staff and external contracted staff.

8.1.2 The Trust operates a Reactive Maintenance Regime for unplanned maintenance requirements through the use of internal directly employed staff and external contracted staff.

8.1.3 The Trust Maintenance regime ensures that water quality management of the Trust water installations and systems is maintained in accordance with the requirements of this policy and other relevant statutory requirements

## **8.2 Maintenance Responsibility**

8.2.1 This is the responsibility of the Senior Engineer (Maintenance) who is given responsibility for the maintenance requirements and adequate resources to carry it out. These responsibilities include:

- the provision of adequately trained and supervised manpower;
- clear definitions of the equipment and services to be maintained, together with the procedures to be carried out on them;
- monitoring of the quality of the work carried out to ensure that it is consistently acceptable;
- the implementation of financial control procedures.

## **8.3 Contract Maintenance**

8.3.1 The increasing complexity of building services equipment has resulted in a growing reliance on contractors for the provision of maintenance services. The decision to use either a contractor or in-house staff is taken in the light of local circumstances.

8.3.2 Contracts between the hospital/healthcare premises and service providers should clearly define the responsibilities of both parties.

8.3.4 When selecting subcontractors, particularly in relation to the control of *Legionella*, their competence should be established beforehand (for example companies/individuals who are members of the Legionella Control Association).

## **8.4 Maintenance Brief**

8.4.1 The Senior Engineer (Maintenance) requires a brief from the management that sets out in a clear and unambiguous manner the following requirements:

- scope of work
- budgeting – overall and single item limits
- level of reliability
- response time required to correct faults
- criteria for quality of service
- reporting procedure
- accountability and responsibility
- energy-saving policy
- health and safety policy
- environmental and sustainability factors

8.4.2 The above requirements are necessary regardless of whether the work is carried out by contractors or in-house staff.

## **8.5 Performance monitoring**

8.5.1 This involves the regular inspection of systems and records, which should be in such detail as to enable management to form an opinion regarding compliance with the agreed criteria.

8.5.2 If a contractor is commissioned to carry out maintenance and in-house expertise is not available to monitor their performance, an independent professional adviser should be retained to carry out this function. Using another maintenance contractor in a monitoring role could lead to a conflict of interest.

8.5.3 Performance monitoring should establish that:

- the required level of service is met
- all the required plant is being maintained
- system performance is being maintained (where water treatment is provided as part of the control strategy, it will be necessary to test for Legionella)
- maintenance is being carried out to the agreed standard
- correct replacement parts are being used
- the agreed spares stocks are being held on site
- records are being correctly maintained
- the agreed standards, number of staff, and number of visits are being achieved
- plant is being operated to achieve optimum energy usage
- health and safety requirements are being complied with
- only agreed subcontractors are being employed
- the client and typical users of the building are satisfied
- invoices accurately reflect the work carried out, including materials expended
- breakdowns do not occur too often
- adequate consideration is being given to the potential environmental impact of contractors' action, for example disposal of lubricants, chemicals, worn parts etc. that cannot be recycled.

## **8.6 Emergency Action**

8.6.1 Contingency plans are available in the event of the following:

- a power failure causing failure to maintain temperature in calorifiers or affecting distribution/circulating pumps (such action might require the removal of a calorifier from service for thermal disinfection, to be followed by thermal disinfection of the entire system)
- a mains water failure that could last beyond the period for which storage capacity has been designed (such action might entail advising clinical staff to restrict the amount of bathing/showering that takes place, temporary cessation of laundry and sterile supply activities; in extreme conditions, it may be necessary to resort to "tankered" water supplies).

## **9.0 Training**

9.1 Management ensures that a programme of staff training is in place to ensure that those appointed to devise strategies and carry out control measures are

appropriately informed, instructed and trained.

- 9.2 Management review the competence of staff on a regular basis, and refresher training is given with records of training attendance maintained. Although training is an essential element of ensuring competence, it is believed within the context of experience, knowledge and other personal qualities that are needed to work safely. competence is dependent on specific needs of individual installations and the nature of risks involved.
- 9.3 All Estates, Capital Project staff and line management involved in the installation and/or maintenance of hot and cold water systems receive at least a legionella awareness training course via a competent registered and recognised body/organization.
- 9.4 The Responsible Person (Water) receives specialised training in water hygiene and legionella issues via a competent registered and recognised body/organisation.
- 9.5 Contractors and/or Installers must have had specialised training in water hygiene and legionella issues via a competent registered and recognised body/organisation. It is essential to ensure and check that potential contractors are companies/individuals who are members of the Legionella Control Association.
- 9.6 Furthermore, contractors and/or Installers must have other requisite Health and Safety; Working at Height; and Confined Space certification and/or other certification, to allow them to work safely on all Trust premises under a permit to work system in accordance with the Trust's Contractors Permit to Work Policy.

## **10.0 Monitoring**

### **10.1 General Monitoring**

- 10.1.1 The Water Quality Group meets 3 times per annum to review the results of regular and ad-hoc monitoring for Water Quality and also meets for extra ordinary meetings when required to review any issues identified and decide on appropriate actions and remedial works.

### **10.2 Monitoring for Legionella**

- 10.2.1 Monitoring includes periodic sampling for the presence of legionella bacteria. This is undertaken at least quarterly, unless sampling is necessary for other reasons, such as to help identify possible sources of the bacteria during outbreaks of Legionnaires' disease. More frequent sampling is carried out when commissioning a system and establishing a treatment programme. Sampling is carried out, on a monthly basis, until it can be shown that the system is under control. If a legionella-positive sample is found as a result of routine sampling, more frequent samples may be required as part of the review of the system and/or the risk assessment, to help establish when the system is back under control. The sampling method is in accordance with ISO 11731:19988 and the biocide neutralised where possible. Samples are taken as near to the heat source as possible. They are tested by a UKAS accredited laboratory that takes part in the Public Health Laboratory Service Water Microbiology External Quality Assessment Scheme for the isolation of legionella from water. The laboratory

will also apply a minimum theoretical mathematical detection limit of less than, or equal to, 100 legionella bacteria per litre of sample.

10.2.2 Legionella bacteria are commonly found in almost all natural water sources, so sampling of water systems and services may often yield positive results and the interpretation of any results of sampling should be carried out by experienced microbiologists. Failure to detect legionella bacteria should not lead to the relaxation of control measures and monitoring. Neither should monitoring for the presence of legionella bacteria in a cooling system be used as a substitute in any way for vigilance with control strategies and those measures identified in the risk assessment.

10.2.3 Detection of Legionella must be escalated using the Escalation Process for Legionella identified as seen in Appendix 2 and Appendix 6.

### **10.3 Monitoring for Pseudomonas Aeruginosa**

10.3.1 Routine monitoring includes periodic sampling for the presence of Pseudomonas. This is undertaken in accordance with HTM04 and as identified by the Water Quality Group. If a Pseudomonas-positive sample is found as a result of routine sampling, more frequent samples may be required as part of the measures implemented by the Water Quality Group and as identified in the Escalation Process for Pseudomonas in Appendix 3, to help establish when the system is back under control. Samples are tested by a UKAS accredited. The laboratory will use a testing methodology which will provide from Zero.

10.3.3 Detection of Pseudomonas must be escalated using the Escalation Process for Pseudomonas identified as seen in Appendix 3 and Appendix 7.

### **10.4 Monitoring for Chlorine Dioxide Levels**

10.4.1 Routine monitoring includes periodic sampling for the levels of ClO<sub>2</sub>. This is undertaken in conjunction with Legionella Sampling of Sentinel Outlets as part of the water Quality management contract and as identified by the Water Quality Group. If a Legionella -positive sample is found as a result of routine sampling, more frequent ClO<sub>2</sub> samples may be required as part of the measures implemented by the Water Quality Group, to help establish when the system is back under control. Samples are tested by trained Contract or in-house staff.

### **10.5 Policy Compliance**

10.5.1 An annual external independent audit of compliance with this policy, including compliance with the requirements to undertake appropriate risk assessments, action plan, results and works for the prevention and management of legionella, pseudomonas aeruginosa and other opportunistic pathogens, in undertaken as part of a Water Quality Management annual independent audit. The results of the audit are reported to the Water Quality Group and Health and Safety Group.

10.5.2 The Infection Prevention Control Team may also undertake ad-hoc audits for compliance with this policy.

10.5.3 Examples of the competencies to be assessed when carrying out an audit or risk assessment are provided in Appendix 1.

## **11. Communication & Implementation**

- 11.1 The Deputy Director of Estates and Facilities Management is responsible for issuing copies to senior operational managers for them to disseminate within their wards and departments as appropriate.
- 11.2 The Deputy Director of Estates and Facilities Management, Bouygues Estates Manager and Grosvenor Estates Manager are responsible for ensuring all Retained and PFI Estates staff read and fully understand the policy and it is read in conjunction with the Control of Contractors Policy
- 11.3 The approved policy will be notified in the Trust's Staff Focus and made available on the Trust's website and Intranet

## **12.0 Equality & Diversity**

- 12.1 The Trust is committed to the provision of a service that is fair, accessible and meets the needs of all individuals.

## **13.0 Review**

- 13.1 The Water Quality Group and the Infection Prevention and Control Team will review summaries of results and ongoing work plans for legionella control on a three-monthly basis or more frequently on an ad-hoc basis if required. Where this review identifies areas at a high risk of incidents a further assessment will be undertaken to include the risk into the Trust Risk Assurance Framework.
- 13.2 This policy will be reviewed in 3 years or earlier as a result of staff change, national or local initiatives.

## APPENDIX 1

### LEGIONELLA/ P.aeruginosa COMPETENCIES

<b>DOMESTIC WATER SYSTEMS (hot and cold water services including showers)</b>	
<b>RISK FACTOR</b>	<b>Yes/No</b>
Has an outbreak or case of legionellosis been identified as having been caused by inhalation of water from the system or has legionella been found in the system in the past.	
Is measured temperature between 20°C and 50°C (unless supplementary water treatment regime in operation, e.g. ionisation or chlorine dioxide).	
Are showers present?	
Do thermostatic mixing valves supplying long pipe runs or multiple outlets.	
Is hot water supplied from storage calorifiers?	
Is cold water from cold water storage tanks (risk increases above 1000 litres).	
Are susceptible people using services?	
Are disabled toilets with dedicated wash basins present?	
Is there low turnover of water, excessive storage, vacant areas or little used outlets?	
Is the System Complex?	
Is the System Old?	
Are cold water tanks in poor condition?	
Are there signs of poor water quality in the calorifier or are internal surfaces of the calorifier in poor condition?	
Does it appear that materials which support microbial growth are in contact with water?	
Do records indicate that the total viable counts regularly recorded at 10 <sup>3</sup> cfu/ml or above?	
Are the outlets which create considerable aerosols – high water pressure, spray taps?	

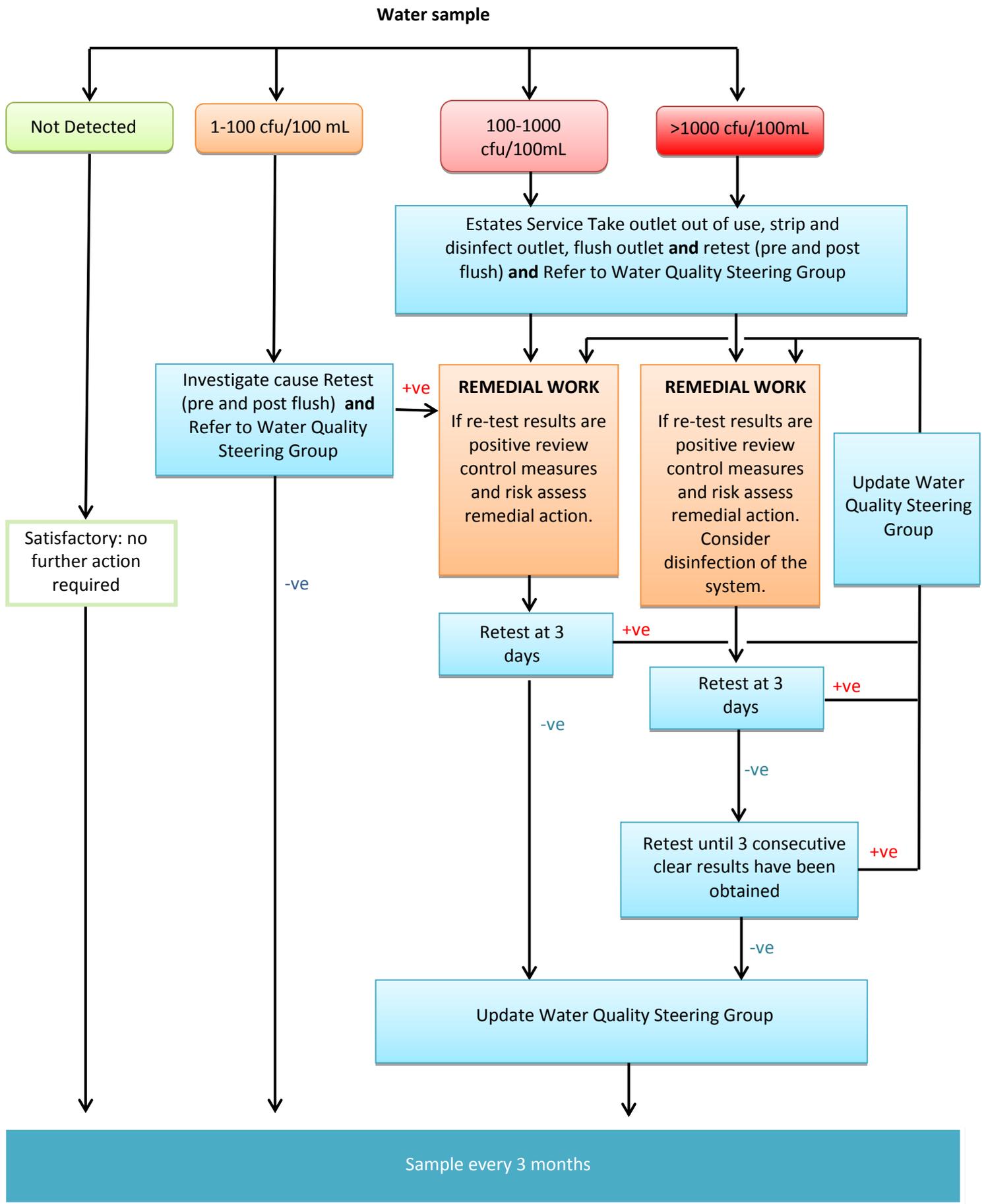
Is there a mix of copper and steel in contact with water?	
Is there multiple connected cold water tanks.	
Does system have a history of little or no maintenance?	
Is access to internal surfaces of calorifiers difficult?	
Is circulation of hot water not continuous and/or are dead legs longer than recommended.	
Do water tanks have openings large enough for insects, animals or detritus to pass through?	
Is there a water softener in line?	
<b>Analysis of the above risk factors indicates that the system surveyed presents a High/Medium/Low Risk of Legionellosis</b>	

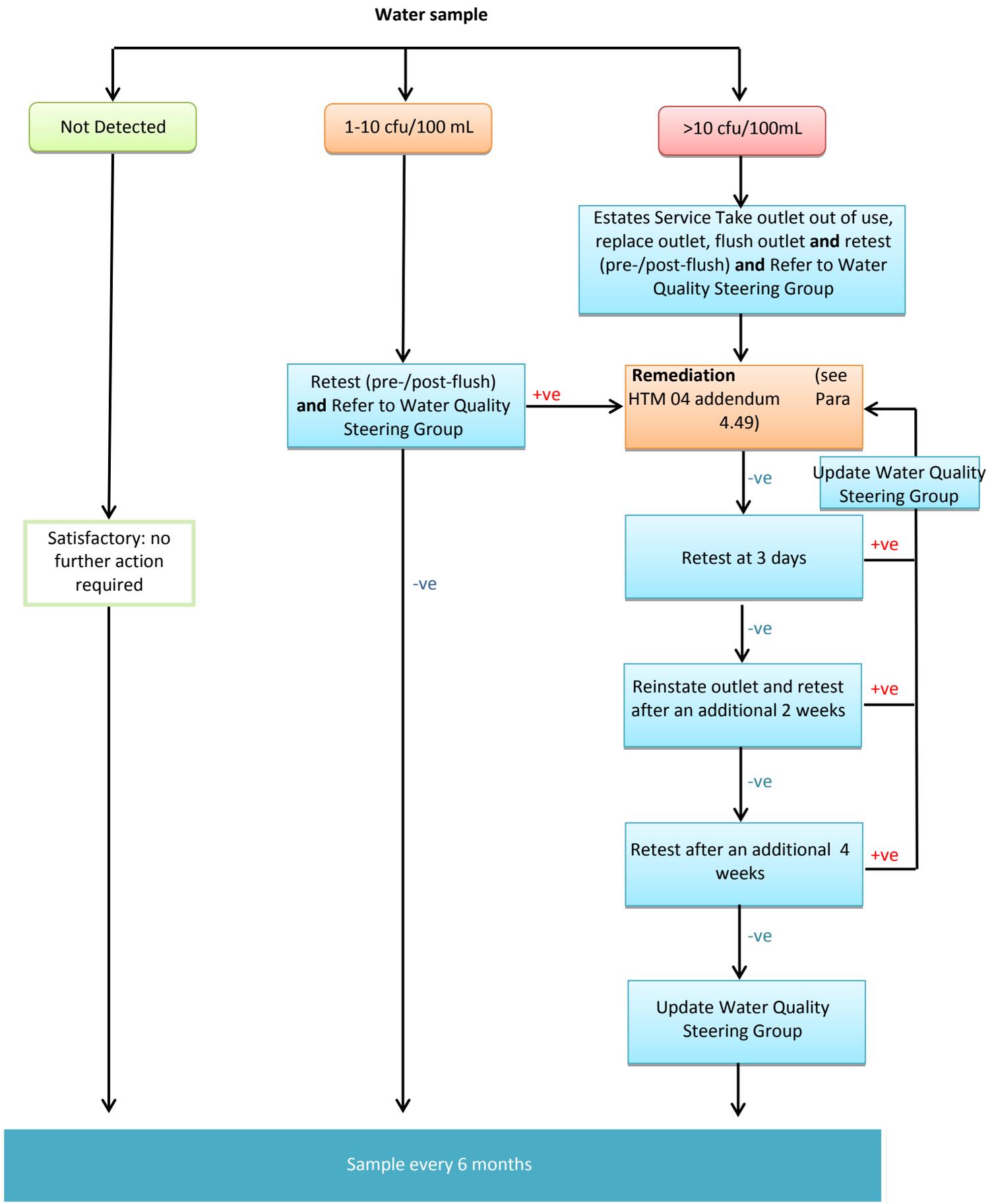
### **FIRE SUPPRESSION SYSTEMS (Hose Reels and Sprinklers etc.)**

<b>RISK FACTOR</b>	<b>Yes/No</b>
Has an outbreak or case of legionellosis been identified as having been caused by inhalation of water from the system or has legionella being found in the system in the past?	
Is there a history of poor or no maintenance of the storage tank?	
Has the storage tank been found to be in a poor condition internally?	
Does the storage tank have badly fitting lid.	
Does it appear that materials which support microbial growth are in contact with the water?	
Do records from water samples taken from the tank indicate a total viable count (TVC) of 10 <sup>3</sup> cfu/ml or greater.	
Does stored water temperature exceed 20°C.?	
Does solar gain or local sources of heat affect the tank or distribution system?	
Is there exposure to aerosols, during testing, intense or prolonged?	
Do susceptible persons carry out tests?	
<b>Analysis of the above risk factors indicates that the system surveyed presents a High/Medium/Low Risk of Legionellosis.</b>	

<b>WATER SOFTENERS</b>	
<b>RISK FACTOR</b>	<b>Yes/No</b>
Has an outbreak or case of legionellosis been identified as having been caused by inhalation of water from the system or has legionella being found in the system in the past?	
Is there a history of poor or no maintenance of the softener?	
Has the softener been found to be in a poor condition internally (brine tank)?	
Are susceptible persons exposed to aerosols from systems served by the softener?	
Do records from water samples taken from the brine tank or from float valves served from the softener indicate a total viable count (TVC) of 10 <sup>3</sup> cfu/ml or greater.	
Does brine temperature exceed 20°C.?	
Is there contamination of stored salt or dirt in the brine tank?	
Are there any local sources of heat gain to the softener?	
Are the service lights illuminated?	
Does it appear that materials which support microbial growth are in contact with the water?	
<b>Analysis of the above risk factors indicates that the system surveyed presents a High/Medium/Low Risk or Legionellosis.</b>	

<b>PRESSURE WASHERS (Bin washers, lance pressure washers etc.)</b>	
<b>RISK FACTOR</b>	<b>Yes/No</b>
Has an outbreak or case of legionellosis been identified as having been caused by inhalation of water from the system or has legionella being found in the system in the past?	
Is there a history of poor or no maintenance of the system?	
Has the tank been found to be in a poor condition internally?	
Does it appear that materials which support microbial growth are in contact with the water?	
Do records from water samples taken from the tank indicate a total viable count (TVC) of 10 <sup>3</sup> cfu/ml or greater.	
Does stored water temperature exceed 20°C.?	
Is heated water option available?	
Is filtration and recirculation of drain water incorporated?	
Is filtered drain water is untreated or inadequately treated before reuse.	
Is ventilation inlet or operable window in proximity to the spray?	
Is there poor containment of the spray?	
Are susceptible persons exposed to aerosols?	
<b>Analysis of the above risk factors indicates that the system surveyed presents a High/Medium/Low Risk or Legionellosis.</b>	





## Appendix 4

### Trust Birthing Pools

Please see below a table showing the locations and the number of birthing pools at each location.

	Location	Number of birthing pools
1	Broomfield Hospital Maternity Dept	1
2	St. Peter's Hospital, Maldon	1
3	WJC Maternity Unit, Braintree	2

**Responsibility Tree for Water Quality/Hygiene**

