

The Control of Legionella Bacteria in Water Systems:

Policy and Procedures

Estates Operations

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Imperial College Policy Statement

Sections 2 and 3 of the Health and safety at Work etc. Act 1974 (HSWA)¹ place duties on employers (including higher education establishments) to ensure the health and safety of their employees and others who may be affected by their activities. The Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH)² and the Management of Health and Safety at Work Regulations 1999 (MHSWR)³, require an assessment of the risks from exposure to harmful bacteria, such as legionellae, to be conducted and in the case of COSHH, to eliminate risks and where this is not possible, to control the risks adequately.

The Health and safety Executive's Approved Code of Practice (ACoP) 'Legionnaires' disease: the control of legionella bacteria in water systems (L8)⁴, embodies the relevant provisions of HSWA, COSHH and MHSWR and provides guidance on how employers may comply with their legal obligations with regard to managing risks from exposure to legionellae. More detailed practical guidance on how this can be achieved is provided in the associated technical guidance in HSG274, parts 1, 2 and 3⁵.

Imperial College London (the College) will ensure that risk assessments are conducted and take all reasonable precautions to ensure that risks to its staff, students, contractors and visitors from exposure to airborne Legionella bacteria in building hot and cold water services, evaporative cooling, and other, water systems in operation on its premises are controlled effectively.

This policy does not include those specialised water systems which may be installed within academic Departments which are the responsibility of the Faculties.

Water systems associated with all new projects will be installed, commissioned and handed over in accordance the provisions of L8 and the guidance provided in HSG274.

Introduction

Legionnaires' disease is a potentially fatal form of pneumonia caused by the inhalation of very small water droplets, or aerosols, which contain Legionella bacteria. The disease was first discovered in America in the 1970s after a number of people attending a convention became ill with influenza like symptoms.

The provisions of the ACoP imposes the following responsibilities on the College:

1. Appoint members of staff to fulfil the following roles:
 - a. **Duty Holder** – Imperial College London has overall responsibility for the control of premises.

¹ <http://www.legislation.gov.uk/ukpga/1974/37/section/37>

² <http://www.hse.gov.uk/pubns/priced/l5.pdf>

³ <http://www.legislation.gov.uk/uksi/1999/3242/contents/made>

⁴ <http://www.hse.gov.uk/pubns/priced/l8.pdf>

⁵ <http://www.hse.gov.uk/pubns/books/hsg274.htm>

- b. **Responsible Person** – the Responsible Person has the delegated responsibility for the implementation of the College's policy and for the management of the water systems across all Campuses in accordance with the ACoP.
2. Identify and assess the sources of risk from the hot and cold water systems on each campus.
 3. Have in place a system for managing the risks identified through either prevention or control measures.
 4. Continually monitor the efficacy of control measures applied to water systems and implement agreed remedial measures where these become necessary to control the risk.
 5. Maintain adequate records of maintenance, monitoring, testing, disinfection and pasteurisation of the water systems necessary to demonstrate compliance with the College's procedures and ACoP and to follow, where appropriate the guidance in HSG274.
 6. Train all relevant employees, including maintenance staff in the provisions of the ACoP and the guidance published in HSG274. A copy of these documents will be issued to each Maintenance Manager for reference by Team Members.

The responsibilities noted above will be implemented throughout all campuses. The Estates Operations Department approved maintenance procedures are as follows:

Procedures

1. Appointment of members of College Staff

The Duty Holder – Imperial College London is the Duty Holder in accordance with the Approved Code of Practice L8/ HSG274.

The Responsible Person – The Head of Maintenance is delegated the responsibility of managing the College's water systems in accordance with the Approved Code of Practice L8/ HSG274.

2. Identification and assessment of the risk

A survey will be completed by a competent person for all of the building services water systems in College premises, e.g., cooling towers, mains water, cold water down services and hot water down services on Campuses. To mitigate risk, the survey will include inspection of the pipework, taps, storage vessels, tanks, calorifiers, heat exchangers, showers etc., to assess and record the risks to occupants of exposure to Legionella bacteria.

Following the risk assessment a building specific log book shall contain a general services schematic layout of hot and cold water services and the control procedure for the water system, i.e., the written scheme of control.

The survey will not include those specialist water systems installed within academic areas which are the responsibility of the Faculties. The impact of the installation of such systems will be discussed at College Water Safety Group (WSG) meetings and measures to ensure that risks associated with them will be devised, implemented and monitored by the WSG.

A desk top review of the existing risk assessment shall be carried out every 2 years and where a significant change to any system has been made then a full risk assessment will be carried out.

Any significant change made to the system will be assessed by the service provider at completion of works (e.g., tank replacement) and the records and risk assessment reports shall be updated.

3. System for managing the risks.

The following measures have been agreed for the management and maintenance of the water systems to minimise the risk of Legionella bacteria colonisation.

i) Hot water services

- a. Calorifiers, buffer vessels: monthly, check flow and return temperatures. The flow temperature should be set to achieve 60 deg C. 12 monthly internal inspection clean and disinfection.
- b. Sentinel taps: monthly, carry out temperature checks to confirm water reaches 50 degrees C within 1 minute.
- c. Little used outlets (i.e., hot water outlets that are used less than weekly): shall be flushed for 5 minutes. Identifying infrequently used outlets in laboratories and the research areas and conducting any flushing required shall be the responsibility of the respective Faculties' safety officer.
In residential buildings, the Hall Management team shall be responsible for identifying infrequently used outlets and conducting any flushing required.
The flushing record shall be provided to the Estates Customer Service Centre on a monthly basis.
- d. Water taps: 12 monthly carry out temperature tests across a representative number of taps throughout the building to confirm water reaches 50 degrees C within 1 minute. Each year, 20% of representative outlets will be checked on a planned rolling programme to ensure that hot water temperatures at all representative outlets are measured over a five-year period.

ii) **Cold water services**

- a. Sentinel taps: monthly, carry out temperature checks to confirm water is below 20 degrees C after 2 minutes.
- b. Water tanks: 6 monthly, take sample of water for basic bacteriological testing (TVC/coliforms/*E. coli*), carry out inspection of the tanks and note temperatures remote from the ball valve. Annually, carry out deep clean and disinfection of the tanks.
- c. Little used outlets (i.e., cold water outlets that are used less than weekly): shall be flushed for 5 minutes. Identifying infrequently used outlets in laboratories and the research areas and conducting any flushing required shall be the responsibility of the respective Faculties' safety officer.

In residential buildings, the Hall Management team shall be responsible for identifying infrequently used outlets and conducting any flushing required.

The flushing record shall be provided to the Estates Customer Service Centre on a monthly basis.

- d. Water taps: 12 monthly carry out temperature tests on a representative number of taps throughout the building to confirm that water is below 20 degrees C after 2 minutes. Each year, 20% of representative outlets will be checked on a planned rolling programme to ensure that cold water temperatures at all representative outlets are measured over a five-year period.

iii) **Showers:** 3 monthly, dismantle, clean and descale shower heads and hoses.

iv) **Emergency showers and eye wash sprays:** 6 monthly, flush through to drain.

v) **Spray humidifiers:** 6 monthly, clean descale and disinfect spray humidifiers/air washers and make up tanks including all wetted surfaces.

vi) **Water softeners:** 12 monthly, clean and disinfect resin bed and brine tank.

vii) **Cooling towers:** Every Monday, Wednesday and Friday microbiological dip slides and basic water treatment tests including conductivity will be taken from every pond of each tower. The dip slides will be incubated at 30 degrees C for a period of 2 days. If a dip slide indicates a bacterial level of greater than 10^5 colony forming units the emergency procedures detailed in Appendix 1 of this policy and procedures document will be implemented.

The College Contracted Service Provider will at each service visit take dip slides and inspection will be carried out on the water treatment plant. Adjustments will be made to maintain satisfactory water conditions as necessary. Any defects found will be reported immediately to the Estates Operations Customer Services Centre on 0207 594 8000.

2 weekly – a water sample will be taken from each cooling tower by an independent water quality consultant to undertake
30 degrees C plate counts.

Monthly – a water sample will be taken from each cooling tower by an independent water quality consultant and analysed for Legionella bacteria.

6 monthly - each tower will be cleaned and disinfected.

12 monthly - deep clean/disinfection which will include the removal and cleaning of the pack.

4. Monitoring of water systems.

- i) An independent qualified water quality consultant will carry out the following tests on the water systems at the intervals specified.
 - a) Monthly – the consultant will progress a rolling programme of annual water tests for each building. Samples are taken from each of the hot and cold water systems and a sample from the drinking water system. The samples are sent to an independent laboratory to be tested for Legionella and bacteria (coliforms etc). Any samples which are found to be outside of the control limits are notified to Estates Operations Customer Services Centre for corrective action. Both Head of Maintenance and the nominated responsible person shall be informed.
 - ii) The consultant shall carry out the audit at specified intervals and will provide a report of the findings to the Head of Maintenance and the nominated responsible person.
 - a) 3 monthly – the consultant will review the water treatment, maintenance regime and records for all of the cooling towers and water systems, undertaken by the measured term maintenance contractor.
 - b) 3 monthly – the consultant will carry out a general inspection of the external and internal condition of each of the cooling towers, inspect the drift eliminators, review the schematic drawing and inspect the log book to ensure the records are being kept up to date, noting any departures from the control limits.
 - c) 3 monthly – the consultant will take water samples from each of the cooling tower ponds for analysis by an independent laboratory. Any samples that are found to be outside of the control limits are notified to the Head of Maintenance and emergency corrective actions taken.

5. Maintain adequate records of maintenance, monitoring, testing, disinfection and pasteurisation of the water systems necessary to demonstrate compliance with the College's procedures and the provisions of the ACoP and the guidance in HSG274.

- a) Copies of the risk assessments for each of the buildings shall be kept on the shared drive and a desk top review shall be carried every 2 years or sooner where the need dictates.
- b) Maintenance records for the cooling towers and water systems are maintained by the College Contracted Service Provider and these are audited on a 3 monthly basis by the External Auditor
- c) Copies of the 3 monthly audit reports completed by the independent qualified water consultant are retained by the Head of Maintenance.
- d) A record of all maintenance activities, pasteurisations and tank cleaning etc., is retained on the CAFM planned and reactive system managed by the Estates Operations Customer Services Centre.

6. Areas Occupied with Clinical Trials patients

For Clinical trial patients and other NHS environments within the College, specific Department of Health guidance in the form of Health Technical Memorandum (HTM) 04-01, Safe water in healthcare premises, should be followed. The guidance, revised in 2016 is published in 3 parts: Part A, Design, installation and commissioning; Part B, Operational management; and Part C, *Pseudomonas aeruginosa* – advice for augmented care units. HTM 04-01 advocates a holistic approach to managing water safety by the application of Water Safety Plans (WSP) commissioned and delivered by Water Safety Groups (WSG) and takes into account the greater vulnerability of many patients to waterborne infection risks whilst in healthcare premises.

The College embraces this holistic approach to water risk management and will apply its principles across its Estate, applying the higher standards of control as required in clinical areas, noting that it is equally applicable to both new and existing sites

Appendix 1.

Emergency procedures

The following emergency procedures will be implemented where there is a departure from the control limits for calorifiers, water tanks, water systems or cooling towers:

Cooling Towers – Poor dip slide result (>105) cfu/l

Dump half volume of water held within the cooling system.

Shot dose with biocide.

Carry out repeat water sampling

Cooling Tower – Poor Legionella result

Drain entire cooling tower water system.

Refill and chlorinate.

Carry out repeat water sampling

Domestic Hot water – Poor Legionella result

Cease use of showers and any spray outlets.

Pasteurise hot water system by raising hot water temperature within the entire calorifier or buffer vessel to 70°C.

Flush through outlets starting from the nearest, through the entire system.

Return elevated temperature setpoint back to normal setting.

Carry out repeat water sampling

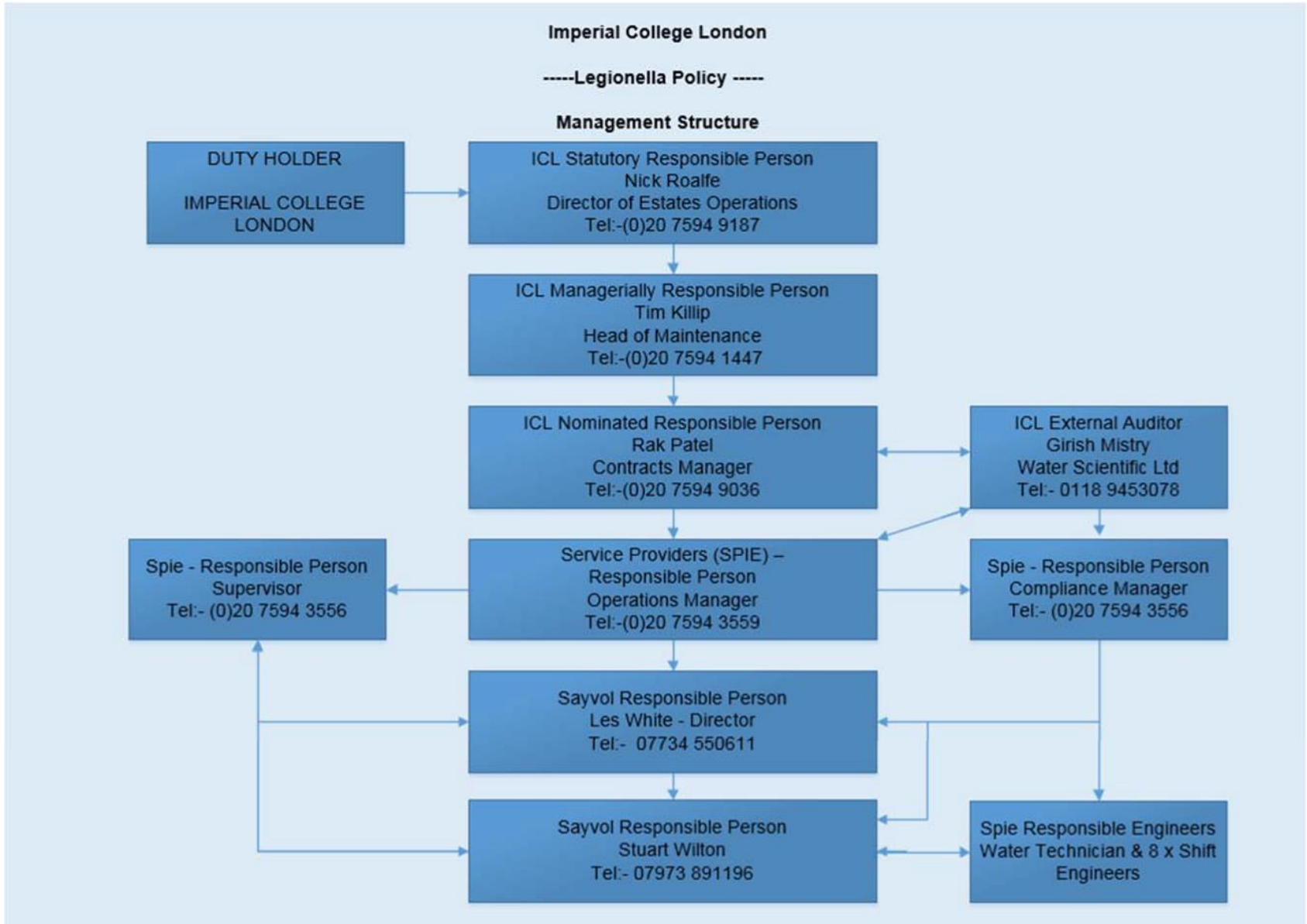
Domestic Cold water – Poor Legionella Result

Cease use of showers and any spray outlets.

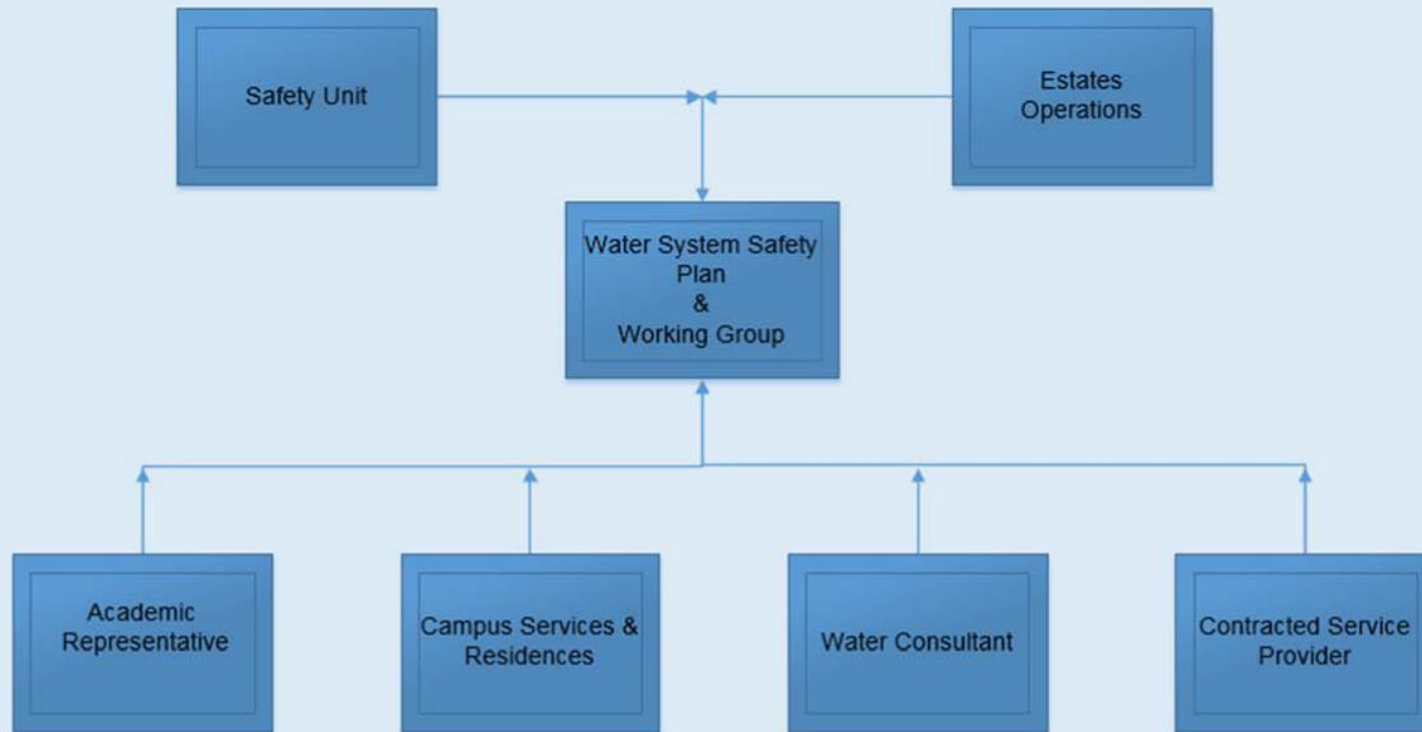
Chemically disinfect entire cold water system.

Carry out repeat water sampling

Imperial College London Legionella Policy - Management Structure



Water Safety Group



Water Scientific Escalation Process

