



Checklist for the Prevention of Legionnaires' Disease in Leisure Centres

Legionnaires' Disease: - Minimising the Risk

Legionnaires' disease is a rare though severe illness caused by the bacterium *Legionella* and is preventable through the application of an active *Legionella* control programme. Each year, a number of cases of Legionnaires' disease are notified in Ireland, see <http://www.hpsc.ie/a-z/respiratory/legionellosis/surveillancereports/annualreports/>

The aim of this checklist is to provide guidance to those operating leisure centres on steps they can take to reduce the risk from Legionnaires' disease. The term leisure centre used here refers to standalone leisure centres, leisure centres which are part of a hotel or commercial accommodation complex and other premises such as day spas which have aerosol-generating water features such as spa pools, pool fountains, showers and saunas. A person can be at risk of contracting Legionnaires' disease when they breathe in mist or steam from a contaminated aerosol-generating water feature. Sporadic cases and outbreaks of Legionnaires' disease associated with leisure centres have been reported from a number of countries (1-3).

Legal claims for Legionnaires' disease can be a significant cost and cases associated with commercial premises often receive extensive media coverage and can harm the reputation of the premises. The risk from Legionnaires' disease can be reduced by careful attention to a number of simple measures.

Please note that this is not a legal document. Premises operators should ensure that they are compliant with all the health and safety legislation applicable to their premises.

1. What is Legionnaires' disease?

Legionnaires' disease is a form of pneumonia which kills between 5 and 15% of those infected and is caused by *Legionella* bacteria. *Legionella* bacteria can also cause a less serious illness known as Pontiac fever. Illness usually develops 2-10 days after infection but may take longer. Not everyone who is exposed to *Legionella* will get ill. People with a weakened immune system, underlying illness, smokers, a history of excess alcohol intake and older people are at a higher risk of getting ill from *Legionella*.

2. Symptoms

Legionnaires' disease usually starts with a fever, chills, headache and muscle pain. This is followed by a dry cough and breathing difficulties that may progress to severe pneumonia. Between 25 and 50%

of those infected will also have diarrhoea or vomiting and about 50% become confused or delirious. Most patients need to be hospitalised and treated with appropriate antibiotics.

Pontiac fever is a milder flu-like illness.

Accurate diagnosis requires specific laboratory tests.

3. How is Legionnaires' disease caught?

Legionnaires' disease is caught through breathing in air containing the *Legionella* bacteria in an aerosol that may not be visible. Aerosols can be formed from fine droplets generated from water containing the bacteria by, for example, running a tap or shower, flushing a toilet, or from bubbles rising through water in a spa pool.

The bacteria can live and multiply in water at temperatures of 20°C to 45°C. They can be found in the natural environment such as rivers, lakes and moist soil but usually in low numbers. Higher numbers can occur in inadequately maintained man-made water systems. *Legionella* bacteria do not appear to multiply below 20°C and are killed within a few minutes at temperatures above 60°C. They may, however, remain dormant in cool water and multiply when temperatures reach a suitable level.

Chlorination of water supplies does not guarantee elimination of *Legionella* bacteria.

Spread of *Legionella* from one person to another (person-to-person transmission) has very rarely been documented.

4. Where are the potential risk areas in leisure centres?

Wherever water droplets can be created there is a risk of infection e.g.:

- Showers and taps
- Spa baths, whirlpool baths and hot tubs
- Water fountains in swimming pools
- Turkish baths and saunas
- Steam rooms
- Ornamental fountains, particularly indoors
- Cooling towers and evaporative condensers for air-conditioning, even if situated on the roof or in the grounds of the leisure centre

5. Where can *Legionella* bacteria multiply?

Hot and cold water systems including storage tanks/cisterns.

Any system or part of a system where the water is warm, i.e. between 20°C and 45°C, and particularly when above 30°C, including:

- Pipes with little or no water flow (this includes unoccupied rooms)
- Slime (biofilm) and dirt on pipes feeding showers and taps and tank surfaces
- Rubber and natural fibres in washers and seals
- Flexible hoses and artificial rubber seals
- Water heaters and hot water storage tanks
- Scale and corrosion in storage vessels, pipes, showers and taps
- Recirculating water in spa pools
- Behind the tiles of swimming pools if the waterproofing material lining the pool has been compromised due to the modification of its design e.g. addition of a bench

These situations and conditions encourage the growth of *Legionella* bacteria and increase the risk of infection to leisure centre guests and staff.

6. How are cases of Legionnaires' disease monitored in Ireland?

Legionnaires' disease is a notifiable disease in Ireland, meaning that by law, diagnosed cases must be notified to the local Medical Officer of Health by the diagnosing doctor or laboratory. Under the Infectious Diseases Regulations 1981 as amended (S.I. No. 390 of 1981), a Medical Officer of Health is empowered in the event of a case or suspected case of an infectious disease or a probable source of infection to carry out an investigation and take such steps as are necessary or desirable for investigating the source of infection, for preventing the spread of infection and for removing conditions favourable to infection.

Under these regulations, premises are requested to facilitate any investigation into the possible transmission of an infectious disease.

7. Reducing the risk

The risk of Legionnaires' disease can be minimised. Any organisation or premises (work-related or leisure-related) that does not have an active programme to control the growth of *Legionella* bacteria are negligent in ensuring the safety of its workers, visitors, guests and others.

A *Legionella* control programme should comprise the following:

1. Have one named person responsible for *Legionella* control
2. Ensure that the named person is trained in the control of *Legionella* and other staff are trained to be aware of the importance of their role in controlling *Legionella*

3. Keep hot water circulating at all times at 50°C-60°C¹ (too hot to put hands into or under for more than a few seconds)
4. Keep cold water cold at all times throughout the system. It should be maintained at temperatures below 20°C
6. Keep showerheads and taps clean and free from scale
7. Clean and disinfect cooling towers and associated pipes used in air conditioning systems regularly - at least twice a year
8. Clean and disinfect water heaters (calorifiers) and hot water storage tanks at least once a year
9. Disinfect the hot water system with high level (50mg/L) chlorine for 2-4 hours after work on water heaters and before the beginning of a season
10. Clean and disinfect all water filters regularly - every one to three months
11. Inspect water storage tanks, cooling towers and visible pipework monthly. Ensure that all lids and coverings are intact and firmly in place
12. Inspect the inside and outside of the cold water tanks at least once a year and clean. If they contain a deposit or are otherwise dirty, disinfect with 50mg/L chlorine for a minimum of 1 hour.

Ensure that the system modifications or new installations do not create pipework with intermittent or no water flow or insufficient capacity to cope with surges in requirements.

13. If there is a spa pool, ensure that:
 - Free chlorine residual of 3-5 mg/L is maintained in the spa pool water² or if bromine is used, 4-6 mg/L of total active bromine. The levels should be monitored each day before the spa pool is used and thereafter at least every two hours
 - A pH between 7.0-7.6 is maintained²
 - Replace at least half of the water each day
 - Backwash sand filters daily or more regularly as necessitated by a system-specific risk assessment
 - Clean and disinfect the whole system including the balance tank weekly
 - Daily records are kept of all water treatment readings such as temperature, pH and chlorine concentrations and ensure that any measurements outside of those specified have been acted upon and are checked regularly by the manager

¹ Where these temperatures cannot be achieved due to local conditions, suitable alternative residual disinfection procedures must be used and supported by regular (at least quarterly) testing for *Legionella*. Residual disinfection procedures that have been used include chlorine dioxide and copper/silver ionisation

² National Guidelines for the Control of Legionellosis in Ireland, 2009, Health Protection Surveillance Centre. A pH of 7.3-7.5 is recommended in the Environmental Health Standards for Swimming Pools, Spa Pools, Hydrotherapy Pools and other Multi-User Pools, EHOA/ILAM

Further advice about specific controls should be sought from experts in this field who can carry out a full risk assessment of the leisure centre. See also Chapter 8, Section 8.5, National Guidelines for the Control of Legionellosis in Ireland, 2009 at <http://www.hpsc.ie/A-Z/Respiratory/Legionellosis/Guidance/>

See also UK Health and Safety Executive/Health Protection Agency. Management of Spa Pools: Controlling the risks of infection. <http://www.hse.gov.uk/pubns/priced/hsg282.pdf>

14. If there is a swimming pool, ensure that:

- Free chlorine residual of 1-3 mg/L is maintained²
- A pH between 7.0-7.6 is maintained²

8. Legionella testing

Testing for *Legionella* (which is not compulsory) can be misleading. Samples should only be collected by trained personnel and examined by laboratories accredited for testing water for *Legionella* bacteria. A negative test does not necessarily mean that the leisure centre is clear of *Legionella* or that there is no risk.

9. Water treatment systems

There are a number of effective water treatment systems known to be beneficial in controlling water quality and safety. The type of system best suited to your site will depend on a number of different factors relating to the size and type of your operation. Independent advice should always be sought from reputable and qualified people before choosing a system and it is important to remember that no system will work if not maintained and checked regularly.

10. Further information

Further information can be obtained from:

- Irish guidelines for control of Legionellosis at <http://www.hpsc.ie/A-Z/Respiratory/Legionellosis/Guidance/>
- EWGLI Technical Guidance for the Investigation, Control and Prevention of Travel associated Legionnaires' disease at : http://ecdc.europa.eu/en/healthtopics/legionnaires_disease/ELDSNet/Documents/EWGLI-Technical-Guidelines.pdf
- European Legionnaires' disease Surveillance Network (ELDSNet) website at http://ecdc.europa.eu/en/healthtopics/legionnaires_disease/ELDSNet/Pages/index.aspx

11. References

1. <http://publichealth.lacounty.gov/acd/Diseases/legionellaFitnessCenter2009.pdf>
2. <http://www.hse.gov.uk/legionnaires/barrow.htm>
<http://www.hse.gov.uk/legionnaires/assets/docs/barrowreport.pdf>
3. <http://abc7ny.com/news/positive-samples-of-legionnaires-disease-found-at-long-island-gym/1688555/>