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FACTS

European Agency for Safety and Health at Work

Legionella and legionnaires' disease: European policies and good practices

Legionnaires' disease is a form of pneumonia caused by the bacterium *Legionella pneumophila* and related bacteria. A less severe form of the disease is a respiratory infection called Pontiac fever. Legionnaires' disease is normally contracted by inhaling tiny droplets of water (aerosols), contaminated with *Legionella*. However, most people exposed to *Legionella* do not become ill and person-to-person spread of the disease has not been documented. Some people are at higher risk of contracting legionnaires' disease, e.g. those over 45, smokers, heavy drinkers, people suffering from chronic respiratory or kidney disease, and people with immunosuppression.

Legionnaires' disease not only affects the general public, e.g. travellers staying in hotels, but also workers, especially maintenance technicians of air-conditioning or water supply systems. There is evidence that workers in places where mist machines are present, dental practitioners, workers on offshore oil and gas installations, welders, vehicle washers, miners, healthcare workers, workers in industrial wastewater treatment plants in different industries, e.g. pulp and paper mills, could also be exposed to *Legionella*.

In Europe, a network (EWGLI) was set up to improve knowledge on the epidemiological and microbiological aspects of legionnaires' disease, but it has barely taken into account any occupational risk. This means that there is a lack of reliable data on legionnaires' disease in occupational settings. On 1 April 2010 the EWGLI network was transferred to the European Centre for Disease Control and renamed the European Legionnaires' Disease Surveillance Network (ELDSNet).

Conditions for growth of *Legionella*

- Water temperatures between 20 °C and 45 °C
- Stagnation or low water turnover
- High microbial concentration, including algae, amoebae, slime and other bacteria
- Presence of biofilm, scale, sediment, sludge, rust or other organic matter
- Degraded plumbing materials, such as rubber fittings, which may provide nutrients to enhance bacterial growth

Risk systems for *Legionella* exposure

- Water systems incorporating a cooling tower
- Water systems incorporating an evaporative condenser
- Hot and cold water systems
- Spa pools (also known as whirlpool baths, hot tubs and spa baths)
- Humidifiers and water misting systems
- Waterlines to dental chairs
- Aeration ponds in biological treatment plants and industrial wastewater treatment plants

- High-pressure water cleaning machines
- Other plants and systems containing water which is likely to exceed 20 °C in temperature and which may release a spray or aerosol

Cleaning and maintenance of the aforementioned systems is associated with a risk of exposure to *Legionella*.

Control of *Legionella* risks

The risks from exposure to *Legionella* are normally controlled by measures which prevent the proliferation of the bacteria in the system, and by reducing exposure to water droplets and aerosol. Precautions include:

- controlling the release of water sprays;
- avoiding water temperatures between 20 °C and 45 °C;
- avoiding water stagnation that can encourage the growth of biofilm;
- avoiding the use of materials which harbour bacteria and other micro-organisms or provide nutrients for microbial growth;
- maintaining cleanliness of the system and the water in it.

As a last resort, maintenance personnel might need to use personal protection equipment (such as respirators).

EU-OSHA report: *Legionella and legionnaires' disease: a policy overview*

The report presents the regulatory framework on *Legionella* and legionnaires' disease in the European Union, in EU Member States and in non-EU countries, along with other normative documents related to the practical application of this legislation (standards, guidelines, etc.). The report also summarises the policies of international organisations, such as the WHO or ISO, and of standardisation bodies such as the CEN.

At the national level, almost all European countries have adopted public health policies against *Legionella*, while a few of them mention it as a special issue in their OSH legislation. In most EU countries, occupational risks from *Legionella* are covered by laws, decrees, etc., based on Directive 2000/54/EC on the protection of workers from risks related to exposure to biological agents at work.

Management of *Legionella* risk on ships

Legionella outbreaks have been linked to ships, and on-board water systems are a risk factor. The Transport and Water Management Inspectorate of the Netherlands (Inspectie Verkeer en Waterstaat) has produced guidance on managing these risks. Information on the prevention of *Legionella* in water systems is presented in the context of those in use on ships. Information is also given about the enforcing authorities of different types of shipping, and about *Legionella* risk analysis and management plans.

Minimising *Legionella* risk in a Hungarian pharmaceutical plant

The Hungarian pharmaceutical plant is part of a worldwide pharmaceutical group. In France, where the headquarters of the group are located, *Legionella* issues are regulated by national legislation with provisions stricter than those in Hungary. The company decided to apply the French provisions regarding *Legionella* to its Hungarian plant as well. *Legionella* monitoring revealed high-risk spots in the hot water circulation system. The company cleaned the piping and introduced regular heat shock treatment. The company also set up a new company water management plan, including cooling water. This standard company approach helped to tackle *Legionella* risk and has prevented diseases so far.



Hidden closed loop in hot water circulation system that provided room for *Legionella* growth — Source: OMF1

Environmental health surveillance programme for the prevention of legionnaires' disease during the 2004 Athens Olympic Games

An environmental health surveillance programme was launched for the 2004 Athens Olympic Games. Among many other activities it contained a series of inspections for the prevention of legionnaires' disease in water supply systems, cooling towers and decorative fountains. Standardised reports were designed for the inspections and a scoring system was developed for qualitative assessment. Environmental health inspectors were trained to carry out consistent, standardised inspections and water sampling for *Legionella*. Guidelines for the prevention of legionnaires' disease were published and distributed among the inspectors and facility owners.

Risk assessment as an aid for the prevention of *Legionella* contamination in Italian trains

A working group of specialists from ISPESL, Trenitalia and RFI was set up to assess the risk from exposure to *Legionella* for workers and passengers on trains. Ad hoc guidelines were elaborated for biological risk assessment and management at railways, in accordance with Italian law (DLgs 81/2008). All railway staff members were trained on the risks from *Legionella*. Specific 'Guidelines for the prevention and control of the *Legionella* spp. contamination in water tanks of railways cars' were issued to the train staff and the workers in maintenance workshops, and in particular those dealing with water supply, hydraulic circuits, cleaning and repairing. Personal protective devices were given to workers responsible for the maintenance and disinfection

of the tanks, repair of the hydraulic system and cleaning of the water tanks. Safety data sheets for all chemical products, disinfectants, detergents or additives used for sanitisation and disinfection were made available for professional users, along with descriptions of their job procedures.



Sediment and debris on walls and bottom of water tank — Source: ISPESL

Effective *Legionella* control at the academic hospital Saint-Luc, Brussels

The academic hospital Saint-Luc in Belgium (Cliniques universitaires Saint-Luc) has a long experience in the prevention of *Legionella* growth in the warm water supply system. Since 1980 the hospital has installed and tested different control measures with varying degrees of success. Nowadays, it operates a chemical disinfection method using chlorine dioxide with great success: *Legionella* is no longer detectable in the warm water. The automatic dosing unit for chlorine dioxide is easy to install and to maintain. The concentration of chlorine dioxide complies with the legal requirements of the Flemish law.



Academic Hospital Saint-Luc — Source: Cliniques Universitaires Saint-Luc

For more information on *Legionella*-related policies please consult the report entitled *Legionella and legionnaires' disease: a policy overview* at:

http://osha.europa.eu/en/publications/literature_reviews/legionella-disease-policy-review.pdf/view

This factsheet is available in 24 languages at:

<http://osha.europa.eu/en/publications/factsheets>

More information on risk assessment for biological agents is available at:

<http://osha.europa.eu/en/publications/e-facts/efact53/view>

For more information on good practice to control *Legionella*, see our case studies database, available at:

<http://osha.europa.eu/en/practical-solutions/case-studies>

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