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Legionellosis

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Introduction

Legionellosis comprises two clinical syndromes: Legionnaires' disease causing pneumonia, and Pontiac fever, a generally mild flu-like illness. Legionellosis is caused by bacteria of the genus *Legionella* [1]. There are more than 50 known species of *Legionella*, with *L. pneumophila* usually associated with Legionnaires' disease [2]. Of the 16 serogroups of *L. pneumophila*, serogroup 1 is responsible for most cases.

The term Legionnaires' disease was used to describe an outbreak of severe pneumonia that occurred during an American Legion convention in Philadelphia, United States (US) in July 1976. The bacterium identified from this outbreak was subsequently named *Legionella pneumophila* [3].

Epidemiology

Global epidemiology

Legionnaires' disease occurs worldwide, but is mainly reported from industrialised countries. Information about Legionnaires' disease is not collected on a worldwide scale, but by individual countries, and centrally within Europe by the [European Legionnaires' Disease Surveillance Network \(ELDSNet\)](#). Clusters and outbreaks usually result when conditions allow for the rapid growth of the bacteria, which in artificial water sources arise from failures in control and prevention measures. Around 40% of cases reported in England and Wales are related to foreign travel [4].

In 2008, 3,181 cases of legionellosis were reported in the US [5]. There has been a sustained rise in its incidence in the US since 2001. It is not clear if this is due to greater use of diagnostic testing and improved reporting or is a reflection of a true increase in transmission [6].

In 2008, 5,960 cases of Legionnaires' disease were reported from 34 European countries [7]. The highest number of cases was reported in France (1,244), Spain (1,219) and Italy (1,107). However, the rates per million population were highest in Switzerland (28.6), Slovenia (23.7), Denmark (23.3) and the Netherlands (20.5) [7].



In 2009, 808 cases of travel-associated Legionnaires' disease were reported from European countries [7].

Legionnaires' disease in travellers from England and Wales

Between 2000 and 2009, 39% (1327/3438) of Legionnaires' disease cases reported in residents of England and Wales were associated with travel abroad [4]. In 2009, there were 345 total cases reported including 43 deaths [8]; 126 cases (36.5%) were associated with foreign travel.

Risk for travellers

The major risk to travellers is through exposure to contaminated water sources that become aerosolised, e.g. air conditioning systems, cooling towers, and showers in hotels, camp sites, and cruise ships. In July 2007, a small outbreak of *L. pneumophila* occurred in elderly passengers on a Baltic cruise. Low levels of the bacteria were detected in the cabin showers of two of these passengers and also in other parts of the ship [9].

Outbreaks can also be traced to inadequately maintained whirlpools, hot tubs and spas. Correct maintenance of hot and cold water systems is critical to the control and prevention of infection with *Legionella*.

Legionnaires' disease is more commonly diagnosed in people over the age of 50 years and individuals who are smokers or have impaired respiratory or cardiac function or immunosuppression are at increased risk [2].

Transmission

Legionella bacteria are widely distributed in the environment. The bacteria are found in natural water sources such as streams, rivers, lakes, and thermal pools, and in man-made sources such as hot and cold water systems, air conditioning units and spa pools [2]. The bacteria survive in a wide variety of ecological conditions and lie dormant in cool water, only multiplying when the water achieves a suitable temperature.

Temperatures between 25°C and 42°C provide optimum conditions to promote growth [10]. The presence of scale, sediment and sludge, together with bio-films, is believed to promote favourable growth conditions [2].

In order to be a hazard to human health, *Legionella* need to be present in sufficient numbers and the water must be aerosolised allowing bacteria to be inhaled. Person to person transmission does not occur [10].

Signs and symptoms

Legionellosis comprises two clinical syndromes: Legionnaires' disease, a pneumonia with multisystem involvement, and Pontiac fever, a self-limiting influenza-like illness [2].



The incubation period for Legionnaires' disease ranges from two to 19 days with a median of 6 to 7 days. Illness begins acutely with fever, muscle aches, headache, a dry cough and shortness of breath, leading on to pneumonia. Diarrhoea, vomiting, confusion and delirium can also be present.

Most patients will improve with support and antibiotics; however, severe illness resulting in respiratory or systemic failure and shock can develop, especially in the elderly and those with pre-existing lung disease or chronic illnesses. The mortality rate is in the region of 10% to 15% [10].

Infection with *Legionella* can also result in a mild, influenza-like illness (Pontiac fever), which has a shorter incubation period and is not associated with pneumonia [12].

Treatment

It is difficult to differentiate Legionnaires' disease from other types of pneumonia based on clinical symptoms alone. Therefore, there should be a high index of clinical suspicion so that appropriate treatment can be initiated. The definitive diagnosis is made by urinary antigen detection, culturing the organism from sputum or by serology. The urinary antigen detection method will confirm infection during the acute phase of the illness and is a rapid diagnostic test.

Legionnaires' disease is a notifiable infectious disease, and all positive results should be confirmed at the [Health Protection Agency's \(HPA\) Respiratory and Systemic Infection Laboratory](#). Guidelines for investigating Legionnaire's disease are available on the [Health Protection Agency website](#).

Treatment should be initiated with a course of a fluoroquinolone or a macrolide [13].

Prevention

In Europe, there are guidelines in place for ensuring that water systems in hotels, holiday accommodation and on cruise ships, are regularly checked, cleaned and conform to accepted standards. [The guidelines can be downloaded from the HPA website](#) [14]. Clusters of Legionnaires' disease occurring at accommodation sites throughout Europe are detected by ELDSNet, and network members are required to investigate and report on all cluster sites. [15].

Those at increased risk of infection, such as the elderly, those with chronic medical conditions and the immunocompromised, may consider avoiding the use of jacuzzis and whirlpool spas [10].

Travellers should be aware of the risk, be advised about the mode of transmission and seek medical advice if they develop a pneumonia-type illness suggestive of Legionnaires' disease. There is no vaccine against infection with *Legionella spp.* [10].

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Links

[Health Protection Agency Legionnaires' disease](#)

[European Legionnaires' Disease Surveillance Network](#)

Further reading

Field VK, Ford L, Hill DR (eds). Health Information for Overseas Travel. National Travel Health Network and Centre. London, UK, 2010.