Most water supply systems can be a source of Legionella-related illness in humans. We therefore need to monitor these systems

Legionella bacteria in water supply systems

Legionellosis was first described after 221 members of the American Legion fell ill after celebrating the Legion's 200th anniversary at a hotel in Philadelphia in 1976. It was not until 25 years later that Norway had its first outbreak, in 2001, when 28 people were infected in Stavanger, seven of whom died. We have since had outbreaks in Østfold county – in 2005 and 2008. In 2005, 103 people were infected, and ten died. This is one of the largest known outbreaks of Legionnaire's disease in the world.

Legionella bacteria occur naturally in small quantities in water and soil. It is particularly when the bacteria get the opportunity to multiply in water in technical systems that they can represent a risk of infection for humans. People can be infected by inhaling aerosolised water or particles contaminated with Legionella bacteria. *Legionella pneumophila* is the species of Legionella most frequently associated with illness in humans. In the last ten years, 21–48 cases of Legionellosis have been reported annually to the Norwegian Surveillance System for Communicable Diseases (MSIS). The exception was in 2005, when, as noted, we had a major outbreak in Norway.

All freshwater systems can represent a risk of infection if there is a ready supply of nutrients and the right temperature for the Legionella bacterium to grow. In this number of Tidsskriftet, a study is described of the occurrence of *Legionella* in Norwegian naval vessels (1). The study provides important knowledge about the occurrence of *Legionella* in water supply systems on board ships. In about half of the vessels surveyed, *Legionella pneumophila* was found in the water supply system. The study also showed that in vessels where the bacterium was found, free-living amoebae were also found. Demonstration of the presence of amoebae indicates that the nutritional conditions exist for the Legionella bacterium to multiply. These findings are an important source of knowledge for infection prevention.

The purpose of preventing Legionella infection is to stop individual cases of infection occurring as well as large-scale outbreaks. The circumstances surrounding large-scale outbreaks of Legionellosis can be complex, as the outbreaks in Østfold demonstrated. The source of the infection in those cases proved to be an industrial air scrubber (a type of pollution-control device that cleans air and gases) and a biological treatment plant (2–5). The prevention of Legionella infection in technical plants and systems is regulated by various laws and regulations. Municipal authorities are required to oversee all cooling towers and air scrubber plants and inspect them regularly. The plant owners are responsible for ensuring that the plants do not represent a risk of infection. It is important to assess whether there is a potential for the growth of Legionella bacteria and what events, such as aerosol formation, may lead to people being exposed to the bacteria (6). Microbiological analysis is a supplement to the knowledge of technical and process-related conditions which contribute to the multiplication or spread of Legionella bacteria. The results of the project published in this number of Tidsskriftet will contribute to knowledge concerning the measures that should be taken to prevent people being infected with *Legionella* on board ships (1).

Where Legionellosis is suspected, several microbiological diagnostic methods can be used to detect it. One quick and simple method is to test for Legionella antigen in urine, although this will only detect disease where *Legionella pneumophila* serogroup 1 is present. Isolating the Legionella bacteria from clinical samples enables the species and type of bacteria to be determined. Genetic typing of the bacteria is necessary to be able to demonstrate whether several people are ill with the same bacterium isolate and to be able to compare the patient isolate with the environmental isolate from possible infection sources (4). A number of laboratories have begun using polymerase chain reaction (PCR) technique to detect the presence of *Legionella* in various sample materials. The method is speedy and sensitive.

PCR was used as a screening method in the study carried out to survey *Legionella* on Norwegian naval vessels. Positive samples were also cultured (1). By culturing the PCR-positive samples, information was obtained about the presence of live Legionella bacteria. Findings of the same genetic bacteria type in the ships' water supply systems and the bunkering stations resulted in the conclusion that the transmission of *Legionella* to the ships' water systems probably occurred via the bunkering stations.

Legionellosis is a Class A notifiable disease in Norway, which means that all cases must be notified to the Surveillance System for Communicable Diseases (MSIS) by both medical microbiological laboratories and diagnosing clinicians. All health personnel suspecting a case of Legionellosis are furthermore required, under the MSIS and tuberculosis regulations, to alert the municipal medical officer immediately, who again alerts the county governor and the Norwegian Institute of Public Health. The Norwegian Institute of Public Health communicates information about diagnosed cases to the European Legionnaires' Disease Surveillance Network (ELDSNet), which can compare this information with information from other countries.

Legionellosis is still a rare disease, and most cases occur sporadically. Outbreaks are rare, but it is important to maintain constant controls as the disease can be severe, with high mortality rates among the elderly and people with compromised immune systems.

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