
Executive Summary

Health Council of the Netherlands. Controlling Legionnaire's Disease. The Hague: Health Council of the Netherlands, 2003; publication no. 2003/12.

Following the 1999 epidemic of Legionella pneumonia which broke out among visitors to the West-Friese Flora in Bovenkarspel, the Minister of Health, Welfare and Sport has approached the Health Council for advice. The Minister wanted to know how prevention could be improved and how gains might be made from the improved diagnosis and treatment of patients suffering from Legionnaire's Disease. Building on a previous advisory report completed in 1986, the Committee on Legionellosis addresses these questions in the present report. Its ability to provide concrete answers is of course subject to the limitations of the scientific situation.

Legionnaire's Disease

In 1976, the Legionella bacterium was identified as the pathogen which causes Legionnaire's Disease. This followed an incident in which American war veterans became ill following their stay at a hotel in Philadelphia. Being difficult to culture, the bacteria had not previously been identified as a pathogen. It had apparently proliferated in the hotel's air-conditioning system. This bacteria's unusual characteristics meant that it was able to proliferate at temperatures of between 20°C and 45°C in the biofilm lining mains water systems and other fittings. Individuals can then become infected by breathing in an aerosol of contaminated water. Soon thereafter, Legionnaire's Disease was also found in the Netherlands. It emerged that the Legionella bacteria was present in the mains water systems of several hospitals. Accordingly, the first Health Council advisory report focused heavily on this nosocomial problem.

Legionnaire's Disease or Legionellosis has various forms. Individuals can come into contact with Legionella without becoming ill, as shown by the presence of antibodies in their blood. Alternatively, the disease can manifest itself as a mild dose of flu. Finally, victims may go on to develop pneumonia. The fact that Legionella pneumonia can be very serious, even lethal, was illustrated once again by the events in Bovenkarspel.

Legionella causes eight hundred cases of severe pneumonia every year

It is difficult to establish the true scale of the Legionella problem. In this advisory report, the Committee has restricted itself to the number of patients admitted to hospital with Legionella pneumonia. Even making an estimate of that figure proved to be no easy matter. The disease is difficult to diagnose, the mandatory notification procedure leaves much to be desired and is also very erratic, depending on the course of current events.

In 1998, there were 0.26 notifications per 100,000 head of population. In 1999, following Bovenkarspel, this figure had risen to 1.7 per 100,000 head of population, which corresponded to 279 patients. Using another approach, the Committee arrives at an annual figure of 800 cases of Legionella-caused pneumonia that are treated in hospital. There are about 110,000 cases of pneumonia in the Netherlands each year. Of these, about 15 percent are admitted to hospital (16,000) and about 5 percent of these (800) are caused by Legionella. Legionella pneumonia has a mortality of about 10 percent (80 individuals per annum). None of these figures takes account of the continually changing circumstances and the gradual implementation of numerous rules and recommendations.

One interpretation of this data is that we do not yet fully understand the scale of the problem. Another interpretation is that this problem fades into insignificance when set against the large number of pneumonia cases in general. Finally, a third interpretation is that when dozens of individuals die because technical deficiencies cause our water supply to become contaminated with lethal bacteria, this is a 'grave situation' and a 'major problem'.

When we compare the above-mentioned figures to the current standards for drinking water, there is certainly an unreasonably large risk of catching Legionella. The risk of acquiring an infection from drinking water should be less than 1:10,000 individuals per annum. The maximum permissible mortality risk level is defined as 1:1,000,000 individuals per annum while a negligible mortality risk level is equivalent to 1:100,000,000 individuals per annum. Compared to these converted standards, the Committee's estimated mortality risk level for Legionella pneumonia is between five and five hundred times as high.

Policy recommendations

There are four areas in which the risk of Legionella infection can be reduced at acceptable cost, without involving a major impact on the environment. The Committee that drew up this advisory report took the view that policy should, at the same time, address the following points.

European agreements

About half of these Legionella patients become infected while abroad, mostly in South European holiday resorts. The greatest gains can therefore be made by working within a European framework to implement modern guidelines in all member states.

Rapid diagnosis and treatment

It is impossible to completely eliminate Legionella from mains water systems and fittings. Accordingly, the focus should be on diagnosis and treatment. Serious illness and mortality can be avoided by rapidly reaching a diagnosis and through the use of prompt and adequate therapy in cases of suspected Legionella pneumonia. To this end, the Committee has included a number of specific recommendations in this advisory report.

Modification of water fittings

In the Netherlands the problem can be tackled at source. Mains water systems and water atomising equipment should be subjected to a risk analysis. If indicated, a management plan should be drawn up with the aim of modifying the system to reduce the risk.

The Committee cannot endorse the addition of monochloramine or other chemical disinfectants to the entire Dutch mains water distribution system. The adverse effects on the environment, on the quality of our excellent water, and on the service life of pipelines and fittings, as well as the expense involved, massively outweigh any possible gains.

Extensive legislation has been drafted over the years and this is now in place. Nevertheless, some points still require attention to ensure that high-risk systems are not overlooked. This applies to large-scale events where water atomisers are being used, residential properties and small companies, water atomisers that are not connected to the mains water system, drilling rigs and ships. The Committee also feels that legislation is

no substitute for responsible attitudes on the part of those who wield authority over the systems in question.

Research

Further rationalisation of policy with regard to Legionella is dependent on greater understanding and on technical improvements. Accordingly, every case of Legionella pneumonia should trigger a systematic search for the source of infection. Methods used in molecular biology, such as the polymerase chain reaction (PCR), should be introduced for the detection of Legionella bacteria in mains water and for the purpose of diagnosing patients. There should also be more research into the connection between Legionella growth in tapping points and the risk of disease. Furthermore, materials must be developed for pipelines, couplings and taps which make it more difficult for these structures to be colonised by Legionella. Finally, scientific research should be initiated into the effectiveness of alternative control methods in mains water systems and fittings.

Political weighing of costs and benefits

Measures aimed at keeping mains water systems and water atomising equipment 'healthy' are set out in the *Tijdelijke Regeling legionellapreventie in drinkwater* (Provisional Scheme for the prevention of Legionella in drinking water) and in the *Ontwerpbesluit tot wijziging van het waterleidingbesluit* (Draft decree for the amendment of the Water Supply Decree). The political debate regarding these documents focuses on the affordability of the measures being put forward. An attempt should therefore be made to find a rational risk stratification, which will provide the basis for a sensible approach to priority setting. The elements to be considered here are those costs and benefits that can be expressed in quantitative terms, the vulnerability and susceptibility of exposed individuals, as well as the social acceptability (or unacceptability) of certain risks. Overdue maintenance should be performed, irrespective of the efforts allocated to the prevention of Legionella pneumonia.

The Committee notes that the issue of affordability is another fundamental area of tension. In medical terms, the costs and benefits of various activities are usually compared on the basis of the costs per quality adjusted life year (QALY). In this way, measures to protect the environment can be compared with medical interventions. On the other hand, environmental issues involve more than QALYs alone. We feel responsible for the environment, which is temporarily entrusted to our stewardship, and we want to bequeath it to future generations in pristine condition. Considerably larger sums of money are spent in this context than is usual by medical standards. Policy-

makers should therefore ask themselves whether they see the Legionella problem from the viewpoint of the health service or that of environmental policy. On that basis it can be decided if and how much extra effort is warranted.