



MANUAL FOR THE PREVENTION OF LEGIONELLOSIS IN INSTALLATIONS AT RISK

1. Organisations involved

The General Direction for Public Health and Alimentation (Dirección General de Salud Pública y Alimentación) of the Health Department, Community of Madrid. The Direction was renamed in 2009 and it became the General Direction for Management and Inspection (Dirección General de Ordenación e Inspección).

2. Description of the case

3.1. Introduction

In the past, outbreaks of Legionnaires' disease in Spain have had a significant impact on society and have been widely covered by the media. The problem called for prompt and efficient action by the public health services aiming at the prevention and control of the disease. Spain has promoted an adequate legal framework on both the national and the regional level. For example, following an outbreak in Alcalá de Henares in 1996 that affected 224 people, the city of Madrid's Health Department issued a regional ordinance (Ordinance 1187/1998, 11 June) which regulated the hygiene standards that must be met by air-conditioners and humidifiers to ensure the prevention of Legionnaires' disease. This ordinance has been used as a basis for the elaboration of the first national law on this issue (Royal Decree 909/2001, 27 July). This decree requires the owner of the installation to provide the regional health administration with the number and the technical characteristics of any cooling towers and evaporative condensers before they are put into operation. Thus, the authorities have been able to register all installations in the region of Madrid.

In order to prevent and control Legionnaires' disease as an emerging risk, Madrid has designed a strategy that forms part of its broader public health programme. The objective was to minimise the risks in installations in which water may produce bioaerosols containing *Legionella* bacteria during their operation. One of the activities of the programme was to provide information on *Legionella* to public health technicians and maintenance technicians working in such installations. This was achieved by the publication of a 'Guide for the Prevention of legionellosis in installations at risk' (*Guía para la prevención de la Legionelosis en instalaciones de riesgo*). This guide tackled the problems relating to cooling towers and evaporative condensers – the installations associated with most of the outbreaks. The technical and scientific experience accumulated in recent years led to the abolition of Royal Decree 909/2001 and the adoption of Royal Decree 865/2003, which established hygiene criteria for the prevention and control of Legionnaires' disease and is still in force.

Royal Decree 865/2003 considered two different categories of installations: installations with a high risk for proliferating and spreading the disease (cooling towers, hot water supply systems, whirlpools, swimming pools, spas, etc.) and a second category with a lower risk of this kind (e.g. decorative fountains, water pipes which can spread the disease to the urban environment, humidifiers, etc). This decree stipulates that owners or operators of existing cooling towers and evaporative condensers must register them with the authorities. The decree also establishes a series of general and specific preventive measures for installations in the first category. The new legal framework necessitated a new approach for installation owners and technicians. In order for them to fulfil their duties, the city's Health Department produced a new version of the 2000 Guide incorporating tools enabling the automatic control of new technological systems.

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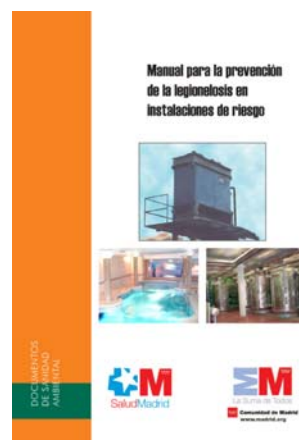
3.2. Aims

- To provide information on the risks of proliferation of legionella in certain installations such as cooling towers, hot water systems, spa baths, etc.
- To develop hygiene maintenance plans as indicated in the national sanitary legislation regarding the prevention of Legionnaires' disease.
- To provide tools to evaluate the risk of proliferation of legionella in relevant facilities.
- To promote the introduction of hazard analysis and critical control point (HACCP) systems based on the evaluation of risk.

3.3. What was done, and how¹?

The new guide, the 'Manual for the Prevention and Control of legionellosis in installations at risk' (*Manual para la prevención y control de la legionelosis en instalaciones de riesgo*) was drawn up in 2005 by technicians of the Environmental Health Service and the Public Health Service of the Community of Madrid, in collaboration with experts from the relevant employees' associations.

Picture 1: Manual for the prevention of legionellosis in installations at risk



Source: Health Department, Community of Madrid

The manual examines aspects relating to the potential dispersion of bioaerosols containing *Legionella* bacteria, and provides useful information for the design of a maintenance plan based on the principles of hazard analysis and critical control point (HACCP) systems. It briefly describes the biology and ecology of *Legionella*, its multiplication, transmission, clinical manifestations and evolution. Instructions are given concerning the design, operation and the measures for the protection against *Legionella* in installations like cooling towers, evaporative condensers, hot water supply systems, whirlpools, swimming pools, spas, etc. The next chapter deals with maintenance procedures. The first part of it discusses water chemistry and gives information on chemicals and other products for water treatment; sampling and

¹ What was done, including challenges faced and overcome

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analytical techniques, installation and maintenance as well as training topics for maintenance staff. The second part contains specific procedures for cooling towers and evaporative condensers, hot and cold water sanitary systems, whirlpools and swimming pools for private and public use.

Picture 2: Cooling towers



Source: Health Department, Community of Madrid

The manual provides detailed information on an auto-control programme specifically designed for the above installations. The aim is to establish a method for the prevention and elimination of health risks due to the presence of *Legionella* in water. The programme is flexible and can be applied in installations with different characteristics and therefore different risks. At the back of the manual, there are references to relevant legislation and literature, addresses of relevant bodies, websites and other publications on the topic.

The publication of the manual was part of a wider programme developed by the Community of Madrid for the prevention and the control of legionellosis. The aim of the programme was to minimise the spread of the disease by heat exchange systems, which can produce aerosol sprays, and water supply systems. The programme considers cooling towers and the evaporative condensers to be a priority, followed by evaporative cooling equipment and humidifiers. At the same time, in situ inspections were undertaken of hot water systems in hotels, old people's homes and other places where many people are gathered. Current legislation requires the owners of such institutions to have in place an auto-control approach, especially for cooling towers functioning in densely populated areas. This is why the manual places such heavy emphasis on this approach.

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Picture 3: Cooling towers



Source: Health Department, Community of Madrid

In its drive to try and improve the notification procedure for installations at risk of *Legionella*, the Community of Madrid has worked with city councils representing communities with a population higher than 50,000, especially the City of Madrid, and associations of maintenance companies.

An effort was made to promote the approach developed in the manual through a series of training programmes designed for public health inspectors and maintenance technicians in private companies. The idea was to help the trainees increase their knowledge about installations at risk of *Legionella* and legal requirements covered by the new RD 865/2003, to help them develop their own auto-control maintenance programmes for cooling towers and evaporative condensers, hot- and cold-water supply systems, whirlpools and swimming pools for private and public use and to promote different physical and physico-chemical disinfection methods.

- Three training programmes were conducted:
- Basic Course for the Prevention of Legionellosis (in 2000)
- Course on the hygiene conditions of installations at risk of *Legionella*: Cold and hot water sanitary systems (in 2003, 2004, 2005)
- Advanced Course for installations at risk of *Legionella* (in 2006, 2009)

Each course had 25 students, lasted 30 hours and covered theoretical and practical issues. It also included visits to various installations (cooling towers, evaporative condensers, cold and hot water sanitary systems, whirlpools and swimming pools for private and public use). The instructors were professionals from the Public Health Administration, the Autonomous Community of Madrid or the private sector.



The manual was issued by the Department of Public Health and Alimentation. Two editions were published, of 6,000 copies in all. They were distributed to technicians responsible for the maintenance of relevant installations. The manual meets day-to-day practical needs and contributes to a better understanding of the risks from Legionella. Because of its content and approach both technicians and users of the installations found the manual useful. The manual is also available in electronic form [1].

3.4. *What was achieved?*

- A manual was published containing useful information for the design and maintenance of cooling towers, evaporative condensers, cold- and hot-water systems, whirlpools and swimming pools, etc., based on the principles of hazard analysis and critical control point (HACCP) systems.
- The manual has adopted an auto-control approach, greatly facilitating the day-to-day job of maintenance technicians.
- Training programmes were designed and carried out for inspectors and technicians on a basic, standard and advanced level.

3.5. *Success factors*

The manual was drawn up by a team of inspectors of installations such as cooling towers and water supply systems. These specialists were familiar with HACCP procedures, as most of them have had long experience in the food industry. In addition, the information given in the manual is based on know-how developed by specialists in maintenance, etc. Good cooperation and coordination of the whole project was crucial.

3.6. *Further information*

José Frutos García García
Jefe de Servicio de Sanidad Ambiental
Dirección General de Ordenación e Inspección
Consejería de Sanidad
Comunidad de Madrid
c/Julian Camarillo 6a
28037 Madrid
Tel: 91-2052252
Email: josefrutos.garcia@salud.madrid.org

3.7. *Transferability*

Thanks to its structure and content, this manual has been a useful tool for technicians not only in the region of Madrid but also in other Spanish areas. The auto-control programme contained in the manual and stipulated by national legislation (Royal Decree 865/2003) has served as a starting point for similar activities (training, inspection, etc.) in other regions. It is obvious that the developed approach could be used with minor changes by other countries, especially those with a Mediterranean climate.

² The outcome should be recorded here, including what was not achieved as well as any cost benefit analysis. This would also include anything created as part of the action (e.g. creation of a website for more information, and any social partner views)



3.8. Abstract

Madrid's Department of Public Health and Alimentation published a manual for the prevention of risk from Legionnaires' disease. It is based on the principles of HACCP systems and contains useful information for the design and maintenance of cooling towers, evaporative condensers, hot- and cold-water supply systems, whirlpools and swimming pools. The Manual adopts an auto-control approach, suitable for maintenance technicians. Training programmes for inspectors and technicians on a basic, a standard and an advanced level were also carried out.

3. References, resources:

- *Manual para la prevención y control de la legionelosis en instalaciones de riesgo*
http://www.checklistlegionella.com/pdfs/guia_madrid.pdf