

TECHNICAL DOCUMENT

European Legionnaires' Disease Surveillance Network (ELDSNet)

Operating procedures

ECDC TECHNICAL DOCUMENT

European Legionnaires' Disease Surveillance Network (ELDSNet)

Operating procedures



Suggested citation: European Centre for Disease Prevention and Control. European Legionnaires' Disease Surveillance Network (ELDSNet): Operating procedures. Stockholm: ECDC; 2012.

Stockholm, January 2012

ISBN 978-92-9193-328-0

doi: 10.2900/19185

© European Centre for Disease Prevention and Control, 2012

Reproduction is authorised, provided the source is acknowledged.

Contents

Abbreviations	iv
Summary	1
Current edition	1
Introduction	2
1 The network.....	2
2 The procedures.....	2
Part 1. Legionnaires' disease and travel	3
3 <i>Legionella</i> – natural history of the organism	3
4 What is Legionnaires' disease?	3
5 Routes of transmission	3
6 Diagnosis and treatment.....	3
7 Recognised potential sources of infection	4
8 Risk factors associated with infection	4
9 Risks factors associated with accommodation for travellers	4
10 Surveillance of Legionnaires' disease.....	4
11 European surveillance of travel-associated Legionnaires' disease	5
12 The role of ECDC in European surveillance	5
13 Current objectives of the European surveillance network	6
14 Epidemiological methods.....	6
15 Results 1987–2010: the value of surveillance.....	6
16 Related activities within EWGLI	7
Part 2 Definitions and procedures for reporting and responding to cases of travel-associated Legionnaires' disease	8
17 Government-nominated surveillance network members	8
18 Case definitions and why they are important	8
19 Reporting procedures	9
20 Procedures for clusters/outbreaks.....	10
21 Risk assessment report	10
22 Report of additional cases in a cluster and environmental investigations.....	11
23 Report of a rapidly evolving cluster	11
24 Follow-up of clusters associated with more than one accommodation site	11
25 The role of tour operators.....	11
26 Responding to clusters outside ELDSNet.....	12
27 Responding to information requests from lawyers and other individuals	12
References	13
Appendix 1 Legionnaires' disease: minimising the risk Checklist for hotels and other accommodation sites.....	14
What is Legionnaires' disease?	14
Symptoms and diagnosis	14
How is Legionnaires' disease caught?	14
Where are the potential risk areas in hotels?	14
Where can <i>Legionella</i> multiply?	14
Reducing the risk (the 14 point checklist).....	15
<i>Legionella</i> testing.....	15
Further information	15
Appendix 2 Forms A and B.....	16

Abbreviations

ECDC	European Centre for Disease Prevention and Control
EEA	European Economic Area
EU	European Union
EWGLI	European Working Group for Legionella Infections
EWGLINET	European Surveillance Scheme for Travel Associated Legionnaires' Disease
TALD	Travel-associated Legionnaires' disease
WHO	World Health Organization

Summary

This document explains the operating procedures of the European Legionnaires' Disease Surveillance Network (ELDSNet), coordinated by the European Centre for Disease Prevention and Control (ECDC).

ELDSNet is the successor of EWGLINET (the European Surveillance Scheme for Travel Associated Legionnaires' Disease), following the transition of the dedicated surveillance network's coordination from the UK's Health Protection Agency to ECDC on 1 April 2010.

These operating procedures replace Parts 1 and 2 of the European Guidelines for Control and Prevention of Travel Associated Legionnaires' Disease, originally written by Dr Carol Joseph in 2001/02 together with members of EWGLINET and the European Working Group for Legionella Infections (EWGLI), and subsequently endorsed in 2003 by the Committee for the Epidemiological Surveillance and Control of Communicable Diseases in the Community, instituted by Decision No 2119/98/EC of the European Parliament and the Council [1]. In 2005, ECDC was established under Regulation 851/2004 [2]. As a disease-specific network ECDC funded EWGLINET's work from January 2007.

The objective of these procedures is to offer a standardised approach to reporting cases and detecting and responding to clusters of travel-associated Legionnaires' disease (TALD) and aim to further harmonise these procedures across European Member States. They describe how information is communicated within the network, to other stakeholders, as well as the anticipated actions of the network members in response to TALD clusters. However, national laws apply where specific aspects of control and prevention differ between these procedures and the regulations in force in Member States.

Part 1 (Legionnaires' disease and travel) provides information on the nature of Legionnaires' disease, how it is caught, the type of symptoms with which it is associated and the current known sources of infection. It also describes the systems in place in the EU/EEA to monitor the infection at international level and some results from the European surveillance scheme.

Part 2 (Procedures for reporting and responding to cases of travel-associated Legionnaires' disease) defines the roles and responsibilities in response to reports of single cases and clusters for the network's coordinating centre at ECDC, the national government authorities with responsibility for public health in the collaborating countries, and the scheme's national network members nominated by their governments. It outlines the important stages and deadlines required of network members in the country of infection to inform ECDC of the steps taken to investigate and control reported clusters. There is also information in this section on how the public is informed of these procedures.

The technical guidelines included in the former European Guidelines are available on the ECDC website¹.

Current edition

Given the success of the principles of the EWGLINET scheme and the European Guidelines, this edition of the operating procedures includes only a few minor adaptations resulting from the transfer to ECDC. This current edition is based on the latest version of the European Guidelines that underwent revision by the network and ECDC in 2010 and 2011.

Comments or queries about the ELDSNet scheme or these procedures can be addressed to eldsnet@ecdc.europa.eu.

¹ <http://ecdc.europa.eu/en/activities/surveillance/ELDSNet/Pages/index.aspx>

Introduction

Legionnaires' disease was first identified in 1976 [3]. International collaboration at the European level began in 1986 when EWGLI was first formed, with surveillance of travel-associated infections being implemented the following year. Protecting citizens against travel-associated Legionnaires' disease frequently involves international activities. Therefore, it is important that participating countries share the common objective of minimising the risk of infection from recognised environmental sources for all their citizens. These operational procedures provide a set of common measures that should be followed by all EU/EEA countries involved in protecting their citizens against Legionnaires' disease. They were originally produced in response to revised procedures for reporting and responding to cases of travel-associated Legionnaires' disease within European Member States and now reflect changes in the surveillance network's formal status under ECDC coordination. Technical advice to professional groups involved with the control and prevention of *Legionella* in water systems are provided in the specific EWGLI Technical guidelines (available at www.ecdc.europa.eu).

Cases associated with travel are known to comprise up to 50% of national reports of the disease in some countries [4]. Because of widespread publicity, the public is increasingly aware of Legionnaires' disease and the risks associated with tourist accommodation. They demand appropriate action from national governments and public health officials to provide them with adequate protection against these risks. Control measures to be reported in response to cluster detection are now standardised across all EU/EEA Member States.

1 The network

The European surveillance network operates as a disease-specific network in accordance with Decisions 2119/98/EC [1] and 2000/96/EC [5] for the setting up of a network for the epidemiological surveillance and control of communicable diseases in the European Community. Article 3(F) of Decision 2119/98/EC and Article 4 of Decision 2000/96/EC are particularly pertinent for these guidelines and the disease-specific network.

The prime aim of the current European Legionnaires' Disease Surveillance Network (ELDSNet) is to detect, control and prevent cases, clusters and outbreaks of Legionnaires' disease within EU/EEA countries and assist, where possible, with detection and response outside these countries. The network provides the means within the EU to share information and collaborate on Member State actions, so that residents of European countries are increasingly protected from acquiring Legionnaires' disease linked to travel, either within their own country or abroad.

2 The procedures

In recent years, there have been several large outbreaks of Legionnaires' disease in the EU [6–8] (See Part 2 for definitions of an outbreak). In July 2001, the world's largest community outbreak of Legionnaires' disease occurred in Spain [9]. In addition, an annual rise in the number of cases and clusters associated with a visit to a hotel or other tourist accommodation has been recorded by the surveillance scheme [10]. Some of these clusters have involved a considerable number of cases. Before the EWGLI European guidelines were introduced, the lack of European consensus about control measures created many difficulties for patients, other hotel clients, hoteliers, tour operators and public health authorities in the countries concerned. The EWGLI European guidelines (2001–10) were written to address these difficulties and to establish a common approach for control and prevention of travel-associated Legionnaires' disease in all European countries.

For the first edition of the EWGLI guidelines a small team from the surveillance scheme and EWGLI was funded by the European Commission (Directorate-General for Health and Consumer Protection (now Directorate-General for Health and Consumers)) to work together and prepare a first draft document for discussion and comment. Extensive consultations then took place with members of the surveillance scheme and EWGLI, other professional groups and the European Commission Network Committee. Implementation commenced on 1 July 2002 and full endorsement by the Network Committee took place in June 2003. Part 2 of the document was updated in January 2005. In this new edition of the ELDSNet operating procedures Part 1 and Part 2 have both been updated. The EWGLI Technical Guidelines² have also been updated and the two parts concerning the surveillance and the network (Part 1 and 2) now form these ELDSNet operating procedures.

² <http://ecdc.europa.eu/en/activities/surveillance/ELDSNet/Pages/index.aspx>

Part 1. Legionnaires' disease and travel

3 *Legionella* – natural history of the organism

Legionella is a bacterium that is widespread in nature and can be found in environmental water sources such as rivers, lakes and reservoirs, usually in low numbers. From the natural source, it passes into sites that constitute an artificial reservoir (channelled water in towns, water systems in individual buildings, etc). Water temperatures in the range of 20°C to 45°C favour growth of the organism. *Legionella* does not appear to multiply below 20°C (particularly *Legionella pneumophila* strains) and will not survive in water maintained above 60°C. It may, however, remain dormant in cool water and multiply when water temperatures reach a suitable level. *Legionella* also requires nutrients obtained from commonly encountered organisms within the water system itself such as algae, amoebae and other bacteria. The presence of sediment, sludge, scale, rust and other material within the system, together with biofilms, also play an important role in harbouring and providing favourable conditions in which *Legionella* may grow.

4 What is Legionnaires' disease?

Legionnaires' disease is a serious form of pneumonia that carries with it a case-fatality ratio in the order of 10–15%. Symptoms include a flu-like illness, followed by a dry cough and progression to pneumonia. Approximately 25–50% of people infected with *Legionella* may also present with diarrhoea and around 50% may show signs of mental confusion [11]. The incubation period normally ranges from 2 to 10 days but in rare cases it may extend up to 16–20 days after exposure [3]. If not treated, the symptoms normally worsen rapidly and may result in respiratory failure, shock, multi-organ failure and death.

Although more than 50 different species of *Legionella* have been described, around 20 species have been associated with human disease [12]. *Legionella pneumophila* is the species that accounts for almost all of the diagnosed clinical cases.

Legionnaires' disease may present as an outbreak of two or more cases following a limited temporal and spatial exposure to a single source, as a series of independent cases in an area in which it is highly endemic or as sporadic cases without any obvious temporal or geographical grouping. Outbreaks and sporadic cases have occurred repeatedly in buildings such as hotels and hospitals and also on cruise ships.

Pontiac fever is a non-pneumonic illness also caused by *Legionella* bacteria. It has a much shorter incubation period, normally 12–48 hours and presents as a flu-like illness lasting a few days. No antibiotic treatment is necessary for this illness. The attack rate is much higher than for Legionnaires' disease (up to 95% of those exposed) and cases are mainly detected when outbreaks of Pontiac fever occur, for example when exposure is linked to the use of a communal spa pool in a leisure centre or hotel.

5 Routes of transmission

Legionnaires' disease is normally acquired through the respiratory system by breathing in air that contains *Legionella* bacteria in an aerosol. An aerosol is formed from tiny droplets that can be generated by spraying the water or by bubbling air into it, or by water impacting on solid surfaces. The smaller the droplets, the more likely they are to cause infection. Droplets with a diameter of less than 5µm can reach the lower airways more easily than larger ones. Although a rare event, aspiration of contaminated water has been shown to be the cause of Legionnaires' disease in hospital-acquired cases both from respiratory therapy equipment and from contaminated water, including ice. Human-to-human transmission has never been demonstrated.

6 Diagnosis and treatment

Legionnaires' disease has no particular clinical features that clearly distinguish it from other types of pneumonia. Therefore laboratory investigations must be carried out to obtain a diagnosis. The most commonly used primary method is the detection of antigen in a urine specimen during the acute phase of the illness. This rapid and inexpensive method of diagnosis has significantly contributed to an increase in diagnosed cases of Legionnaires' disease since the late 1990s and also a reduction in the associated mortality, although the test mainly detects the common strains of *Legionella* serogroup 1 infection. However, obtaining a respiratory specimen for culture of the organism remains the 'gold standard method' because of the role it can play in identifying sources of infection through comparison of strains from clinical and environmental sources [12] and because of its ability to detect the less common strains of infection. *Legionella* infections do not respond to β-lactam antibiotics like penicillins and cephalosporins and require early treatment from the appropriate range of antibiotics which can both penetrate and act within cells to increase survival rates [13–14].

7 Recognised potential sources of infection

The following are examples of potential sources of Legionnaires' disease:

- Hot and cold water systems
- Cooling towers and evaporative condensers
- Spa pools/natural pools/thermal springs
- Fountains/sprinklers
- Humidifiers for food display cabinets
- Respiratory therapy equipment
- Potting soil/compost
- Vehicle washes
- Water-cooled machine tools

8 Risk factors associated with infection

Recognised risk factors for Legionnaires' disease include belonging to an older age group (≥ 40 years), being male, having a high alcohol intake, having a chronic underlying disease with or without an associated immunodeficiency, having had an organ transplant and having a history of heavy smoking [10,11]. The public health risks associated with Legionnaires' disease and travel are mainly related to the special nature of providing temporary accommodation for people in circumstances that may differ from their normal way of life. Older people are more susceptible to *Legionella* infection and during their travels may be subject to changes in lifestyle and accumulated exposure to *Legionella* from infected sources such as air conditioning or contaminated water systems, against which they have less resistance than younger adults. Diagnosis and treatment of some of these people may be delayed by their not seeking medical assistance until they arrive back in their own country.

9 Risks factors associated with accommodation for travellers

Infection linked to travel is associated with particular features of staying in accommodation designed for short stays and where occupation may be on a seasonal or intermittent basis. The use of the water facilities may be intermittent with the potential for long periods of stagnation. For example, during the low season, room occupancy may be low with sections of the hotel or even the whole hotel closed. These factors can cause whole or parts of the water system to have little or no flow and become stagnant, resulting in loss of temperature and / or residual biocide. A further risk factor in holiday accommodation is the intermittent demand for water used for washing and bathing which may produce surges in requirements at particular times of the day and night; typically early morning before breakfast and early evening before dinner. The accommodation itself may be sited in areas of low rainfall that can result in an intermittent water supply of varying quality. Water treatment regimes will then need more intensive monitoring and more frequent adjustment than would be normal for a water supply of consistent quality. It is possible that, during periods of water shortage, non-essential facilities such as spa pools, fountains and water features may have to be taken out of use because it is not possible to replace the water frequently enough to ensure their safe operation. Adequate temperature control of hot and cold water may be difficult to maintain because of outside ambient temperatures. A further risk factor is that hotels or other accommodation sites frequently have many rooms with individual water outlets, inevitably resulting in very complex water systems, often with long lengths of water piping.

Where hotel extensions have been built and connected to the original hot water system, this may result in insufficient heating capacity to maintain the circulating temperature throughout the whole of the extended premises or to cope with increased surges in demand for hot water.

Hotel gardens are frequently irrigated with sprinklers and these may present an additional risk, particularly if they utilise recycled grey-water or sewage-based water.

The seasonal nature of the holiday trade means that staff may frequently change, making it difficult to maintain a core of adequately trained personnel. In addition, hotel engineers often have no training in controlling *Legionella* in hotel water systems.

10 Surveillance of Legionnaires' disease

Legionnaires' disease is a statutorily notifiable disease in all EU/EEA Member States. Rates of disease vary from 1.0 to 30.0 cases per million population, depending on ascertainment and reporting procedures in individual European countries. However, rates at the lower end of the range represent a considerable underestimate of incidence and it is thought that the true numbers of cases may be up to 20 times the low ranges. It is estimated that less than 5% of cases may eventually be reported to public health authorities through passive surveillance [18]. However, underdiagnosis is a far more serious issue than underreporting in most countries [15].

Studies that have tried to estimate the true incidence of community-acquired Legionnaires' disease have found that *Legionella* species cause between 2% and 16% of community-acquired pneumonia cases in industrialised countries [16–18]. One study in the UK showed that although uncommon overall, a diagnosis of Legionnaires' disease was more likely in severe cases of community-acquired pneumonia, accounting for 14–37% of cases, with an associated case-fatality ratio in excess of 25% [19]. Other studies have shown that rapid administration of the appropriate antibiotics reduces mortality associated with pneumonia and Legionnaires' disease [20–21]. Overall, *Legionella* species are probably the second-to-fourth most common cause of community-acquired pneumonia (pneumococcal pneumonia is the most common cause) [16–17].

There are several reasons why Legionnaires' disease is underdiagnosed and underreported:

- When a patient is diagnosed with pneumonia, treatment is generally started immediately. If the patient is treated with antibiotics that are effective against *Legionella*, the patient usually recovers, without further need to establish the cause of the pneumonia.
- A small proportion of the diagnostic methods for Legionnaires' disease lack sensitivity and may result in producing false negative results.
- The most commonly used method of diagnosis – urinary antigen detection – primarily detects *Legionella pneumophila* serogroup 1 infections. Hence infections due to other serogroups or other species may not be detected by this method of diagnosis.
- Patients with a serious underlying disease involving immunosuppression are particularly at risk from Legionnaires' disease. If these patients die, death may be attributed to their serious condition, without diagnosing the *Legionella* infection.
- Legionnaires' disease is considered to be a severe disease. Therefore, many milder cases may not be suspected and hence not diagnosed.
- Cases of travel-associated infection may be diagnosed in some countries but not forwarded to the national network member in the European surveillance network.

From the above, it can be concluded that the number of cases reported to the European surveillance network is a serious underestimate of the true incidence of travel-associated Legionnaires' disease.

11 European surveillance of travel-associated Legionnaires' disease

International surveillance has been shown to provide added value to national surveillance activities and to contribute to the detection, control and prevention of disease but it requires close cooperation between countries. Information about the surveillance network and its roles and functions is provided on the ECDC website (<http://ecdc.europa.eu/en/activities/surveillance/ELDSNet/Pages/Index.aspx>). The network also fosters collaborations between EU/EEA countries through the exchange of clinical and environmental specimens and the exchange of information which will further the epidemiological and microbiological knowledge of *Legionella* infection.

12 The role of ECDC in European surveillance

ECDC was established in 2005. One of the objectives of ECDC is to strengthen the surveillance of communicable diseases in the EU, and another is to provide guiding principles for response to public health threats related to communicable diseases at the EU level. ECDC can, for example, provide support to Member States by coordinating investigations of a large outbreak of Legionnaires' disease that involves cases from several different Member States, or if a large outbreak occurs outside the EU but affects EU citizens. ECDC also collects annual data on Legionnaires' disease from the EU/EEA Member States to analyse disease trends.

The European surveillance network is a disease-specific network in accordance with Commission Decision 2000/96/EC [8]. It adopted the name EWGLINET in May 2002 in order to distinguish it from the other activities carried out by EWGLI. Representatives from the national authorities with responsibility for public health in each EU/EEA Member State nominate the official members to participate in the network. These are normally one public health epidemiologist from the national public health institute or Ministry of Health and one microbiologist from the national or regional *Legionella* reference laboratory. From 1993 to the end of March 2010, EWGLINET was managed by the coordinating centre at the Health Protection Agency's Centre for Infections in London (formally the Communicable Disease Surveillance Centre of the Public Health Laboratory Service). From April 2010, running the network is the responsibility of ECDC and the network has been renamed ELDSNet.

13 Current objectives of the European surveillance network

- To rapidly detect, disseminate information on and respond in a coordinated fashion to cases, clusters and common-source outbreaks of Legionnaires' disease reported in the EU and EEA area and affecting European residents, both within their own countries or abroad.
- To inform all those that need to know about travel-associated Legionnaires' disease in order to promote primary preventive action and collaborative investigations.
- To reduce the incidence of Legionnaires' disease among EU residents through the support of active control and prevention programmes in each Member State.
- To improve the methods of communication for reporting and receiving information on Legionnaires' disease.

These objectives are supported through ECDC contracts with dedicated external quality assessment schemes for detection of *Legionella* in clinical and environmental samples; the provision of bioinformatics support and a training programme for investigating outbreaks of Legionnaires' disease through risk assessment, sampling and control.

14 Epidemiological methods

Individual cases of TALD are reported by the nominated network members to the network's coordinating centre. Case definitions for reporting are given in Section 18. With complete and rapid reporting, the surveillance network can detect clusters of TALD in residents from two or more EU/EEA countries travelling to a single holiday destination or staying in the same hotel or other commercial accommodation site. Receipt of the information leads to specific and timely action by members in order to protect EU/EEA residents travelling to countries inside and outside of Europe.

As of April 2010, 27 EU Member States and two EEA countries were contributing or receiving data on travel-associated cases. Liaison with other national authorities takes place if the travel-associated infection is linked to countries outside the EU/EEA area, e.g. in other European countries, the USA, South Africa, the Far East, often through collaboration with the World Health Organization.

All network members transmit case information via a secure part of the ECDC web portal. Case reports are incorporated into the European surveillance system (TESSy) database which is then searched for other cases that may have stayed at the same place of accommodation at any time since 1987 when records began.

Cases are normally reported to the network by the country of residence of the case. In addition, people who travel within their own country and develop Legionnaires' disease are also reported by the surveillance network since they contribute to the overall number of cases and clusters that require prompt investigation.

Due to the serious nature of the investigations, it is essential that there is high-quality standardised microbiological testing and reporting of results. This is achieved through the use of standard case definitions and clinical and environmental external quality assessment schemes which contribute to improved diagnostic capability within European laboratories, with schemes run firstly by EWGLI and now outsourced by ECDC through contracted services. However, cases and clusters apparently associated with specific accommodation can arise by chance and the source of infection may be elsewhere.

15 Results 1987–2010: the value of surveillance

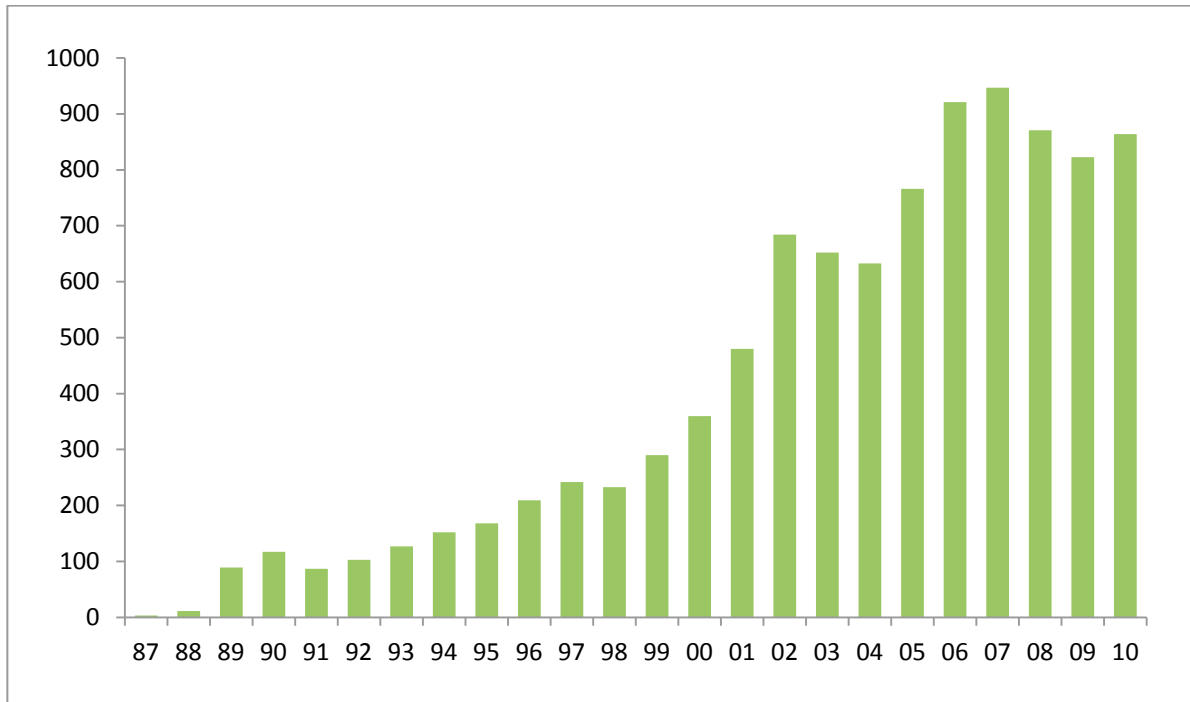
The number of cases of TALD reported has risen from less than one hundred per year in 1987 to about 900 per year (Figure 1). This increase almost certainly reflects increased ascertainment of cases through improved national surveillance schemes and can also be attributed to improved collaboration and reporting by the participating countries. Since 1987, the surveillance scheme has received details of over 8 000 cases and 12 500 visits that were associated with nearly 120 different countries worldwide. Approximately 30% of these cases were part of recognised clusters, outbreaks or cases linked to the same hotel or building over several years. The proportion of deaths reported each year range from 6% to 15% but are considered an underestimate as many countries are unable to provide mortality data.

Overall, countries linked with the most travel-associated cases are Italy, France, Spain and Turkey, with all of these, except Turkey, also reporting a high proportion of travel-associated cases among their own residents who travelled within their own country. Over 100 clusters of two or more cases linked to the same accommodation site have been detected each year since 2001 (when the cluster definition was changed): all require investigation in accordance with the procedures outlined in the guidelines and amount to a formidable amount of response work in some tourist areas in Europe. Investigation results show that almost 60% of cluster accommodation sites in 2007 were positive for *Legionella* when they were sampled [22].

The peak months in Europe for the onset of Legionnaires' disease occur during the summer, the period when most people take their main holiday. August, which is the peak month for school holidays in Europe usually has a lower proportion of cases and suggests that older people who are more at risk of Legionnaires' disease tend to take their

holidays at other times. Male cases outnumber female cases by approximately three to one and the peak age of infection is between 50 and 65 years, although in recent years there has been an increase in the number of cases reported in those aged 75 years or over. Age-standardised rates confirm that the rise in cases correlates with a rise in age group, with the most elderly age group experiencing the highest incidence of Legionnaires' disease [15].

Figure 1: Reported cases of travel-associated Legionnaires' disease 1987–2010



Source: EWGLINET.

16 Related activities within EWGLI

European countries may also be involved in microbiological and environmental studies through EWGLI that contribute to the further understanding and control and prevention of *Legionella* infections. EWGLI was formed in 1986 by a group of scientists with a great interest in Legionnaires' disease and it continues to function as an independent voluntary group of international scientists. They share a common goal of furthering the microbiological and epidemiological understanding of *Legionella* infections and will maintain its shared interests with ECDC in the control and prevention of *Legionella* infections.

The main objectives of the wider EWGLI group are to:

- continue to support European surveillance of travel-associated Legionnaires' disease (ELDSNet);
- collaborate in the investigation and control of Legionnaires' disease;
- extend the pan-European typing scheme for *L. pneumophila* serogroup 1;
- develop strategies for the standardised identification and typing of non-pneumophila *Legionella* species.

Part 2 Definitions and procedures for reporting and responding to cases of travel-associated Legionnaires' disease

The following definitions and procedures have been devised in order to improve control and prevention of travel-associated Legionnaires' Disease (TALD) and to enhance information on the actions taken at accommodation sites when cases are reported to the surveillance network's coordinating centre. The definitions and procedures are in line with operating the surveillance network under Commission Decision 2000/96/EC, although any response by individual countries has to be in accordance with their own laws and guidelines for control and prevention of Legionnaires' disease. These operating procedures do not override national guidelines. They include important procedures for informing the public about clusters of Legionnaires' disease cases associated with holiday accommodation sites (Sections 21–28).

17 Government-nominated surveillance network members

Members of ELDSNet are officially nominated by their national public health authorities to act as national contact points for Legionnaires' disease surveillance. Members have scientific experience with *Legionella* and epidemiological or microbiological responsibility for the diagnosis and surveillance of Legionnaires' disease in their country.

18 Case definitions and why they are important

Epidemiological and microbiological case definitions are needed for surveillance:

- to set standards for defining cases;
- to compare data between countries;
- to verify the diagnosis and share laboratory results;
- to facilitate international investigations and collaboration;
- to develop best practice within and between countries.

EU case definitions for reporting at the international level

NB: These case definitions are under revision.

Legionnaires' disease is an uncommon form of pneumonia. The disease has no particular clinical features that clearly distinguish it from other types of pneumonia, and laboratory investigations must therefore be carried out in order to obtain a diagnosis. The following case definitions have been adopted by the European Commission [23] for ECDC to use for reporting cases of Legionnaires' disease at the international level and replace those originally agreed by EWGLI for EWGLINET.

Clinical criteria: Any person with pneumonia

Laboratory criteria for case confirmation:

At least one of the following three:

- Isolation of *Legionella* spp. from respiratory secretions or any normally sterile site
- Detection of *Legionella pneumophila* antigen in urine
- *Legionella pneumophila* serogroup 1 specific antibody response

Laboratory criteria for a probable case:

At least one of the following four:

- Detection of *Legionella pneumophila* antigen in respiratory secretions or lung tissue e.g. by DFA staining using monoclonal-antibody derived reagents
- Detection of *Legionella* spp. nucleic acid in a clinical specimen
- *Legionella pneumophila* non-serogroup 1 or other *Legionella* spp. specific antibody response
- *Legionella pneumophila* serogroup 1, other serogroups or other *Legionella* spp.: single high titre in specific serum antibody

Epidemiological criteria:

At least one of the following two epidemiological links:

- Environmental exposure
- Exposure to the same common source

Case classification

1. Possible case
NA
2. **Probable case**
Any person meeting the clinical criteria AND at least one positive laboratory test for a probable case OR an epidemiological link
3. **Confirmed case**
Any person meeting the clinical and the laboratory criteria for case confirmation

Laboratory methods for diagnosis of Legionnaires' disease

Details of specimens to be collected and laboratory methods to be used for diagnosis of Legionnaires' disease can be found in laboratory manuals and standard textbooks on *Legionella* [24].

ELDSNet definitions of single cases, clusters and outbreaks

Single cases

Cases who in the two to ten days before onset of illness stayed at or visited a commercial accommodation site that has not been associated with any other cases of Legionnaires' disease, or cases who stayed at an accommodation site linked to other cases of Legionnaires' disease more than two years previously.

Clusters

Two or more cases who stayed at or visited the same commercial accommodation site in the two to ten days before onset of illness and whose onset is within the same two-year period.

Outbreaks

Two or more cases who stayed at or visited the same commercial accommodation site in the two to ten days before onset of illness and whose onset is within the same two-year period and where environmental investigations provide additional evidence suggesting a common source of infection.

If any further cases associated with the cluster site occur more than two years after the last case, they will be reported as new single cases, although the country of infection will receive information on all previous cases linked to the accommodation site regardless of the time period elapsed.

19 Reporting procedures

Reporting to ECDC

Cases are normally reported to ECDC by the country of residence via the password-protected ELDSNet extranet workspace. Occasionally, a report may be made on a patient outside their country of residence if that person was hospitalised in the country of infection or elsewhere. Cases should be reported as soon as the epidemiological, microbiological and travel information is obtained. The information preferred is the complete accommodation address, telephone number, web page URL, room number, and known use of showers, whirlpool spas or other recognised exposure risks. If requested by the country of infection, the name of the patient or the initials should be transmitted (separately and directly between ELDSNet members) in order to facilitate the identification of the exposures (in some EU countries this is only permissible by agreement of the patient). Without satisfactory information on the travel details it may not be possible to identify the accommodation site in the presumed country of infection, especially in resorts where similar hotel names are used by many different establishments.

Several large hotel groups have more than one hotel in a town or resort (e.g. Holiday Inn). In these situations it is essential that the full address of the hotel is provided in order to distinguish it from other hotels in the same group in the same area.

The number of people with TALD who have stayed in privately rented apartments or villas, frequently booked through the internet, has increased steadily in recent years. These cases should continue to be reported to the network although it may be difficult to follow them up without permission for access to the property being given to the investigating authority. However, if a person has stayed in accommodation owned by relatives or friends, which is otherwise not commercially rented out, the case should not be reported.

Cases in persons such as truck drivers who have travelled extensively in the period before onset of infection but slept in their vehicles should be reported to the network, particularly if information is available on the location of truck stops where the case stayed overnight and used the showers or other aerosol-generating apparatus.

Response by ECDC

The case is entered onto the European Surveillance System (TESSy), the database at ECDC, by the network member in a Member State. This database is then searched by ECDC staff for any other cases linked to the same accommodation site. If none are found, ECDC reports the case to the network member in the country of infection, even though sometimes this is the same as the country of reporting. For sites outside of ELDSNet, single case notifications are sent to WHO or directly to country contact persons where available.

Response by the ELDSNet member in the country of infection

The network member in the country of infection should ensure that the site receives the checklist that outlines good practice for minimising the risk of *Legionella* infection (Appendix 1). No further follow-up procedures at the international level are necessary for a single case of TALD. However, many countries carry out environmental investigations for single cases and the results of these can be submitted to ECDC (to eldsnet@ecdc.europa.eu) using Forms A and B (Appendix 2).

20 Procedures for clusters/outbreaks

Identification of a cluster of two or more cases is of sufficient importance to warrant an immediate action by the coordinating centre and the network member or public health authorities in the country of infection.

Response by ECDC

The cluster will be entered into TESSy. All ELDSNet members will be informed immediately of the cluster and of any additional cases linked to the same accommodation site outside the two-year period. WHO is informed of all clusters associated with accommodation sites both within and outside the surveillance network countries and requested to inform the Ministry of Health in the country of infection, if it is not a member or formally in contact with ELDSNet.

Response by the ELDSNet member and the public health authorities in the country of infection

The network member should arrange for the accommodation site to be inspected by a body authorised by the national authority (e.g. a local or regional public health authority) as soon as possible. A risk assessment (according to national guidelines or the EWGLI European guidelines) should be requested, followed by an environmental investigation, sampling of the building's water systems, the implementation of control measures and the drawing up of recommendations against existing or future risks of Legionnaires' disease. The risk assessment should include a technical inspection of the site, the implementation of emergency remedial measures and the listing of any corrective actions taken. The network member should also ensure that their national authority (e.g. national public health institution or Ministry) is aware of the cluster. Results of the assessment and actions taken are reported to ECDC in a standardised form within a specific timeframe (See Section 21).

ECDC can be approached by a Member State's national authorities to request advice for mobilisation of technical expertise in support of site investigations. Such requests should be addressed to eldsnet@ecdc.europa.eu.

21 Risk assessment report

Preliminary report within two weeks of the cluster alert

The ELDSNet member should complete Form A (Appendix 2) in response to the cluster. This form specifies whether or not an inspection and risk assessment have been carried out at the accommodation site. It should be returned to ECDC within two weeks of receipt of the cluster alert (the date of receipt is anticipated as the next working day after date of notification). The report should state whether control measures are in progress and whether the hotel remains open or not. Members of the network are informed of receipt of this report at ECDC, through an updated status summary table on the extranet workspace. A template reporting form is provided in Appendix 2.

If a completed Form A is not received in the specified time period or the form reports that no risk assessment or preventive control measures have been taken, the authorities of that country will be immediately contacted. All ELDSNet members will be informed and a notification of the accommodation site will be posted on the public part of the ECDC website, usually within 48 hours of the Form due date deadline. An advance notice of intended publication is provided to the network members. The name of the accommodation site will be removed from the website when a satisfactory Form A is received or when control measures are considered to have been satisfactorily implemented, up to two years after the publication date.

Full report within six weeks of the cluster alert

Six weeks after the initial cluster alert, information is expected that outlines the investigations and control measures that have been implemented at the accommodation site, including the results of sampling that took place. If *Legionella* was found in the water system, the species and serogroup must be provided. A summary reporting form (Form B, Appendix 2) should be completed and returned to ECDC within six weeks after receipt of the initial cluster notification. If a completed Form B is not received or it states that control measures are unsatisfactory, the network members of that country will be immediately contacted. An advance notice of intended publication to the website is provided to the network members. A notification of the accommodation site will be posted on the public part of the ECDC website usually within 48 hours of the Form B due date deadline. The name of the accommodation site will be removed from the website when a satisfactory Form B is received indicating that control measures are considered to have been satisfactorily implemented, up to two years after the publication date.

ELDSNet members in the country of infection will be reminded 2–3 days in advance of the report deadlines of two weeks and six weeks if the Forms A or B have not been received. All network members will be informed when names of accommodation sites have been removed from the public part of the website. It will be the responsibility of the network member in the country of infection (or of the public health authorities) to liaise with the hotel or other site if that accommodation site has had its name posted on the public website.

22 Report of additional cases in a cluster and environmental investigations

If an additional case is reported with date of onset after a Form B has been received, a new investigation will be required and Forms A and B resubmitted according to set timelines. If new cluster cases arise within two years from an accommodation site where a report was previously received stating all control measures were satisfactorily implemented, a new investigation will be expected. Such cases will be regarded as updates to previous clusters.

23 Report of a rapidly evolving cluster

If a cluster is identified consisting of three cases with dates of onset within a period of three months during the previous six months, this will be regarded as a rapidly evolving cluster and in addition lead to a specific notification report to tour operators. Reporting of investigations should follow the procedures for Forms A and B, but may involve more intensive and detailed confidential information exchange within the network in response to a possible outbreak situation. The results of site investigations should be reported to the coordinating centre in the standard way using Forms A and B within two and six weeks, respectively. If no reports are received within the outlined timeframe, the name of the accommodation site will be made public on the ECDC website and all network members will be informed. As before, the site name will be removed once satisfactory control measures have been implemented and reported to ECDC.

24 Follow-up of clusters associated with more than one accommodation site

Each year, approximately 25–30% of all travel-associated cases stay at more than one accommodation site in the 2–10 days before onset of Legionnaires' disease, making it difficult to organise follow-up of all accommodation sites. For such complex clusters, an extensive itinerary involving several accommodation sites may be associated with two or more cases and all of these sites may need investigating. Where multiple sites are associated with a cluster, it is recommended that the ELDSNet member in the country of infection should prioritise the follow-up of these sites and inform the coordinating centre of their actions. Discretion will be used concerning the publication of accommodation site names on the ECDC website for such complex clusters.

25 The role of tour operators

Even before these guidelines were produced, several countries informed tour operators of clusters and/or single cases because they sometimes played a useful role in helping to identify accommodation site locations and guests who had stayed at them.

ECDC does not routinely report cases or clusters of TALD to any individual, national or international group of tour operators. However, in the event of a large outbreak of Legionnaires' disease or a rapidly evolving cluster (three cases in three months), tour operators will be informed through the International Federation of Tour Operators or, if they have signed up to receive such information, directly by email through a summary report 24 hours after the ELDSNet cluster alert. Tour operators will also be immediately informed whenever an accommodation from an

ELDSNet Member State is published or removed from the ECDC website or when a satisfactory Form B has been received for a cluster site.

Tour operators are also routinely informed of all clusters located in countries that are not ELDSNet members or signatories to these operating procedures, since ECDC does not receive timely information on the control measures being implemented at these accommodation sites.

Very occasionally, tour operators receive notification of a case of Legionnaires' disease directly from a client. In this situation, tour operators should advise the informant to contact their doctor and request the doctor to report the case to the appropriate authority in the country concerned.

It is the responsibility of the ELDSNet member or public health authorities in each participating country to arrange for hotels and other tourist accommodation sites to be informed of these operating procedures. This may best be achieved through contact with their national hotel associations or tourist authorities. Accommodation sites should be informed that they might be subject to publicity on the ECDC website as a consequence of a cluster report to the network member in the country of infection. In the event that a cluster is published on the ECDC website for reasons explained above, the information allows members of the public and tour operators to make an informed choice whether or not to continue to use the accommodation site in question.

For rapidly evolving large clusters or outbreaks in the EU/EEA area, the issue of whether and when to inform guests about the cluster is considered on a cluster-by-cluster basis and is normally dealt with by national authorities of the country where the infection occurs, often with the relevant tour operator. ECDC can assist this process if international contact tracing facilitation is requested by national authorities.

26 Responding to clusters outside ELDSNet

Clusters that occur outside ELDSNet Member States or signatory countries are routinely reported to WHO, either to the WHO European Regional Office in Copenhagen, Denmark, or to WHO headquarters in Geneva, Switzerland. Information on the cluster is passed on to the appropriate WHO Regional Office which is requested to inform the Ministry of Health in the country concerned. In some countries, this results in the implementation of control and preventive measures, including liaison with ECDC, and even voluntarily reporting of actions taken, through completed Forms A and B. For others there may be no response at all. Not participating in ELDSNet, accommodation sites forming part of clusters in these countries are never published in the ELDSNet list on the ECDC website.

27 Responding to information requests from lawyers and other individuals

In the past, the EWGLINET coordinating centre in London received many requests for information on specific incidents or clusters of TALD. These requests came mainly from lawyers, patients and tour operators involved in litigation issues.

ECDC continues to maintain the confidentiality of patient data under European Data Protection Acts. No identifiers, including names of cases, are held on ECDC databases. Environmental investigation results remain the property of the investigating country and will not be released without their permission.

Requests for data exchanged among ELDSNet members **outside** the framework of The European Surveillance System (TESSy) are responded to in the following way:

- An explanation of the actions taken in accordance with these operating procedures may be provided.
- The name and address of the nominated national contact point in the country of infection is given to the person requesting information on results of environmental investigations.

Requests for data exchanged among ELDSNet members in the framework of TESSy, e.g. the total number of cases associated with the cluster or the number of cases by reporting country, are responded to in accordance with the 'Policy On Data Submission, Access, And Use Of Data Within TESSy' agreed between ECDC, the European Commission and the EU Member States (as approved by ECDC's Management Board on 25 June 2009); in particular Sections 5 and 7 thereof.

References

- 1 Decision No 2119/98/EC of the European Parliament and of the Council of 24 September 1998 setting up a network for the epidemiological surveillance and control of communicable diseases in the Community. OJ L 268, 3.10.1998, p. 1–7.
- 2 Regulation (EC) No 851/2004 of the European Parliament and of the Council of 21 April 2004 establishing a European Centre for disease prevention and control. OJ L 142, 30.4.2004, p. 1–11.
- 3 Centers for Disease Prevention and Control (CDC). Respiratory Infection – Pennsylvania. 1977. MMWR. 1997; 46(3):49-50.
- 4 Joseph CA. Legionnaires' disease in Europe 2000-2002. Epidemiol Infect. 2004; (132): 417-424.
- 5 2000/96/EC: Commission Decision of 22 December 1999 on the communicable diseases to be progressively covered by the Community network under Decision No 2119/98/EC of the European Parliament and of the Council. OJ L 28, 3.2.2000, p. 50–53.
- 6 den Boer JW, Yzerman EPF, Schellekens J, Lettinger KD, Boshuizen HC, Van Steenberghe JE, et al. A large outbreak of Legionnaires' disease at a flower show, the Netherlands, 1999. Emerg Infect Dis. 2002; 8: 37-43.
- 7 Nguyen TM, Ilef D, Jarraud S, Rouil L, Campese C, Che D, et al. A community-wide outbreak of Legionnaires disease linked to industrial cooling towers—how far can contaminated aerosols spread? J Infect Dis. 2006; 193(1), 102-11.
- 8 Joseph CA. New outbreak of Legionnaires' disease in the United Kingdom. Editorial BMJ. 2002; 325:347-348.
- 9 Garcia-Fulgueiras A, Navarro C, Fenoll D, Garcia J, Gonzalez-Diego P, Jimenez-Bunuales T, et al. Legionnaires' Disease Outbreak in Murcia, Spain. Emerg Infect Dis. 2003; 9(8), 915-21.
- 10 Ricketts KD, Joseph CA. Travel associated Legionnaires' disease in Europe: 2006. Euro Surveill. 2008; 13 (29): pii = 18930
- 11 Hornei B, Ewig S, Exner M, Tartakovsky I, Lajoie L, Dangendorf F, et al. Legionellosis. In: Bartrum J, Chartier Y, Lee JV, Pond K, Surman-Lee S, editors. *Legionella* and the Prevention of Legionellosis. Geneva: World Health Organization; 2007. pp. 1–27.
- 12 Lück PC. Diagnostics and Clinical Disease Treatment. In: Heuner K, Swanson M, editors. *Legionella: Molecular Microbiology*. Norwich: Horizon Press; 2008.
- 13 Roig J and Rello J. Legionnaires' disease: a rational approach to therapy. J Antimicrob Chemother. 2003; 51:1119-29.
- 14 Edelstein PH. Clinical features of Legionnaires' disease: a selective review. In: Cianciotto NP, Abu Kwaik Y, Edelstein PH, et al, editors. *Legionella: state of the art 30 years after its recognition*. Washington DC: ASM Press;2006. pp. 3–7.
- 15 Joseph CA and Ricketts K. The epidemiology of Legionnaires' disease. In: Heuner K, Swanson M, editors. *Legionella: Molecular Microbiology*. Norwich: Horizon Press; 2008.
- 16 The British Thoracic Society and the Public Health Laboratory Service. Community-acquired pneumonia in adults in British hospitals in 1982-1983: a survey of aetiology, mortality, prognostic factors and outcome. Q J Med. 1987 Mar;62(239):195-220.
- 17 Bohte R, van Furth R, van den Broek PJ. Aetiology of community-acquired pneumonia: a prospective study among adults requiring admission to hospital. Thorax. 1995; 50:543-7.
- 18 Lim WS, Macfarlane JT, Boswell TC, Harrison TG, Rose D, Leinonen M, et al. Study of community acquired pneumonia aetiology (SCAPA) in adults admitted to hospital: implications for management guidelines. Thorax. 2001; 56(4):296-301.
- 19 Hubbard RB, Mathur RM, Macfarlane JT. Severe community-acquired *Legionella* pneumonia: treatment, complications and outcome. Q J Med. 1993; 86:327-32.
- 20 Lettinga KD, Verbon A, Weverling G-J, Schellekens JFP, den Boer J, Yzerman EPF, et al. Legionnaires' disease at a Dutch flower show: Prognostic factors and impact of therapy. Emerg Infect Dis. 2002 Dec;8(12):1448-54.
- 21 Houck PM, Bratzler DW, Nsa W, Ma A, Bartlett JG. Timing of antibiotic administration and outcomes for Medicare patients hospitalized with community-acquired pneumonia. Arch Intern Med. 2004; 164:637-644.
- 22 Ricketts K, Yadav R, Joseph CA. Travel associated Legionnaires' disease – Results 2007. 23rd Annual Scientific Meeting of the European Working Group for *Legionella* Infections. Madrid, May 2008.
- 23 2008/426/EC: Commission Decision of 28 April 2008 amending Decision 2002/253/EC laying down case definitions for reporting communicable diseases to the Community network under Decision No 2119/98/EC of the European Parliament and of the Council. OJ L 159, 18.6.2008, p. 46–90.
- 24 Hornei B, Ewig S, Exner M, Tartakovsky I, Lajoie L, Surman-Lee S, et al. Laboratory aspects of *Legionella*. In: Bartrum J, Chartier Y, Lee JV, Pond K, Surman-Lee S, editors. *Legionella* and the Prevention of Legionellosis. Geneva: World Health Organization; 2007. pp. 175–193.

Appendix 1

Legionnaires' disease: minimising the risk

Checklist for hotels and other accommodation sites

Legionnaires' disease is a rare, though severe, illness in travellers but it can lead to major legal costs for hoteliers or tour operators since the disease is preventable through the application of active *Legionella* control programmes in tourist buildings. The illness is often fatal and the publicity attracted by such cases can severely harm the hotel and tourism business. Almost 900 cases of Legionnaires' disease in European residents were reported to be associated with staying in hotels or other holiday accommodation in 2010.

What is Legionnaires' disease?

Legionnaires' disease is a form of pneumonia which kills between 5 and 15% of those infected and is caused by *Legionella* bacteria. *Legionella* can also cause less serious illness such as Pontiac or Lochgoilhead fever. Legionnaires' disease usually develops 5–6 days after infection but may take longer.

Symptoms and diagnosis

The illness usually starts with a fever, chills, headache and muscle pain. This is followed by a dry cough and breathing difficulties that progress to severe pneumonia. Between 25 and 50% of those infected will also have diarrhoea or vomiting and about 50% become confused or delirious.

Accurate diagnosis requires specific laboratory tests, which will often not be carried out until the guests have returned home.

How is Legionnaires' disease caught?

The disease is acquired through breathing in air containing the *Legionella* bacteria in an aerosol that may not be visible. These aerosols are formed from fine droplets generated from water containing the bacteria by, for example, running a tap or shower, flushing a toilet, or from bubbles rising through water in a spa pool. The bacteria can live and multiply in water at temperatures of 20°C to 45°C with the risk highest at the upper end of this range. They can be found in the natural environment such as rivers, lakes and moist soil but usually in low numbers. High numbers occur in inadequately maintained artificial water systems.

Where are the potential risk areas in hotels?

Wherever water droplets can be created, there is a risk of infection. Examples include:

- Showers and taps
- Cooling towers and evaporative condensers, even if situated on the roof or in the grounds of the accommodation site
- Spa baths, whirlpool baths and hot tubs
- Turkish baths and saunas
- Ornamental fountains, particularly indoors
- Humidified food displays

Where can *Legionella* multiply?

- Hot and cold water systems including storage tanks/cisterns
- Any system or part of a system where the water is warm, i.e. between 20°C and 45°C, and particularly when above 30°C
- Pipes with little or no water flow (this includes unoccupied rooms)
- Slime (biofilm) and dirt on pipes feeding showers and taps and tank surfaces
- Rubber and natural fibres in washers and seals
- Water heaters and hot water storage tanks
- Scale and corrosion in storage vessels, pipes, showers and taps
- Flexible hoses and artificial rubber seals.

These situations and conditions encourage the growth of *Legionella* bacteria and increase the risk of infection for hotel guests, visitors and staff.

Reducing the risk (the 14 point checklist)

The risk of Legionnaires' disease can be minimised. Any hotel that does not have an active programme to control the growth of the bacteria is negligent in ensuring the safety of its guests. This programme should include the following:

- Have one named person responsible for *Legionella* control.
- Ensure the named person is trained in the control of *Legionella* and other staff are trained to be aware of the importance of their role in controlling *Legionella*.
- Keep hot water hot and circulating at all times: 50°C–60°C (too hot to put hands into or under for more than a few seconds)³.
- Keep cold water cold at all times throughout the system: it should be maintained at temperatures below 25°C².
- Run all taps and showers: in guest rooms run for several minutes at least once a week if they are unoccupied and always prior to occupation.
- Keep shower heads, hoses and taps clean and free from scale.
- Clean and disinfect cooling towers and associated pipes used in air conditioning systems regularly: at least twice a year.
- Clean and disinfect water heaters (calorifiers) and hot water storage tanks at least once a year.
- Disinfect the hot water system with a high level (50mg/l) of chlorine for 2–4 hours after work on water heaters and before the beginning of every season.
- Clean and disinfect all water filters regularly: every one to three months.
- Inspect water storage tanks, cooling towers and visible pipe-work monthly. Ensure that all lids and insulation are intact and firmly in place.
- Inspect the inside of cold water tanks at least once a year and clean. If they contain a deposit or are otherwise dirty, disinfect with 50mg/l chlorine for a minimum of 1 hour.
- Ensure that system modifications or new installations do not create pipe-work with intermittent or no water flow or insufficient capacity to cope with surges in requirement.
- If there is a spa pool (synonyms: whirlpool spa, JacuzziTM, spa bath, hot tub) ensure that:
 - it is continuously treated with a minimum of 2–3mg/l chlorine or bromine and the pH is maintained at 7.0–7.6 and the levels are monitored at least three times a day;
 - at least half of the water is replaced each day;
 - sand or diatomaceous earth filters are back-washed daily;
 - the whole system, including the balance tank, is cleaned and disinfected once a week; and
 - daily records are kept of all water treatment readings, such as temperature, pH and chlorine concentrations and ensure that any measurements that are outside of those specified have been acted upon and are checked regularly by the manager.

Further advice about specific controls should be sought from experts in this field who can carry out a full risk assessment of the hotel site.

An example of a structured form for monitoring a *Legionella* prevention programme can be found in the Federation of Tour Operators handbook – Preferred Code of Practice, Health and Safety 2007 (www.fto.co.uk).

Legionella testing

Testing (which is not compulsory) can be inappropriate or misleading. Samples should only be collected by trained personnel and preferably examined within 24 hours of collection by laboratories accredited for testing water for legionellae. A negative test does not necessarily mean that the hotel or other accommodation site is clear of *Legionella* or that there is no risk.

Further information

Further technical information can be obtained from the European Technical Guidelines for Control and Prevention of Travel Associated Legionnaires' Disease available at <http://ecdc.europa.eu/en/activities/surveillance/ELDSNet/Pages/index.aspx>

³ Where these temperatures cannot be achieved due to local conditions, suitable alternative residual disinfection procedures must be used and supported by regular (at least quarterly) testing for *Legionella*. Residual disinfection procedures that have been used include chlorine dioxide and copper/silver ionisation.

Appendix 2

Forms A and B

Reproduced overleaf



European Legionnaires' Disease Surveillance Network

Form A Two Week Post-Cluster Report

ELDSNet Cluster No: _____ (if complex, site code: _____)
Name of hotel/accommodation site:
Town/ Region:
Country:
Date cluster alert was issued by ECDC (dd/mm/yyyy):
Date cluster alert was received by network member (dd/mm/yyyy):

STATEMENT

The above named accommodation site has been visited and an immediate risk assessment (without results from environmental investigations) has been made. Based on the report received from the investigator, I confirm the following:

	YES	NO
A risk assessment has been carried out	<input type="checkbox"/>	<input type="checkbox"/>
Control measures have been started*	<input type="checkbox"/>	<input type="checkbox"/>
The hotel or other accommodation site remains open <input type="checkbox"/>	<input type="checkbox"/>	

*If "No", please specify reason why control measures have not yet been started

Date of risk assessment

Date of this report to ECDC (dd/mm/yyyy):

Name of person sending this report:

on behalf of (if relevant):

Additional comments:

Please return by email to eldsnet@ecdc.europa.eu or fax to +46 (0)8 58 60 10 01



European Legionnaires' Disease Surveillance Network

Form B Six Week Post-Cluster Report

ELDSNet Cluster No: _____ (if complex, site code: _____)
 Name of hotel/accommodation site:
 Town/ Region:
 Country:
 Date cluster alert was issued by ECDC (*dd/mm/yyyy*):
 Date cluster alert was received by network member (*dd/mm/yyyy*):

STATEMENT

An environmental investigation has been carried out at the above named accommodation site. Based on the report received from the investigator, I confirm the following: (please note that answers must be provided to all of these questions)

	YES	NO	N/A*
Environmental sampling was carried out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Legionella was found in the water system(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
if yes – please give species and serogroup:			
Preventive measures were in place before cluster was notified	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Control measures were carried out in response to cluster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
if yes – they included:			
chlorination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
thermal disinfection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
other (<i>please specify</i>)			
Control measures are satisfactory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site informed of need to maintain long term preventive measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The hotel or other accommodation site remains open	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
if no – a new Form B will be required before re-opening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Date of this report to ECDC (*dd/mm/yyyy*):
 Name of person sending this report:
 on behalf of (*if relevant*):
 Additional comments:

* = Not Applicable

Please return by email to eldsnet@ecdc.europa.eu or fax to +46 (0)8 58 60 10 01