



**TECHNICAL DOCUMENT**

# European Legionnaires' Disease Surveillance Network (ELDSNet)

Operating procedures for the surveillance of travel-associated Legionnaires' disease in the EU/EEA

2017

**ECDC TECHNICAL DOCUMENT**

# **European Legionnaires' Disease Surveillance Network (ELDSNet)**

Operating procedures for the surveillance of travel-associated Legionnaires' disease in the EU/EEA

2017



This document was produced by Lara Payne Hallström, Birgitta de Jong and Emmanuel Robesyn, with input from the ELDSNet network coordination committee. The document was also reviewed and commented on by members of the ELDSNet network and experts from the World Health Organization.

Suggested citation: European Centre for Disease Prevention and Control. European Legionnaires' Disease Surveillance Network (ELDSNet) – Operating procedures for the surveillance of travel-associated Legionnaires' disease in the EU/EEA. Stockholm: ECDC; 2017. Stockholm: ECDC; 2017

Stockholm, December 2017

ISBN 978-92-9498-165-3

doi 10.2900/485245

TQ-05-17-229-EN-N

© European Centre for Disease Prevention and Control, 2017

Reproduction is authorised, provided the source is acknowledged.

For any use or reproduction of photos or other material that is not under the EU copyright, permission must be sought directly from the copyright holders.

# Contents

Abbreviations .....	4
Document overview .....	4
Notes on the current edition .....	4
Background .....	5
1 <i>Legionella</i> – natural history of the organism .....	5
2 What is Legionnaires’ disease? .....	5
3 Routes of transmission .....	5
4 Diagnosis and treatment.....	6
5 Recognised potential sources of infection .....	6
6 Risk factors for infection .....	6
7 ELDSNet and TALD surveillance.....	7
8 Definitions for reporting to ELDSNet .....	9
9 Reporting cases to ECDC .....	10
10 Response by ECDC to a single reported case .....	11
11 Response to single TALD cases by the EU/EEA ELDSNet members .....	11
12 Response by ECDC to a cluster .....	12
13 Response by the EU/EEA ELDSNet member to a cluster .....	12
14 Risk assessment reports .....	12
15 Publication to accommodation site list .....	13
16 Report of additional cases in an active cluster .....	13
17 Actions following a rapidly evolving cluster .....	13
18 Actions following a complex cluster .....	14
19 The role of tour operators .....	14
20 Responding to clusters outside the EU/EEA.....	14
21 Responding to information requests from lawyers and other individuals .....	15
References .....	16
Appendix 1. Legionnaires’ disease – Information about Legionnaires’ disease for managers of tourist accommodation .....	17
Appendix 2. Form A .....	20
Appendix 3. Form B .....	21
Appendix 4. Form C .....	22

# Abbreviations

ELDSNet	European Legionnaires' disease Surveillance Network
ESGLI	ESCMID Study Group for <i>Legionella</i> Infections
EU	European Union
EWGLI	European Working Group for <i>Legionella</i> Infections
EWGLINET	European Surveillance Scheme for Travel Associated Legionnaires' disease
IHR	International Health Regulations
TALD	Travel-associated Legionnaires' disease
WHO	World Health Organization

## Document overview

This document describes the operating procedures of the travel-associated Legionnaires' disease surveillance scheme of the European Legionnaires' Disease Surveillance Network (ELDSNet), which is coordinated by the European Centre for Disease Prevention and Control (ECDC).

The objective of these procedures is to offer a standardised approach to reporting cases notified from European Union Member States and other contributing countries in order to detect, and respond to, clusters of travel-associated Legionnaires' disease (TALD). These procedures describe how information is communicated within the network to other stakeholders and also covers actions by network members in response to TALD clusters.

The first sections of these procedures provide some basic facts on Legionnaires' disease, the risk of exposure associated with travelling, and the currently known sources of infection. It also describes the added value of this EU surveillance scheme.

Further sections describe the procedures for reporting and managing notifications of TALD cases. They define the roles and responsibilities of the network's coordinating centre at ECDC and the scheme's national network members (which are appointed by the EU Member States) in response to reports of single cases and clusters. This document also outlines all relevant stages and deadlines the network members in the country of infection undertake in order to inform ECDC of investigations and control measures taken in response to reported clusters.

Additional information is given on how the general public may at times be informed of the status of actions within the remit of these procedures.

## Notes on the current edition

This edition of the operating procedures supersedes the January 2012 edition.

- It includes a revised EU case definition for Legionnaires' disease (dated 8 August 2012)
- It updates references to EU surveillance legislation
- Regarding travel-associated Legionnaires' disease, it clarifies:
  - the definition of rapidly evolving clusters
  - the definition and handling of complex clusters
  - the types of accommodation sites or travel stops that are included in this surveillance
  - the notification timelines by ECDC
  - the notifications issued by ECDC to tour operators
  - the role of ELDSNet contact points outside the EU/EEA
- It includes revised Forms A and B
- It includes the new Form C

Comments or queries about the ELDSNet scheme or these procedures can be addressed to ECDC through the general enquiry email address: [info@ecdc.europa.eu](mailto:info@ecdc.europa.eu).

# Background

## 1 *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*, particularly *Legionella pneumophila*, does not appear to multiply below 20 °C and has limited survival in water maintained above 60 °C. It may, however, remain dormant in cool water and multiply when water temperatures reach a suitable level. *Legionella* 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 plays an important role in harbouring and providing favourable conditions in which *Legionella* may grow.

## 2 What is Legionnaires' disease?

Legionnaires' disease was first identified in 1976 [1]. The disease is a serious form of pneumonia with a case-fatality rate of 10 to 15%. Symptoms include a flu-like illness, followed by a dry cough and progression to pneumonia. Approximately 25 to 50% of people infected with *Legionella* may present with diarrhoea, and around 50% may show signs of mental confusion [2]. The incubation period normally ranges from 2 to 10 days, but in rare cases it may extend up to 20 days after exposure. If not treated, the symptoms normally worsen rapidly and may result in respiratory failure, shock, multi-organ failure, and death.

From the 61 different species of *Legionella* described, 28 species have been associated with human disease (Table 1) [3,4]. *Legionella pneumophila* is the species that accounts for almost all of the cases reported. Legionnaires' disease may be detected as single sporadic cases or as clusters of cases in a limited temporal and spatial exposure to a single source or from a geographical area. 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 to 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 usually only identified in settings that lead to outbreaks, rather than sporadic cases, for example when exposure is linked to the use of a communal spa pool in a leisure centre or hotel.

**Table 1. List of 61 *Legionella* species, according to published association with human disease, as of 13 June 2017**

Associated with human disease (28)	Detected in the environment but not associated with human disease (33)
<i>L. anisa</i> , <i>L. birminghamensis</i> , <i>L. bozemanii</i> , <i>L. cardiaca</i> , <i>L. cincinnatiensis</i> , <i>L. clemsonensis</i> , <i>L. dumoffii</i> , <i>L. erythra</i> , <i>L. feeleii</i> , <i>L. gormanii</i> , <i>L. hackeliae</i> , <i>L. jamestowniensis</i> , <i>L. jordansii</i> , <i>L. lansingensis</i> , <i>L. londiniensis</i> , <i>L. longbeachae</i> , <i>L. lytica</i> , <i>L. maceachernii</i> , <i>L. micdadei</i> , <i>L. nagasakiensis</i> , <i>L. oakridgensis</i> , <i>L. parisiensis</i> , <i>L. pneumophila</i> , <i>L. sainthelensii</i> , <i>L. steeleii</i> , <i>L. tucsonensis</i> , <i>L. wadsworthii</i> , <i>L. waltersii</i>	<i>L. adelaidensis</i> , <i>L. beliardensis</i> , <i>L. brunensis</i> , <i>L. busanensis</i> , <i>L. cherrii</i> , <i>L. drancourtii</i> , <i>L. dresdenensis</i> , <i>L. drozanskii</i> , <i>L. fairfieldensis</i> , <i>L. fallonii</i> , <i>L. geestiana</i> , <i>L. gratiana</i> , <i>L. gresilensis</i> , <i>L. impletisoli</i> , <i>L. israelensis</i> , <i>L. massiliensis</i> , <i>L. moravica</i> , <i>L. nautarum</i> , <i>L. norrlandica</i> , <i>L. quateirensis</i> , <i>L. quinlivanii</i> , <i>L. rowbothamii</i> , <i>L. rubrilucens</i> , <i>L. santicrucis</i> , <i>L. saoudiensis</i> , <i>L. shakespearei</i> , <i>L. spiritensis</i> , <i>L. steigerwaltii</i> , <i>L. taurinensis</i> , <i>L. thermalis</i> , <i>L. tunisiensis</i> , <i>L. worsleiensis</i> , <i>L. yabuuchiae</i>

## 3 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). Person-to-person transmission has never been demonstrated, though suspected in one case in a family household involving exposure to a highly-symptomatic person being cared for by an elderly relative [5].

## 4 Diagnosis and treatment

Legionnaires' disease has no clinical features that 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 contributed to an increase in diagnosed cases of Legionnaires' disease since the late 1990s and to a reduction in the associated mortality, although the test mainly detects the common strains of *Legionella pneumophila* 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 [6] and because of its ability to detect the less common strains of infection. For this reason, it is strongly advised to collect sputum or bronchoalveolar lavage from patients with pneumonia in order to obtain a clinical isolate from culture. *Legionella* infections do not respond to  $\beta$ -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 [7-8].

## 5 Recognised potential sources of infection

The following are examples of potential sources of Legionnaires' disease [9,10,11,12]:

- Hot and cold water systems
- Cooling towers and evaporative condensers
- Heated birthing pools
- Industrial product aeration ponds
- Spa pools, natural pools, thermal springs
- Fountains, sprinklers
- Humidifiers for food display cabinets
- Respiratory therapy equipment
- Dental unit water lines
- Potting soil, compost
- Vehicle washes and car windscreen water tanks
- Water-cooled machine tools

## 6 Risk factors for infection

Risk factors for Legionnaires' disease include belonging to an older age group ( $\geq 40$  years), being male, having a chronic underlying disease with or without an associated immunodeficiency, having had an organ transplant, and having a history of heavy smoking [2].

The public health risks associated with Legionnaires' disease and travel are mainly related to the nature of temporary accommodation designed for short stays and where occupation may be on a seasonal or intermittent basis. Diagnosis and treatment can be delayed by the fact that some cases do not seek medical assistance until they arrive back in their own country.

### Irregular water demand and supply

The use of 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 a site or even the complete site being closed. These factors can cause the water system to have little or no flow and become stagnant, resulting in lower temperatures and/or residual biocide.

The quality and supply of water may vary due to the location of the accommodation site, e.g. in an area with low rainfall. This affects water treatment regimens, which need to be monitored more closely than in areas where such problems do not exist. In areas with high outside temperatures, temperature control for hot and cold water systems may be difficult.

### Water system engineering and maintenance

A further risk factor is that accommodation sites frequently have many rooms with individual water outlets, inevitably resulting in very complex water systems, often with long lengths of water pipes. Where new hotel annexes are connected to the original hot water system, insufficient heating capacity may result, i.e. it can be difficult to maintain the circulating temperature throughout the whole of the extended premises. Heating capacity may also be insufficient to handle a sudden surge in demand for hot water. Repairs or changes in the water pipes may create stagnant water points, favouring conditions for *Legionella* growth. In addition, site engineers may have received only limited training with regard to the control of *Legionella* in water systems. Cooling systems that are

only used seasonally may not be maintained regularly or are sometimes turned on off-season without a prior maintenance check.

## Water use and recreational features

Hotel gardens are frequently irrigated with sprinklers which may present an additional risk, particularly if they utilise waste water (e.g. grey water).

Spas and water features should be designed to ensure adequate and regular maintenance cleaning.

Furthermore, the often seasonal nature of the holiday trade can result in a high staff turnover rate, making it difficult to maintain a core of adequately trained personnel who are aware of *Legionella* issues and the implications this has for such water systems.

## 7 ELDSNet and TALD surveillance

### 7.1 The ELDSNet network

#### *History and aims of the network*

ELDSNet is the successor of EWGLINET a surveillance started by EWGLI, the European Working Group on *Legionella* Infections in 1987. It operates as a disease-specific network in accordance with Decisions 2119/98/EC [13] and 2000/96/EC [14].

With the establishment of ECDC in Stockholm, the public health and surveillance actions of EWGLINET were integrated into the tasks of the centre. In April 2010, the network functionalities were transitioned to ECDC. A new network called ELDSNet was launched. The network covers all EU Member States and is coordinated by ECDC.

The aim of ELDSNet is to detect, control and prevent cases, clusters and outbreaks of Legionnaires' disease in EU/EEA countries, and assist with detection and response outside these countries. The network supports the Member States and other involved countries to share information and collaborate on response actions to provide better protection from travel-associated Legionnaires' disease, both domestically and abroad.

#### *ELDSNet members and network contacts*

Members of the ELDSNet network are appointed by their national public health authorities to act as national contact points for Legionnaires' disease surveillance under the scope of ELDSNet activities. Members usually have scientific knowledge about Legionnaires' disease or *Legionella* bacteria and are involved in the microbiological diagnosis or epidemiological surveillance of Legionnaires' disease in their country.

As of August 2017, 28 EU Member States plus Iceland, Norway and Switzerland contribute data on travel-associated cases. The network liaises with other national authorities if the case is associated with travel in countries outside the EU/EEA. Starting in 2016, EU enlargement countries and European Neighbourhood Partner countries can appoint contact points for ELDSNet in order to receive and communicate on information concerning TALD notifications.

Additionally, ELDSNet has contact points in several countries in different regions worldwide (see online list<sup>1</sup>), totalling over 50 countries which are involved in ELDSNet surveillance and response activities. The remaining countries are notified through collaboration with the World Health Organization. Information on cases with a travel history to an accommodation site within the EU can be voluntarily reported to ECDC by other countries through their ministries of health or their national public health institutes by contacting [eldsnet@ecdc.europa.eu](mailto:eldsnet@ecdc.europa.eu).

### 7.2 The added value of TALD surveillance

Since 2010, each year travel-associated Legionnaires' disease cases have accounted for 20% of all reported Legionnaires' disease cases in the EU/EEA. The number of cases reported to the TALD surveillance scheme continues to rise annually, with a 20% increase observed between 2014 and 2015 [15]. This trend may be driven by an aging EU population, increased travel among older age groups at higher risk of infection, and broader use of diagnostic tests. With a reported mortality of 5% among travel-associated Legionnaires' disease cases notified to ECDC, surveillance and response actions towards travel-associated cases may contribute to reducing the impact of this disease.

The TALD surveillance scheme operates daily within ECDC working hours. If there are sufficient grounds (e.g. an ELDSNet-notified cluster), an investigation is launched by the EU/EEA country where the reported associated accommodation is situated. In 2015, the estimated median delay between onset of illness and reporting to ELDSNet was 17 days. ELDSNet-notified clusters located in the EU/EEA should lead to site assessments and reporting to ECDC on the response actions taken. Investigation results show that 60% of the investigated

<sup>1</sup> <https://ecdc.europa.eu/en/publications-data/epidemic-intelligence-information-system-epis>



ELDSNet-notified cluster sites had *Legionella*-positive water samples [15]. This is comparatively higher than positivity rates for buildings outside the hospitality sector, as documented by other studies in the EU/EEA [16,17].

A major added value of ELDSNet TALD surveillance is that clusters can be detected based on the contribution of all countries reporting to the surveillance scheme. In fact, in 2015, 60% of the notified clusters would probably not have been identified if the countries had conducted their disease surveillance alone, because the first two cases of the cluster were reported by different countries.

The ELDSNet surveillance scheme contributes to protecting the health of travellers worldwide. In 2015, 20% of TALD cases reported through ELDSNet had a history of travel to destinations outside the EU/EEA, which contributes to raising awareness regarding prevention and control of *Legionella* in tourist destinations worldwide.

Though TALD surveillance has been conducted for many years by EU/EEA countries, the number of cases reported to ELDSNet are likely to be only a fraction of the real number of Legionnaires' disease cases among travellers.

There are several reasons why travel-associated Legionnaires' disease may be underdiagnosed and underreported, even within the EU/EEA countries:

- 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, which also means that it is no longer considered relevant to establish the cause of the pneumonia or undertake laboratory testing. Without the laboratory test, the case cannot be reported to the surveillance scheme.
- The most commonly used method of diagnosis – urinary antigen detection – primarily detects *Legionella pneumophila* serogroup 1 infections.
- A small proportion of the diagnostic methods for Legionnaires' disease lack sensitivity and may result in producing false negative results.
- 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.
- EU/EEA residents may fall ill while on holiday and are diagnosed in a country not aware of, or contributing to, the ELDSNet surveillance scheme.
- Diagnosed cases of travel-associated disease are not reported to the national ELDSNet network member for reporting to ELDSNet.
- Cases reported to the ELDSNet TALD surveillance need complete travel details, but not all patients can provide site locations or addresses.

Despite these surveillance limitations, the public health value of the TALD surveillance remains high.

Further information on trends in the epidemiology of Legionnaires' disease in Europe is available in several reports<sup>2</sup> and the online ECDC Surveillance Atlas<sup>3</sup>.

### 7.3 Objectives of the TALD surveillance scheme

- To rapidly detect cases and clusters of travel-associated Legionnaires' disease reported in the EU/EEA and affecting European residents, both in their own countries or abroad;
- To disseminate information on TALD and respond to it in a coordinated fashion;
- To promote awareness of travel-associated Legionnaires' disease in order to support primary preventive action and collaborative investigations;
- To assist in the detection or understanding the extent of common-source outbreaks of Legionnaires' disease worldwide through prompt notification of reported travel-related cases and clusters;
- To reduce the incidence of travel-associated Legionnaires' disease among EU residents through the support for awareness of active control and prevention at accommodation sites.

### 7.4 Overview of surveillance methods

At the country level, clinicians and microbiologists report individual TALD cases to their national surveillance scheme for Legionnaires' disease. The national contact point for ELDSNet reports these cases to ECDC using the EU case definition. With complete and rapid reporting, ELDSNet can detect clusters of cases which have a history of travel to the same accommodation site. Receipt of the information leads to specific and timely action by members in order to protect EU/EEA residents travelling in and outside of Europe.

<sup>2</sup> <https://ecdc.europa.eu/en/legionnaires-disease>

<sup>3</sup> <https://ecdc.europa.eu/en/legionnaires-disease/surveillance/atlas>

All network members transmit case information to ECDC on a secure section of the ECDC web portal to a specific disease surveillance database. The database is searched for previously reported cases that may have stayed at the same accommodation site. Most often, cases are reported by the network member or contact point of the case's country of residence, but a case report can also be made by any ELDSNet-participating country that has diagnosed a case of travel-associated Legionnaires' disease. This reduces the delay in the surveillance scheme and speeds up notification to the country where the accommodation site is located. In addition, cases in people who travel within their own country, stay in commercial accommodation, and develop Legionnaires' disease are also reported by the surveillance network because 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 by supporting external quality assessment (EQA) schemes for laboratories which contribute to improved diagnostic capabilities in European laboratories.

It should be noted that cases and clusters associated with a specific accommodation can arise by chance, while the source of the infection may lie elsewhere. In ELDSNet, it is therefore understood that a notification related to a TALD case or cluster does not necessarily imply that the accommodation named is the actual source of infection.

## 7.5 Definitions and procedures for TALD case report management

The following definitions and procedures have been devised to improve the prevention and control of travel-associated Legionnaires' disease (TALD) and to improve the information exchange on actions taken at accommodation sites when cases are reported to ECDC.

The definitions and procedures are developed in line with the following European Union and Commission Decisions:

- Decision No 1082/2013/EU of the European Parliament and of the Council. This Decision on serious cross-border threats to health establishes a network for the epidemiological surveillance of communicable diseases and related special health issues under the coordination of ECDC.
- Decision No 851/2004/EC, the founding regulation of ECDC.

Further information on other relevant legal documents defining the list of diseases/special health issues under EU surveillance as well as case definitions can be found on the ECDC website<sup>4</sup>.

Any response by individual countries has to be in accordance with its own laws and guidelines for the prevention and control of Legionnaires' disease. These operating procedures do not override national guidelines.

This document includes important procedures for informing the public about clusters of Legionnaires' disease cases associated with travel accommodation sites. They do not provide technical specifications or specific advice for professional groups involved in the technical control and prevention of *Legionella* in water systems or in environmental investigations. Specific guidelines may exist at the national level. Reference technical guidelines for the prevention, control and investigation of infections caused by *Legionella* species are available on the ECDC [website](#).

## 8 Definitions for reporting to ELDSNet

### 8.1 Case definition for Legionnaires' disease

The current EU case definition for Legionnaires' disease is stated in the Commission Implementing Decision of 8 August 2012 (2012/506/EU):

#### **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
- Significant rise in specific antibody level to *Legionella pneumophila* serogroup 1 in paired serum samples

#### **Laboratory criteria for a probable case**

At least one of the following four:

<sup>4</sup> [http://ecdc.europa.eu/en/aboutus/what-we-do/surveillance/Pages/legal\\_framework.aspx](http://ecdc.europa.eu/en/aboutus/what-we-do/surveillance/Pages/legal_framework.aspx)

- 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 respiratory secretions, lung tissue or any normally sterile site
- Significant rise in specific antibody level to *Legionella pneumophila* other than serogroup 1 or other *Legionella* spp. in paired serum samples
- Single high level of specific antibody to *Legionella pneumophila* serogroup 1 in serum

Epidemiological criteria: Not applicable

### Case classification

1. Possible case: Not applicable
2. Probable case: Any person meeting the clinical criteria AND at least one laboratory criterion for a probable case
3. Confirmed case: Any person meeting the clinical criterion AND at least one laboratory criterion for a confirmed case

Details of specimens to be collected and laboratory methods to be used for the diagnosis of Legionnaires' disease can be found in laboratory manuals and standard textbooks on *Legionella* [18].

## 8.2 TALD case and cluster definitions

### Single TALD 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 other cases of Legionnaires' disease in the two years prior to date of onset of illness.

### Cluster TALD cases

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.

A cluster can be categorised as:

- **Rapidly evolving:** when three or more cases have onset of illness within a three-month period occurring in the six months preceding the cluster notification or notification update. This categorisation indicates a possible recent increase of exposure risk.
- **Complex:** a combination of cluster sites having one or more cases in common.
- **Active:** a cluster having at least one or more cases associated within two years of the most recent case (based on date of illness onset), is considered an active cluster. If additional cases are reported to an active cluster this is considered a cluster update.
- **Expired:** when no cases associated with a site are reported within two years of the most recent case illness onset. If a new case is reported associated with an expired cluster site, they will be reported as a new single case.

## 9 Reporting cases to ECDC

Cases are normally reported to ECDC by an ELDSNet member via a password-protected IT platform. Probable or confirmed cases should be reported as soon as the epidemiological, microbiological and travel information is obtained. For the travel history, dates of stay and each accommodation site address need to be provided. Further information such as site telephone number and URL of the accommodation's web page can also be reported. Without satisfactory information on the travel details it may not be possible to identify the accommodation site and its geographical location, especially in resort areas where similar hotel names are used by many different establishments. Some large hotel groups may have more than one hotel in a town or resort. It is therefore 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. Supplementary information such as use of showers, whirlpool spas or other exposure risks can be provided to support environmental site investigations by the local public health authorities.

In order to facilitate local public health investigations, the ELDSNet contact point of the country of travel can request additional information from another ELDSNet contact point, e.g. room number, place number of a campsite, name or initials of the patient, or date of birth. This information should be transmitted directly between ELDSNet contact points under communication channels as mutually agreeable. In some EU countries sharing such additional information is only permissible with the consent of the patient.

The number of TALD cases who have stayed in privately rented rooms, apartments, houses, or swaps booked through the internet has increased over the years. Such cases should continue to be reported to the network. However, if a Legionnaires' disease case stayed in an accommodation owned by relatives or friends which is

otherwise not available to the public, the case should not be reported. Likewise, the surveillance scheme does not include private company-owned or company-rented flats used for own staff or student accommodations. Such cases may be reported directly between country contact points of the ELDSNet network.

Accommodation sites can include a day or night cabin stay on vessels (i.e. sea or river cruise ships, ferries, rented holiday leisure boats). Currently, the surveillance scheme does not include long-distance buses/coaches and sleeper trains (due to changing coach, wagon and train numbers), which limits tracing of exposure risks. Cases in persons such as truck drivers who travelled in the period before onset of illness but slept in their vehicles, should be reported to the network if information is available on the location of truck stops where the case used public facilities (e.g. showers, toilets). Cases with a history of transit stays in airports or other travel terminals and who have used showers or rest facilities in transit lounges may also be reported.

Cases who have an association with the accommodation site only through occupational exposure should not be reported to ELDSNet for the purposes of the travel-associated surveillance scheme but may be reported directly between ELDSNet contact points. Similarly, Legionnaires' disease cases who were day visitors to spa or other thermal resorts that do not have accommodation facilities on site are not included in the ELDSNet surveillance database but may be reported directly between ELDSNet contact points or mentioned as a comment to a case report travel history if they used another public accommodation site.

## 10 Response by ECDC to a single reported case

Once a case is entered into the ECDC TALD database, ECDC checks the consistency of the case information and the accommodation details. A search is performed in the database in order to identify previously reported cases associated with this accommodation site and to determine if these cases had onset of illness within the two years prior to this reported case. If no such cases are identified in the database, ECDC notifies the country where the accommodation site is located of a 'single-site notification'. It also informs of any additional cases or clusters associated with the same accommodation site in the last five years. ECDC aims to validate and notify the reported case within 24 working hours after receiving the report from the ELDSNet member/contact point.

Single-case notifications are sent to the attention of the ELDSNet member of the EU/EEA country where the accommodation site is located. Countries outside the EU/EEA will be issued a single-case notification through the ELDSNet contact point or alternatively through WHO, who may notify the State National Focal Point for the International Health Regulations (IHR). Notifications are also electronically copied to the country that reported the case. If the case is reported as a resident in another country, then his or her country of residence is copied into the notification.

No country of infection is allocated to cases associated with vessels (e.g. cruise ships, ferries). ECDC shares the notification of the case with those countries having a port of call in the vessel itinerary in the five days following cluster identification. If a port of call is in the EU/EEA, the notification will be sent to the corresponding ELDSNet contact point who then contacts the relevant port authorities in their country. Under certain circumstances, ECDC ELDSNet may directly notify the vessel's operator, for instance when it is clear that the vessel will be at sea for several days in a row.

## 11 Response to single TALD cases by the EU/EEA ELDSNet members

The ELDSNet contact point in the country of infection ensures that the notified accommodation site receives a checklist which outlines good practice for minimising the risk of *Legionella* infection (Appendix 1). Many countries carry out environmental investigations of sites associated with single cases, and an investigation assessment can be voluntarily submitted to ELDSNet using Forms A and B (Appendix 2).

With regard to vessels, the contacted port authorities may choose to communicate with other port authorities about the notification or contact the vessel directly about an assessment of risk and possible precautionary control measures. Actions taken in response to single-case notifications concerning vessels may be shared with the ELDSNet network. National authorities and port authorities may choose to communicate through the EU ShipSan Act Information System platform, available from <https://sis.shipsan.eu/>. Technical guidelines on the prevention and control of legionellosis on passenger ships are available in the [ShipSan Manual](#). The WHO handbook for management of public health events onboard ships is available through the [PAGNET](#) network (Ports, Airports and Ground Crossing Networks) and is available from:

[http://apps.who.int/iris/bitstream/10665/205796/1/9789241549462\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/205796/1/9789241549462_eng.pdf).

## 12 Response by ECDC to a cluster

Identification of a cluster warrants an immediate action by ECDC and the public health authorities in the country where the associated accommodation site is located.

A cluster identification code is created and a notification is issued containing the travel dates and disease onset dates for all cases within the cluster period. ELDSNet members will be immediately informed about the cluster. It also informs of any additional cases or clusters associated with the same accommodation site in the last five years. WHO will be informed of cluster notifications and will inform the national IHR focal point of the country of travel if the country does not have an ELDSNet contact point.

## 13 Response by the EU/EEA ELDSNet member to a cluster

After the notification of a cluster, the ELDSNet member for the country where the accommodation site is located should initiate action through communication to the relevant authorities:

- The accommodation site should be inspected by a body authorised by the national authority (e.g. a local or regional public health authority) as soon as possible. The risk should be assessed in accordance with national guidelines or the European technical guidelines, and may include environmental sampling, e.g. sampling of the building's water systems.
- Authorities should implement control measures and draw up recommendations against existing or future risks for Legionnaires' disease.

The risk assessment should include a technical inspection of the site, lead to the implementation of immediate remedial measures, and list all corrective actions taken. Results of the assessment and actions taken are reported to ECDC in a standardised form within a timeframe of six weeks.

ECDC can be contacted by an ELDSNet network member or contact point to request advice or mobilisation of technical expertise in support of site investigations.

## 14 Risk assessment reports

### 14.1 Preliminary report within two weeks of the cluster alert (Form A)

The ELDSNet member should complete Form A (Appendix 2) in response to the cluster. This form specifies whether 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 notification. The form should also state whether control measures are in progress and whether the hotel remains open. Members of the network are informed when the report is received at ECDC. This is done through an updated status summary table on the restricted ECDC ELDSNet platform.

If a completed Form A is not received within the specified time period or the form reports that no risk assessment or preventive control measures were taken, the network members of the accommodation site country will be contacted and the investigation status of the accommodation site will be discussed. Together with the ELDSNet member it is jointly agreed – based on the form and the status of the ongoing investigations – whether the accommodation site name should be listed on the accommodation site list of the ECDC website<sup>5</sup> within the next 48 hours<sup>6</sup>. If the accommodation site's name is not published online, the reasons (e.g. site was closed) for not doing so should be communicated to the ELDSNet network.

ELDSNet members will be sent a reminder 2–3 days in advance of the due date if Form A was not received.

### 14.2 Full report within six weeks of the cluster alert (Form B)

Six weeks after the initial cluster notification, information about the cluster should be reported to ECDC and the network that provides summary information from the investigation. This information includes a statement on control measures implemented at the accommodation site and summarises all water-sampling results. Summary reporting is done through completion of Form B (Appendix 2). The form should be returned to ECDC within six weeks of receipt of the initial cluster notification. ECDC informs the members of the network when Form B is received.

If a completed Form B is not received within the specified time period or if it states that the control measures are unsatisfactory, the network members of the accommodation site country will be contacted and the accommodation site investigation status discussed. Based on Form B and the status of the ongoing investigation, it will be decided

<sup>5</sup> <https://ecdc.europa.eu/en/legionnaires-disease/threats-and-outbreaks/accommodation-site>

<sup>6</sup> Time span excludes weekends and ECDC holidays.

whether an accommodation site should be made public on the ECDC website within the next 48 hours<sup>6</sup>. If the accommodation site's name is not included in the accommodation site list on the ECDC website, the ELDSNet network is informed.

ELDSNet members will be sent a reminder 2–3 days in advance of the due date if Form B was not received.

If an accommodation site that was issued a cluster notification is expected to close down for the season within the next six weeks, Form B may be completed to inform of the closure. Before the accommodation site reopens, an updated Form B with investigation results should be submitted to ECDC.

## 15 Publication to accommodation site list

The list of accommodation sites on the ECDC website shows current accommodation sites where clusters of Legionnaires' disease were identified but where ELDSNet was not informed about any assessment of the risk of *Legionella* infection, or where ELDSNet believes that there may be an increased risk to travellers. Generally, this is due to the fact that neither form A nor B were received for these accommodation sites by the specified due date and that the extent of the risk could therefore not be assessed. Alternatively, Form B was received but the accommodation site failed to implement the recommendations from the competent authorities in a satisfactory way.

The ECDC online list does not include accommodation sites located outside the EU/EEA, since Form B is not expected to be completed to ECDC under these procedures. Accommodation sites which are closed and where a Form B could not be completed will not be published on this list.

Publication usually occurs within 48 hours once the decision to publicise is made. An advance notice of the intended online publication of the accommodation site's name is sent to the ELDSNet network members 48 hours<sup>6</sup> ahead of publication. The name of the accommodation site will be removed from the website if a satisfactory Form B is received or if satisfactory control measures are reported as implemented. The name of the accommodation site will also be removed if no further cases were associated with the site in the two years after the last case's onset date.

It will be the responsibility of the network member or of the public health authorities in the country where the accommodation is located to inform the site that its name and location will be published on the ECDC website and to liaise with the accommodation site once it is published on the public website.

The objective of publishing the accommodation site's name and location on the ECDC website is to allow members of the public and tour operators to make an informed choice whether to use the accommodation site in question.

## 16 Report of additional cases in an active cluster

Reporting of additional cases within a two-year period after the date of onset of the most recent case in a cluster notification will result in a cluster notification update. If the additional case is reported with a date of stay after a satisfactory Form B is received at ECDC, new investigations are expected, and Forms A and B are required before the two- and six-week deadlines.

## 17 Actions following a rapidly evolving cluster

In addition to the procedures described in sections 13 to 16, additional procedures are required in the case of a rapidly evolving cluster.

For rapidly evolving clusters in the EU/EEA, the question of whether and when to inform guests is normally dealt with by the national and/or local authorities of the country where the site is situated (where exposure likely occurred). An additional form (Form C) will be requested from the EU/EEA country where the accommodation site is located. The purpose of this form is to provide the ELDSNet network with more detailed information about what information was provided to the guests. The form should be completed and submitted to ECDC ELDSNet within one week after the cluster was notified as 'rapidly evolving'. As Form C does not provide information to assess the possible risk at the site, non-submission of Form C will not lead to publication of the accommodation site's name on the ECDC website.

The results of site investigations are reported to the ECDC ELDSNet coordinating centre in the same manner as for standard clusters in the EU/EEA countries, i.e. by completing Forms A and B within two and six weeks, respectively.



## 18 Actions following a complex cluster

Each year, approximately 25 to 30% of all TALD cases stay at more than one accommodation site in the 2–10 days before onset of illness. These cases may contribute to standard clusters or be part of complex clusters (see definition under 8b). Each year, ELDSNet notifies between 5 and 15 complex clusters. Forms A and B are expected for each active cluster site within a complex cluster if those sites are in the EU/EEA, in accordance with procedures as described in sections 13 to 16.

## 19 The role of tour operators

Tour operators may have a responsibility for the health and safety of their clients. Unlike the associated accommodation sites, tour operators may not be aware of TALD clusters. To fill this information gap, ELDSNet offers summary reports on certain notified clusters of travel-associated Legionnaires' disease.

Tour operators can electronically subscribe to this service and are then routinely informed about clusters located in countries outside the EU/EEA (summary report type 1) because ECDC is not required to receive timely information on the control measures implemented at these sites. Rapidly evolving clusters inside the EU/EEA and globally are covered by a type-2 summary report. Summary reports are issued to subscribed tour operators 24 hours<sup>6</sup> after the notification through the ELDSNet network. This time delay is to allow for national authorities to contact local authorities concerning the notification. However, in the event of a rapidly evolving cluster leading to rapidly successive cluster notification updates to the network, type 2 summary report updates may be issued within less than 24 hours. The information provided in both summary report types contains the accommodation site's name and address and the dates of travel for each reported case that is associated with the cluster site.

Tour operators on the subscriber list will also be informed 48 hours<sup>6</sup> ahead of time if an accommodation site's name and address in an EU/EEA Member State is about to be published on ECDC's website. If an accommodation is removed from the ECDC website, tour operators will be informed on the same day.

Tour operators are immediately informed when a satisfactory Form B was received from an EU/EEA Member State with a cluster site for which a type-2 summary report was issued. Tour operators are also informed of voluntarily completed Form Bs for other sites worldwide which were submitted by the national public health authorities. A Form B which was voluntarily submitted by a non-EU/EEA Member State is not subject to rejection or approval by ECDC. Instead, ECDC passes on information from Form B without further assessment.

Very occasionally, tour operators receive notifications of cases of suspected or confirmed TALD directly from a client. In such situations, tour operators may wish to advise the informants to contact a medical doctor and request the doctor to report the case to the appropriate national authority. This helps ELDSNet receive relevant information and identify relevant clusters. This could then lead to public health investigations in the country of accommodation site.

It is the responsibility of the ELDSNet member or the public health authorities in each participating country to raise awareness of these operating procedures to hotels and other tourist accommodation sites. This may best be achieved through contact with national hotel or tourism associations or tourist authorities.

## 20 Responding to clusters outside the EU/EEA

Clusters that occur outside the EU/EEA and in regions where no ELDSNet contact points are available are routinely reported to the WHO regional IHR contact point for the WHO European Region. If no ELDSNet contact point exists in the country of the accommodation site location, information on the cluster is passed on as deemed relevant through IHR mechanisms to the WHO regional IHR contact points and national IHR focal points of the concerned countries.

In some of these countries, the notification of clusters leads to the implementation of control and preventive measures and the voluntarily reporting to ECDC of actions taken. This may be communicated through Forms A and B, which should be completed by the ELDSNet contact point or the competent public health authorities of the country. Accommodation sites outside the EU/EEA associated with a TALD cluster are never published on the ECDC accommodation list web page.

With regard to vessels, the procedures in response to a TALD cluster are the same as for outside the EU/EEA. Forms A and B may be submitted voluntarily by an ELDSNet contact point or the competent public health authorities of the country where port authorities or national authorities are involved in investigations.

## 21 Responding to information requests from lawyers and other individuals

ECDC maintains the confidentiality of patient data reported under the ELDSNet surveillance scheme in accordance with the European Data Protection Acts. No personally identifiable information or sensitive personal information such as patient names, residential addresses or dates of birth is collated or stored in surveillance databases used for the purpose of ELDSNet TALD surveillance. Consequently, ECDC is unable to identify a person as a case of TALD reported through the ELDSNet surveillance.

Requests for data for the purpose of research, are responded to in accordance with the ECDC document [Policy on data submission, access, and use of data within TESSy – 2015 revision](#). Information requests concerning data exchanged among ELDSNet members within the framework of The European Surveillance System (TESSy) will also be responded to taking into account this TESSy policy and may include an explanation of the actions taken in accordance with these operating procedures.

Other requests for specified documents to ECDC will be handled in accordance with [Regulation \(EC\) 1049/2001](#) and the [rules on access to documents](#) at ECDC. Please see the ECDC website page for more information: <https://ecdc.europa.eu/en/about-us/access-documents>

Requests for information received by ELDSNet country members related to ELDSNet TALD surveillance activities are subject to the relevant national laws of that country.



## References

- [1] Centers for Disease Prevention and Control (CDC). Respiratory Infection – Pennsylvania. 1977. MMWR. 1997; 46(3):49-50.
- [2] 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.
- [3] Newton H.J., Ang D.K., van Driel I.R., Hartland E.L. 2010. Molecular pathogenesis of infections caused by *Legionella pneumophila*. Clin Microbiol Rev 23: 274–98.
- [4] Palmer A, Painter J, Hassler H, Richards V, Bruce T, Morrison S et al. *Legionella clemsonensis* sp.nov.: a green fluorescing *Legionella* strain from a patient with pneumonia. Microbiol Immunol 2016; 60: 694-701.
- [5] Probable Person-to-Person Transmission of Legionnaires’ disease. N Engl J Med 2016; 374:497-498 February 4, 2016 DOI: 10.1056/NEJMc1505356
- [6] Lück PC. Diagnostics and Clinical Disease Treatment. In: Heuner K, Swanson M, editors. *Legionella: molecular microbiology*. Norwich: Horizon Press; 2008.
- [7] Roig J and Rello J. Legionnaires’ disease: a rational approach to therapy. J Antimicrob Chemother. 2003; 51,1119-29.
- [8] 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.
- [9] Collins SL, Afshar B, Walker J, Aird H, Nail F, Phin N., et al. Heated birthing pools as a source of Legionnaires’ disease. Epidemiol Infect. 2016 Mar;144(4):796-802.
- [10] de Jong B, Allestam G, Lundberg AK. Biological treatment of industrial wastewater; An overlooked source of *Legionella* infection? European Working Group for *Legionella* Infections 20th annual meeting, ISS 2005. Abstract book. Available from: <http://www.iss.it/binary/publi/publi/05-C2.1115128370.pdf>
- [11] Ricci ML, Fontana S, Pinci F, Flumana E, Pedna MF, Farolfi P et al. Pneumonia associated with a dental unit waterline. The Lancet Volume 379, No.9816 p684, 18 February 2012. Available from: <http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2812%2960074-9/fulltext?elsca1=ETOC-LANCET&elsca2=email&elsca3=segment>
- [12] Van Heijensbergen E, Schalk J, Euser S, Brandsema P, den Boer J, de Rosa Husman AM. Confirmed and potential sources of *Legionella* reviewed *Environ. Sci. Technol.*, 2015, 49 (8), pp 4797–4815.
- [13] 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.
- [14] 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.
- [15] ECDC Annual Epidemiological Report on Legionnaires’ disease in Europe 2015 {in draft October 2016}
- [16] Mathys W, Stanke J, Harmuth M, Junge-Mathys E. Occurrence of *Legionella* in hot water systems of single-family residences in suburbs of two German cities with special reference to solar and district heating. Int J Hyg Environ Health. Available: <https://www.ncbi.nlm.nih.gov/pubmed/17409022>
- [17] Den Boer JW, Euser SM, Brandsema P, Reijnen L, Bruin JP. 2015. Results from the national *Legionella* outbreak detection program, the Netherlands, 2002-2012. Emerging Infectious Diseases, 21:1167-1173.
- [18] 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 – Information about Legionnaires' disease for managers of tourist accommodation

Disclaimer: This information leaflet is for general informative purposes only. Please contact the responsible authorities in your country for country-specific guidance or legislation.

This appendix is available as a downloadable [leaflet](#) and available in all EU languages.

## Background

Each year more than 1 000 travellers are reported to have contracted Legionnaires' disease<sup>7</sup>. However, the risk of Legionnaires' disease in travel accommodations can be reduced. This leaflet contains information for owners or managers of tourist accommodation (e.g. hotels, apartments, camping sites).

## What is Legionnaires' disease?

Legionnaires' disease is a severe type of pneumonia (lung infection) caused by *Legionella* bacteria. About 5–10% of the patients die. Not everybody who is exposed to *Legionella* will get ill. People with underlying illness, smokers and older people are at a higher risk of getting ill from *Legionella*. Symptoms generally start between two and ten days after infection, but in rare cases it may take up to three weeks to develop symptoms.

The illness usually begins with a fever, chills, headache and muscle pain. This is followed by a dry cough and breathing difficulties that may progress to severe pneumonia. About a third of patients also have diarrhoea or vomiting and about half become confused or delirious. Most patients need to be hospitalised and treated with appropriate antibiotics. Diagnosis requires specific laboratory tests. The diagnosis is often made after the traveller has returned home.

## How is Legionnaires' disease caught?

Legionnaires' disease is caught by inhaling microscopic water droplets (aerosols) containing the *Legionella* bacteria. These bacteria live in water and multiply when conditions are suitable; for example, stagnant water in man-made water systems at 20 °C to 50 °C. Aerosols with *Legionella* may be produced by, for example, running a tap or shower, by bubbles rising through water in a spa pool or by some air-conditioning systems.

## Is the accommodation the source of infection?

If a person with Legionnaires' disease is reported to have stayed in specific accommodation, this does not necessarily mean that the patient got the infection there. He or she could have got the infection from a variety of different places. However, when two or more cases stayed at the same accommodation, especially within a short period of time, it is more likely that the accommodation is the source of the infection. In that situation, urgent investigations at the accommodation are needed.

As a manager of tourist accommodation you should be aware of the risk of Legionnaires' disease and take measures to reduce this risk as much as possible.

## Where are the risk areas in tourist accommodation?

Wherever water droplets (aerosols) can be created, there is a risk of infection. Some examples are:

- Showers and taps
- Spa/whirlpool baths
- Cooling towers and evaporative condensers used for air conditioning
- Ornamental fountains, particularly indoors
- Humidified food displays and other misting devices
- Water systems of garden hoses used for watering plants

<sup>7</sup> European Centre for Disease Prevention and Control. Legionnaires' disease in Europe, 2014. Stockholm: ECDC; 2016. Available from <http://ecdc.europa.eu/en/publications/Publications/legionnaires-disease-europe-2014.pdf>

## Where can *Legionella* bacteria survive and multiply?

- In water at temperatures between 20 °C and 50 °C
- In hot and cold water tanks or cisterns
- In pipes with little or no water flow (this includes unoccupied rooms)
- In slime (biofilm) and dirt on the inner surfaces of pipes and tanks
- On rubber and natural fibres in washers and seals
- In water heaters and hot water storage tanks
- In scale and corrosion in pipes, showers and taps.

These conditions encourage the growth of *Legionella* and increase the risk of infection to guests and staff.

## How do we monitor Legionnaires' disease?

The European Legionnaires' disease Surveillance Network (ELDSNet) carries out surveillance of Legionnaires' disease. It is coordinated by the European Centre for Disease Prevention and Control (ECDC). The network consists of epidemiologists and microbiologists nominated by national public health authorities in the EU and many countries around the world. This network shares information between countries where people became ill and the countries where their infection could have occurred. This network also has procedures to notify clusters of cases to tour operators. You can reduce this risk by having a *Legionella* control plan.

## What can I do as a manager of tourist accommodation to avoid Legionnaires' disease infections among my guests?

### Reducing the risk: a 15-point plan for reducing the risk from *Legionella*

The risk of Legionnaires' disease can be minimised.

Hoteliers and other accommodation owners are recommended to follow the 15-point plan for reducing the risk from *Legionella*:

1. Have one named person responsible for *Legionella* control.
2. Ensure the named person has sufficient training and experience to be able to carry out the role competently and other staff are trained to be aware of the importance of their role in controlling *Legionella*.
3. Keep hot water hot and circulating at all times: Between 50 °C and 60 °C (too hot to put hands into for more than a few seconds) throughout the entire hot water system.
4. Keep cold water cold at all times. It should be maintained at temperatures below 20 °C throughout the system to all outlets (this may not be possible when the ambient temperature is high, but every effort should be made to ensure that cold water entering the premises and in storage remains as cold as possible).
5. Run all taps and showers in guest rooms and other areas for several minutes to draw through water (until it reaches the temperatures stated in points 3 and 4) at least once a week if rooms are unoccupied, and always prior to occupation.
6. Keep shower heads and taps clean and free from scale.
7. Clean and disinfect cooling towers and associated pipes used in air conditioning systems regularly – at least twice per year.
8. Clean, drain and disinfect water heaters (calorifiers) once per year.
9. Disinfect the hot water system with high level (50mg/l) chlorine for 2–4 hours after work on the system and water heaters and before the beginning of every season.
10. Clean and disinfect all water filters regularly, as directed by the manufacturer, at least every one to three months.
11. Inspect water storage tanks, cooling towers and visible pipe work monthly. Ensure that all coverings are intact and firmly in place.
12. Inspect the inside of cold water tanks at least once per year and disinfect with 50mg/l chlorine and clean if containing a deposit or otherwise dirty.

13. Ensure that when carrying out system modifications or new installations they do not create pipework with intermittent or no water flow, and disinfect the system following any work.
14. If there is a spa pool (also known as whirlpool spas, 'Jacuzzis', spa baths), ensure that:
  - it is continuously treated with 2–3mg/l chlorine or bromine and the levels and pH are monitored at least three times per day;
  - at least half of the water is replaced each day;
  - sand filters are backwashed daily;
  - the whole system is cleaned and disinfected once per week.
15. Keep daily records of all water treatment readings, such as temperature, pH value and chlorine concentrations and ensure that they are checked regularly.

Further advice about specific controls should be sought from experts in this field. They can carry out a full risk assessment of the accommodation. Your local public health authorities can advise you further.

## Environmental *Legionella* testing

Testing for *Legionella* is a useful tool, but only if carried out by trained personnel who in parallel also assess the water system. Further, water samples should be examined by laboratories accredited for *Legionella* testing (e.g. by UKAS, ISSO, ACCREDIA or equivalent national bodies). A negative test result does not necessarily mean that the accommodation site is clear of *Legionella* or that there is no risk.

## How do I find out more?

On the ELDSNet webpage<sup>8</sup>, you can find more information and a link to the 'European technical guidelines for the prevention, control and investigation, of infections caused by *Legionella* species – June 2017'.

<https://ecdc.europa.eu/en/publications-data/european-technical-guidelines-prevention-control-and-investigation-infections>

<sup>8</sup> [http://ecdc.europa.eu/en/healthtopics/legionnaires\\_disease/ELDSNet/Pages/index.aspx](http://ecdc.europa.eu/en/healthtopics/legionnaires_disease/ELDSNet/Pages/index.aspx)

# Appendix 2. Form A

## European Legionnaires' Disease Surveillance Network

### Form A Two-week post-cluster report

Version: December 2017

ELDSNet Cluster/Site: <ClusterID> Name of hotel/accommodation site: <Site name>

Town/Region: <Town> Country: <Country>

Date cluster alert was issued (dd/mm/yyyy): <Notification date>

#### STATEMENT\*

**A site risk assessment in response to this cluster notification has been made at the above named accommodation site. Based on the report received from the investigator, I confirm the following:**

A site risk assessment has been carried out: <Yes/No>

Date of risk assessment (dd/mm/yyyy): <Date>

Was there a water management plan in place before the cluster notification: <Yes/No>

Control measures have been started since the cluster notification: <Yes/No>

Please specify the reason why control measures have not yet been started: <Text>

The accommodation site is currently closed entirely: <Yes/No>

What is the reason:

Seasonal closure: <Yes/No>

Closure due to cluster notification: <Yes/No>

By when is reopening planned: <Date> (approximate date)

Is there a partial closure (sub-site or installation): <Yes/No>

Which sub-site or installation is closed: <Text>

Additional comments: <Text>

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

Name of person sending this report: <Name>

<Date of report>

\* Disclaimer: This statement confirms that the local authority has reviewed the actions taken at the accommodation site. This statement does not imply that the accommodation is the source of infection for any associated case(s). Furthermore, this statement does not confirm or exclude a risk of Legionnaires' disease at the accommodation. An investigation report of the site may be available at the local authority level in the country. Note that routine sampling, water management plans, control systems and actions taken in response to a cluster may depend according to country relevant legislation.

# Appendix 3. Form B

## European Legionnaires' Disease Surveillance Network

### Form B

Six-week post-cluster report

Version: December 2017

ELDSNet Cluster/Site: <ClusterID> Name of hotel/accommodation site: <Site name>

Town/Region: <Town> Country: <Country>

Date cluster alert was issued (dd/mm/yyyy): <Notification date>

#### STATEMENT\*

**A site risk assessment with environmental investigation has been made at the above named accommodation site. Based on the report received from the investigator, I confirm the following:**

A site risk assessment has been carried out: <Yes/No>

Environmental sampling was carried out in response to the cluster: <Yes/No>

*Legionella* was found in the water system(s): <Yes/No>

Serogroup and highest level CFU/l: <Text>

Was there a routine environmental sampling and control system in place before the cluster notification: <Yes/No>

Date of the last routine control: <Date>

*Legionella* was found in the water system(s): <Yes/No>

Actions taken in response to cluster: <Yes/No>

They included: Chemical disinfection: <Yes/No>

Thermal disinfection: <Yes/No>

Cleaning: <Yes/No>

Structural improvements: <Yes/No>

Other: <Text>

Recommendations from the competent authorities are implemented in a satisfactory way: <Yes/No>

Site informed of need to maintain long term preventive measures: <Yes/No>

The accommodation site is currently closed entirely: <Yes/No>

What is the reason:

Seasonal closure: <Yes/No>

Closure due to cluster notification: <Yes/No>

By when is reopening planned: <Date> (approximate date)

Is there a partial closure (sub-site or installation): <Yes/No>

Which sub-site or installation is closed: <Text>

Additional comments: <Text>

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

Name of person sending this report: <Name>

\* *Disclaimer:* This statement confirms that the local authority has reviewed the actions taken at the accommodation site. This statement does not imply that the accommodation is the source of infection for any associated case(s). Furthermore, this statement does not confirm or exclude a risk of Legionnaires' disease at the accommodation. The competent public health authorities confirm an investigation at the accommodation site was performed and if relevant, action was taken to minimize the risk of Legionnaires' disease at the accommodation. Should any further information come to light, a new investigation in accordance with ELDSNet Operating Procedures may be required. An investigation report of the site may be available at the local authority level in the country. Note that routine sampling, water management plans, control systems and actions taken in response to a cluster may depend according to country relevant legislation.

# Appendix 4. Form C

## European Legionnaires' Disease Surveillance Network

### Form C

### One-week post-rapidly evolving cluster report

Version: December 2017

ELDSNet Cluster No: <ClusterID>      Name of accommodation site: <Site Name>

Town/Region:            <Town>

Country:                <Country>

Date cluster alert was issued by ECDC (dd/mm/yyyy): <Notification date>

#### STATEMENT

**The above named accommodation site has been contacted for an immediate risk assessment. Based on the report received from the investigator, I confirm the following:**

Contact has been taken with the accommodation site to initiate a site risk assessment: <Yes/No>

#### 1. People still present at this accommodation site

Have the public health authorities requested to inform current guests, staff or visitors until the source is identified or form B is accepted: <Yes/No>

The *approximate* number of people potentially exposed at present (in the 24 hours before ELDSNet notification)

- guests: <Text>
- staff: <Text>
- visitors\*: <Text>

#### 2. People who left this accommodation and were potentially exposed in the 14 days prior to ELDSNet notification

The approximate number of people

- guests: <Text>
- visitors\*: <Text>

For residents from another country, please list the countries and their approximate number of guests

- From which nationalities: <Text> Approximate number per country: <Text>

Were the potentially exposed people informed of the potential risk? < Yes/No >

Via which instance were the exposed persons informed of the potential exposure and the need to seek medical advice if symptoms appear?

- Via tour operator: <Yes/No>
- Via hotel manager: <Yes/No>
- Via public health authority: <Yes/No>
- Other, please explain: < Yes/No> <Text>

Via what means were the exposed persons informed?

- Through telephone calls (or visits): <Yes/No>
- Through letters: <Yes/No>
- Through email: <Yes/No> Other, please explain: <Yes/No>

Approximately how many of the potentially exposed persons have been reached by the time of this report

- guests:< Text>
- staff:< Text>
- visitors\*:< Text>

**3. People who might become exposed in the near future**

Have arrangements been made to inform future guests and visitors until source is identified or form B is accepted: <Yes/No>

Which arrangements have been made? < Text>

Additional comments: < Text>

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

Name of person sending this report: < Name>

On behalf of (if applicable): <Text>

*\* Visitors: people visiting the accommodation for use of facilities for non-guests, e.g. spa or pool.*

ECDC disclaimer: This statement confirms that public health authorities in the country of the cluster location have contacted the accommodation site and provides information herein, as available at submission date of the form. This statement does not imply that the accommodation is the source of infection of any associated case(s).



## European Centre for Disease Prevention and Control (ECDC)

Postal address:  
Granits väg 8, SE-171 65 Solna, Sweden

Visiting address:  
Tomtebodavägen 11A, SE-171 65 Solna, Sweden

Tel. +46 858601000  
Fax +46 858601001  
[www.ecdc.europa.eu](http://www.ecdc.europa.eu)

An agency of the European Union  
[www.europa.eu](http://www.europa.eu)

Subscribe to our monthly email  
[www.ecdc.europa.eu/en/publications](http://www.ecdc.europa.eu/en/publications)

Contact us  
[publications@ecdc.europa.eu](mailto:publications@ecdc.europa.eu)

Follow us on Twitter  
[@ECDC\\_EU](https://twitter.com/ECDC_EU)

Like our Facebook page  
[www.facebook.com/ECDC.EU](http://www.facebook.com/ECDC.EU)

---

### ECDC is committed to ensuring the transparency and independence of its work

In accordance with the Staff Regulations for Officials and Conditions of Employment of Other Servants of the European Union and the ECDC Independence Policy, ECDC staff members shall not, in the performance of their duties, deal with a matter in which, directly or indirectly, they have any personal interest such as to impair their independence. Declarations of interest must be received from any prospective contractor(s) before any contract can be awarded.  
[www.ecdc.europa.eu/en/about-us/transparency](http://www.ecdc.europa.eu/en/about-us/transparency)

## HOW TO OBTAIN EU PUBLICATIONS

### Free publications:

- one copy:  
via EU Bookshop (<http://bookshop.europa.eu>);
- more than one copy or posters/maps:  
from the European Union's representations ([http://ec.europa.eu/represent\\_en.htm](http://ec.europa.eu/represent_en.htm));  
from the delegations in non-EU countries ([http://eeas.europa.eu/delegations/index\\_en.htm](http://eeas.europa.eu/delegations/index_en.htm));  
by contacting the Europe Direct service ([http://europa.eu/europedirect/index\\_en.htm](http://europa.eu/europedirect/index_en.htm)) or  
calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (\*).

(\* The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

### Priced publications:

- via EU Bookshop (<http://bookshop.europa.eu>).



■ Publications Office