RAPID RISK ASSESSMENT

Update - Outbreak of Legionnaires' disease in a hotel in Calpe, Spain November 2011 – May 2012

24 May 2012

Main conclusions and recommendations

An outbreak of Legionnaires' disease, which has been ongoing since November 2011 and is associated with a hotel in Calpe, Spain, has to date resulted in 25 cases, including six deaths. Twenty-two of the cases are travel-associated (from United Kingdom, Spain, France and Belgium) and three are among hotel staff. Onset of illness occurred between November 2011 and May 2012. Two of the cases are probable, one diagnosed with a single high serological titre and another epidemiologically linked to the outbreak. All cases are associated with one hotel in the town of Calpe, in the province of Alicante, Spain, indicating a continuous source outbreak at the hotel, despite control measures implemented since January 2012.

In the absence of an identified and controlled source of *Legionella*, there may be an ongoing risk of exposure to *Legionella* for hotel guests and persons working at the hotel.

Source and date of request

ECDC Internal Decision, 2 February 2012.

ECDC Internal Decision, 22 May 2012.

Public health issue

Risk for guests and hotel staff in the context of an outbreak of Legionnaires' disease ongoing since November 2011.

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Disease background information

Legionnaires' disease is a common cause of atypical pneumonia caused by *Legionella* bacteria, most commonly the species *Legionella pneumophila*. Another clinical manifestation of the infection is Pontiac fever, a self-limited febrile illness that does not progress to pneumonia or death. Legionnaires' disease is characterised by a non-productive cough, accompanied by anorexia, malaise, myalgia and headache. Abdominal pain and diarrhoea are also common. Illness can be severe and despite improvements in diagnostics and treatment options, fatality can occur in about 5–15% of cases if not treated appropriately with available antibiotics. Both sporadic cases and outbreaks occur worldwide and are recognised more commonly in summer and autumn. An outbreak of Legionnaires' disease may be difficult to detect due to low attack rates (0.1–5%) [1].

The incubation period of Legionnaires' disease is, for the majority of cases, between two and 10 days, with a median of six days. However, incubation periods as long as 19 days have been seen [2]. Legionnaires' disease usually affects more males than females, with smokers and the elderly or immunocompromised individuals at higher risk of complications.

A laboratory diagnosis of Legionnaires' disease can be made using a variety of laboratory tests including: culture/isolation of the causative organism, antigen detection in urine, a significant rise in antibody titres or PCR methods. Determination of the monoclonal subtype and molecular sequence typing can support linking between strains from the sampled environment and from patients.

Legionnaires' disease is a waterborne disease, associated with man-made water systems. In conditions that are favourable for *Legionella* growth (such as water temperatures in the range of 25–42°C, stagnant water with sediment build-up, and low biocide levels) the bacteria can multiply. Aerosolisation of such a water supply can cause sporadic cases or outbreaks through inhalation of this aerosol. Cooling towers, evaporative condensers, humidifiers, decorative fountains, whirlpools, showers, etc. are examples of installations with identified risks [1,3].

Control measures available to reduce the amount of *Legionella* in a water system depend on the system's engineering and use. They can include temperature control, disinfection using chemicals or other oxidising materials, use of biocides or installation of filters [3].

Surveillance and control of the disease is, in accordance with Decision No 2119/98/EC [4], organised at the European level through the European Legionnaires' disease surveillance network (ELDSNet) [5]. A European case definition has been established for surveillance purposes. As part of the network's activities, on a daily basis countries notify data on individual cases of travel-associated Legionnaires' disease (TALD). Identified clusters of TALD are shared with all Member States through ELDSNet. Risk assessments of accommodation sites associated with the cluster are undertaken by the Member State where the accommodation site is located, reported to ECDC and shared with the network [5].

Event background information

The update of this risk assessment is occasioned by the notification of four new cases since the control measures implemented in February 2012, one case with symptom onset in March 2012 and three with symptom onset during the first half of May.

Since 16 December, 22 cases of TALD have been notified to the ELDSNet Surveillance Network. All travellers (sixteen residents from the United Kingdom, three from Spain, two from France and one from Belgium) stayed at the hotel between 25 November 2011 (first arrival) and 2 May (last departure). Dates of disease onset range from 22 November 2011 to 11 May 2012 (see Figure 1). An additional three cases have been detected in hotel staff with disease onset dates of 20 December 2011, 1 and 21 January 2012, respectively.

All but three travel-associated cases have been confirmed by urinary antigen test. Two clinical isolates have been typed in the United Kingdom and were both found to be *L. pneumophila* serogroup 1, mAb subgroup 'Allentown/France', DNA-sequence type ST23. The average age of the TALD cases is 73 years (ranging from 44 to 89) and the gender distribution is eleven males to eleven females.

This hotel was associated with a cluster in 2006 involving seven cases. No risk installations in the surrounding area, such as cooling towers, have been identified [6].

The regional health office and epidemiological department are leading investigations in the hotel. A preliminary outbreak report regarding the outbreak was published in February 2012 [7]. Since February, control measures taken include daily determination of chlorine (in the tap water system) and bromine (in the whirlpool installation) levels, measurements of pH and temperature in the hot and cold water system, control inspections regarding working conditions, measurements taken by the public health authorities and water sampling.

The results of 161 water samples are available. All samples from the tap water system have been found to be negative. However, results from water samples taken at the whirlpool were found to be positive on 1 March (very low positivity), 18 April and 8 May. The results of whirlpool sampling on 29 February and 5 March were negative. Following the first two positive results, control measures (increasing the bromine levels and cleaning and

disinfecting the installations) were requested by the public health authorities. The third (highly) positive sample on 8 May resulted in the immediate closure of the whirlpool. Following the implementation of an action plan proposed by the public health authorities, the whirlpool was reopened on 13 May.

According to the Spanish authorities, tour operators have been informed and were asked to inform all tourists who stayed at the hotel from mid April until May about the need to consult a physician, should symptoms appear. Between 24 April and 8 May there were reported to have been 2 387 guests of 15 nationalities staying at the hotel.

The hotel was closed from 2–10 February 2012 and the spa installations were closed between 8 and 13 May. Epidemiological investigations of the last four cases are currently ongoing.

ECDC threat assessment for the EU

The age and profile of reported cases in the current outbreak is normal for a Legionnaires' disease outbreak. It has only affected travellers to Calpe, more specifically those staying at the identified hotel, and hotel staff.

Legionnaires' disease cannot be transmitted from human to human. The risk associated with any specific source is therefore limited to a population confined in time and space to the area where a contaminated water-aerosolising installation is situated.

The clustering of cases in time and place indicates a source at the hotel, especially as no cases have been reported from the community, except among hotel workers.

An important finding is the typing results of the strain in two of the patient samples. These results should enable the strains to be matched to positive environmental samples. Information sharing at the European level is therefore of utmost importance in order to identify the source of the outbreak.

The risk of new cases occurring is currently limited to staff of the hotel and visitors who were present during the last three weeks. Results of whirlpool sampling on 18 May are expected by the end of May. Since the hotel is still open, the whirlpool is accessible to visitors and no negative results are known from the last whirlpool sampling, the risk for new cases cannot be excluded.

Exposure at the hotel has resulted in cases occurring from late November 2011 to the beginning of May 2012. Since the tap water system has been found negative and positive water samples have been found at the whirlpool, coinciding with the travel dates of the last three cases, the source is currently suspected to be associated with the whirlpool. In 1999, one of the largest Legionnaires' disease outbreaks was associated with the exposition of a whirlpool, indicating that there is a potential for infection, even for those just passing by a contaminated whirlpool [2].

Conclusions

Although the exact source of the outbreak has not been identified, the close clustering of the cases suggests an outbreak from a source within the hotel.

Environmental investigations have been conducted by and at the request of public health authorities in order to identify the source of this outbreak. So far the investigation has indicated the whirlpool to be the most probable source of infection. However, further epidemiological and microbiological investigations are needed to determine the probability of the cases having been infected by aerosolisation of contaminated whirlpool water. Work will also need to be done to establish the sequence matching of the water samples and the clinical samples from the cases.

In the absence of an identified and controlled source of *Legionella* in the hotel, there may be an ongoing risk of exposure to *Legionella* for hotel guests and persons working at the hotel.

The risk of Legionnaires' disease should be considered higher for those over 40 years of age, smokers and immunocompromised persons. For this group, timely diagnosis and appropriate treatment will be particularly important.

As Legionnaires' disease cannot be transmitted from human to human, the risk to the European Union remains limited to recent visitors to the hotel. The information given to visitors about their potential exposure is important to ensure timely diagnosis and appropriate treatment. Current and future visitors to the hotel require relevant information, both to ensure quick diagnosis and treatment and to make them aware of the risks identified during investigations. Very stringent control measures are essential in order to limit the exposure risk and prevent further cases of Legionnaires' disease.

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References

1 Heymann DL. Control of Communicable Diseases Manual. 18th ed. American Public Health Association; 2004.

2 Den Boer JW, Yzerman EP, Schellekens J, Lettinga KD, Boshuizen HC, Van Steenbergen JE, et al. A large outbreak of Legionnaires' disease at a flower show, the Netherlands, 1999. Emerg Infect Dis. 2002 Jan;8(1):37-43.

3 World Health Organization. *Legionella* and the prevention of legionellosis. Geneva: WHO; 2007. Available from: http://www.who.int/water_sanitation_health/emerging/legionella_rel/en/index.html

4 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.

5 European Legionnaires' Disease Surveillance Network (ELDSNet). See : http://ecdc.europa.eu/en/activities/surveillance/ELDSNet/Pages/index.aspx

6 Teleconference 2 February 2012 with participation of United Kingdom, Spain (national and regional authorities), ECDC and representatives from tour operators.

7 Preliminary report: outbreak of Legionnaires' disease in a hotel in Calpe, Spain, update on 22 February 2012, Eurosurveillance . Volume 17, Issue 8, 23 February 2012.

Figure 1: Epigraph with weeks of symptom onset for cases of Legionnaires' disease associated with the hotel in Calpe, Spain (2011–2012)