



RAPID RISK ASSESSMENT

Outbreak of Legionnaires' disease in the Lisbon area, Portugal

13 November 2014

Conclusions

The outbreak of Legionnaires' disease in Portugal with 311 cases reported as of 13 November 2014 is one of the largest in the European Union. Vila Franca de Xira is not considered a tourist destination and no case has so far been confirmed outside Portugal. Despite the magnitude of the outbreak, this event can be considered a local event. All cases were infected in Vila Franca de Xira where the outbreak is occurring.

Cooling towers of major industrial installations in the area of Vila Franca de Xira were closed and investigations to identify the source of the outbreak are ongoing.

Source and date of request

An Early Warning and Response System (EWRS), message from Portugal on 9 November 2014.

ECDC internal decision, 10 November 2014.

Public health issue

A large outbreak of Legionnaires' disease was reported by Portuguese authorities on 7 November 2014. This rapid risk assessment focuses on the risk for the EU in relation to this event.

Consulted experts

European Centre for Disease Prevention and Control: Céline Gossner, Julien Beauté, Birgitta de Jong, Dragoslav Domanovic, Joana Gomes Dias, Emmanuel Robesyn, Denis Coulombier.

External experts: Ana Maria Correia, Eugénio Cordeiro, Cátia Sousa Pinto, Maria Teresa Marques, Paula Vasconcelos, Paulo Nogueira.

Erratum: 13 November 2014, the following sentence in Annex 1 was amended to; Filtration of whole blood can remove infected phagocytes, but only partially.

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Disease background information

Legionnaires' disease (LD) is a severe pneumonia caused by *Legionella* bacteria, most commonly *Legionella pneumophila*. Legionnaires' disease is not transmitted from person-to-person but through inhalation of contaminated aerosols or aspiration of contaminated water. Illness can be severe and may be accompanied by systemic symptoms such as fever, diarrhoea, myalgia, impaired renal and liver functions, and delirium [1]. Despite improvements in diagnostics and treatment options, fatality can occur in about 8–12% of cases. Known risk factors for LD include increasing age, male gender, smoking, chronic lung disease, diabetes and various conditions associated with immunodeficiency [2]. In Europe, most cases are sporadic and community-acquired but outbreaks can occur. The disease shows a marked seasonality with most cases reported during the warm season [3]. Community outbreaks may be difficult to detect due to low attack rates (0.1–5%) [4].

The incubation period of LD is two to 14 days, with a median of six days. However, longer incubation periods have been described of up to 19 days [5-6].

A laboratory diagnosis of Legionnaires' disease is essential to confirm the diagnosis. The case definition used for reporting in the EU/EEA can be found at <http://ecdc.europa.eu/en/activities/surveillance/ELDSNet/Pages/EU%20case%20definition.aspx> [7]. Various laboratory tests are available including culture of the causative organism, antigen detection in urine, a significant rise in antibody titres and 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 often associated with man-made water systems. The *Legionella* bacteria can multiply in favourable conditions such as water temperatures in the range of 25 to 42°C, stagnant water with sediment build-up, and low biocide levels. Inhalation of aerosolised water can result in infection. Cooling towers, evaporative condensers, humidifiers, decorative fountains, whirlpools, and showers are examples of installations with identified risks [4,8].

Control measures 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 [8].

Legionnaires' disease is notifiable in all EU and EEA countries. Since 2010, the surveillance of LD in Europe has been operated by the European Legionnaires' Disease Surveillance Network (ELDSNet) under the coordination of ECDC. More information about ELDSNet can be found at:

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

Event background information

On 7 November 2014, Portugal identified an outbreak of Legionnaires' disease in three parishes of Vila Franca de Xira, situated 30km north of Lisbon: Póvoa de Santa Iria, Forte da Casa and Vialonga. Vila Franca de Xira is not considered to be a tourist area. Seventeen cases were initially identified on 7 November when epidemiological and environmental investigations started. As of 13 November, 311 cases have been identified (including eight cases reported in other Regions: Norte, Centro and Algarve). Seven patients with underlying diseases have died. All cases were infected in Vila Franca de Xira.

According to the Portuguese health authorities, this is the largest outbreak ever reported in Portugal. The regional response team is being supported by a national response team including epidemiologists, clinicians, microbiologists, statisticians and experts in modelling, geo-referencing and environmental health. The Ministry of Health has been in direct contact with the Ministry of Environment, Spatial Planning and Energy, the National Institute of Sea and Atmosphere and the National Authority for Water Resources and Waste within the investigation and response to this outbreak.

The environmental investigation started on 7 November identified a set of circumstances that can point to a possible source of this outbreak, based on: geographic distribution of the cases, environment samples, meteorological conditions of temperature and humidity and winds at the area and time of the year, and modulating emissions from the cooling towers. As a precautionary measure, cooling towers from major industrial installations in the area of Vila Franca de Xira were closed on 9 November 2014.

Press releases are being issued on a daily basis by the Portuguese health authorities (in Portuguese):

<http://www.dgs.pt/informacao-e-comunicacao/comunicados-do-diretor-geral.aspx>

In order to inform other European health authorities, Portugal posted a message through the EWRS on 9 November.

ECDC threat assessment for the EU

The large number of cases in a short period of time suggests an environmental source that has spread contaminated aerosols in the area. The Portuguese authorities are focusing the environmental investigation on such a possibility. Since 9 November they have implemented precautionary measures in closing cooling towers of major industrial installations in the area of Vila Franca de Xira. People who have been in the affected area in the past three weeks (longest documented incubation period is 19 days) may therefore have been at risk of infection, and could be currently incubating the disease and may develop symptoms up to three weeks after exposure. People with underlying illness or a weakened immune system are at increased risk of developing the disease if exposed and may present with more severe disease.

Since Legionnaires' disease cannot be transmitted from person-to-person, the risk remains limited to people who have been possibly exposed in the affected area during the period when the bacteria was spread in the environment. Travellers who have visited Vila Franca de Xira in the past three weeks and who develop symptoms of Legionnaires' disease should seek rapid medical advice and indicate their possible exposure.

The health authorities in Portugal have kept the public informed through regular press releases and local information sessions about the disease and exposure risks.

To date, no cases associated with this outbreak have been detected outside of Portugal. The suspected cases reported in Peru and Angola were further excluded for *Legionella*. Legionnaires' disease cases that are detected outside of Portugal and who match the case definition (see Annex 2) should be reported through ELDSNet (eldsnet@ecdc.europa.eu).

Conclusions

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Cooling towers of major industrial installations in the area of Vila Franca de Xira were closed and investigations to identify the source of the outbreak are ongoing.

For further information, please contact support@ecdc.europa.eu.

Annex 1: Legionnaires' disease and donations of substances of human origin

Transmission of *Legionella* through transfusion of infected blood and blood components or cells and tissues has not been reported in scientific literature. Only one probable case of *Legionella* transmission through lung transplantation was reported in the United States [9].

As donors presenting with symptoms are deferred from donation, symptomatic cases of Legionnaires' disease do not represent a risk. *Legionella* can be present in blood phagocytes during the incubation period or in the asymptomatic clinical course of infection and thus can be present in donated blood or cells and tissues. Filtration of whole blood can remove infected phagocytes, but only partially. Data on survival of *Legionella* in stored blood components or cells and tissues are missing. *Legionella pneumophila* grows at temperatures between 25 and 42°C [10]. At lower temperatures it will survive without multiplying [11] but survival of *Legionella* below 4°C is not likely [11]. Therefore, *Legionella* will not survive in the erythrocytes that are stored at +2°C to +6°C. It is also expected that bacteria will not survive freezing and thawing of plasma. However, platelets stored at room temperature could be a critical blood component for bacterial growth and transmission.

In the absence of reported cases, it seems that the combination of the filtration removal of leukocytes from whole blood and the effect of storage temperatures of blood components minimises the risk of *Legionella* transmission through transfusion. Additionally, pathogen inactivation of plasma and platelets would eliminate the risk. Monitoring of bacterial growth in platelets could also diminish the risk.

Donors from affected area should be carefully examined. Those with acute respiratory symptoms should be temporarily deferred from blood donation for 14 days. Donors who have a diagnosed infection with *Legionella* should be deferred during the clinical course of illness and 14 days after recovery. The post-transfusion information should be reinforced and 'look-back procedures' enhanced. When available, pathogen inactivation of fresh frozen plasma and platelets is recommended.

The risk of *Legionella* transmission through cells and tissues that are stored in frozen condition or subjected to pathogen inactivation or reduction procedures is also very low.

Risk of *Legionella* transmission through organ transplantation should be assessed individually taking into account possible exposure of the donor and immunocompromised status of organ recipient.

Annex 2: Suggested case definition related to this outbreak

The case definition for cases related to this outbreak is person

- meeting the EU case definition [7],
- AND
 - residing in the municipality of Vila Franca de Xira, Portugal
 - AND developed symptoms after 1 October 2014*
- OR
 - Having visited the municipality of Vila Franca de Xira, Portugal after 1 October 2014*
 - AND developed symptoms two days or more after entering the area
 - AND developed symptoms not more than 19 days after leaving the area

* The date of 1 October may be revised according to the findings of the ongoing epidemiological investigation documenting the onset of symptoms of cases.

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