

## Seroprevalence of *Legionella* in Blood Donors and Occurrence of *Legionella pneumophila* in Water Distribution Systems in Riga

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**Introduction.** Legionnaires' disease is an important, but relatively uncommon, respiratory infection that can cause substantial morbidity and mortality and it is normally acquired by inhalation or aspiration of legionellae from a contaminated environmental source. Legionellae are found in freshwater environments or wet soil, but the major reservoirs are man-made aquatic environments, particularly warm water systems. Over 90% of legionellosis cases are caused by *Legionella pneumophila*. A possible presence of a continuous environmental infective source would probably result in a high prevalence of antibodies to *Legionella* in the population.

**Aim.** The aim of the study is to determine the seroprevalence of *Legionella* spp. in general healthy population in Riga and investigate the occurrence of *Legionella* spp. in water supply systems in different administrative districts of the city.

**Material and Methods.** Blood samples were collected from 550 healthy blood donors living in Riga. Volunteers completed standardized questionnaire, including information on social and demographic characteristics, including age, sex, place and type of residence, technical parameters of residence, information about recent medical episodes, and information related to potential exposure. A total of 163 hot and 139 cold water samples were collected from 94 apartment buildings in different administrative districts of Riga. Isolation and identification of *Legionella pneumophila* in water samples was carried out using the ISO 11731 standard. The blood samples were analysed for immunoglobulin G antibodies directed against *L. pneumophila* serogroups 1 to 6 by enzyme-linked immunosorbent assays (ELISA, Vircell).

**Results.** Overall, 7.1% (39) of all blood samples were positive for IgG in the ELISA test. The study population was 208 males and 342 females with seropositivity 3.8% and 9.1%, respectively. The age range varied from 19 to 65 years. A total 7.9% from 493 residents of apartment buildings were seropositive; however, none of 57 residents of single family homes were positive. Most (433) of these residents lived in buildings with central hot water supply system (8.3% positive), while 177 were residents of buildings with other type of hot water supply system (2.6% positive). During the study year, 452 respondents had taken shower somewhere other than home (7.5% positive). Total of 86 respondents indicated that they have had recent medical episodes (fever, bronchitis or pneumonia) during the last year before sampling and 12.7% were positive to *Legionella* IgG. The amount of *L. pneumophila* positive water samples in different administrative districts ranged from 20% up to 65%. At least one *L. pneumophila* positive sample was detected in 87 of 120 apartment buildings.

**Conclusions.** Overall, higher seroprevalence of *Legionella* was observed in blood of donors residing in administrative districts of Riga with more frequent occurrence of *L. pneumophila* in water distribution systems. The seroprevalence was significantly higher ( $p < 0.05$ ) in donors living in apartment buildings with central hot water supply system (8.3%) than in donors living in buildings where water was heated with electricity, gas or other system (2.6%). This study indicates that centralised hot water system in Riga could be a potential source of diseases caused by *Legionella*; however, more comprehensive epidemiological studies are needed to confirm this.