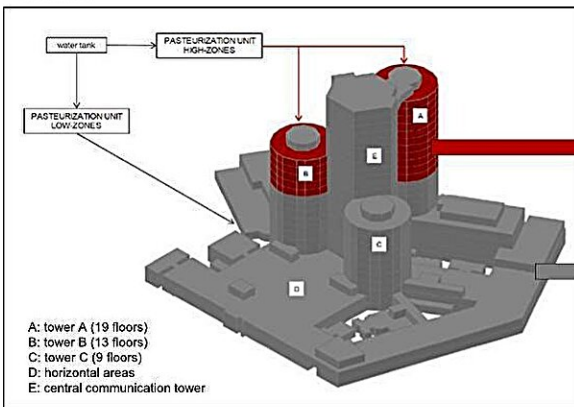


Study reveals need to review temperature control measures in hospitals to manage Legionella

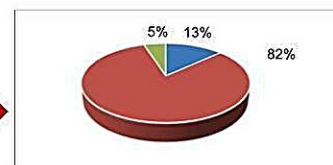
May 10 2024

789-bed hospital with two independent hot water installations
6-year longitudinal study (2012-2017)
80 Legionella isolates for genotyping by PFGE
10 Legionella isolates for studying thermotolerance by cytometry

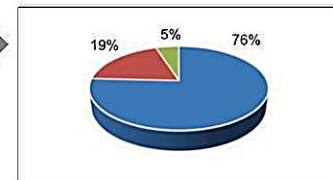


PFGE analysis

High-zones: 81.8% pattern B. Low-zones: 75.8% patterns A+Aa
The same predominant strain of *L. pneumophila* persists in hot water systems for years, being different in independent installations of the same building



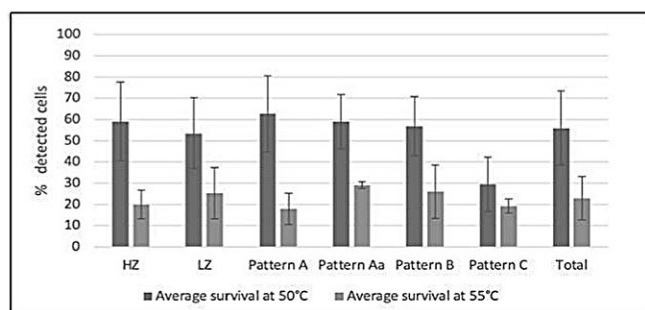
- Pattern A+Aa
- Pattern B
- Pattern C



Legionella viability analysis after thermic treatments

Analysis by flow-cytometry before and after thermic treatments for 24 hours to estimate the proportion of living/dead cells.

The exposure of *L. pneumophila* to the required control temperatures in hospitals hot water systems, 50°C or 55°C, generates 52% and 23% of viable but nonculturable subpopulations, respectively.



Credit: *Science of The Total Environment* (2024). DOI: 10.1016/j.scitotenv.2024.172410

New work has disclosed significant findings on the survival of the *Legionella pneumophila* bacterium in hospital water systems. Recently [published](#) in the journal *Science of The Total Environment*, the study suggests adjustments to control policies to effectively combat legionellosis.

The study examined 80 isolates of *Legionella pneumophila* serogroup 6 from two independent hot water systems in a hospital, highlighting the genotypic variability and thermotolerance of the strains. By using [flow cytometry](#) to assess membrane integrity after exposing the bacteria to temperatures of 50°C, 55°C, and 60°C for 24 hours, the team found that a significant percentage of bacteria showed no growth on plate cultures, but remained in a viable but non-culturable (VBNC) state.

Specifically, 52% of the bacteria at 50°C and 23% at 55°C retained their membrane integrity, while less than 5% did so at 60°C. These findings underscore the limitation of the plate culture method for detecting *Legionella* under thermal stress conditions.

The research team includes the Clinical and Environmental Infectious Diseases Study Group (CEID) at Germans Trias i Pujol Research Institute (IGTP), led by Dr. Laura Gavalda from the Bellvitge University Hospital, in collaboration with Institut Català d'Oncologia and Barcelona Public Health Agency.

Noemí Párraga, the first author of the study, emphasizes, "The plate culture technique for *Legionella* control, required by Spanish legislation, underestimates the presence of this bacteria under stress factors, as it may remain in a viable but non-culturable state. This state can be reversed, recovering the microorganism's infective capability."

This study suggests the possibility of improving detection methods to ensure safe hospital environments, acknowledging that *Legionella* can

withstand regulatory temperatures and remain in a viable but non-culturable state. It is advisable to consider this subpopulation in assessments, as it has the potential to become infectious.

"Increasing the temperature by 5°C at the endpoints of hot water circuits could significantly reduce cases of legionellosis, especially in centers with a high presence of at-risk individuals," points out Dr. Gavaldà.

In 2022, the new Royal Decree 487/2022 was published in Spain, establishing the sanitary requirements for the prevention and control of legionellosis. This document sets out a series of measures for the prevention and control of *Legionella* in water installations. One of the defined measures is the temperature in hot and cold water circuits. A [minimum temperature](#) of 60°C is established in accumulators and 50°C at the endpoints (taps and showers) and on the return. The minimum required by the current royal decree are the microbiological controls through plate culture.

Dr. Laura Gavaldà was a specialist in the Preventive Medicine and Hospital Hygiene Service at Bellvitge Hospital at the time of the study. She is currently the head of the Tuberculosis Prevention and Control Service and Specific Programs at the Public Health Agency of Catalonia.

More information: Noemí Párraga-Niño et al, Persistence of viable but nonculturable *Legionella pneumophila* state in hospital water systems: A hidden enemy?, *Science of The Total Environment* (2024). [DOI: 10.1016/j.scitotenv.2024.172410](https://doi.org/10.1016/j.scitotenv.2024.172410)

Provided by Germans Trias i Pujol Research Institute

Citation: Study reveals need to review temperature control measures in hospitals to manage

Legionella (2024, May 10) retrieved 23 July 2024 from
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