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Legionella Genotype Map –Statewide Genomic Surveillance of Environmental Isolates

Monday, October 13, 2025 6:51 PM (1 minute)

Background:

Despite their significant public health relevance, the epidemiological links between environmental *Legionella* sources and human infections remain poorly defined. This is due to limited strain-level resolution in standard detection methods and a lack of harmonized genomic surveillance data across environmental compartments. With climate change promoting conditions conducive to *Legionella* growth and transmission, the need for a robust molecular surveillance system is growing.

Objective:

To establish a genomic framework for routine environmental monitoring and genotyping of *Legionella* spp. in Lower Saxony using whole genome sequencing (WGS), in order to develop a state-level “*Legionella* Genotype Map” as a tool for outbreak preparedness and source attribution.

Methods:

Up to date around 100 environmental *Legionella pneumophila* ($n = 93$) most common and clinically relevant pathogenic *Legionella* species isolates from diverse geographic regions and water types across Lower Saxony. The isolates have already been collected and cultivated with high quality standard taxonomically verified using short-read sequencing (Illumina) and long-read sequencing (Oxford Nanopore), enabling high-resolution hybrid genome assemblies. Subsequent analyses include resistome/pathogenicity profiling using a custom-built bioinformatics pipeline in collaboration with the University of Duisburg-Essen and Universitätsmedizin Essen.

Results:

The survey sequencing results using short-read sequencing and WGS for core genome sequence multilocus typing (cgMLST, Ridom Seqsphere) analysis of *Legionella pneumophila* isolates ($n = 93$) showed different complex types (>50 , CT) (Fig.). However, there were clustering samples resulting in clusters (>10), which gives a first look on surveillance data across environmental compartments as a tool for outbreak preparedness and source attribution.

Keywords

Legionella, Genomic Surveillance, sequencing, environment, preparedness

Registration ID

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Professional Status of the Speaker

Senior Scientist

Junior Scientist Status

No, I am not a Junior Scientist.

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