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More than the Sum of Its Parts: Combining Genomic and Epidemiological Data for Comprehensive and Sustainable Pathogen Surveillance

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Interconnecting multiple fields and methods has become a crucial part of surveillance systems throughout the recent decade. In this work, we developed a system to integrate data from Germany's mandatory notifications for infections with genomic data in a continuous manner. This constant flow of integrated data enables new insights into the dynamics of and serves as a benchmark for detecting logistical, technological, and scientific challenges of Germany's surveillance system.
One crucial aspect represents the automation of processes by setting up new digital solutions and standards. The data integration requires a primary ID for sample identification, as well as a secure ID used exclusively for linking case and genomic data. A generic set of properties describes the biological sample and its journey to genomic sequencing. This metadata is utilized, among others, to assess turnaround time and identify potential improvements to expedite the process from sampling to the initialization of public health measures.
In conclusion, the digital developments and infrastructure in this work facilitate the integration of patient-related information with pathogen properties, providing the base for scalable and comprehensive surveillance. The patient's symptoms during their sickness, along with existing risk factors and mutations in the pathogen's genome, allow us to detect correlations that serve as a basis for testing causation and identifying new areas for public health measures.

Keywords

Data Integration, Genomics, Integrated Genomic Surveillance, Public Health

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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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