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Successes & Outlook of the Integrated Genomic Surveillance: importance of computational infrastructure for pandemic preparedness in Germany

Inhalt

The Integrated Genomic Surveillance (IGS) enables monitoring of 30 prioritized pathogen groups with increased public health importance. Genomic information from notifiable cases detected throughout Germany are collected at the Robert Koch Institute (RKI). Here, sequences are integrated with case data of the German reporting system to provide a comprehensive overview on the national emergence, spread, outbreaks and evolution of pathogens, enabling the foundation for infectious disease monitoring and prevention.

Our results highlight multiple major successes of the IGS project, including establishing a centralized infrastructure for storing, analyzing and maintaining surveillance data. As part of this, the IGS Datawarehouse (IGS DWH) represents the basis for combined investigations of genomic and epidemiological data. Interacting with this are bioinformatic analyses, dashboards, interactive visualizations and automated reports. To provide these, we have developed specialized computational workflows (IGS Bioinformatics Toolkit & Omni-fluss) for high-throughput genomic analyses of multi-pathogen data sets.

To date, the IGS has been used to analyze more than 1.2 million pathogen samples, including a majority of SARS-CoV-2 sequences, supporting infectious disease monitoring on a national scope. We hereby highlight the importance of establishing scalable, robust and maintainable infrastructure such as the IGS for pandemic preparedness and intersectoral One Health projects.

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Bioinformatics, Integrated Genomic Surveillance, Public Health, Pandemic Preparedness

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No, I am not a Junior Scientist.

Autor: Dr. WOLF, Silver A. (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany)

Co-Autoren: BUCK, Hanna (Integrated Genomic Surveillance Coordination (IGS), Robert Koch Institute, Berlin, Germany); DRILLER POVILL, Maximilian (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); FUCHS, Stephan (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); GÖTZE, André (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); HARTKOPF, Felix (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); HOUWAART, Torsten (Genome Competence

Centre (MF1), Robert Koch Institute, Berlin, Germany); IGS SYSTEM DEVELOPMENT GROUP, the (Robert Koch Institute, Berlin, Germany); KREMER-FLACH, Katrin (Surveillance and Electronic Reporting and Information System (FG32), Robert Koch Institute, Berlin, Germany); LATARETU, Marie (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); LITZBA, Nadine (Integrated Genomic Surveillance Coordination (IGS), Robert Koch Institute, Berlin, Germany); MAATSCH, Hannah (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); ROSCHEK, Caroline (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); SCHULZ, Anne-Christine (Integrated Genomic Surveillance Coordination (IGS), Robert Koch Institute, Berlin, Germany); SEMMLER, Torsten (Integrated Genomic Surveillance Coordination (IGS), Robert Koch Institute, Berlin, Germany); SEYAM, Yusra (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany); TITTMANN, Benjamin (Surveillance and Electronic Reporting and Information System (FG32), Robert Koch Institute, Berlin, Germany); WOLK, Paul (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany)

Vortragende(r): Dr. WOLF, Silver A. (Genome Competence Centre (MF1), Robert Koch Institute, Berlin, Germany)

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