

GenEpi-BioTrain

Genomic Epidemiology and Public Health Bioinformatics Training in the EU/EEA, the Western Balkan, and Türkiye

Dive into the forefront of various training activities in this quarterly edition of the GenEpi-BioTrain newsletter, where we strive to provide the best learning experience to all the nominated candidates working in public health institutions.

In this newsletter, join us as we unravel various training activities that have already been conducted and planned for the first and second quarters of 2024.

“3-day workshop” on AMR



GenEpi-BioTrain - Topical training: Bioinformaticians' roles and responsibilities in WGS-based MRSA, CRE and *Clostridioides difficile* ...

Launch date: 30 January - 1 February 2024

Tags: *C. difficile*, CRE, MRSA, epidemiology

A 3-day workshop was held at the Statens Serum Institut (SSI), Denmark, from the 31st to the 1st of February 2024, to enable the trainees to perform whole genome sequencing (WGS) based surveillance and outbreak investigations of: methicillin-resistant *Staphylococcus aureus* (MRSA), carbapenem-resistant Enterobacterales (CRE) and *Clostridioides difficile*.

This workshop was part of block three training on pathogen wave two and was attended by ten trainees from different European countries. Most of the trainees were bioinformaticians with different proficiency levels.

The course introduced the utility of WGS data for surveillance and outbreak investigations of hospital-acquired infections caused by MRSA, CRE, and *C. difficile*. The emphasis was on solving simulation exercises, supplemented with expert lectures routinely using WGS in public health. The trainees enjoyed the training sessions and expressed their satisfaction regarding the content, format, and teaching provided by the trainers during the workshop. The presentation given by trainees about the bioinformatic pipeline in their own

country provided valuable information about the current status of bioinformatic skills. It further opened the possibility for networking among the countries.

At the end of the course, trainees learned how to use bioinformatic approaches to extract information from the sequencing data and to convey it to microbiologists and epidemiologists for surveillance and outbreak investigations. Detailed information about this workshop can be found on ECDC Virtual Academy (EVA): [Course: GenEpi-BioTrain - Topical training: Bioinformaticians' roles and responsibilities in WGS-based MRSA, CRE and Clostridioides difficile surveillance and outbreak investigation \(europa.eu\)](https://ecdc.europa.eu/en/courses/genepi-biotrain-topical-training-bioinformaticians-roles-responsibilities-wgs-based-mrsa-cre-clostridioides-difficile-surveillance-and-outbreak-investigation)

Bridging the Gaps in Bioinformatics



GenEpi-BioTrain Training in Genomic Epidemiology and Public Health Bioinformatics "Bridging the Gap" - Second edition (FWD and VPD)

Launch date: 26/Feb - 08/Mar 2024

Tags: Bioinformatics, Databases, Introduction, Pipeline, ...

A 2-week "Bridging the Gaps in Bioinformatics" workshop was held at the Staten Serum Institut (SSI), Denmark, from 26 February to 8 March 2024, with the overall objective of strengthening the programming skills & knowledge, database management, and supporting development and usage of bioinformatic tools in the public health context.

Ten trainees from different European countries were selected for the course. This workshop was part of block one training on pathogen waves three and four. The trainees had diverse professional backgrounds, such as microbiologists and public health

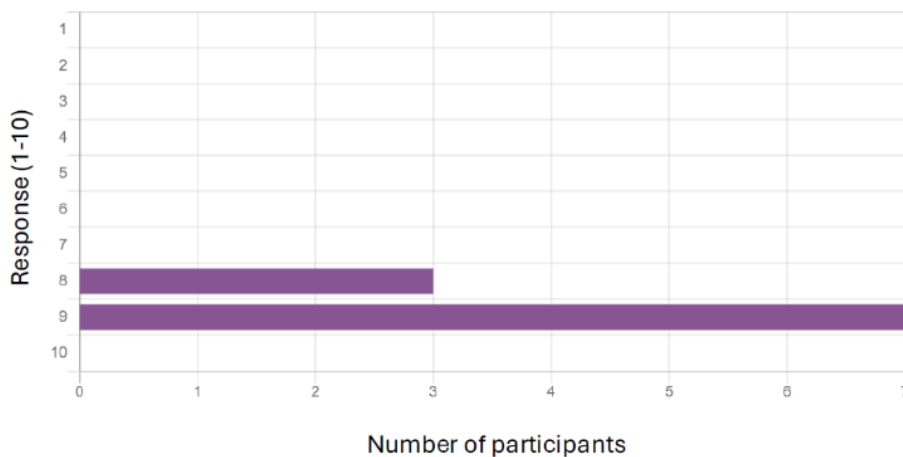
specialists. Still, they had a common goal of learning the basics of bioinformatics to enable them to work independently as bioinformaticians in their own country.

The workshop was organized into three main themes: a) processing and quality control of the sequencing data to write a basic script using Python/bash, allowing them to extract information from the processed data; b) developing a pipeline for generating a genome assembly, and 3) finally to understand the underlying principle of good coding practice, code documentation, etc. The workshop was mainly focused on hands-on exercises so the trainees could understand the basics of coding practices and, later, apply the learned tools to generate a pipeline for genome assembly by using raw reads as input. After completing the course, the trainees were confident to perform fundamental analyses supporting epidemiological investigations, including interaction with public databases. Detailed information about this workshop can be

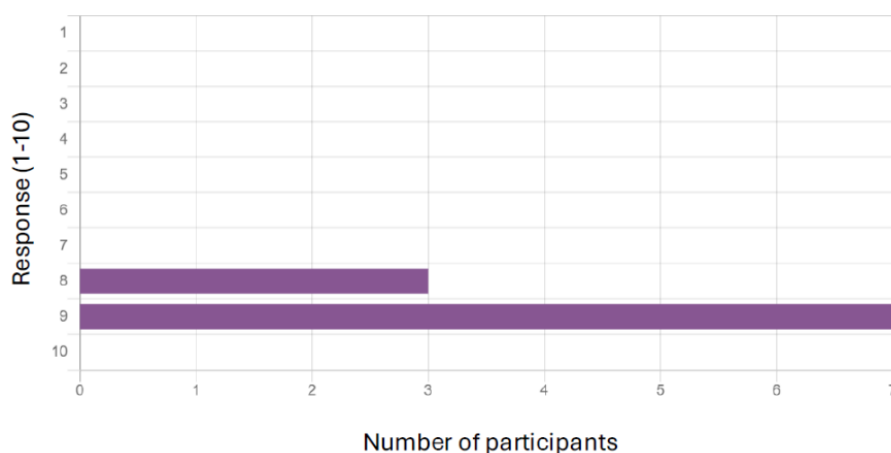
found on ECDC Virtual Academy (EVA): Course: GenEpi-BioTrain Training in Genomic Epidemiology and Public Health Bioinformatics “Bridging the Gap” - Second edition (FWD and VPD) (europa.eu)

Bridging the Gaps in Bioinformatics is one of the most sought-after courses among the various training courses provided under the GenEpi-Biotrain program. The trainees on this course are grouped as block one candidates, and they will further attend a one-week exchange visit and a 3-day Structured Query Language (SQL) course for beginners. At the end of the course, participants’ feedback was collected as displayed as a graph below.

1. How would you rank this course overall? (10 is a perfect score)



2. Would you recommend this course to other people in your network?



Virtual trainings

The GenEpi-BioTrain team is hosting a series of virtual training sessions to attract the attention of participants from diverse backgrounds. As the topics covered during the virtual training are not limited to pathogen waves, a wide array of topics could be included depending on the demands of the participants. Generally, one training is organized monthly, a recording of which is available on the EVA platform and can be accessed even after the training is completed.



GenEpi-BioTrain - Virtual training 06: Introduction to SARS-CoV-2 wastewater analysis

Launch date: 24 and 31 January 2024 (12:30-16:00 CET)

Tags: NGS, Quality control, WGS, interpretation, surveill...

(EVA): [Course: GenEpi-BioTrain - Virtual training 06: Introduction to SARS-CoV-2 wastewater analysis \(europa.eu\)](#)

SSI organized the sixth virtual training on “Introduction to SARS-CoV-2 wastewater analysis” on **24th and 31st January 2024, 12:30-16:00 CET**. In total, 378 participants enrolled for the course on the EVA platform. This virtual training introduced the concept of wastewater surveillance and explained the practical details of SARS-CoV-2 sample preparation from wastewater for sequencing and further analysis. Participants gained insight into the analysis steps, such as investigating lineage abundance from sequencing data using command line tools. Detailed information about this workshop can be found on ECDC Virtual Academy



GenEpi-BioTrain - Virtual training 07 - Phylogenetics and alignments

Launch date: 19, 20 March 2024

Tags: alignments, phylogenetics

SSI organized the next virtual training on the topic of “Phylogenetics and alignments”. It was held on **19th and 20th March 2024, 12:30-16:00 CET**. More than 450 participants enrolled for the course on the EVA platform. The focus was on generating phylogenies using state-of-the-art tools for alignments and phylogenetic inference. Detailed information about this workshop can be found on ECDC Virtual Academy (EVA): [Course: GenEpi-BioTrain - Virtual training 07 - Phylogenetics and alignments \(europa.eu\)](#)

Overview of all GenEpi-BioTrain virtual trainings on EVA:

[Course: GenEpi-BioTrain - Virtual training 01: Whole-genome sequencing-based \(WGS\) detection of antimicrobial resistance \(AMR\) in bacteria \(europa.eu\)](#)

[Course: GenEpi-BioTrain - Virtual training 02: From sequencer to polished reads for bacteria \(europa.eu\)](#)

[Course: GenEpi-BioTrain - Virtual Training 03: Introduction to bioinformatic analysis of SARS-CoV-2 amplicon sequencing data \(europa.eu\)](#)

[Course: GenEpi-BioTrain - Virtual training 04: Avian influenza NGS data analysis for outbreak investigation from a one health perspective \(europa.eu\)](#)

[Course: GenEpi-BioTrain - Virtual training 05: Bacterial genome assembly and quality control \(europa.eu\)](#)

[Course: GenEpi-BioTrain - Virtual training 06: Introduction to SARS-CoV-2 wastewater analysis \(europa.eu\)](#)

[Course: GenEpi-BioTrain - Virtual training 07 - Phylogenetics and alignments \(europa.eu\)](#)

Future activities

Future activities are presented in chronological order.

An **exchange visit for bioinformaticians** is underway at SSI from **18th to 22nd March 2024** for the five trainees belonging to block one/pathogen wave two category who attended the “Bridging the Gaps in Bioinformatics” workshop in May 2023. The exchange visits are designed to cater to the individual needs of the trainees, and the agenda is based on the trainees' preference to hone their skills for future needs in their own country.

An **exchange visit for bioinformaticians** will be conducted at SSI from **15th to 19th April 2024** for the five trainees belonging to block one/ pathogen wave three category who will also attend the “Bridging the Gaps in Bioinformatics” workshop in February/March 2024. The exchange visits are designed to cater to the individual needs of the trainees, and the agenda is based on the trainees' preference to hone their skills for future needs in their own country.

A **3-day workshop on specific food- and water-borne diseases (FWD) topics will be held at Institute Pasteur (IP), France, on 22nd – 24th April 2024** for ten block three trainees of pathogen wave 3. This workshop will focus on conducting standard phylogenetic analyses in the context of FWD surveillance and outbreak investigation.

A **3-day workshop on “SQL databases”** will be held at SSI on **14th – 16th May 2024** for block one trainees of pathogen wave 3 (n=5) and pathogen wave 4 (n=5), who will also attend the “Bridging the Gaps in Bioinformatics” workshop in February/March 2024. The course will introduce SQL, its functionality, and its uses in public health surveillance.

A **2-week “Interdisciplinary genomic epidemiology and public health”** workshop will be held at IP from May 27th to June 7th, 2024, for block two / pathogen wave three trainees. It will focus on *Listeria monocytogenes*, *Salmonella enterica*, and other foodborne pathogens, including *Escherichia coli* and *Klebsiella pneumoniae*. The trainees will be introduced to genomic epidemiology, bacterial population biology, bioinformatics concepts, and essential tools for public health microbiology.

A two-week **exchange visit for bioinformaticians** will be conducted at SSI from **26th August to 6th September 2024** for the five trainees belonging to the pathogen wave two/AMR category. The exchange visits target bioinformaticians with some prior experience with WGS data analysis. An announcement for the two-week exchange visit has been made, and the potential candidates are encouraged to contact the National Focal Points (NFPs) of their respective countries to apply for the spot.

Additional training activities will occur in 2024, and specific dates will be communicated in the following newsletter.