

# GenEpi-BioTrain

## Minutes of the Information meeting held on 18.10.2024



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## Introduction:

The third information meeting of the training program in Genomic Epidemiology and Public Health Bioinformatics (GenEpi-BioTrain) was held on 18.10.2024.

The main objectives of this meeting were to provide a background for the initiation of the training program and to inform about the upcoming training activities for Pathogen Wave 5 (Tuberculosis, TB) and Pathogen Wave 6 (Antimicrobial Resistance, AMR). The meeting included presentations of the main activities planned for 2025, followed by a presentation of the six partners involved in the GenEpi-BioTrain consortium, including Host institutes (SSI, IP, RCB, THL, KUH) and Training institutes (SSI/DTU, RCB, IP). Lastly, the procedure for the nomination process and the selection of the candidates was presented, and participants were invited to ask questions in the Q&A session.

The agenda for the meeting is reported below.

Programme	
13:00-13:05	<b>Welcome</b> (Anders Rhod Larsen, SSI) <ul style="list-style-type: none"><li>○ Adoption of the meeting agenda &amp; Housekeeping</li></ul>
13:05-13:15	<b>Presentation: Background of the training programme</b> (Theresa Enkirch, ECDC)
13:15-13:25	<b>Presentation: Training programme in genomic epidemiology and public health bioinformatics – “GenEpi-BioTrain”</b> (Valeria Bortolaia, SSI) <ul style="list-style-type: none"><li>○ Overview of the training programme and training activities</li></ul>
13:25-13:35	<b>Presentation: “Bridging the gaps in bioinformatics”</b> (Kirsten Ellegaard, SSI) <ul style="list-style-type: none"><li>○ Outline and learning outcomes of the course edition 2025</li></ul>
13:35-13:45	<b>Presentation: Pathogen Wave 5 activities at Research Center Borstel</b> (Christian Utpatel, RCB) <ul style="list-style-type: none"><li>○ Overview of activities at RCB in 2025</li></ul>
13:45-13:50	<i>Short break</i>
13:50-14:10	<b>Presentation: GenEpi-BioTrain consortium partners</b> <ul style="list-style-type: none"><li>○ DTU</li><li>○ IP</li><li>○ RCB</li><li>○ SSI</li><li>○ THL</li><li>○ KUH</li></ul>
14:10-14:20	<b>Presentation: Nomination and selection process</b> (Theresa Enkirch, ECDC) <ul style="list-style-type: none"><li>○ Who did we invite and why</li><li>○ Who will be involved and how</li><li>○ Nomination and selection of training participants</li><li>○ Upcoming dates</li></ul>
14:20-14:30	<b>Feedback and Q &amp; A session; AOB</b> (Anders Rhod Larsen, SSI)

### **Presentation: Background of the training program (Theresa Enkirch, ECDC)**

- Theresa Enkirch welcomed new participants from the Western Balkans and Türkiye to a training program initiated in response to the COVID-19 pandemic. The program's origins traced back to several EU investments aimed at enhancing biodefense preparedness and rapid detection of SARS-CoV-2 variants. Key initiatives include the HERA incubator launched in February 2021 and a €200 million investment announced by the EU to bolster whole genome sequencing (WGS) capabilities.
- The European Commission and ECDC have been pivotal in providing short-term access to high-capacity WGS services and supporting long-term national investments in WGS infrastructure. These initiatives enhance public health laboratories, cross-border networking, and bioinformatics standardization and training.
- ECDC's expanded mandate in 2022 emphasized collecting molecular pathogen data to detect and investigate serious cross-border health threats. ECDC also published a strategy for integrated genomic typing to support multi-country outbreak investigations and continuous surveillance through WGS.
- A training need assessment conducted in 2021 identified significant gaps in bioinformatics knowledge and expertise among EU and Western Balkan countries. The survey revealed a strong interest for training in evolutionary biology, metagenomics, and phylogeny, highlighting the need for standardized data collection and multidisciplinary team exercises.
- In response, the Genomic Epidemiology and Public Health Bioinformatics Training Program (GenEpi-BioTrain) was launched as part of cross-border capacity-building initiatives. With a budget of up to €5.2 million over four years, the program aims to enhance genomic epidemiology capabilities beyond COVID-19. The program has completed two years of training, with ongoing activities to further develop expertise in genomic epidemiology and public health bioinformatics.

### **Presentation: Overview of the training program (Valeria Bortolaia, SSI)**

- The program aims to train public health professionals to build capacity for the routine use of genomic information for surveillance, preparedness, and outbreak response.
- Target participants for the training activities are public health professionals with and without bioinformatic knowledge, depending on the type of training course.
- The concept of pathogen waves was explained: every year, the training activities will mainly focus on two selected pathogens. Activities related to different pathogen waves will occur at different training sites.
- The training institutes are: Statens Serum Institut (SSI) and Technical University of Denmark (DTU), Denmark; Institut Pasteur (IP), France; Research Center Borstel (RCB), Germany; Finnish Institute for Health and Welfare (THL), Finland; Karolinska University Hospital (KUH), Sweden.

Five different types of training activities will be performed during the training program.

- 1) "Bridging the gaps in bioinformatics" workshop.
- 2) Interdisciplinary workshop in genomic epidemiology and public health bioinformatics.
- 3) Exchange visits for bioinformaticians.
- 4) Three-day training on specific topics in genomic epidemiology and/or public health bioinformatics.
- 5) Virtual training in genomic epidemiology and/or public health bioinformatics on various topics.

### **1) "Bridging the gaps in bioinformatics" workshop**

- The aim is to strengthen programming knowledge and skills for using and developing bioinformatics tools in the public health context.
- The participants are beginners in bioinformatics and interested in working in bioinformatics.
- It is an in-person workshop that lasts two weeks. It is held once a year, and there are ten trainees per course. For the year 2025, the event will be held at the SSI campus from **24<sup>th</sup> February to 7<sup>th</sup> March 2025**.
- The curriculum covers an overview of sequencing technologies, genome assembly and analysis, QC, coding best practices, and pipeline development, among other topics.

### **2) Interdisciplinary workshops in genomic epidemiology and public health bioinformatics**

- This training aims to improve the knowledge and capacity for applied genomic epidemiology and bioinformatics for public health action.
- The trainees are the 'country teams', where each team comprises a bioinformatician, a microbiologist, and an epidemiologist from the same country.
- It is an in-person workshop that lasts two weeks. It is held twice a year, with 10 country teams (30 trainees) per course.
- The curriculum is developed around cases, such as common outbreak scenarios, that need to be solved by leveraging interdisciplinary collaboration.
- For 2025, Pathogen Wave 5 is scheduled to take place at RCB from **31<sup>st</sup> March 2025 to 11<sup>th</sup> April 2025**, and Pathogen Wave 6 will be held at SSI from **27<sup>th</sup> October 2025 to 7<sup>th</sup> November 2025**.

### **3) Exchange visits for bioinformaticians**

- The aims are to learn the best practices of public health bioinformatics and build a network of support. The visit is tailored to the individual needs of each trainee.
- It is an in-person activity, with three - five trainees per visit. Over the course of four years, exchange visits will be held for a total of 60 trainees: 40 will attend one-week visits, 15 will attend two-week visits, and five will attend three-week visits.
- For the one-week visits, the participants are bioinformaticians who have already attended the 'Bridging the gaps in bioinformatics' workshop.

- A one-week exchange visit for **Pathogen Wave 5** is scheduled at RCB from **15<sup>th</sup> to 19<sup>th</sup> September 2025**, while another one-week exchange visit for **Pathogen Wave 6** will be held at IP from **16<sup>th</sup> June to 20<sup>th</sup> June 2025**.
- The two-week and three-week visits will be announced separately.

#### **4) Three-day specific training in genomic epidemiology and/or public health bioinformatics**

The aim is to train in specific topics selected depending upon the needs of the participants.

- The participants may have different skills, and the training curriculum can be modified to accommodate different proficiency levels.
- It is a three-day, in-person course held three times a year. There are ten trainees per course.
- The three-day course on SQL databases, attended by the trainees enrolled in the 'Bridging the Gaps in Bioinformatics' workshop, will take place at SSI from **20<sup>th</sup> to 22<sup>nd</sup> May 2025**.
- The three-day course specific to Pathogen Wave 5 will be held at RCB from **2<sup>nd</sup> to 4<sup>th</sup> June 2025**
- The three-day course specific to Pathogen Wave 6 will take place at SSI from **9<sup>th</sup> to 11<sup>th</sup> December 2025**.

#### **5) Virtual training on genomic epidemiology and/or public health bioinformatics**

- The aim is to train the interested trainees virtually for a full day or two half days.
- The topics can vary, and countries are welcome to express their needs for specific topics.
- Virtual training is performed approximately once every month.

#### **Information dissemination activities**

- A virtual information session to present further details on the content of the training activities to the appointed trainees is scheduled for January 2025.
- A quarterly newsletter is sent out regularly to inform about the ongoing and planned activities of the GenEpi-BioTrain program.
- ECDC Virtual Academy (EVA) has a shared space open to everyone and course-specific pages for the trainees.

#### **Presentation: Bridging the gaps in bioinformatics (Kirsten Ellegaard, SSI)**

- Kirsten Ellegaard introduced the third edition of the "Bridging the Gaps in Bioinformatics" course, designed for Block 1 participants, i.e. trainees who attend this workshop, a three-day course on SQL databases and a one-week exchange visit for bioinformaticians.

- The course is aimed at beginners in bioinformatics and is part of an annual training initiative, with four planned editions in total. The course has been conducted twice already, with positive feedback and a high number of applications.
- The course focuses on genome sequencing and analysis, helping participants to process sequencing data from raw reads to genomes, as well as initiating basic genomic analysis.
- It is an intensive course that spans two weeks, packed with a comprehensive schedule designed to cover both theoretical and practical aspects of bioinformatics.
- The course aims to teach participants how to handle and process sequencing data using bioinformatics tools.
- Emphasis is placed on critically evaluating data at all stages of the analysis process and understanding the importance of accuracy in genomic analysis.
- Participants will be introduced to the command line interface, Bash scripting, and Python programming to equip them with the skills to handle data and build basic pipelines.
- While some genome analysis can be done without the command line, the course focuses on providing bioinformatics skills that are critical for advanced work in the field:
  - Week 1 focuses on command line basics, data quality assessment, and genome assembly using Illumina and Nanopore data;
  - Week 2 covers more advanced topics like phylogeny, pathogen-specific tools, pipeline development, and sharing data in public repositories. The final day is reserved for catch-up sessions and mentoring.
- The course is highly practical, with participants working on real sequence data using pre-configured laptops (Ubuntu operating system). Approximately 90% of the course is dedicated to hands-on exercises, with minimal lecture time (10%). Participants are expected to be highly motivated and willing to continue their training and development after the course.

### **Presentation: Overview of training activities at Research Center Borstel (Christian Utpatel, RCB)**

- Christian Utpatel briefly introduced the public health importance of TB, which causes approximately 1.5 million deaths per year, with 10 million new infections reported annually. TB was the deadliest infectious disease until surpassed by COVID-19 in 2022.
- Multidrug-resistant TB (MDR-TB) represents a serious threat, complicating treatment and public health efforts. Efforts to combat TB include the WHO's End TB Strategy, which aligns with the UN Sustainable Development Goals, aiming to eliminate TB by 2030.
- Three main training activities that will be conducted within GenEpi-BioTrain at RCB in 2025 are:

### **Interdisciplinary workshop in genomic epidemiology and public health bioinformatics**

- This two-week course will enhance participants' knowledge and skills in genomic epidemiology and bioinformatics, focusing on using open-source tools for WGS, AMR, and epidemiological data analysis.

- The course aims to deepen participants' understanding of how to interpret integrated results for infectious disease prevention and control. Practical sessions will cover the advantages and disadvantages of different diagnostics and national surveillance sequencing strategies.
- Participants will engage in hands-on experience with targeted sequencing from primary specimens and WGS for surveillance

### **One-Week Exchange Visit for Bioinformaticians**

- This exchange visit will be tailored to the specific needs of five participants, focusing on discussions before the visit to identify individual learning goals.
- Topics may include specific pipelines, cluster and outbreak detection, transmission analysis, and the use of antibiotic resistance data.

### **Three-Day Course on Specific Topics**

- This course will delve into advanced topics in genomic data analysis, including advanced phylogenetic analysis and Bayesian modeling, to understand the evolution of AMR and outbreak dynamics.

### **Additional presentations**

- All the consortium partners (IP, RCB, SSI, THL, KUH) and the contractor, DTU, gave a presentation explaining the organization and activities at their institutes.
- The last session was devoted to the explanation of the procedure for nomination and selection of the participants for the GenEpi-BioTrain program. Nomination of the participants should be done by the National Focal Points (NFP) for Microbiology.

### **Important dates to consider:**

ECDC will send out invitation letters and the nomination template to the NFPs for Microbiology, with the other NFPs and Operational Contact Points (OCPs) invited to this meeting in copy, on **21<sup>st</sup> - 22<sup>nd</sup> October 2024**. A survey link will be attached to the nomination template. The invitation concerns Pathogen Wave 5 (Tb) and Pathogen Wave 6 (AMR). The deadline for nomination submission is **29<sup>th</sup> November 2024, and there will be no extensions**. The successful candidate will be notified by **20<sup>th</sup> December 2024 at the latest**. The selected candidates should confirm their acceptance of the program by **15<sup>th</sup> January 2025**.

The virtual training will take place throughout the year. All the national contact points will be informed, and the information will be posted on EVA. No application is required to participate in the virtual training, and the recorded sessions will be uploaded on EVA. It is advisable to create a login on EVA so that the participants can receive automatic notifications regarding these trainings.

## Q & A sessions:

**Q1:** Will the slides/video recording be shared after the meeting?

**A1:** Yes, the minutes, video recordings, and slides will be uploaded to EVA and accessible to all the participants.

**Q2:** Is it possible to nominate a candidate whose contract will end in April 2025 and will likely be renewed but the information will not be available at the time of application?

**A2:** Yes, it is possible to nominate such a candidate; however, it is advisable to have a backup in place if the primary candidate cannot attend.

**Q3:** Will the OCP for bioinformatics be informed about the nomination process?

**A3:** The OCP for bioinformatics will be informed, along with the National Focal Points for Microbiology in each respective country.

**Q4:** Can a beginner in bioinformatics apply for an interdisciplinary workshop as part of a country team?

**A4:** Yes, that is permissible.

**Q5:** Is applying for multiple training blocks from a single country possible?

**A5:** Yes, applications for multiple training blocks are permitted, as applying for one does not exclude the possibility of applying for another.

**Q6:** Can a candidate re-apply if they have already applied or attended a workshop on antimicrobial resistance (AMR)?

**A6:** Yes, candidates are welcome to re-apply if they haven't been selected before; they can also re-apply if they have already attended the course, however, it does not make much sense to repeat the course because the content will be similar

**Q7:** Can a university team collaborating with public health institutions apply for the workshop?

**A7:** Yes, that is permissible.



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