



FWD AMR. RefLabCap

Welcome to the 3rd Multidisciplinary training workshop June 2024

Susanne Schjørring, Ph.D, *European Public Health Microbiologist*
Foodborne Infections, Statens Serum Institut, Denmark

"House Keeping Rules"

Microphones off during the presentations

After each presentation there will be time for questions

- Raise the "hand" or use the chat to ask questions

When the word is yours

- **Please say your name, country - before the question**

Key for a successful workshop is participation and that you ask questions

This session will be recorded

FWD AMR-RefLabCap

Network of national reference laboratories in public health on AMR in *Salmonella* and *Campylobacter*

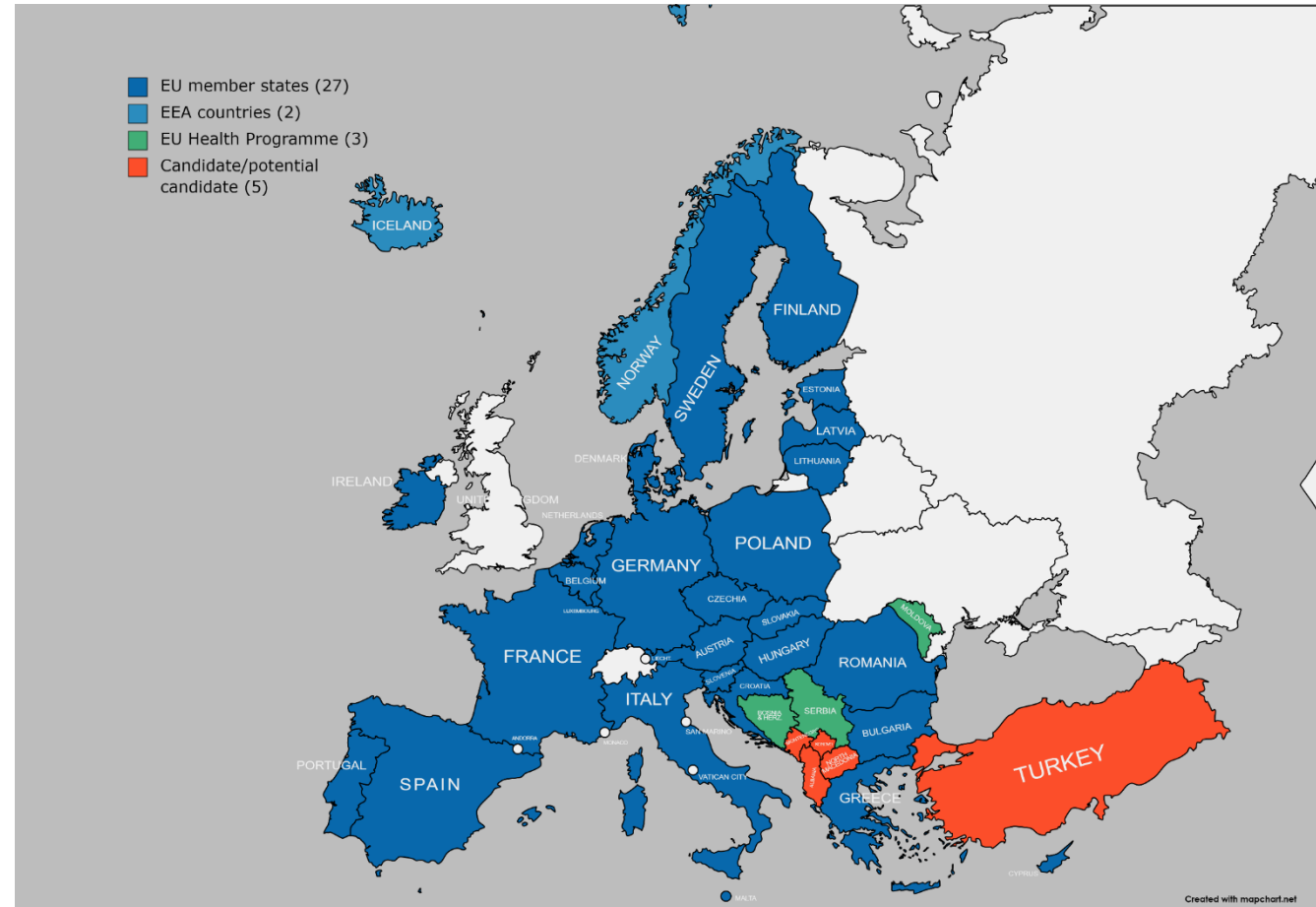
Laboratories functioning as NRL on AMR in
Salmonella and/or *Campylobacter*

32 countries: Network participants

- EU/EEA countries
- Additional EU Health Programme countries

5 candidate/potential candidate countries

FWD AMR RefLabCap



Networking

- A key element of the project

The goal is to

- facilitate a strong network of laboratories
- facilitate experience and knowledge exchange
- be valuable for laboratories at all levels of development

Networking is facilitated through the general meetings, webinars and online workshops

This workshop

Each country

- Facilitate a strong collaboration between microbiologists and epidemiologists
- Enhance knowledge of opposite expertise

Between countries

- Enhance collaboration
- Knowledge exchange

Experience with interpretation of WGS analyses and outbreak investigations



None



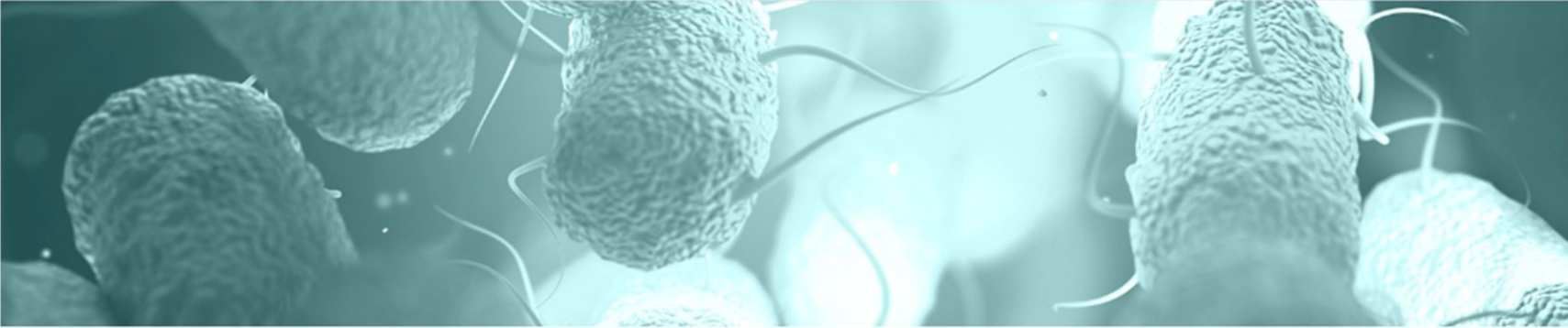
Some




A lot

- 1. Multidisciplinary training workshop (<https://www.fwdamr-reflabcap.eu/events/2022>)
- 2. Multidisciplinary training workshop (<https://www.fwdamr-reflabcap.eu/events/2023>)

Website



Food- and Waterborne Diseases Antimicrobial Resistance - Reference Laboratory Capacity



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News

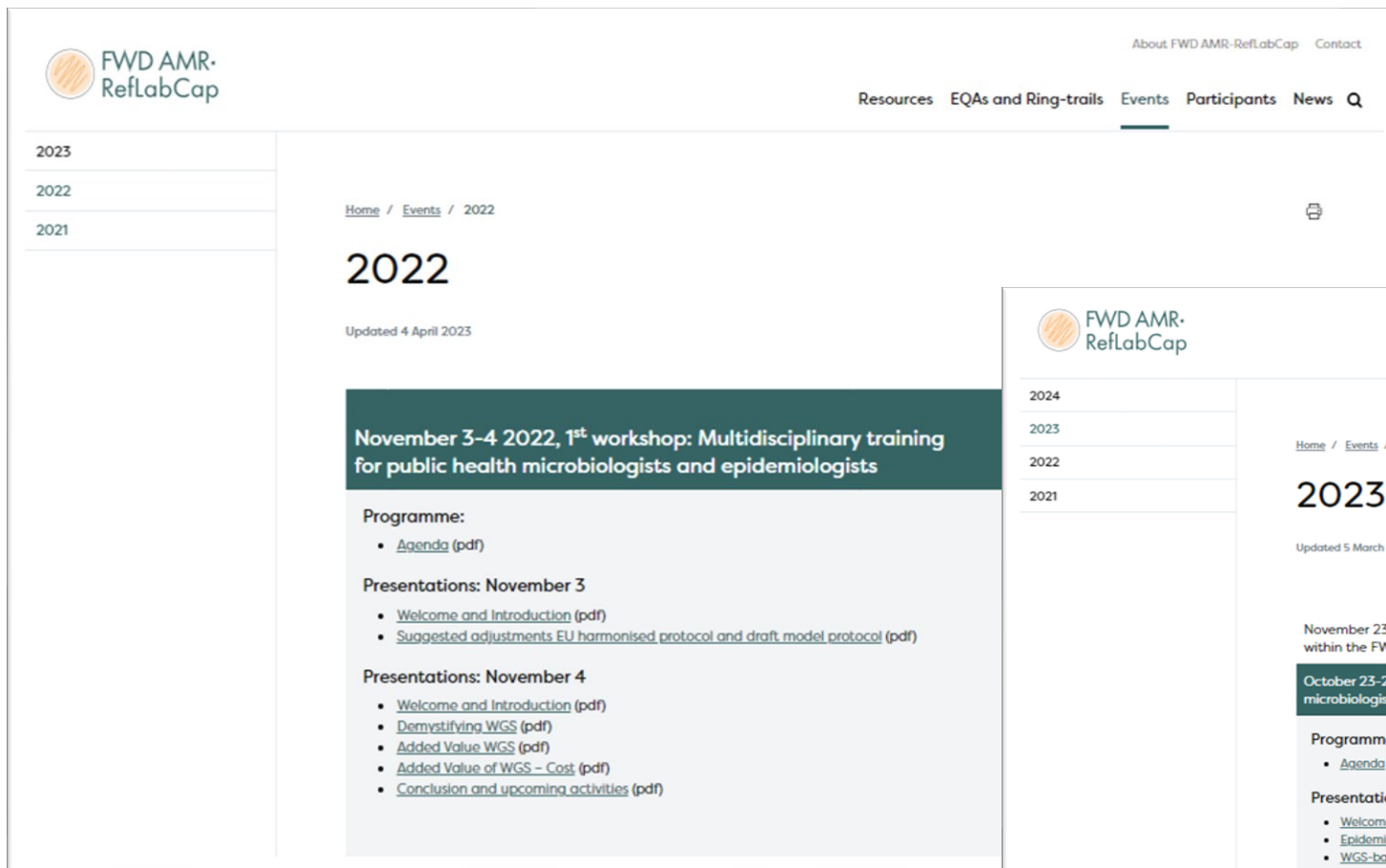
[August 2023 Newsletter](#)
15 August 2023

[October 2023 - 2nd Multidisciplinary training workshop](#)
1 August 2023

[January 2023 - Newsletter](#)
10 January 2023

<https://www.fwdamr-reflabcap.eu/>

1. and 2. Multidisciplinary workshop



The screenshot shows the FWD AMR-RefLabCap website with the 'Events' tab selected. The left sidebar lists the years 2023, 2022, and 2021. The main content area is for the year 2022, updated on 4 April 2023. It features a dark green header for the 'November 3-4 2022, 1st workshop: Multidisciplinary training for public health microbiologists and epidemiologists'. Below this, the 'Programme' section lists an 'Agenda (pdf)'. The 'Presentations: November 3' section lists 'Welcome and Introduction (pdf)' and 'Suggested adjustments EU harmonised protocol and draft model protocol (pdf)'. The 'Presentations: November 4' section lists 'Welcome and Introduction (pdf)', 'Demystifying WGS (pdf)', 'Added Value WGS (pdf)', 'Added Value of WGS - Cost (pdf)', and 'Conclusion and upcoming activities (pdf)'.

FWD AMR-RefLabCap

About FWD AMR-RefLabCap Contact

Resources EQAs and Ring-trails **Events** Participants News Q

2023
2022
2021

Home / Events / 2022

2022

Updated 4 April 2023

November 3-4 2022, 1st workshop: Multidisciplinary training for public health microbiologists and epidemiologists

Programme:

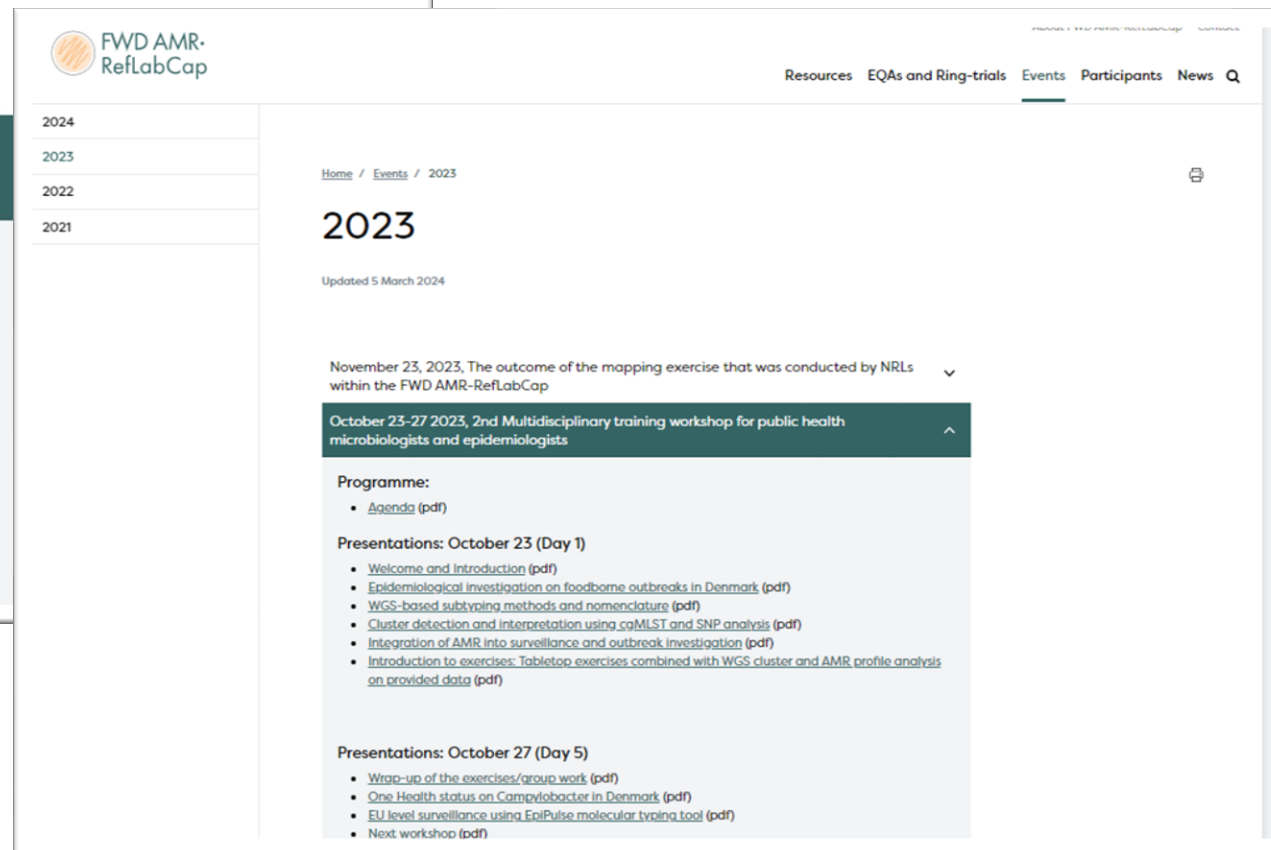
- [Agenda \(pdf\)](#)

Presentations: November 3

- [Welcome and Introduction \(pdf\)](#)
- [Suggested adjustments EU harmonised protocol and draft model protocol \(pdf\)](#)

Presentations: November 4

- [Welcome and Introduction \(pdf\)](#)
- [Demystifying WGS \(pdf\)](#)
- [Added Value WGS \(pdf\)](#)
- [Added Value of WGS - Cost \(pdf\)](#)
- [Conclusion and upcoming activities \(pdf\)](#)



The screenshot shows the FWD AMR-RefLabCap website with the 'Events' tab selected. The left sidebar lists the years 2024, 2023, 2022, and 2021. The main content area is for the year 2023, updated on 5 March 2024. It features a dark green header for the 'October 23-27 2023, 2nd Multidisciplinary training workshop for public health microbiologists and epidemiologists'. Below this, the 'Programme' section lists an 'Agenda (pdf)'. The 'Presentations: October 23 (Day 1)' section lists 'Welcome and Introduction (pdf)', 'Epidemiological investigation on foodborne outbreaks in Denmark (pdf)', 'WGS-based subtyping methods and nomenclature (pdf)', 'Cluster detection and interpretation using coMLST and SNP analysis (pdf)', 'Integration of AMR into surveillance and outbreak investigation (pdf)', and 'Introduction to exercises: Tabletop exercises combined with WGS cluster and AMR profile analysis on provided data (pdf)'. The 'Presentations: October 27 (Day 5)' section lists 'Wrap-up of the exercises/group work (pdf)', 'One Health status on Campylobacter in Denmark (pdf)', 'EU level surveillance using EpiPulse molecular typing tool (pdf)', and 'Next workshop (pdf)'.

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Resources EQAs and Ring-trails **Events** Participants News Q

2024
2023
2022
2021

Home / Events / 2023

2023

Updated 5 March 2024

November 23, 2023, The outcome of the mapping exercise that was conducted by NRLs within the FWD AMR-RefLabCap

October 23-27 2023, 2nd Multidisciplinary training workshop for public health microbiologists and epidemiologists

Programme:

- [Agenda \(pdf\)](#)

Presentations: October 23 (Day 1)

- [Welcome and Introduction \(pdf\)](#)
- [Epidemiological investigation on foodborne outbreaks in Denmark \(pdf\)](#)
- [WGS-based subtyping methods and nomenclature \(pdf\)](#)
- [Cluster detection and interpretation using coMLST and SNP analysis \(pdf\)](#)
- [Integration of AMR into surveillance and outbreak investigation \(pdf\)](#)
- [Introduction to exercises: Tabletop exercises combined with WGS cluster and AMR profile analysis on provided data \(pdf\)](#)

Presentations: October 27 (Day 5)

- [Wrap-up of the exercises/group work \(pdf\)](#)
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1st FWD AMR – RefLabCap workshop Multidisciplinary training for public health microbiologists and epidemiologists

Online, 3-4 November 2022

Agenda

3. November 2022 – National surveillance

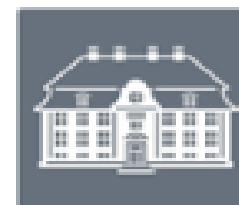
Time	Title	Presenter
13:00 – 13:15	Welcome and introduction	Eva Møller Nielsen
13:15 – 13:45	Presentation of the updated EU protocol for harmonised monitoring of AMR and the draft model protocol for national surveillance	Jeppe Boel
13:45 – 14:45	Break-out session: Discussion in groups on establishing/optimising national surveillance of AMR in <i>Salmonella</i> and <i>Campylobacter</i>	All
14:45 – 15:30	Plenum discussion	Jeppe Boel
15:30 – 15:50	Wrap-up	Jeppe Boel

4. November 2022 – Added value of WGS

Time	Title	Presenter
09:00 – 09:10	Welcome and introduction	Susanne Schjørring
09:10 – 10:10	De-mystifying WGS	Jette Sejer Kjeldgaard
10:10 – 11:00	Added value of WGS for surveillance/outbreak investigations	Eva Litrup
11:00 – 11:30	Added value of WGS (Cost)	Ana Rita Bastos Rebelo
11:30 – 12:00	Conclusions / Upcoming activities	Susanne Schjørring



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4 October, 2023

The 2nd multidisciplinary training workshop

Date: 23-27 October 2023

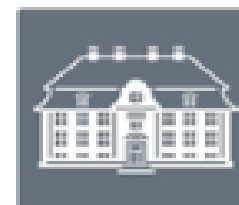
Location: online

Agenda

Day 1: 23 October, Online meeting		Presenter
9:00 - 9:10	Welcome and Introduction	Susanne Schjørring (SSI)
9:10 - 9:45	Epidemiological investigation on foodborne outbreaks in Denmark	Luise Müller (SSI)
9:45 - 9:55	Coffee break	
9:55 - 10:20	WGS-based subtyping methods and nomenclature	Egle Kudirkiene (SSI)
10:20 - 10:40	Cluster detection and interpretation using cgMLST and SNP analysis	Pernille Gymoese (SSI)
10:40 - 10:50	Coffee break	
10:50 - 11:15	Integration of AMR into surveillance and outbreak investigation	Mia Torpdahl (SSI)
11:15 - 11:30	Introduction to exercises: Tabletop exercises combined with WGS cluster and AMR profile analysis on provided data	Susanne Schjørring (SSI)
	Lunch break	
12:00 - 13:00	Break-out session - start at the plenum, groups of 5-6 countries. Susanne Schjørring (SSI), Egle Kudirkiene (SSI), Jeppe Boel (SSI), Mia Torpdahl (SSI), Jette Sejer Kjeldgaard (DTU) and Ana-Rita Bastos Rebelo (DTU)	



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Clone

Isolates of bacterial species that are indistinguishable in genotype are assigned as a clone

Cluster

Instead, in outbreak investigations we use clusters of isolates with nearly identical genomes to consider pathogen mutation rates in different hosts/environments and time

Cluster cut-offs for cgMLST and SNP analyses:

- *Salmonella* - depends on the serovar
 - 0-3 ADs/SNPs in clonal serovars and
 - up to 5 AD/SNP in other serovars
- *Campylobacter* - 5 or less ADs/SNPs

Proposed protocol for whole genome sequencing-based analysis for detection and tracing of epidemic clones of antimicrobial resistant *Salmonella* and *Campylobacter*
- to be used for national surveillance and integrated outbreak investigations by NRLs for public health

8 July 2022

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<https://www.fwdamr-reflabcap.eu/resources/reflabcap-protocols-and-guidelines>

Genotyping using SNP (e.g. CSI Phylogeny)

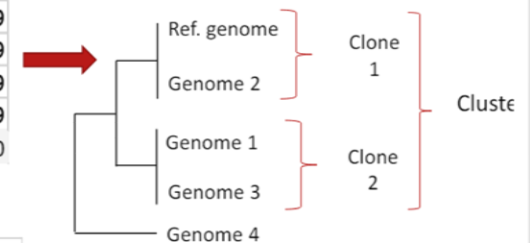
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Pairwise similarity matrix (.txt format)

	Ref. Genome	Genome 2	Genome 1	Genome 3	Genome 4
Ref. Genome	0	0	3	3	9
Genome 2	0	0	3	3	9
Genome 1	3	3	0	0	9
Genome 3	3	3	0	0	9
Genome 4	9	9	9	9	0

	Ref. Genome	Genome 2	Genome 1	Genome 3	Genome 4
Ref. Genome	0	0	3	3	9
Genome 2	0	0	3	3	9
Genome 1	3	3	0	0	9
Genome 3	3	3	0	0	9
Genome 4	9	9	9	9	0

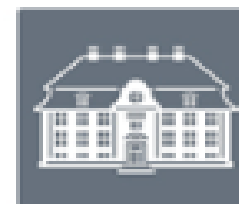
Phylogenetic tree (.newick file format)



The user defines clusters based on selected SNP thresholds, e.g. 0-3 SNPs



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4 October, 2023

The 2nd multidisciplinary training workshop

Date: 23-27 October 2023

Location: online

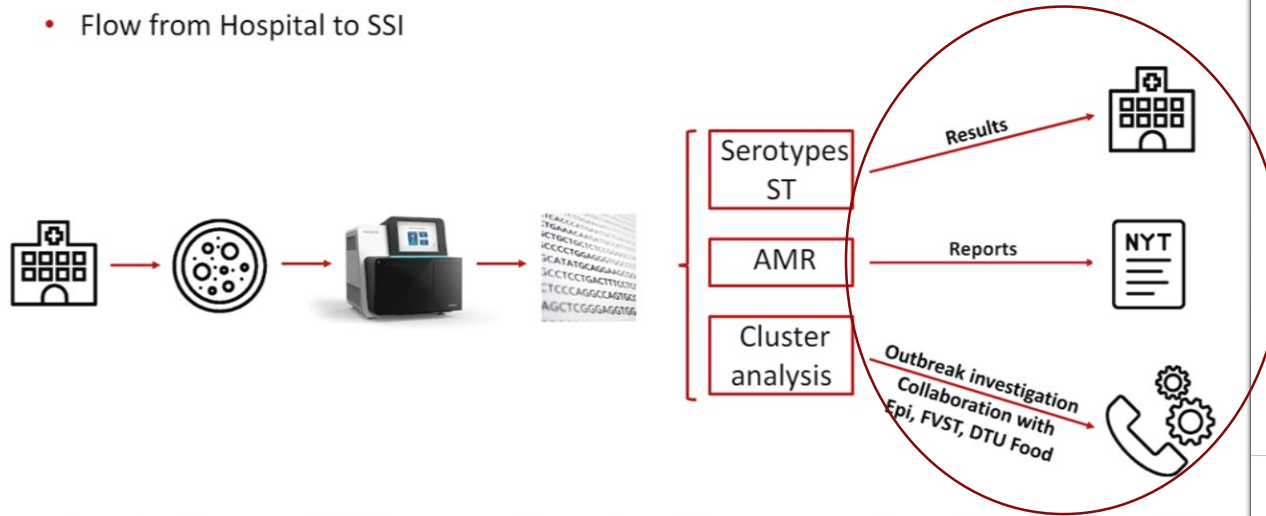
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WGS-based surveillance of *Salmonella* in Denmark



- Real time surveillance since 2018
- Flow from Hospital to SSI



- *Campylobacter* overall very diverse
- cgMLST and single linkage
 - ≤ 4 AD cut-off
- ~50% of human isolates form clusters
 - mostly small, some big
- 25-30% of human isolates match to food isolates (mostly chicken)

3rd Multidisciplinary training workshop

Agenda (Day 1 and 2)

Day 1: 24 June, Online meeting	
10:00 - 10:10	Welcome
10:10 - 10:20	Introduction to exercises: Tabletop exercises including interpretation of WGS cluster and AMR profile

Day 2: 25 June, Data analysis	
Approx. 3 hours/species	The two representatives from each country (epidemiologist and microbiologist/ bioinformaticians) work together on the two exercises (Salmonella/Campylobacter).

Agenda (Day 3, 4 and 5)

Day 3: 26 June, Interpretation support and discussion

13:00 - 14:30	Group of countries meet with a facilitator for questions and discussion on <i>Salmonella</i> exercise
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Day 4: 27 June, Interpretation and discussion

13:00-14:30	Group of countries meet with a facilitator for questions and discussion on <i>Campylobacter</i> exercise
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Agenda (Day 5)

Day 5: 28 June, Online meeting		Presenter
09:00 - 09:50	Summary of the Table-top exercises	Susanne Schjørring
09:50 - 10:00	<i>Coffee break</i>	
10:00 - 10:30	WGS-based surveillance as a paradigm shift in outbreak detection, AMR monitoring and source attribution in <i>Campylobacter</i> spp. in Portugal	Mónica Oleastro, Portugal
10:30 - 11:00	<i>Salmonella</i> Strathcona outbreak investigation and antimicrobial resistance profiles of <i>Salmonella</i> spp. isolates from 2000-2022 in Austria	Sabine Maritschnik, Austria
11:00 - 11:50	Data sharing, events, clusters and cut-offs	Cecilia Jernberg (ECDC)
11:50-12:00	Final remarks	Susanne Schjørring (SSI)

Data download

Evaluation survey



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Introduction to exercises
3rd Multidisciplinary training workshop
EXERCISE

Susanne Schjørring
Foodborne Infections, SSI, Denmark

Learning objectives

- The microbiologist and epidemiologist will throughout the exercise apply steps of an epidemiological outbreak investigation
- Improve analytical skills in the interpretation of whole genome sequencing (WGS) data
- Become familiar with the terminology from the “other field of expertise”
- Enhance the ability to communicate cross-sectorial and discuss improvements to the information flows

Exercises

Structure requirements

- Tabletop outbreak investigation exercise!
 - No data analysis is needed – only assesses the data provided in the PDF file
 - But data will be available after Day 5 for training purposes

The focus is on

- WGS analysis of *Salmonella/Campylobacter* and AMR
- cross-sector collaboration
- communication flow

Exercises

Two scenarios

- *Salmonella*
- *Campylobacter*
- Different scenarios
- The scenarios develop over time
- **Please DO NOT READ AHEAD**
 - **Some of the answers to the questions will be revealed on the next page**

General info

IN BLACK:

- Scenario text
- Development of the outbreak, detailed information, etc.

IN BLUE:

- *Questions*

Exercises

- Outbreak investigation (some of the 10 steps)
 - Case definition and descriptive epidemiology
 - Patient interviews and hypothesis generation
 - Analytical study
 - WGS analysis and interpretation
 - Traceback and microbiological testing
 - Communication of results
- A lot of open questions to encourage discussion between you (Epi/Micro) or Country
“How many cases would you inform the epidemiologist about? and how would the information be delivered in your country”?
- **Epidemiologist please include your microbiologist in the interpretation of the epi-data**
- **Microbiologist please include your epidemiologist in the interpretation of the WGS-data**

Exercise release

Today at 10:30 an email with the two exercises will be sent to all participants

- Contact fwdamr@ssi.dk in case of any issues
- Rest of Day'1 and Day 2:
 - work with the exercises, the data and the interpretation
 - (approx. 3 hours/species)
- How are you planning to conduct the exercise tomorrow
 - together or remotely – teams/zoom?

Discuss the exercise

Day 3: 13:00

- We will talk about the results of the ***Salmonella* exercise**
 - specific issues, interpretations, differences between the countries etc.
 - lessons learned
 - *only Campylobacter laboratories are invited*

Day 4: 13:00

- We will talk about the results of the ***Campylobacter* exercise**
 - specific issues, interpretations differences between the countries etc.
 - lessons learned
 - *only Salmonella laboratories are invited*



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3rd Multidisciplinary training workshop
June 2024

Enjoy