FWD AMR· RefLabCap

STATENS SERUM INSTITUT

DTU

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

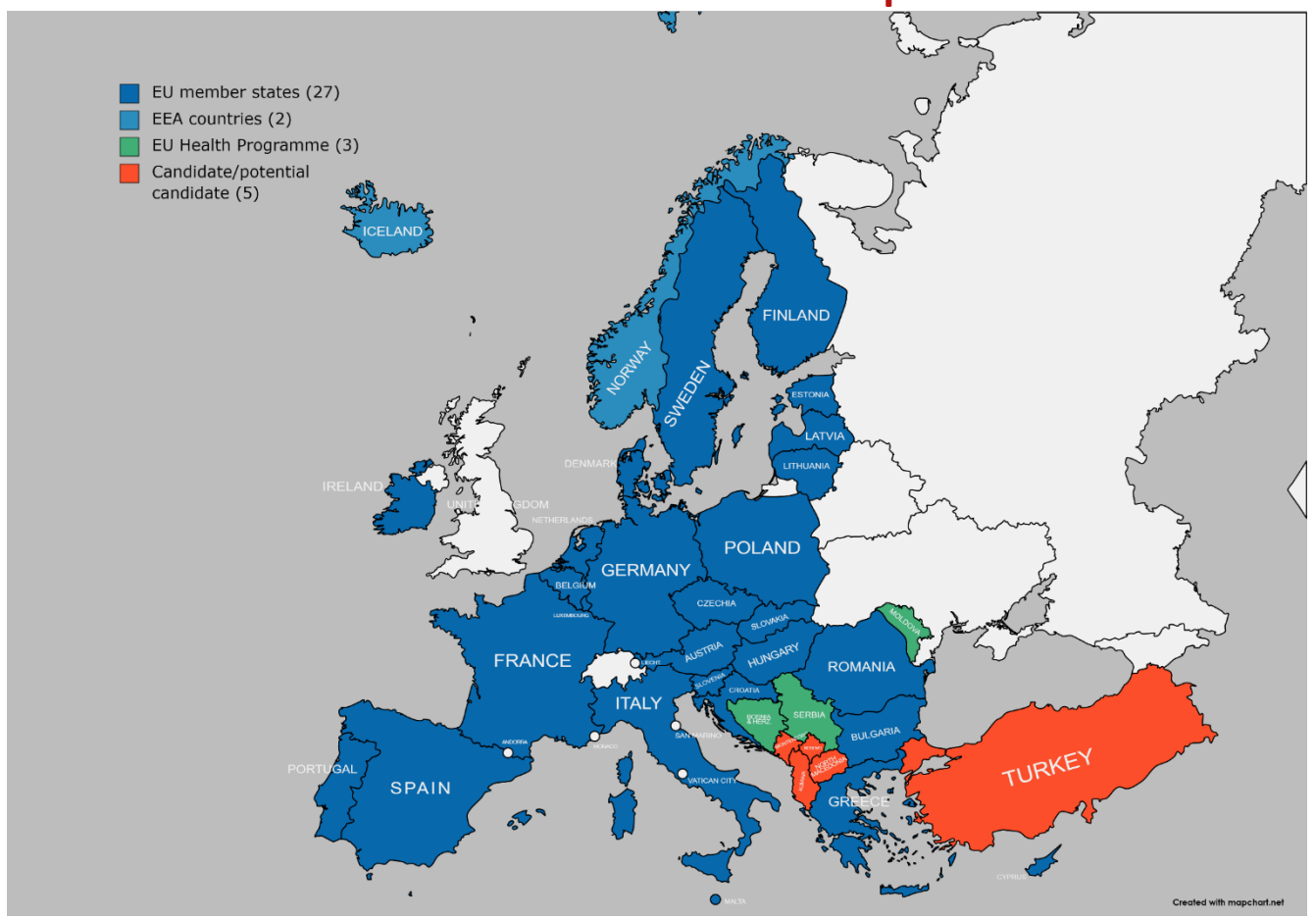
FWD AMR-RefLabCap

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



Workshop participants

22 countries ~ 24 laboratories

Country	Microbiologist	Epidemiologist
Albania	Artan Bego	Luljeta Alla
Austria (CAMPY)	Sandra Koeberl-Jelovcan	Sabine Maritschnik
Belgium (SALM)	Commans Florian	Portell Buj Elena
Belgium (CAMPY)	Mairesse Célestin	Prévost Benoit
Croatia	Ana Gverić Grginić	Leona Paradi
Cyprus	Christos Karagiannis	N/A
Czech Republic	Petra Španělová	Barbora Zapletalová
Estonia	Kairi Tõnsau	Liidia Dotsenko
France (SALM)	Carolina Silva Nodari	Nathalie Jourdan-Da Silva
Greece (SALM)	Georgia Mandilara	Atnthi Chrysostomou
Greece (CAMPY)	Olga Pappa	Theologia Sideroglou
Iceland	Freyja Valsdottir	Anna Margrét Hallórsdóttir

Country	Microbiologist	Epidemiologist
Ireland (CAMPY)	Diana Costa	Anne Carroll
Kosovo	Zana Deva	Albiona Rashiti-Bytyçi
Latvia	Oksana Savicka	Margarita Maksimova
Lithuania	Jekaterina Sinotova	Ausra Valaikiene
Poland	katarzyna zacharczuk	Michał Czerwiński
Portugal	Mónica Oleastro /Leonor Silveira	Sebastian von Schreeb
Romania	Mihaela Oprea	Daniela Cristea
Serbia (CAMPY)	Biljana Miljković Selimović	Mihajlo Spasic
Slovakia (SALM)	Dagmar Gavačová	Nikola Jankovič
Slovenia	Marija Trkov	Eva Grilc
The Netherlands	Maren Lanzl	Oda Van den Berg
Turkey	Belkis Levent	Zeynep Ozge Ozguler

Project team

Project team, SSI	Project team, DTU
Susanne Schjørring	Ana-Rita Bastos Rebelo
Egle Kudirkiene	Jette Sejer Kjeldgaard
Katrine G. Joensen	
Pernille Gymoese	

ECDC / EURLs (Day 5)

ECDC
Therese Westrell
Johanna Takkinen
Cecilia Jernberg

EURLs
Hanne Skarin (EURLs – Campylobacter)
Angela van Hoek (EURLs – Salmonella)

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

FWD AMR RefLabCap Project activities

- Network meetings
- Workshops
- Online presentations/discussions
- Email communication, website

- Minimal and optimal requirements for AMR surveillance
- Standard WGS protocol
- Proposal for updated EU protocol for harmonised AMR monitoring
- Model protocol for national surveillance of AMR
- Guidance document on internal quality control schemes

- AMR testing and surveillance
- Outbreak investigations
- WGS data analysis and interpretation
- Annual ring-trials to assess bioinformatics pipelines
- Annual EQAs: AST, genotypic AMR prediction, etc.

- Action plan development and implementation in priority countries
- Local/regional capacity building support in priority and in additional countries
- Support for national laboratory network establishment

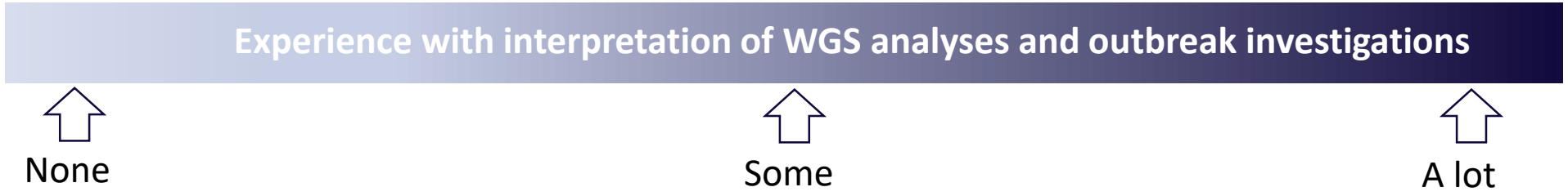
This workshop

Each country

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

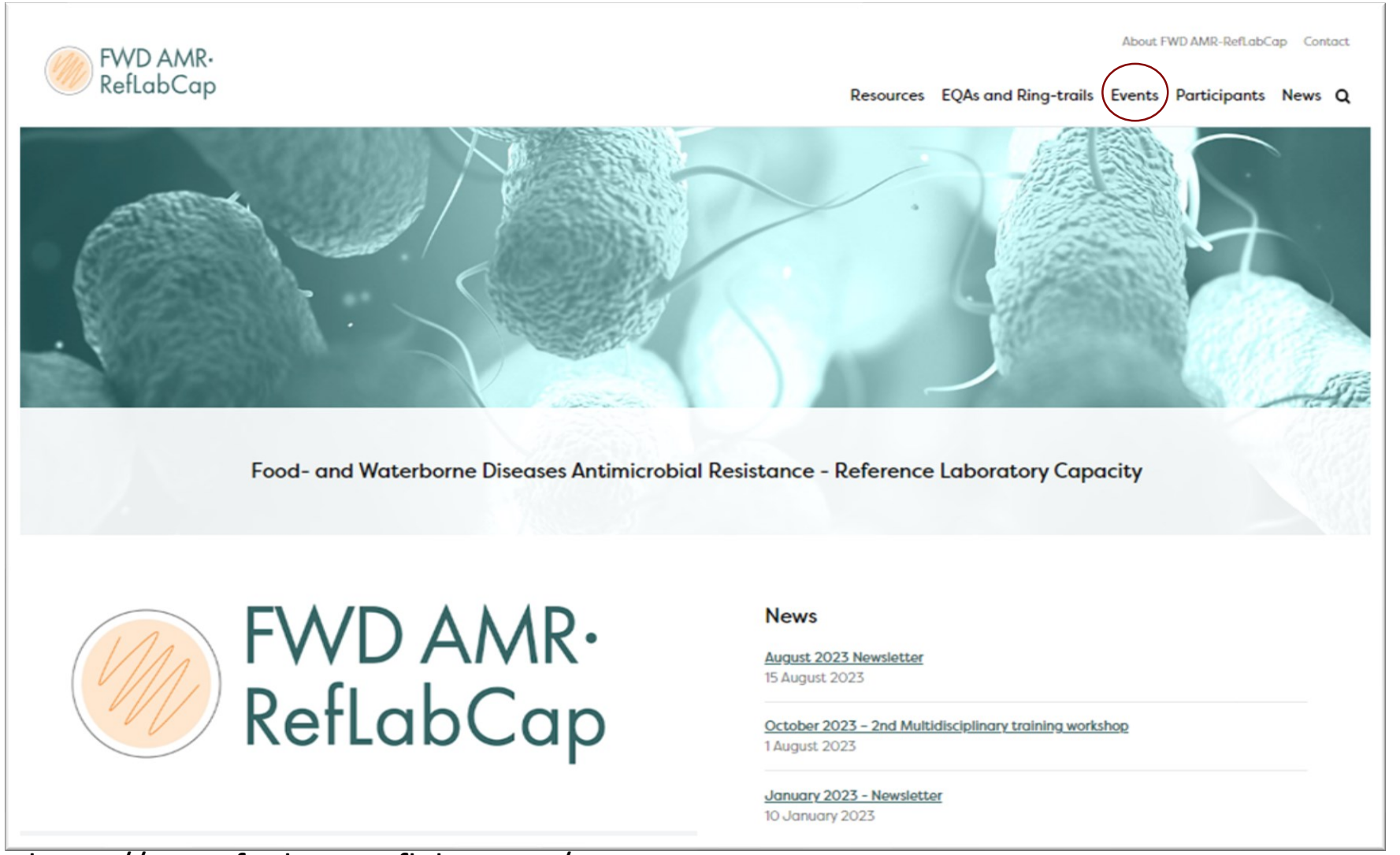
Between countries

- Enhance collaboration
- Knowledge exchange



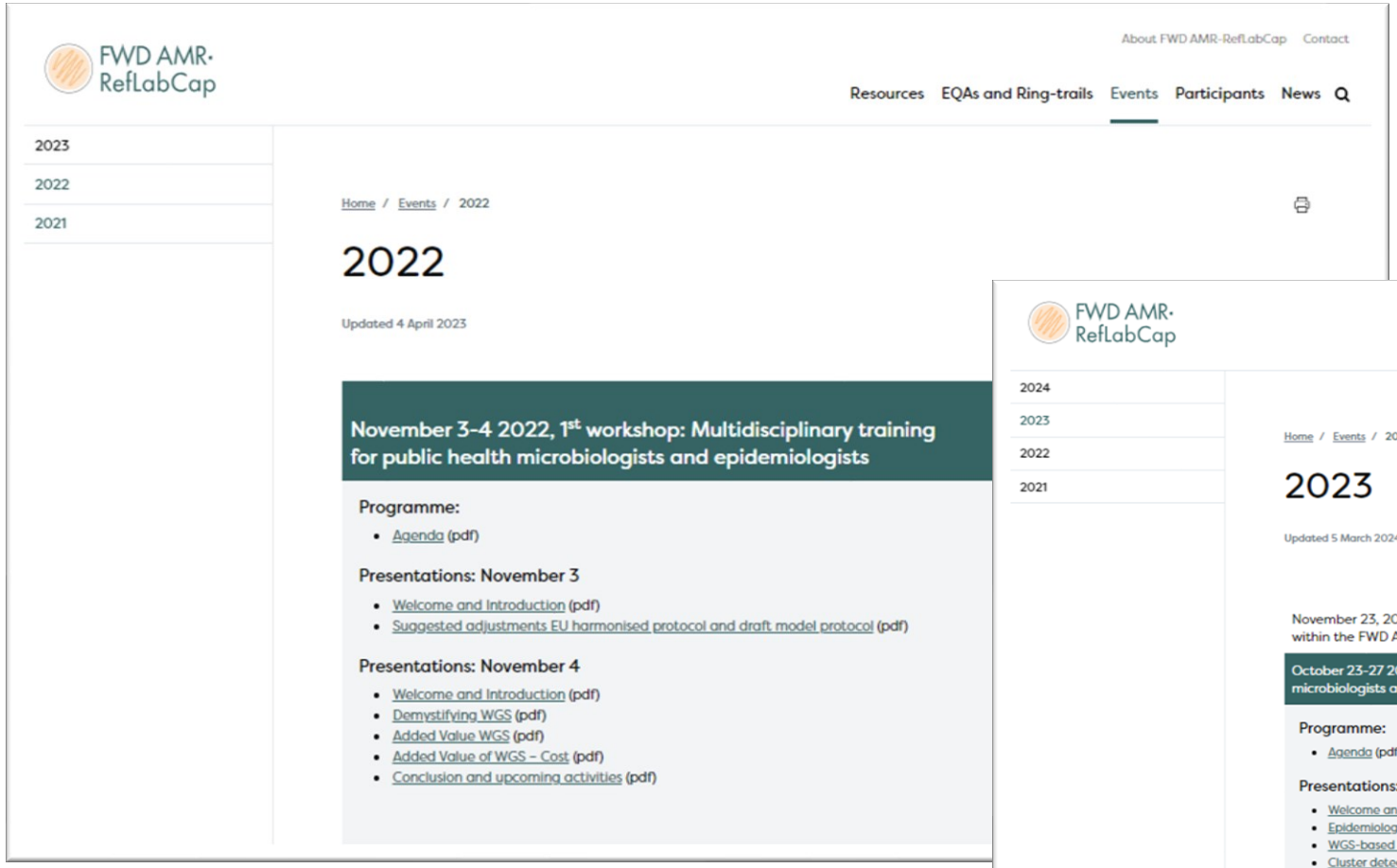
- 1. Multidisciplinary training workshop (https://www.fwdamr-reflabcap.eu/events/2022)
- 2. Multidisciplinary training workshop (https://www.fwdamr-reflabcap.eu/events/2023)

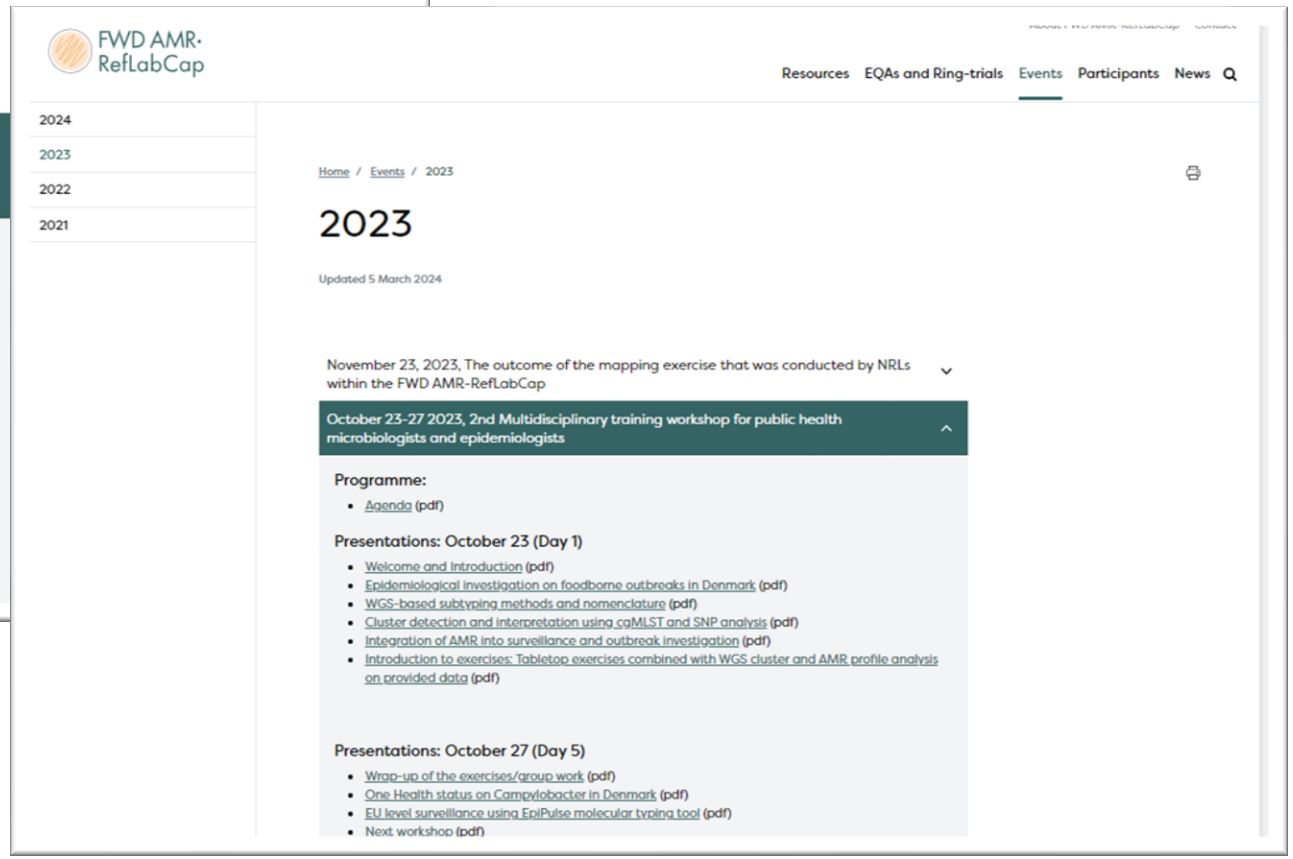
Website



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

1. and 2. Multidisciplinary workshop





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 *Salmonella* and *Campylobacter*	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)	

What is consumer purchase data?

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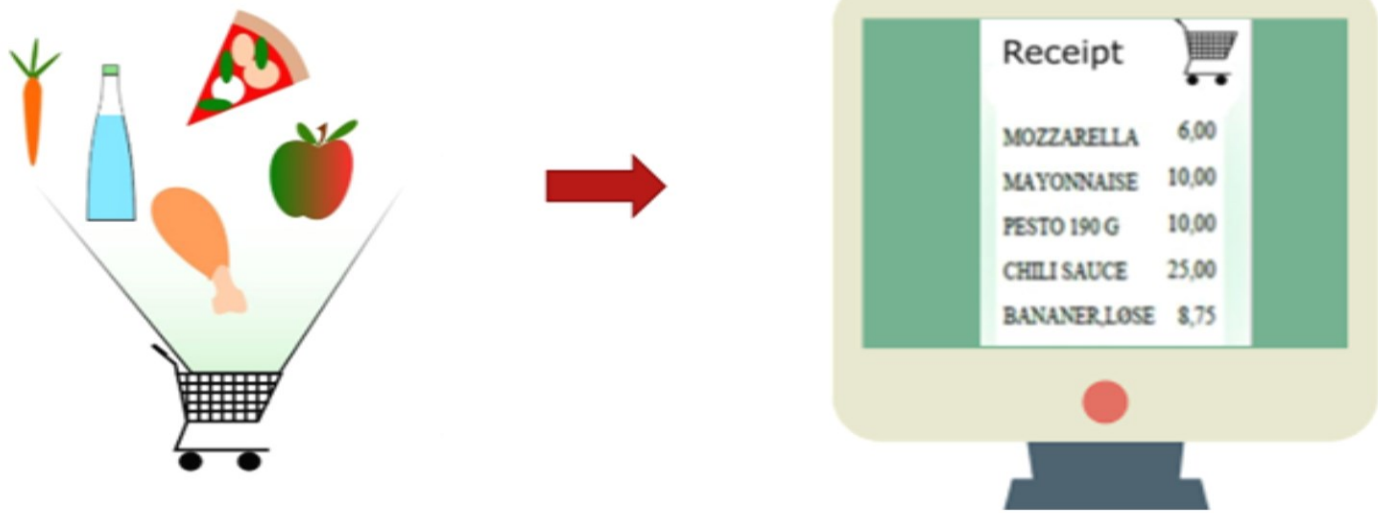
- Looking in the receipts of the food bought by patients prior to disease onset
- Data retrieved from supermarket databases
- Using membership/loyalty card or credit/debit card
- Search for specific transactions
- Compare purchase data from different patients



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Clone

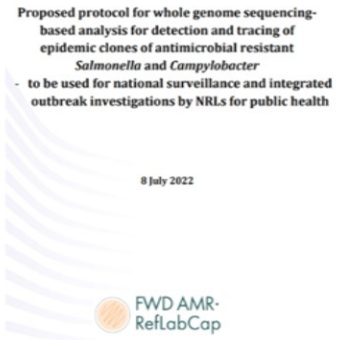
Isolates of bacterial species that are **indistinguishable in genotype are assigned as a clone**

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



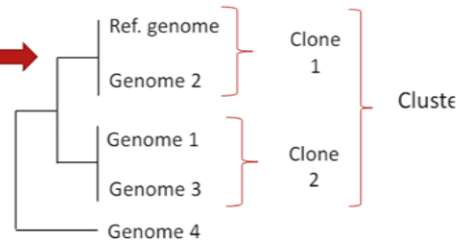
https://www.fwdamr-reflabcap.eu/resources/reflabcap-protocols-and-guidelines

Genotyping using SNP (e.g. CSI Phylogeny)

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

Phylogenetic tree (.newick file 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

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

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WGS-based surveillance of *Salmonella* in Denmark

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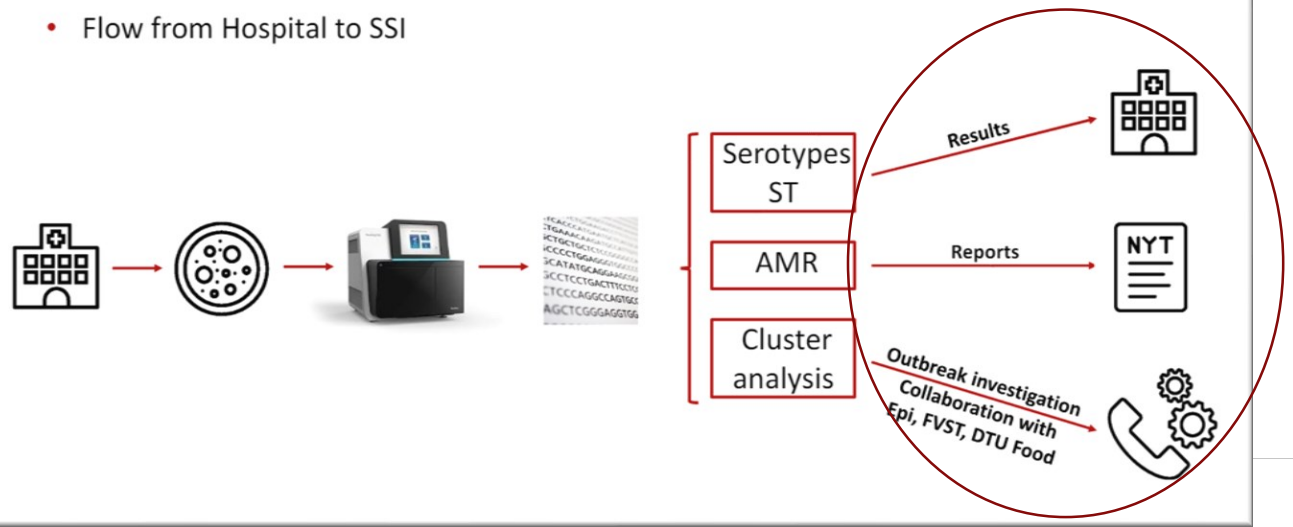
- Real time surveillance since 2018
- Flow from Hospital to SSI



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- *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 ***Salmonella*** exercise

Day 4: 27 June, Interpretation and discussion	
13:00-14:30	Group of countries meet with a facilitator for questions and discussion on ***Campylobacter*** exercise

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	*Coffee break*	
10:00 - 10:30	WGS-based surveillance as a paradigm shift in outbreak detection, AMR monitoring and source attribution in *Campylobacter* spp. in Portugal	Mónica Oleastro, Portugal
10:30 - 11:00	*Salmonella* Strathcona outbreak investigation and antimicrobial resistance profiles of *Salmonella* 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

Exercises

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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

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Structure requirements

- Tabletop outbreak investigation exercise!
  - No data analysis is needed – only asses 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