



FWD AMR.  
RefLabCap

STATENS  
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# Food- and Waterborne Diseases Antimicrobial Resistance – Reference Laboratory Capacity

## FWD AMR RefLabCap

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- ❖ 1. General introduction to the FWD AMR-RefLabCap project
  
- ❖ 2. Introduction to a questionnaire to be answered by all participants
  - Questions, answers, clarifications in relation to the questionnaire
  - Link to survey by email; deadline 21 September 2021
  
- ❖ 3. First network meeting: 30/11- 1/12 2021 at SSI in Copenhagen
  - Input for the contents is welcome
  - Online/hybrid will be considered



## Provision of EU networking and support for public health reference laboratory functions for antimicrobial resistance in *Salmonella* and *Campylobacter* in human samples

- ❖ The project is run under a contract with HaDEA on behalf of DG SANTE and in close cooperation with ECDC
- ❖ 4-year project: **2021-2024**
  
- ❖ Contractors:
  - Statens Serum Institut (SSI)
    - Project leader: Eva Møller Nielsen, Section of Foodborne Infections
      - Susanne Schjørring, Egle Kudirkiene, Jeppe Boel, Malgorzata Ligowska-Marzeta
  
  - National Food Institute, Technical University of Denmark (DTU)
    - René Hendriksen, Research group for global capacity building
      - Birgitte Helwigh

- ❖ Support countries to enhance the **validity and accuracy of surveillance data** in order to inform concerted actions against AMR at EU level and enable better **detection and control of cross border threats** to human health from AMR
- ❖ AMR in *Salmonella spp* and *Campylobacter spp* in human samples
- ❖ Cooperation with ECDC, DG SANTE and when relevant also EFSA and EURLs
- ❖ Participants:
  - Countries participating in the EU Health programme
  - Candidate and potential candidate countries, other funding

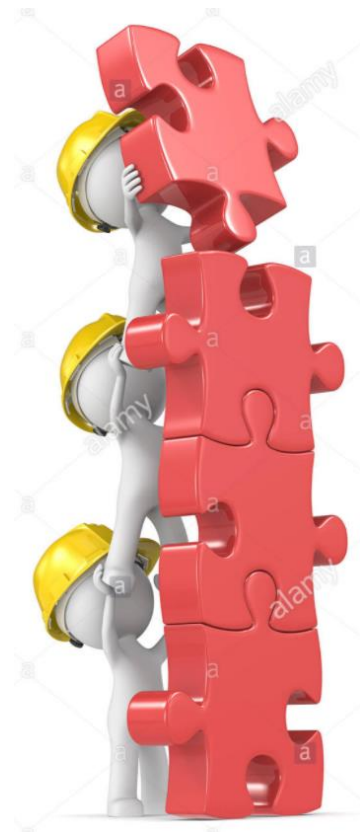
**Networking and capacity building** activities provided to national public health reference laboratories to improve their functions for AMR surveillance of human *Salmonella* and *Campylobacter* infections

**Modernisation of methods** for diagnostics, typing and AMR by using whole genome sequencing (WGS)

Activities to support the role of NRLs for public health to work with and **build capacities in the regional and local laboratories** in their own countries

Two pathogens: *Salmonella* spp and *Campylobacter* spp in humans

A specific focus on countries where capacities are less well developed



**Training**

**Methods**

**Capacity building**

**Networking**

**Network** meetings, workshops, online presentations

- exchange of experience, best practice, inspiration
- discussions on NRL requirements, protocols, feedback on activities

**Website:** Protocols, guidance docs, training material, links



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## News

[7 September - online meeting](#)  
26 August 2021

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[Welcome to FWD AMR-RefLabCap](#)  
12 May 2021



[Protocols and guidelines](#)[Other networks](#)[Antimicrobial resistance](#)[Organisations](#)[Home](#) / [Resources](#)

# Resources

**Material of relevance for the FWD AMR-RefLabCap Network participants.**

Updated 31 May 2021

In the menu to the left, you can find protocols, guidelines and training material of relevance for the FWD AMR-RefLabCap project, including material developed during this 4-year project. In addition, we have collected links to homepages related to the topic antimicrobial resistance as well as relevant organisations and networks.



[Home](#) / [EQAs](#) / [Links to other EQAs](#)



# Links to other EQAs

List of External Quality Assessments (EQAs) not directly under the FWD AMR-RefLabCap project.

Updated 1 June 2021

Almost every year ECDC offers the Member States participation in the AST-EQAs (Salmonella and Campylobacter) and Typing EQAs (Salmonella, STEC and Listeria). See the list of EQAs at [ECDC webpage](#) for an overview and EQAs specifically related to antimicrobial susceptibility testing listed [here](#).

**Recently published reports related to foodborne pathogens are listed below**

**External quality assessment on species identification and antimicrobial susceptibility testing of *Campylobacter***

[AST-Campylobacter EQA-4](#)

[AST-Campylobacter EQA-3](#)

**External quality assessment on species identification and antimicrobial susceptibility testing of *Salmonella***

[AST-Salmonella EQA-4](#)

[AST-Salmonella EQA-3](#)

**External quality assessment scheme for *Salmonella* typing**

[Salmonella EQA-9](#)

[Salmonella EQA-8](#)

[Salmonella EQA-7](#)

[Salmonella EQA-6](#)

[Salmonella EQA-5](#)

[Salmonella EQA-4](#)

[Home](#) / [Events](#)

## Events

Here, we announce network meetings, workshops, training courses, etc.  
Contact us at [fwdamr@ssi.dk](mailto:fwdamr@ssi.dk) for further information.

Updated 26 August 2021

### 7 September 2021 14:00-15:00 – online meeting

**General introduction to the project** and introduction to a capacity survey to be conducted in September 2021 among all participating laboratories.

*Online meeting for representatives from all laboratories in the FWD AMR-RefLabCap network. Invitations were sent to the listed contact emails on 25 August 2021.*


### 30 November – 1 December 2021 (tentative) – Network meeting at SSI, Copenhagen, Denmark

**First network meeting** with the aim of facilitating exchange of information and good practice between the participating national reference laboratories. Planned activities of the project will be presented and discussed.

*The 2-day meeting is planned as a physical meeting at SSI for two representatives from each country as well as representatives from relevant EURLs in the food safety area. The meeting might be changed to an online meeting or a hybrid online/physical meeting depending on possible travel*

## • Minimum and optimal requirements in PH NRL functions

- Recommended coverage of surveillance
- Sampling and testing frequency
- Epi-situations for isolation & referral of isolates from primary to national level
- Methodological and resource capacity and capability requirements at all levels



Obs MRSA	mecA pos	NT	32
Obs MRSA	mecA pos	NT	36
Bakteriemi		NT	30
Obs MRSA	mecA pos	NT	32
Bakteriemi		NT	32
Bakteriemi		NT	33
Bakteriemi		NT	3
Bakteriemi		NT	3
Bakteriemi		NT	NT
Obs MRSA	mecA pos	NT	24
Bakteriemi		NT	24
Obs MRSA	mecA pos	NT	28
Bakteriemi		NT	32
Obs MRSA	mecA pos	NT	33
Obs MRSA	mecA pos	NT	0
Obs MRSA	mecA pos	NT	32
Obs MRSA	mecA pos	NT	32
Obs MRSA	mecA pos	NT	24
Obs MRSA	mecA pos	NT	32

## • Identify capacity/capability gaps in all countries

- Existing information
- Survey in network



## ❖ Capacity building activities for all NRLs

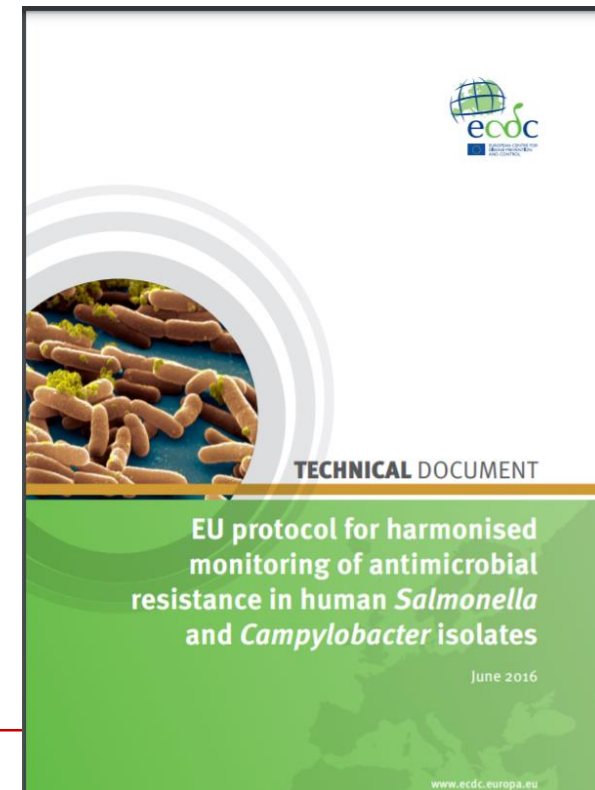
- Lab training courses
- Workshops and surveillance exercises on integrated WGS-based surveillance

## ❖ Tailored support to 'priority countries'

- country visits
- action plans



- ❖ Propose optimal methodologies for AMR detection, integrated into WGS-based surveillance for cluster detection
  - Existing guidance and literature, incl. bioinformatics and databases
    - Seek consensus experts/ECDC/EFSA/EUCAST
  - Set of common methods and standard protocols for national surveillance
    - Agreement in network
  
- Review/amend existing EU protocol for AMR surveillance to include genetic AMR determinants





- Multi-disciplinary training workshops and webinars for PH epidemiologists and microbiologists
  - integration of WGS into national AMR surveillance and outbreak investigation
- EQAs of WGS-based resistome profiling
  - 3 rounds for all NRLs
- Inter-laboratory ring-trials of bioinformatics pipelines for prediction of AMR



Home > Life Sciences > Medicine & Healthcare

## Antimicrobial resistance – theory and methods

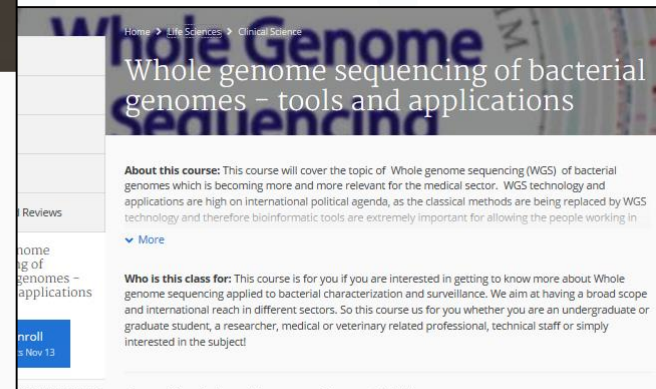
**About this course:** The course will cover the topics related to antimicrobial resistance with basic definitions and overview on antimicrobials their use and the emergence and spread of resistance. The course will guide you through the concepts and the importance of resistance spread and dissemination and how that happens. It will show you how bacteria become resistant and which mechanisms they might

**Who is this class for:** This course is for you if you are interested in getting to know more about antimicrobials and antimicrobial resistance in bacteria. We aim at having a broad scope and international reach in different sectors. So this course us for you whether you are an undergraduate or graduate student, a researcher, medical or veterinary related professional, technical staff or simply interested in the subject

Created by: Technical University of Denmark (DTU)



Financial Aid is available for learners who cannot afford the fee. [Learn more and apply.](#)




Home > Life Sciences > Clinical Science

## Whole genome sequencing of bacterial genomes – tools and applications

**About this course:** This course will cover the topic of Whole genome sequencing (WGS) of bacterial genomes which is becoming more and more relevant for the medical sector. WGS technology and applications are high on international political agenda, as the classical methods are being replaced by WGS technology and therefore bioinformatic tools are extremely important for allowing the people working in

**Who is this class for:** This course is for you if you are interested in getting to know more about Whole genome sequencing applied to bacterial characterization and surveillance. We aim at having a broad scope and international reach in different sectors. So this course us for you whether you are an undergraduate or graduate student, a researcher, medical or veterinary related professional, technical staff or simply interested in the subject

Created by: Technical University of Denmark (DTU)



Financial Aid is available for learners who cannot afford the fee. [Learn more and apply.](#)

# Support NRLs to build capacities in local/regional labs

- ❖ Support all NRLs in mapping the regional/local labs' capacities for detection and characterization of *Salmonella* and *Campylobacter*
  - Strengths/weaknesses and gaps/further needs for each country
- ❖ Support NRLs to carry out regional capacity building ( $\geq 16$  MSs)
  - Physical and online meetings and workshops
  - Learning material
  - Ongoing individual support
- ❖ Support NRLs to establish national network of labs
- ❖ Model protocol for national surveillance of AMR in Salm/Campy
- ❖ Guidance for internal QC schemes for reference AMR testing







# Coming activities

## Survey on technical capability/capacity in NRLs

- September 2021

## Network meetings in Copenhagen

2 representatives per country

- Autumn 2021
- Spring 2023
- Autumn 2024

## EQA for WGS-based resistome profiling

- Autumn 2022 + 2023 + 2024

## Inter-lab ring-trials, bioinformatics pipelines for AMR prediction

- Autumn 2022 + 2023 + 2024



Laboratory courses in phenotypic testing

Multidisciplinary training for public health micro+epi

- AMR surveillance and integration of WGS

Country visits, 'priority countries' – technical support and action plans

Support to NRLs to:

- map regional/local labs' capacity (gaps/needs)
- carry out capacity building at regional/local level (16 countries)
  - workshops, webinars, etc.



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[WWW.FWDAMR-RefLabCap.EU](http://WWW.FWDAMR-RefLabCap.EU)

**Contact the FWD AMR-RefLabCap team:**

[fwdamr@ssi.dk](mailto:fwdamr@ssi.dk)

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Birgitte Helwig  
René Hendriksen



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# INTRODUCTION TO THE QUESTIONNAIRE

Egle Kudirkiene

September 7, 2021



- ❖ **Review on existing information on capacities and capabilities at the country level for:**
  - Antimicrobial susceptibility testing
    - ✓ EU-AMR, GLASS, CAESAR, EU-LabCap reports, EQAs
  - Molecular strain typing
    - ✓ ECDC technical and zoonoses reports, ECDC surveys, EURL reports, EQAs

**Mostly based on information from 2016 – 2019**

**We need an updated information and specifically from laboratories within the FWD AMR- RefLabCap network**

- ❖ To **complete the information** on the capacity and capability of phenotypic AST and genotypic AMR prediction of *Salmonella* and *Campylobacter* as well as molecular strain typing
- ❖ The results and assessments of the questionnaire will be used to inform a **capacity building plan and training activities** for participating countries in FWD AMR-RefLabCap project
- ❖ An aggregated **summary of the findings will be presented** to participating laboratories at the network meetings

# THE CONTENT OF THE QUESTIONNAIRE

1. Laboratory identification	2. National public health laboratory services	3. Phenotypic and genotypic testing of antimicrobial resistance	4. National surveillance of antimicrobial resistance	5. Molecular strain typing	6. WGS capacity, capability status and capacity building plans
<ul style="list-style-type: none"> <li>• Laboratory Name</li> <li>• Contacts</li> <li>• Organisms: <i>Salmonella</i> <i>Campylobacter</i></li> </ul>	<ul style="list-style-type: none"> <li>• Primary diagnostics</li> <li>• Services and support to local/regional laboratories</li> </ul>	<ul style="list-style-type: none"> <li>• Methods and protocols in use</li> <li>• Antimicrobials tested</li> <li>• The purpose of testing</li> <li>• Isolate selection for testing</li> <li>• The extent of testing</li> </ul>	<ul style="list-style-type: none"> <li>• Antimicrobials included in surveillance</li> <li>• Data/sample material collection from local/regional laboratories</li> <li>• Confirmatory testing</li> <li>• Timing of testing and storage of isolates</li> <li>• Data sharing and reporting</li> <li>• The extent of testing</li> </ul>	<ul style="list-style-type: none"> <li>• Methods in use (e.g. MLVA, PFGE, WGS)</li> <li>• The purpose of typing (e.g. surveillance, outbreaks)</li> <li>• The extent of testing</li> </ul>	<ul style="list-style-type: none"> <li>• Current WGS activities</li> <li>• Types of analyses performed</li> <li>• Bioinformatics resources, tools and pipelines in use</li> <li>• Plans for implementation of WGS</li> <li>• Wishes for the support and training</li> </ul>



## ∴ Launching date - 7<sup>th</sup> September

- You will receive an invitation email with a unique link/per contact person with a Username and a Password

### 1. Welcome to FWD AMR-RefLabCap survey!

The questionnaire is composed of six sections and 50 questions in total. All the questions need to be answered before you can proceed to the next question (choose or type NA, when possible, if the question is not relevant for you).

The questionnaire is aimed at the appointed contact person for the FWD AMR-RefLabCap project; however, the questionnaire can be saved and the link shared with colleagues if relevant.

When filling in the questionnaire, you have the following options:

- Click “**Options**” and “**Pause**” to save your answers and finish at a later time (using the same link)
- Click “**Options**” and “**Print**” to print your answers or save to a file. This can be done at any time, but before pressing “Submit results”
- Click “**Previous**” to go back to the questions you have already answered
- Click “**Options**” and “**Go to..**” to go back to a specific page

**Note:** After pressing “**Submit results**” you will not be able to review your answers.

Any comments can be written at the end of the form.

If you need help, you are welcome to contact us at [fwdamr@ssi.dk](mailto:fwdamr@ssi.dk) or call us at +45 32688341/+4532683317

## ∴ Submission of completed questionnaire – 21<sup>st</sup> September

# EXAMPLE 1 – ORGANISMS


Does your laboratory perform AMR testing on bacterial isolates?


→ Select all relevant answers (*Salmonella* spp.)

- Yes, phenotypic testing of AMR
- Yes, genotypic testing of AMR
- None of the above

Does your laboratory perform AMR testing on bacterial isolates?

Select all relevant answers (*Campylobacter* spp.)

- Yes, phenotypic testing of AMR
  - Yes, genotypic testing of AMR
  - None of the above
- 
-

- 
- ❖ Yes, to **genotypic or phenotypic** testing of AMR (Salmonella and Campylobacter)
    - **1<sup>st</sup> level** - four general questions about testing of AMR (Salmonella and Campylobacter)
  
  - ❖ Yes, to **phenotypic testing** (Salmonella)
    - **2<sup>nd</sup> level** - three questions about phenotypic testing of AMR (Salmonella)
  
  - ❖ Yes, to **genotypic testing** (Salmonella and Campylobacter)
    - **3<sup>rd</sup> level** – questions about genotypic testing of AMR (Salmonella and Campylobacter)

# EXAMPLE 3 – TEXT FIELD FOR DETAILS

Which methods does your laboratory use for phenotypic testing of AMR?

Select all relevant answers (*Salmonella* spp.)

- Automated system (e.g. Vitek)
- Commercial broth microdilution (e.g. Sensititre/Trek)
- In-house broth microdilution
- Agar dilution
- Gradient strips (e.g. Etest)
- Disk diffusion
- Other (please specify)

'own text' or 'NA'

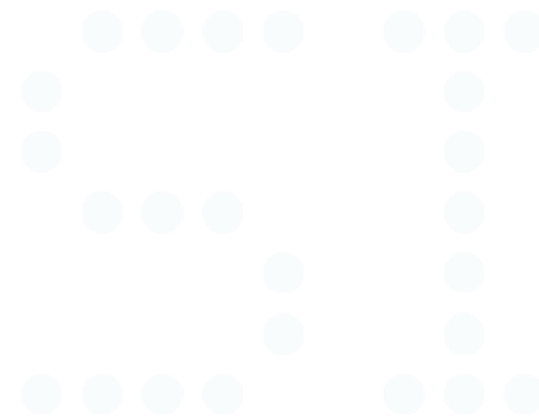
(19/4000)

# EXAMPLE 4 – COMPLEX QUESTIONS

Which tools for AMR prediction from WGS data does your laboratory routinely use ?

Select all relevant answers (*Salmonella* spp.)

AMRFinderPlus Standard database	AMRFinderPlus Custom database	NA
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CARD Standard database	CARD Custom database	NA
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ResFinder Standard database	ResFinder Custom database	NA
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PointFinder Standard database	PointFinder Custom database	NA
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ARG-ANNOT Standard database	ARG-ANNOT Custom database	NA
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
MEGARes Standard database	MEGARes Custom database	NA
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other tools ( <i>Salmonella</i> spp., please specify)	AMRFinderPlus and ARG-ANNOT databases using Re	
I don't know (please indicate why)	we do not analyze data ourselves/we use ResFinder to	



- ❖ Number of isolates tested in 2019 or 2020 (covid-19 effect)

*When answering the questions please provide the information/data from recent years, e.g. you can choose 2020, however if 2020 was atypical due to covid-19 pandemic or data is not available then use information/data from 2019*

- ❖ Some questions about testing of AMR may seem repetitive:
  - Phenotypic and genotypic testing of AMR is about technical capability to perform the testing of AMR
  - National surveillance of AMR is to know what is done for the purpose of surveillance

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