



EURGen-RefLabCap Webinar

Report on the gaps in WGS capacity and molecular testing equipment, software and analytical skills at national laboratory level

Friday, 1 April 2022

11:00-12:00 CET

Ana Rita Rebelo (anrire@food.dtu.dk)



European Antimicrobial Resistance Genes Surveillane Network Reference Laboratory Capacity (EURGen-RefLabCap) EURGen-RefLabCap supports EU networking and capacity building with-in public health reference laboratory functions for antimicrobial resistance in priority healthcareassociated infections







Virtual Housekeeping

Please write your country and name in the chat.



Please **turn off your cameras and microphones** unless you're speaking – this will help with bandwidth and maximise audibility.



Do frequently **use the chat function** to share your views, comments and challenges. Keep the chat constructive, respectful and on topic!



If you wish to make a comment for e.g. the discussion, please use the 'Raise hand' function.







Meeting agenda

1. Results of the report and email consultation

2. Discussion

3. Upcoming tasks





BACKGROUND



- Survey in summer focusing on the five core functions as defined by ECDC
- Answers from 37 European NRLs

- Detailed overview of European capacity for phenotypic and genotypic bacterial species identification and antimicrobial susceptibility testing of CRE/CCRE
 - methods used by the NRLs
 - use of adequate **control strains or reference materials** from reliable sources
 - map of European capacity for WGS-based analysis of CRE/CCRE
 - identify the different **needs of the NRLs** to improve it or implement it in their settings
 - specific needs of PCs, including **step-by-step approaches** to improve capacity for WGS



BACKGROUND









Email consultation

- Document shared 18 February 2022
- Consultation from 18 February to 4 March

- 14 responses
 - 11 with suggestions
 - 3 with no changes
- 3 results from country visits

EURGen-RefLabCap consultation on report mapping NRL capacity for phenotypic, molecular and WGS-based characterization of CRE/CCRE					
EURGen-RefLabCap	← Reply	≪ Reply All	→ Forward		
To O EURGen-RefLabCap			fr 18-02-202	2 11:59	
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Written consultation on the EURGen-RefLabCap report on WGS capacity_18_Feb_2022.docx V SC20197401_Deliverable T3.2 Gaps in WGS capacity_v 18 KB	l.docx		~		
Dear members of the EURGen-RefLabCap Network, We have prepared a report mapping NRL capacity for phenotypic, molecular and WGS-based characterization of CRE/CCRE in 37 European countries. This report will serve as a guide to identify the main areas in which the EURGen-RefLabCap project should support the NRLs in order to increase WGS capacity for AMR surveillance and outbreak detection within Europe, and will be used towards designing harmonized WGS protocols for implementation in the NRLs and planning training courses and other capacity building activities.					
We now initiate a two-weeks period of consultation by email where you can send any comments, corrections or desired changes to this document. Importantly, we would appreciate if you could also clarify all questions related to your NRL as described in Appendix 1, and correct any other answers about your NRL that might have been misrepresented in the text of the report.					
The report is attached for your consideration, and we kindly ask that any comments as well as answers to country-specific validation questions (Appendix 1) are sent to us, using the attached template, by Friday 4 March.					
Kind regards on behalf of the EURGen-RefLabCap team,					





RESULTS – SPECIES IDENTIFICATION





■PC ■Non-PC





RESULTS – AST







RESULTS – PHENOTYPIC AST







RESULTS – GENOTYPIC AST









RESULTS – AST QC



Phenotypic AST

QC of CRE/CCRE

23/28 use control strains for both2 only for CRE3 no controls

QC of CRE

5/6 use control strains 1 no controls

Genotypic AST

<u>WGS</u>

5/33 -- special QC (discussed later)

QC of CRE/CCRE

22/28 use control material 6 no controls / no answer

carbapenems but not colistin

having resistant strains but not susceptible ones, or vice-versa







Capacity for WGS





























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Bioiformatics tools:

Species identification

16S rRNA gene 11 16S rRNA gene, Prokka, Other (rpoB) 16S rRNA gene, ANI 16S rRNA gene 5 Prokka, rMLST Other (Kraken) Other (Centrifuge) 16S rRNA gene, Other (MashDistance integrated in Ridom Seqsphere) 16S rRNA gene, KmerFinder rMLST 16S rRNA gene, KmerFinder, rMLST, Other (Kleborate, Pathogenwatch) 16S rRNA gene Prokka Other (MLST and Kaiju) ANI, rMLST 16S rRNA gene, ANI, KmerFinder, Prokka 16S rRNA gene, KmerFinder 16S rRNA gene, KmerFinder, Prokka ANI, Other (Highest hit towards internal species database)







Bioiformatics tools:

AMR genotyping

AMRFinderPlus 6 ResFinder, Other (in-house) CARD, ResFinder ResFinder 18 ResFinder ResFinder, Other (SRST2) AMRFinderPlus, CARD, ResFinder AMRFinderPlus, CARD, ResFinder CARD, ResFinder ResFinder CARD, ResFinder, Other (Kleborate, Pathogenwatch) 8 CARD. ResFinder Other (under discussion) CARD, ResFinder AMRFinderPlus, Other (LRE-Finder, Kleborate) ResFinder CARD, ResFinder, Other (ABRicate) AMRFinderPlus, ResFinder ResFinder AMRFinderPlus, ResFinder, ARIBA ResFinder







Bioiformatics tools:

Typing and cluster analysis

MLST	18
cgMLST	14
SNP-analysis	11
wgMLST	10









Eighteen NRLs perform QC of WGS results.

Almost all use combinations of raw data and assembled data QC parameters.

average read depth (n=14)number of reads (n=14)contamination (n=12)total number of contigs (n=11)total base-pairs (n=9)total length of contigs (n=9)N50 (n=8) PHRED score (n=7)"Other parameters" (n=6)





RESULTS – DATA MANAGEMENT





DTU

RESULTS – DATA MANAGEMENT









Some NRLs reported difficulties in acquiring a complete set of control materials for AST

 The NRLs should contact organizations or institutions (including but not limited to the EURGen-RefLabCap project team) to ensure completeness of their QC collections.

The NRLs should actively engage with activities from the project

- Providing clarifications when needed to ensure that future activities follow their specific needs
- Participating in consultations to ensure that all outputs from the project are usable in their settings
- Communicate directly with the team for any other issues





RECOMMENDATIONS - PCs



Countries with capacity for molecular methods and WGS for analysis of CRE/CCRE

Shortcomings were identified in data management and sharing strategies.

It would be advisable that metadata is always associated with the respective sequence data.

It is *recommended that data are shared as readily and transparently as possible*, to ensure proper monitoring and surveillance of CRE/CCRE at the European level.

Integrated digital systems facilitate communication between different public health stakeholders and, importantly, cross-examination of data originated from different sources. (...) Implementation of such systems is often expensive and might demand restructuring of one or several public or private organisations, thus it is *acceptable that NRLs might currently declare that they have no plans for their implementation*.





RECOMMENDATIONS - PCS



Countries with capacity for molecular methods but not WGS for analysis of CRE/CCRE

Implementation of WGS in these NRLs entails a complex workflow.

Securing the permissions to implement WGS in the laboratories or to access available platforms

Mapping current laboratorial workflow

Mapping the current metadata, data and results workflow

Implementing the proper infrastructure for data

Identification of possible stakeholders that could provide short- and long-term funding





RECOMMENDATIONS - PCs



Countries without capacity for molecular methods and WGS for analysis of CRE/CCRE

Species ID and/or AST through non-molecular methods.

Implement those

Follow previous workflow for WGS





CONCLUSIONS



The EURGen-RefLabCap project will:

- o create and distribute a harmonised protocol for WGS analysis of CRE/CCRE,
- o organize External Quality Assessment exercises and benchmarking exercises.
- o organize practical training courses on WGS
- provide training on bioinformatics analysis
- o Support or facilitate help for securing access to WGS for the identified PCs with that need

o additional *ad hoc* consultations, training courses, or any other relevant activities







Upcoming task

Proposed WGS-based genome analysis protocol for CCRE surveillance and outbreak investigations

Document will be distributed April 2022

2 weeks of email consultation period

Changes will be implemented and followed by a Videoconference

European Commission
Service Contract for the provision of EU networking and support for public health reference laboratory functions for antimicrobial resistance in priority healthcare associated infections
SC 2019 74 01
Deliverable T3.3
Proposed common WGS-based genome analysis methods and standard protocols for national CCRE surveillance and integrated outbreak investigations
Version nº: 1.0 Date: 31-03-2022
Health and Digital Executive Agency







Thank you on behalf of the EURGen-RefLabCap team

EURGen-RefLabCap@food.dtu.dk



