MINIMUM AND OPTIMAL REQUIREMENTS FOR NPHRL

SURVEY RESULTS ON CAPACITY FOR TESTING AND SURVEILLANCE OF AMR

Egle Kudirkiene

Network meeting

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FWD AMR· RefLabCap

SURVEILLANCE OF SALMONELLA AND CAMPYLOBACTER

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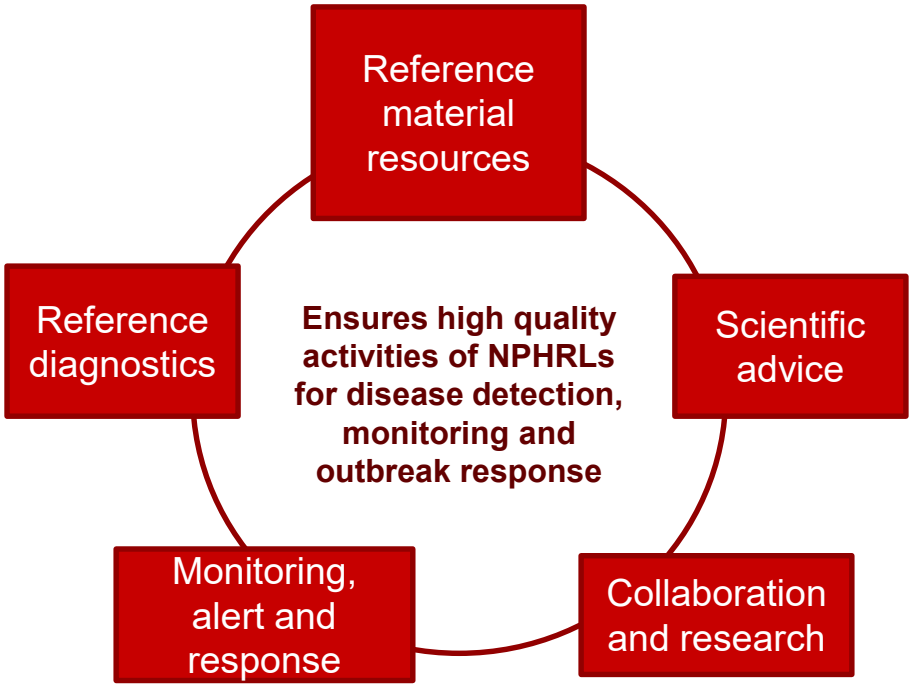
- All Member States (MS) are obliged to **collect relevant and comparable data** on *Salmonella* and *Campylobacter:*
  - infections in humans,
  - food-related outbreaks, and
  - the occurrence of resistance to antimicrobials (AMR) relevant for the treatment of human infections with these bacteria

Directive 2003/99/EC

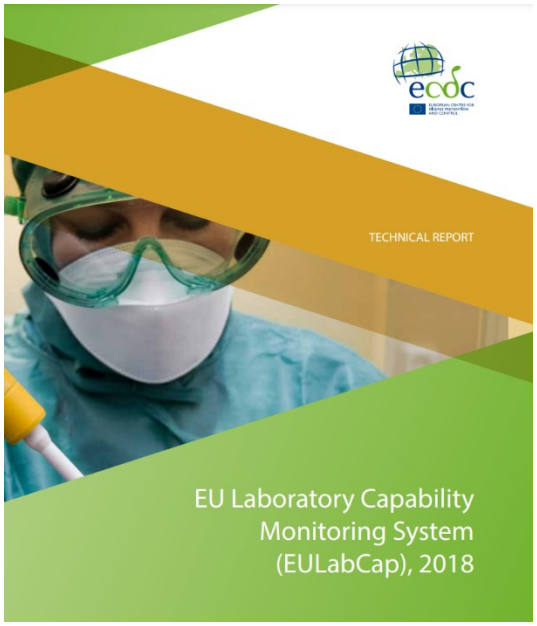
- **The data must be reported to ECDC**, however the **it is not always comparable due to**:
  - dissimilar **organisation and operation of the national public health reference laboratories (NPHRLs)** in different MSs
  - variation in **data quality level**
  - differences in the **case definitions and methodologies used**

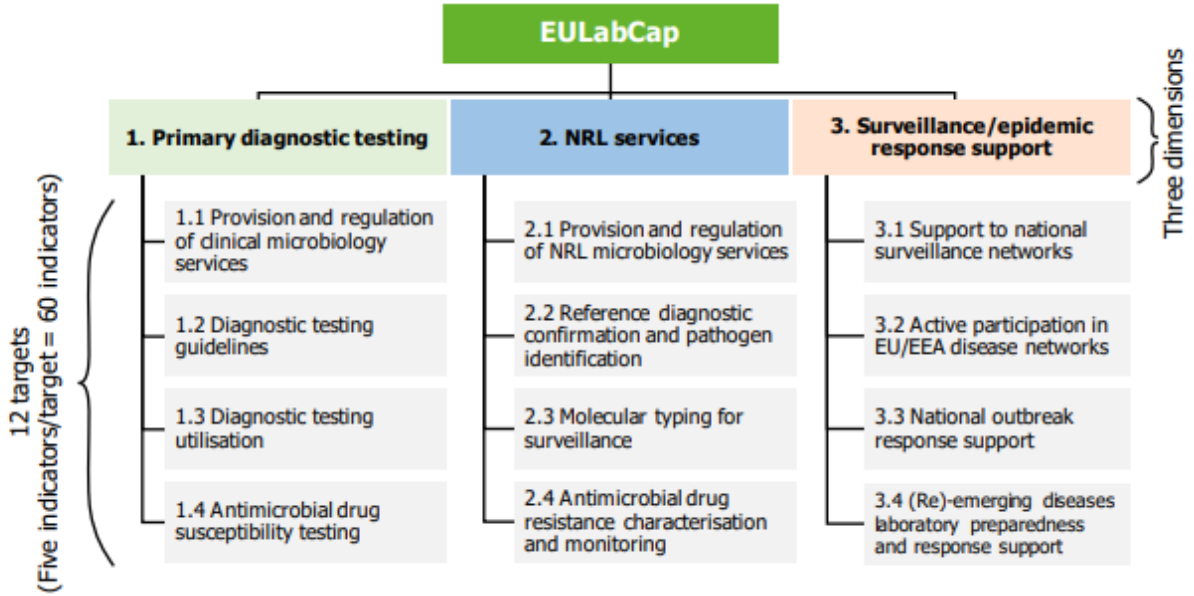
CORE FUNCTIONS OF NPHRL



European Centre for Disease Prevention and Control. Core functions of microbiology reference laboratories for communicable diseases. Stockholm: ECDC; 2010

MONITORING OF NPHRL MICROBIOLOGY SYSTEM





European Centre for Disease Prevention and Control. EU Laboratory Capability Monitoring System (EULabCap) – Report on 2018 survey of EU/EEA country capabilities and capacities. Stockholm: ECDC; 2020.

Substantial variation in capacities and capabilities between the laboratories

Some laboratories:

- Had an insufficient level of laboratory capacity and capability to conduct effective public health surveillance
- Were unable to provide an adequate level of disease threat response

RECOMMENDATIONS OF MINIMUM AND OPTIMAL REQUIREMENTS OF THE REFERENCE LEVEL FUNCTIONS FOR THE NATIONAL SURVEILLANCE SYSTEMS FOR AMR IN *SALMONELLA* AND *CAMPYLOBACTER* IN HUMANS

1. Support to primary diagnostic testing

2. Laboratory-based surveillance of AMR, alert and response

- Support to national surveillance networks
- National outbreak response support
- Participation in EU disease networks and research
- The design of AMR surveillance system, sampling and testing frequency
- Referral, timing and storage of *Salmonella* and *Campylobacter* isolates

3. National Public Health Reference Laboratory Services

- Internal and external quality control
- Reference diagnostics and characterisation of *Salmonella*
- Reference diagnostics and characterisation of *Campylobacter*

MINIMAL VS. OPTIMAL REQUIREMENTS

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- In the same laboratory, **both minimum and optimal requirements may be applied**, e.g.
  - minimum requirements - for the majority of clinical samples/isolates
  - optimal requirements - on a subset of samples/isolates

- If, **NPHRLs do not have the capacity and capability to operate according to at least minimum requirements**
  - service level agreement(s) with other expert or reference level laboratories should be in place

REFERENCE DIAGNOSTICS AND CHARACTERISATION

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Salmonella

Requirements	Serotyping	Antimicrobial resistance	Cluster detection
Minimum	Phenotypic or genotypic: common serovars	Phenotypic AST or genotypic AMR prediction	High resolution molecular typing (e.g. MLVA)
Optimal	Phenotypic or genotypic: all serovars	Phenotypic AST and WGS-based AMR prediction*	WGS-based (e.g. cgMLST, wgMLST, SNP)

Campylobacter

Requirements	Species	Antimicrobial resistance	Cluster detection
Minimum	Phenotypic or genotypic: *C. jejuni, C. coli*	Phenotypic AST or genotypic AMR prediction	Not applicable**
Optimal	Phenotypic or genotypic: all species	Phenotypic AST and WGS-based AMR prediction*	WGS-based (e.g., cgMLST, wgMLST, SNP)

* a defined proportion of isolates or selected isolates are periodically tested phenotypically to ensure detection of novel resistance mechanisms

** Some laboratories may use Pulsed-field gel electrophoresis (PFGE) for cluster detection but this is not considered as a minimum requirement

THE FOCUS OF THE SURVEY

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- to **identify capacity and capability gaps in technical and analytical skills of AMR testing and strain subtyping** at national level in all countries

- **identify countries with the greatest needs for capacity building in phenotypic and genomic testing of AMR ('priority countries')**
  - provide tailored **technical and operational support** for implementation of phenotypic and genomic testing of AMR in human *Salmonella* and *Campylobacter*
  - provide direct advice and **support for each country to create an action plan** to strengthen its national reference laboratory capacities in line with standards set out in EULabCap documentation

- **identify 'additional countries' facing challenges to identify and manage outbreaks** of *Salmonella* spp. and *Campylobacter* spp.

SURVEY OUTCOME

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- Sent to 37 countries (32 EU/EEA/EU Health programme countries and 5 EU-candidate countries)

- **Responses received from 31 EU/EEA/EU Health programme countries and all 5 EU-candidate countries** (n=36)
  - In 29/36 countries responses from the same laboratory covering both *Salmonella* and *Campylobacter* were received
  - In 6/36 countries responses from two laboratories covering either *Salmonella* or *Campylobacter* were received
  - One country responded for *Salmonella* spp. only

SALMONELLA

- AMR testing overview
- Data and sample collection for surveillance of AMR
- National AMR surveillance system coverage
- Molecular subtyping of *Salmonella* isolates

AMR TESTING OVERVIEW - SALMONELLA

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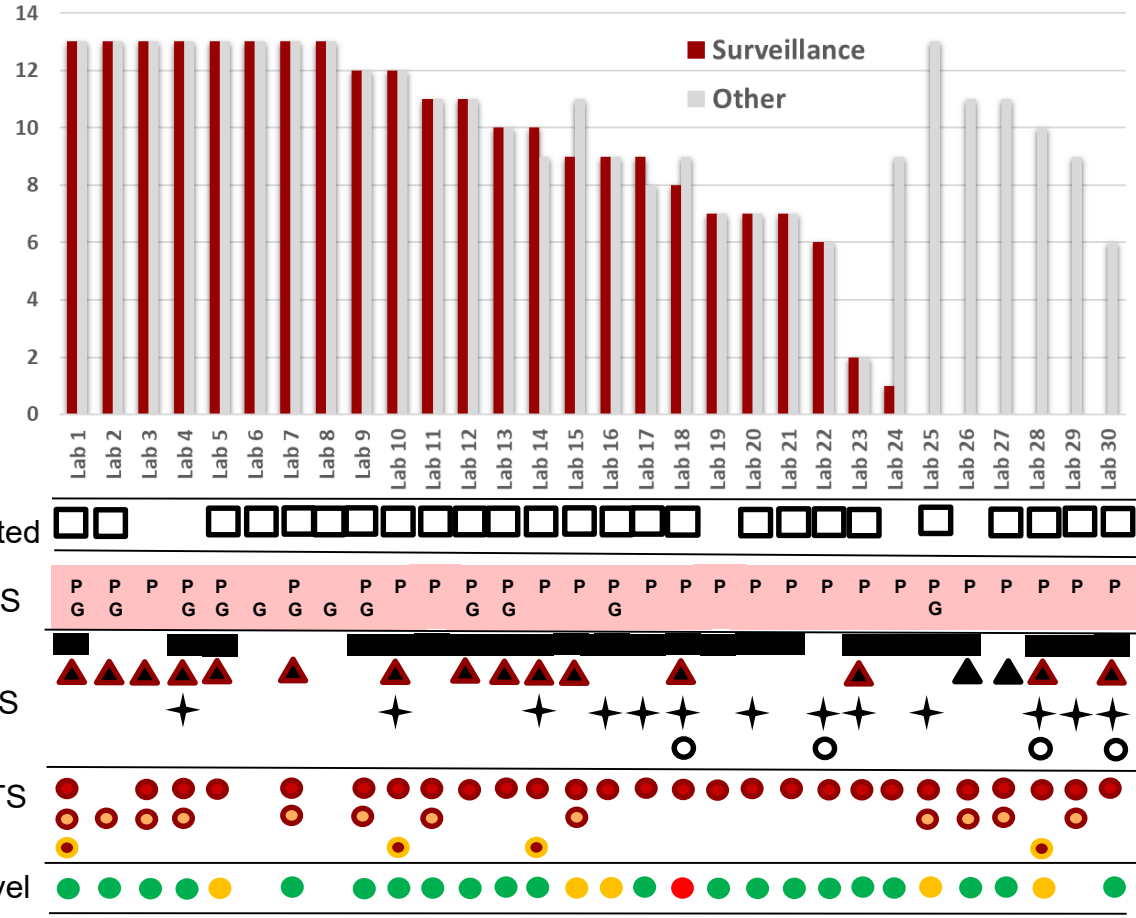
The purpose and the number of antimicrobials tested (phenotypic and genotypic)

N=30

EU/EEA/EU Health



DATA FOR AMR SURVEILLANCE - SALMONELLA

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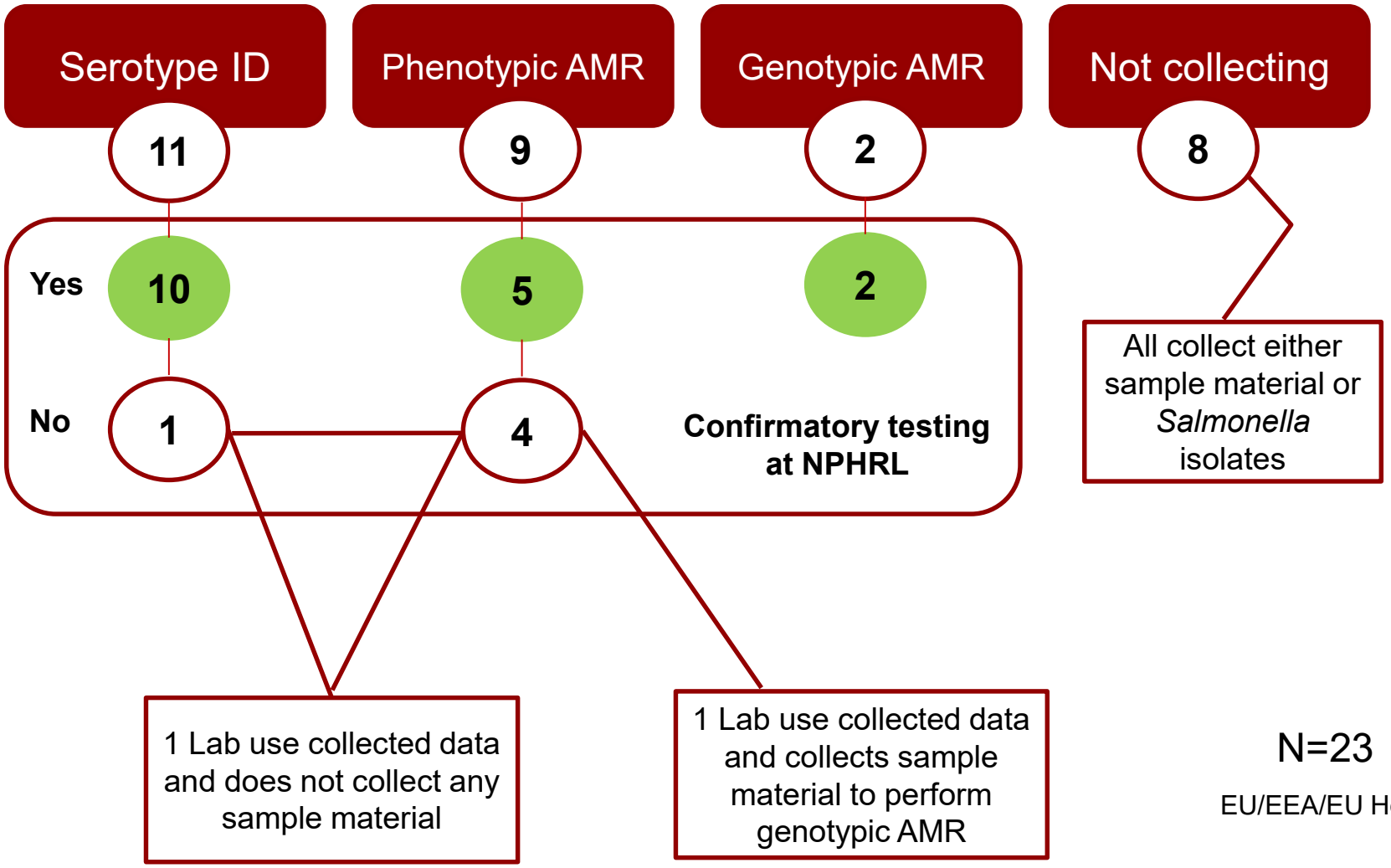
Collection of laboratory data



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EU/EEA/EU Health

COVERAGE OF NATIONAL AMR SURVEILLANCE SYSTEM

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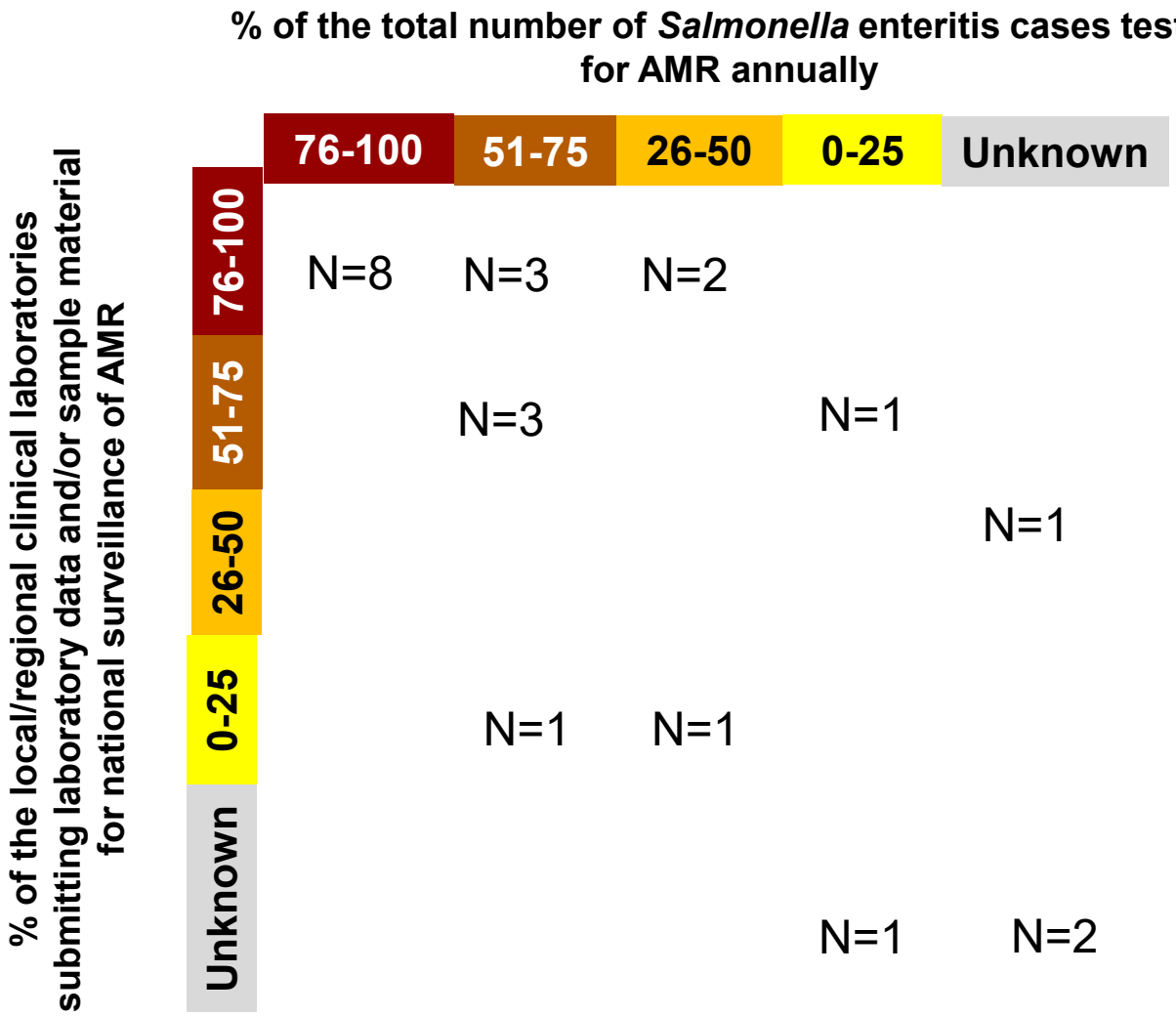

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EU/EEA/EU Health

MOLECULAR SUBTYPING OF SALMONELLA ISOLATES

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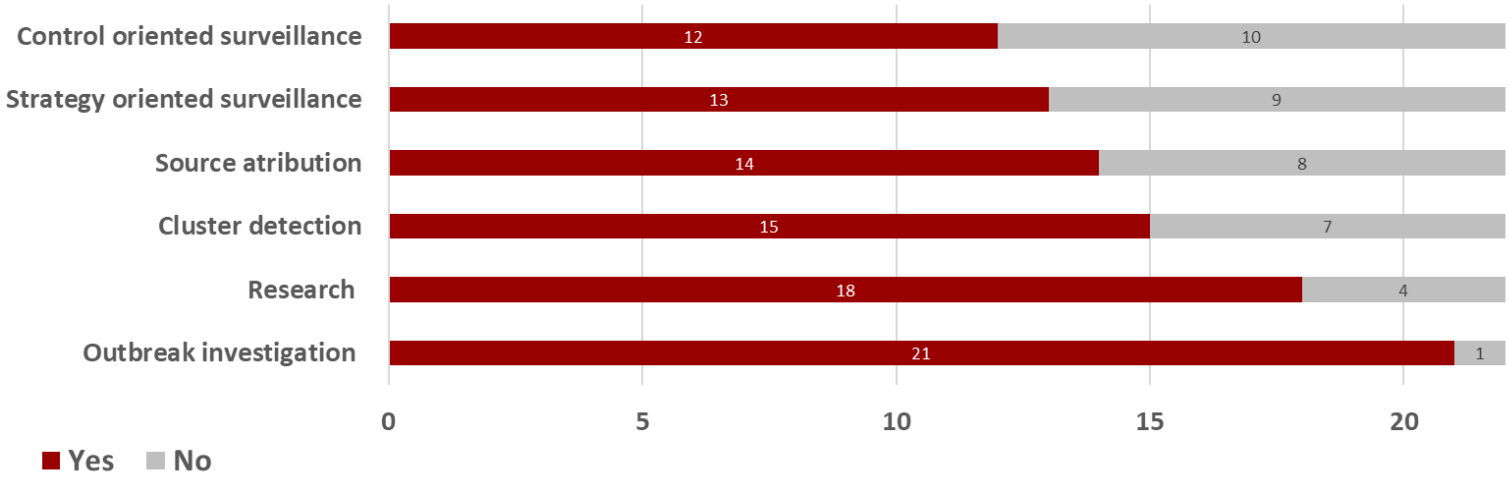
Objectives of molecular subtyping



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EU/EEA/EU Health

AMR testing on outbreak isolates

SALMONELLA AMR SURVEILLANCE IN NON-EU COUNTRIES

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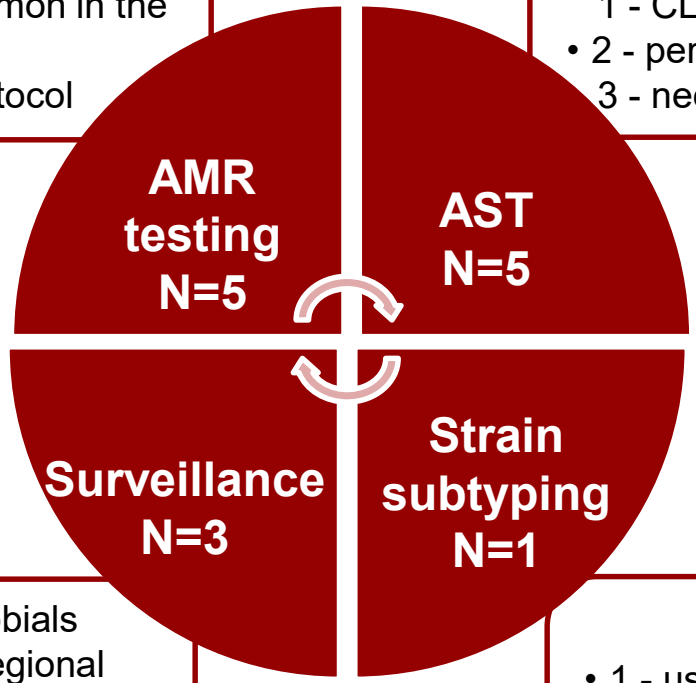
- 7 - 13 antimicrobials tested in all countries
- 5 - phenotypic, 1 - genotypic methods
- 2 - all serovars, 2 - most common in the country, 1 - random testing
- 4 - follow harmonised EU protocol

- 5 - DD, 4 – GS, 3 – AS, 2 - CBD
- 4 - EUCAST CBP, 3 - EUCAST EBP, 1 - CLSI CBP
- 2 - perceive high level of performance, 3 - need improvements



N=5

EU candidate countries

- 3 countries for 7-10 antimicrobials
- 2 - with 0-25% cov. of local/regional laboratories and 76-100% cov. of cases
- 1 - with 76-100% cov. of local/regional laboratories and with unknown coverage of cases

- 1 - uses PFGE for outbreak investigations, source attribution and research

CAMPYLOBACTER

- AMR testing overview
- Data and sample collection for surveillance of AMR
- National AMR surveillance system coverage
- Molecular subtyping of *Campylobacter* isolates

AMR TESTING OVERVIEW - CAMPYLOBACTER

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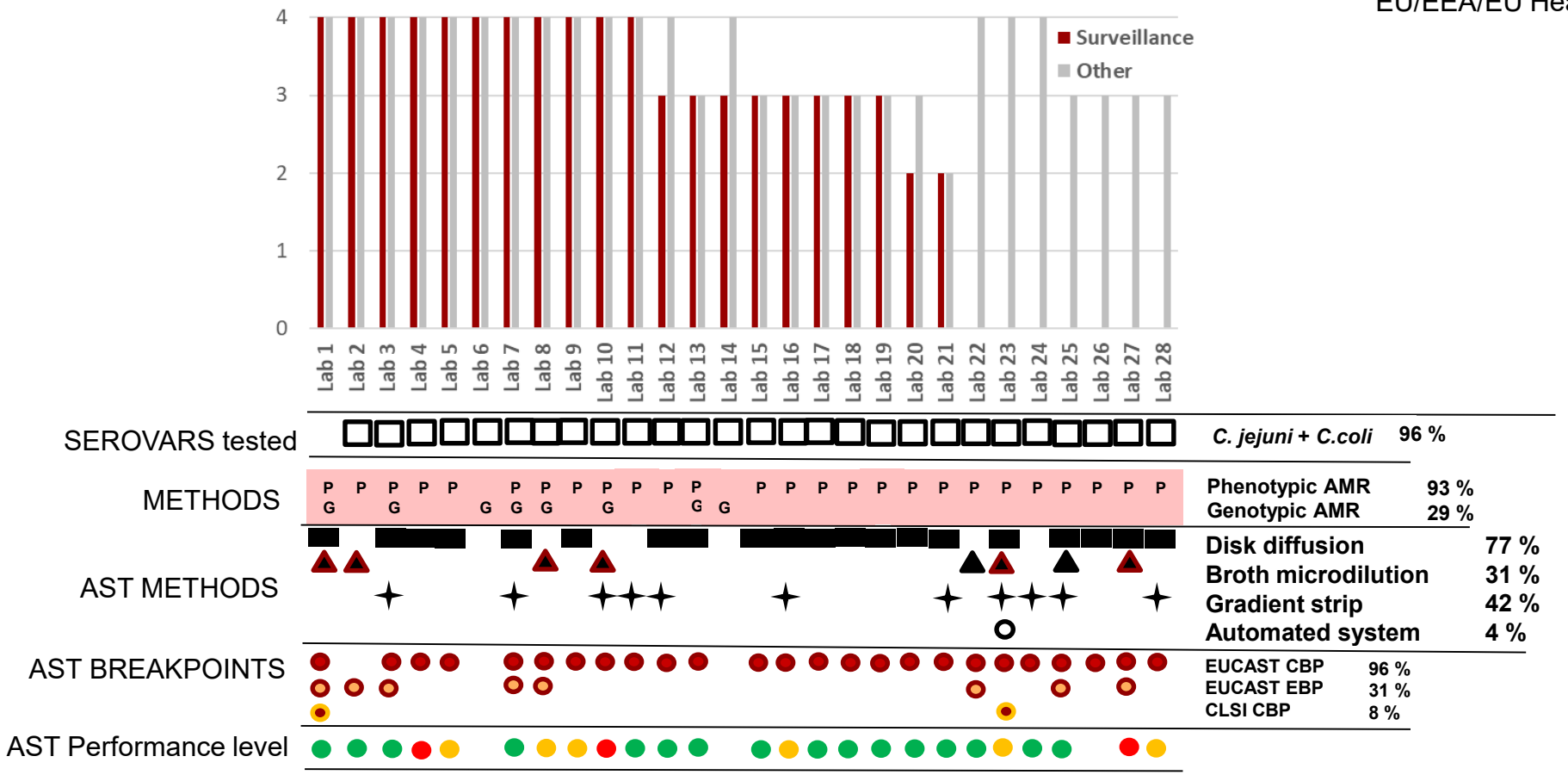
The purpose and the number of antimicrobials tested in all laboratories

N=28

EU/EEA/EU Health



DATA FOR AMR SURVEILLANCE - CAMPYLOBACTER

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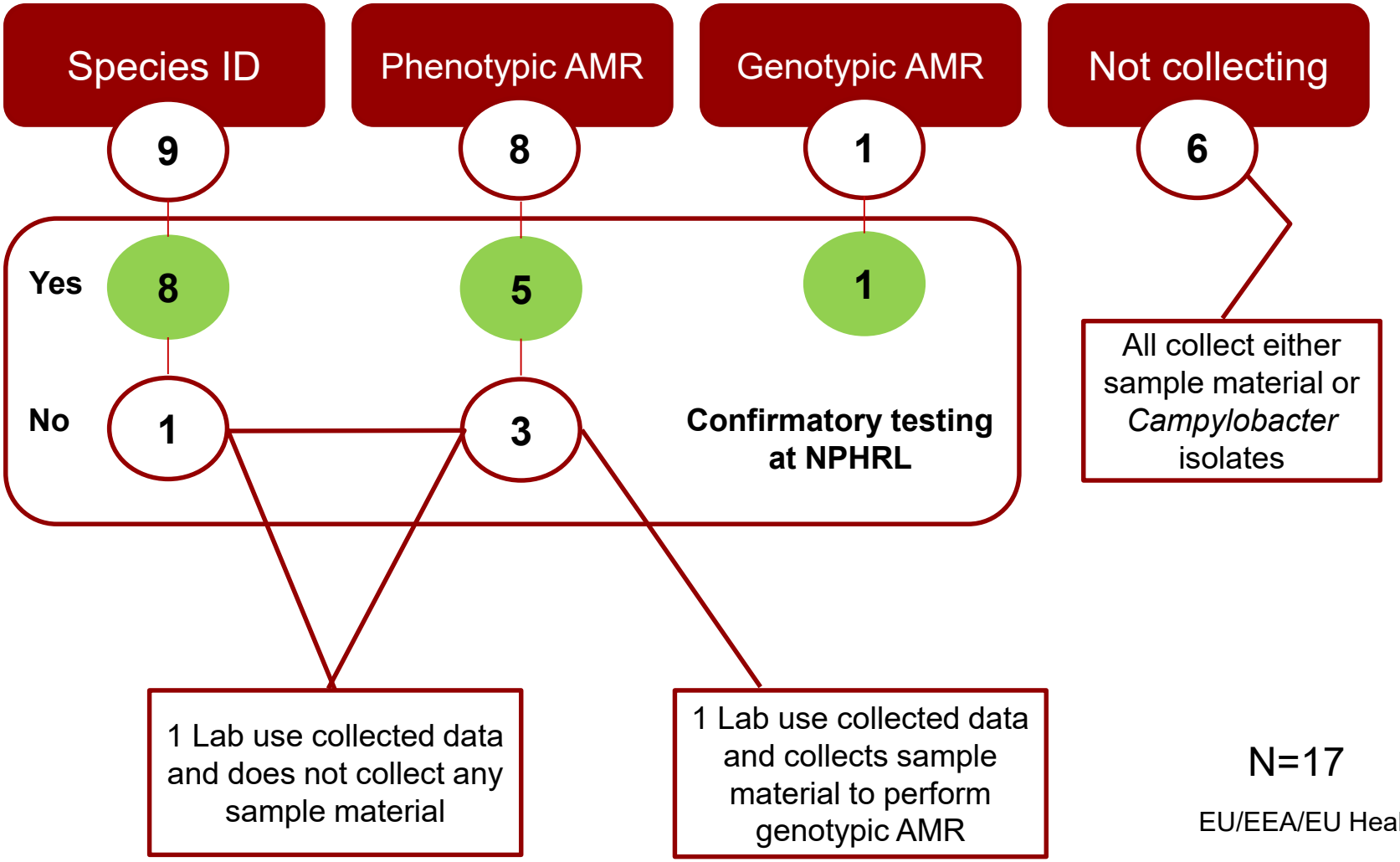
Collection of laboratory data



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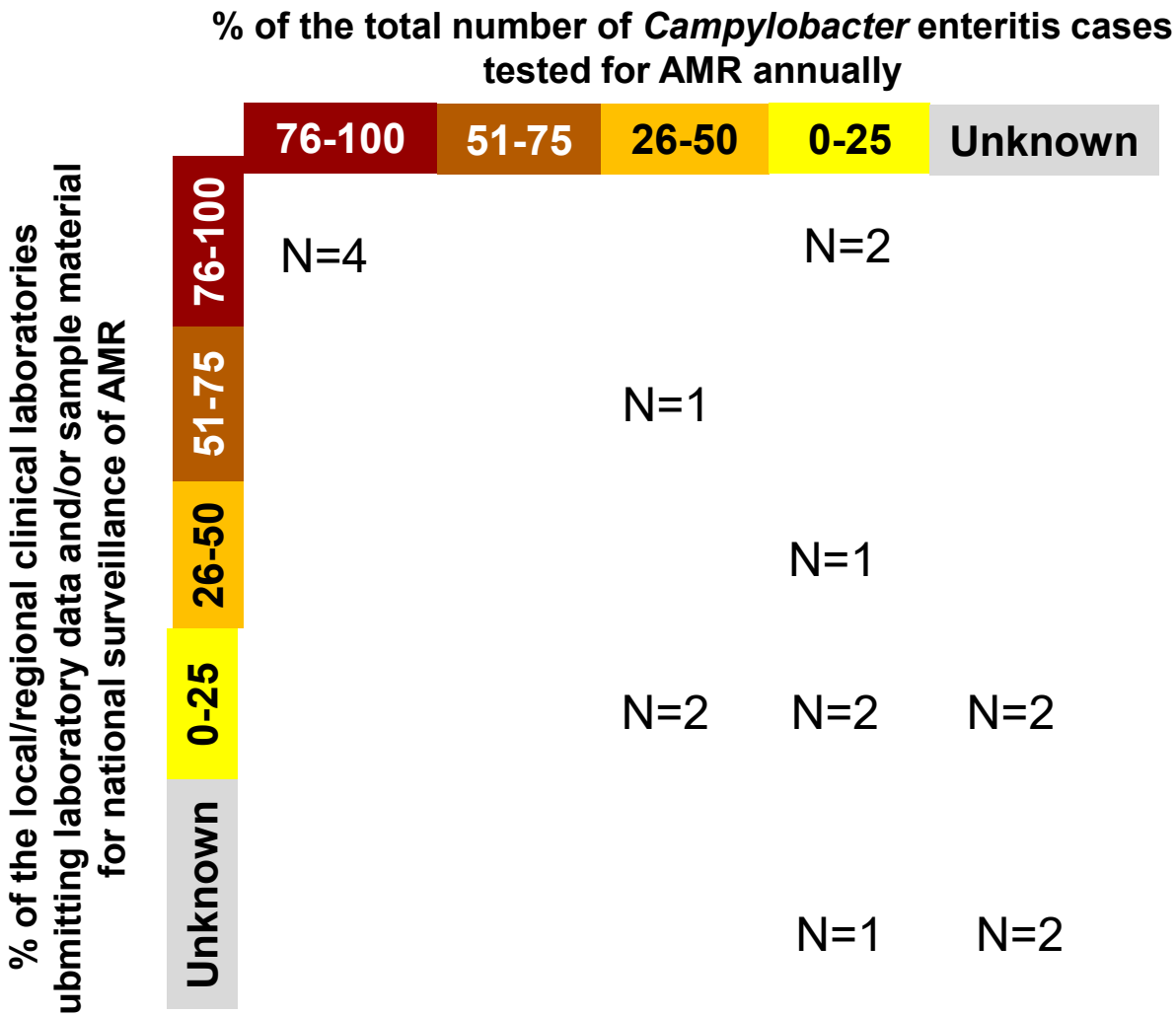
EU/EEA/EU Health

COVERAGE OF NATIONAL AMR SURVEILLANCE SYSTEM



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EU/EEA/EU Health

MOLECULAR SUBTYPING OF CAMPYLOBACTER ISOLATES

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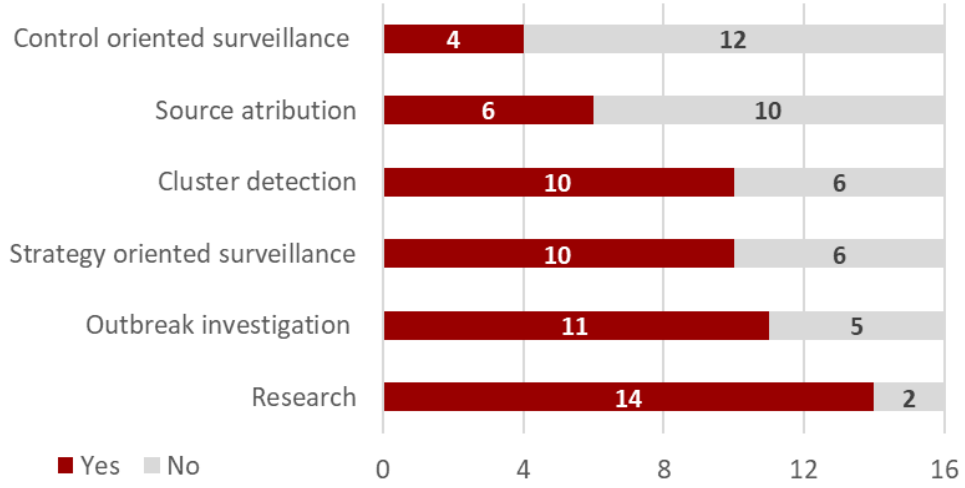
Objectives of molecular subtyping



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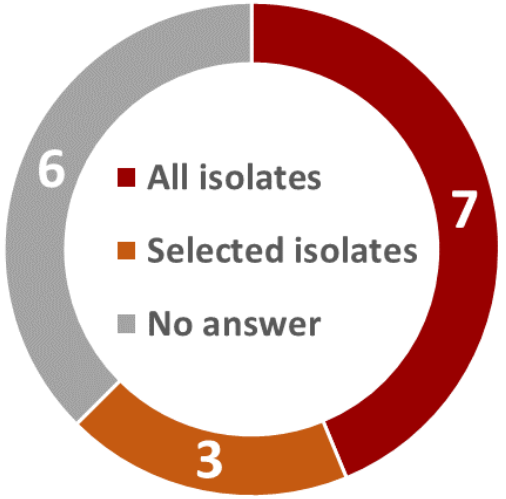
EU/EEA/EU Health

AMR testing on outbreak isolates



CAMPYLOBACTER AMR SURVEILLANCE IN NON-EU COUNTRIES

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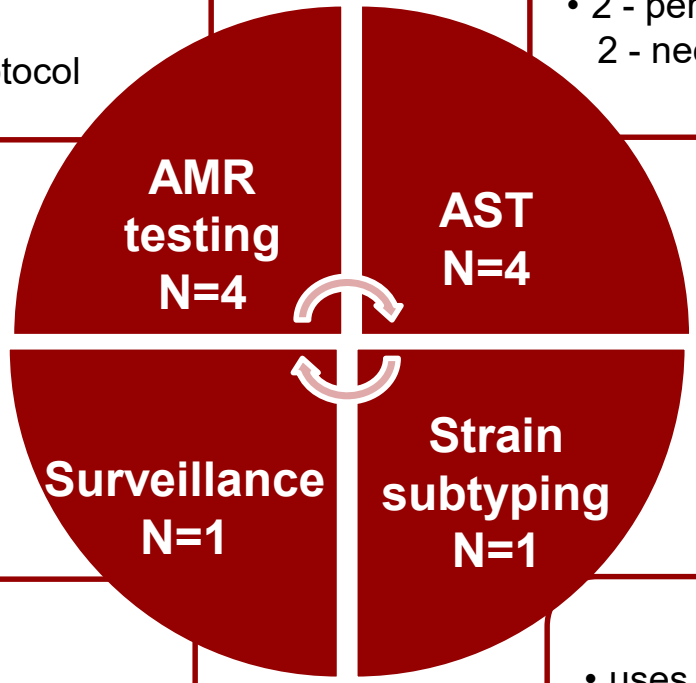
- 3 - 4 antimicrobials tested in all countries
- All use phenotypic methods
- All - *C. jejuni*, 1 - *C. coli*
- 4 - follow harmonised EU protocol

- 4 - DD, 3 - GS
- 4 - EUCAST CBP, 1 - EUCAST EBP
- 2 - perceive high level of performance, 2 - need improvements



N=4

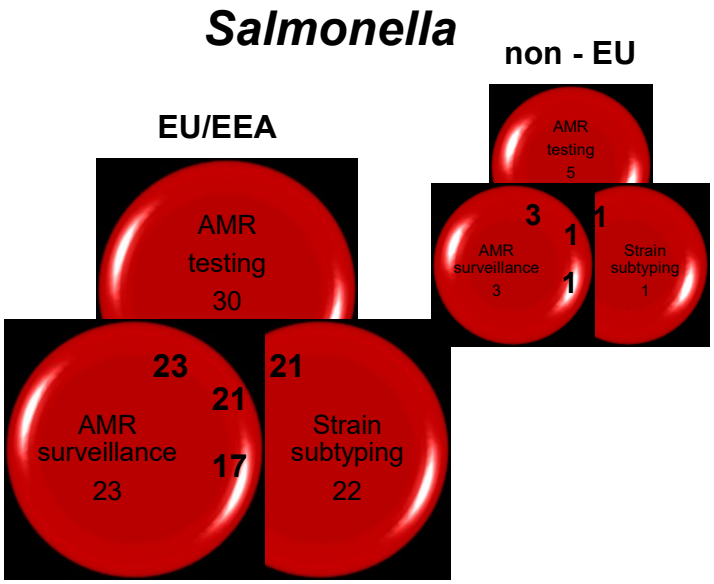
EU candidate countries

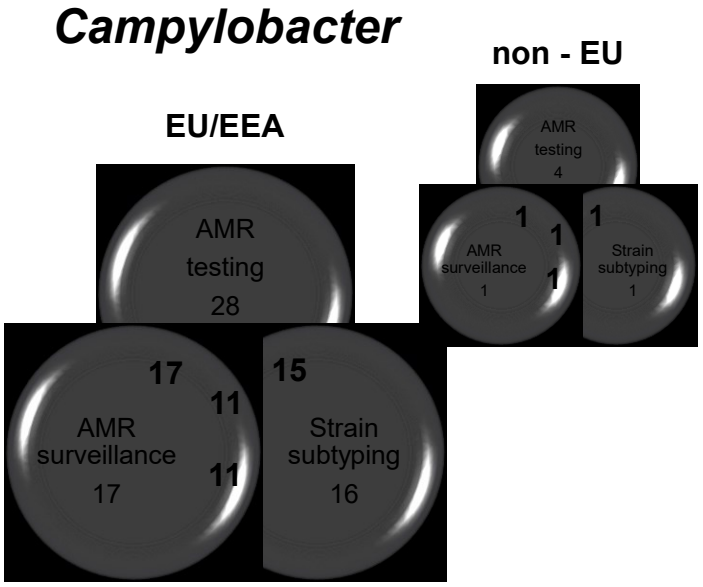
- For 4 antimicrobials
- with 0-25% cov. of local/regional laboratories and 51 - 75% cov. of cases

- uses PFGE for outbreak investigations, source attribution and research

SUMMARY

- Nearly all NPHRLs have a capacity to perform testing of AMR in *Salmonella* and *Campylobacter* isolates from humans using either phenotypic of genotypic methods, however:
  - Approx. 2/3 of NPHRLs perform AMR surveillance and strain subtyping of *Salmonella* isolates
  - Approx. 1/3 of NPHRLs perform AMR surveillance and strain subtyping of *Campylobacter* isolates





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  - Jeppe Boel
  - etc.

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- **Everyone who responded to the survey!**