EU_JAMRAI_WP8.1_Inventory_AMRsurveillance_humans

Fields marked with * are mandatory.

EU-JAMRAI 2 WP8.1 Inventory of surveillance systems for antimicrobial resistance in the human sector

Co-funded by the
Health Programme of
the European Union

Instructions for completing the questionnaire

- Each partner country in JAMRAI-2 WP8.1 should appoint a single coordinator to complete the questionnaire. The coordinator is responsible for contacting relevant national stakeholders in the country to gather the necessary input. Core competencies needed to answer the questionnaire include: clinical microbiology, epidemiology, whole genome sequencing and bioinformatics, and an understanding of the structure of national surveillance system(s).
- Answer the questions keeping in mind that they refer to:
  - National guidance and surveillance system(s) for antimicrobial resistance (AMR) in the human sector,
  - Pathogens of interest, see section below for the list of included pathogens,
  - Isolates from clinical infections (unless stated otherwise).
- Please select the option that best describes the situation in your country even if it is not an exact match. If the question is impossible to answer from your perspective, please contact Amy or Sofia (emails below).
- The questionnaire includes around 45 questions. Some questions include a follow up question that are dependent on the answer provided.
- No questions require that you submit actual data or numbers.
- The time it will take to answer the questions will likely vary between countries (as a minimum 2h are likely needed). Please look through all questions to get a better understanding of how much time is required. Some factors that will influence the time include how many persons the national coordinator needs to contact and the general organization of the national surveillance system(s).
- The survey can be started and finished at a later stage but it must be saved before leaving the webpage. To do this, click “Save as draft” which is located on the right-hand side of the webpage.

- When the survey is finished you must click “Submit” at the bottom of the page.
- The deadline for completing the survey is **Friday February 28, 2025**.

Contact information:
For questions and/or comments, please contact:
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Background, aim, and structure of questionnaire

Background
JAMRAI-2 is an EU-funded One Health Joint Action project focused on different aspects on the containment of AMR. The stated outcome of the human AMR surveillance package (Task 8.1) is “Strengthening national surveillance systems in the human sector”. As a part of this effort, we have designed this questionnaire to collect information needed to build an inventory of national surveillance systems for AMR in the human sector within European countries. The inventory adds to and complements ongoing work at the ECDC, WHO and the European Reference Laboratory for AMR. The focus of the inventory is not on AMR data but to collate information of the underlying surveillance systems producing and collecting the data in each country, and how the data is presented and used.

Aim
The overall aim of the inventory is to serve as a tool to strengthen surveillance of AMR in the human sector in Europe by:

- Creating a joint public dashboard where the collected information on how European countries structure their national surveillance of AMR is displayed. The main focus is on phenotypic and genotypic surveillance. The dashboard should serve as inspiration, facilitate collaboration and enable follow up of changes made to countries surveillance systems over time.
- In a later stage, the information gathered in the inventory together with other sources of information will be used to build an interactive roadmap where specific actions to improve surveillance will be displayed. The roadmap will also include suggestions on capacity-strengthening initiatives that would be needed to achieve the suggested enhancements.

This questionnaire is designed to capture the content that is going to be displayed in the dashboard. It includes different perspectives of AMR surveillance such as guidance, structure, content and the use of data from a national perspective (Figure 1). The majority of the questions concern the national AMR surveillance system(s). Some questions concern the presence of national guidance aimed for healthcare facilities and clinical microbiological laboratories at a regional level that collect and provide AMR data. The rationale for including this is that the initial data collection and analysis influence the comparability and representation of the data submitted to the national surveillance system. Another important aspect we want to capture is how AMR data is used. A potential area with high impact for both patient treatment and antibiotic use is the development of treatment guidelines for common infections based on available quality assured Antimicrobial Susceptibility Test (AST) data.

Publication and processing of data

All non-personal data collected in this inventory will be made publicly available during the project. Data collected that are considered personal are; full name, email, institution and type of institution. The responses to the survey will be compiled, analyzed and displayed by country in a public dashboard. Both the inventory and the dashboard are being developed during the JAMRAI-2 project as a proof of concept. The long-term goal is to create a sustainable working methodology that can live on and be continuously updated after the JAMRAI-2 collaboration has ended. You will find more information about personal data processing and GDPR in the privacy statement in the Background documents.

Structure of the questionnaire

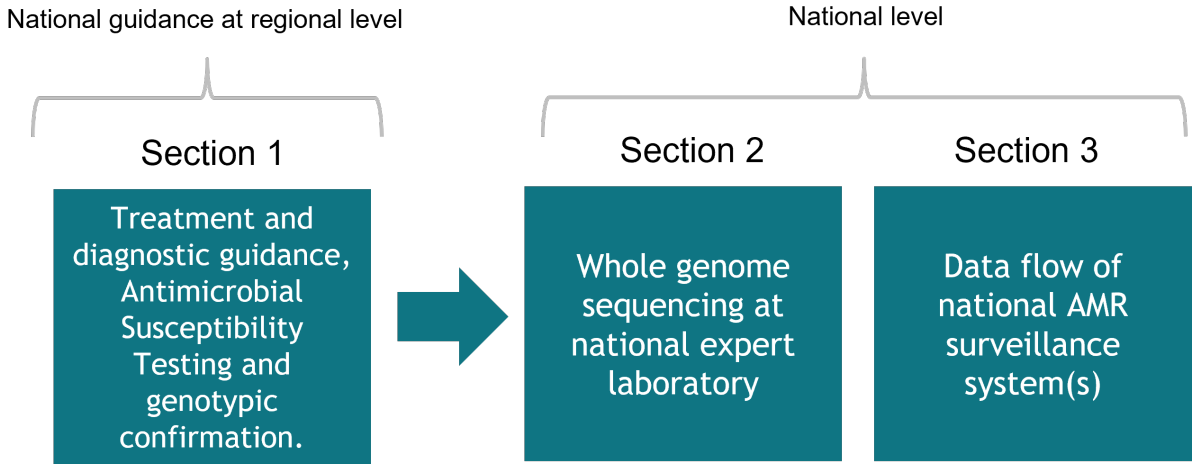
The questionnaire is designed to be answered from a national perspective and is structured into three sections, as illustrated in Figure 1. The following expertise will be useful when answering the different parts:

Section 1: A microbiologist at the national reference laboratory or equivalent national expert laboratory with knowledge about healthcare structures relating to AMR, and the national process(es) to generate national guidance. The questions are designed to be answered from a national perspective and there should be no need to contact individual laboratories.

Section 2: A microbiologist and/or bioinformatician working at the national reference laboratory or an equivalent national expert laboratory with the responsibility to perform/manage WGS for AMR nationally.

Section 3: A microbiologist/epidemiologist at the national level with knowledge about the set-up and content of the national AMR surveillance system(s).

Figure 1. The different sections and their content included in the questionnaire.



Included pathogens

The included pathogens are in line with the list under surveillance by ECDC (EARS-Net) and the WHO pathogen priority list for AMR bacteria. The main focus is on clinical isolates from human infections, unless otherwise specified. Please answer the questions from this perspective.

The included pathogens can cause severe infections in humans, most of them healthcare-associated infections and outbreaks. Healthcare-associated infections with the included AMR pathogens are currently the major cause of morbidity and mortality in humans in Europe. Several of the included pathogens are also important from a One Health perspective considering that they can infect and form reservoirs in both

animals and the environment.

Included pathogens and their resistance (R) phenotypes used throughout the questionnaire:

- *Escherichia coli*: Third-Generation Cephalosporin resistance (3GC-R), carbapenem resistance (carbapenem-R) and colistin resistance (colistin-R).
- *Klebsiella pneumoniae*: Third-Generation Cephalosporin resistance (3GC-R), carbapenem resistance (carbapenem-R) and colistin resistance (colistin-R).
- *Pseudomonas aeruginosa*: carbapenem resistance (carbapenem-R).
- *Acinetobacter baumannii*: carbapenem resistance (carbapenem-R).
- *Staphylococcus aureus*: methicillin resistance (MRSA).
- *Enterococcus faecium* and *Enterococcus faecalis*: vancomycin resistance (VRE).
- *Streptococcus pneumoniae*: penicillin resistance and macrolide resistance.
- *Haemophilus influenzae*: ampicillin resistance.
- *Clostridioides difficile*.

Excluded pathogens
Some pathogens, including fungi, parasites and viruses, fall outside of the scope of this questionnaire, although they may become relevant for future surveys. In addition to these pathogens, we have decided to exclude:

- *M. tuberculosis* and *N. gonorrhoeae:* These bacteria do not fall within the defined categories listed above. In addition, many countries have separate surveillance systems, laboratories and networks specifically for these bacteria. This makes it logistically difficult to combine into a single questionnaire.
- Food and waterborne bacterial pathogens: Bacterial pathogens such as *Salmonella*, *Campylobacter* and *Shigella* are not generally healthcare-associated. In addition, many countries have separate surveillance systems and approaches.

Terms and abbreviations:

AMR: Antimicrobial Resistance
AST: Antimicrobial Susceptibility Testing
3GC: Third-Generation Cephalosporin
CML: Clinical Microbiological Laboratory
CSF: Cerebral Spinal Fluid
Community-associated infection: Referring to infections that are contracted in a community setting, i.e. outside of a healthcare facility.
ECDC: European Centre for Disease Prevention and Control
Empiric treatment: The initiation of antibiotic treatment prior to pathogen and resistance identification. This would be based on available data and clinical experience.
Extended AST: Refers to any additional AST performed on an isolate that has undergone a first routine AST. Often this is performed on specific resistant phenotypes where additional treatment options might be needed. Can also be performed for surveillance purposes. Does not refer to repetition of AST at national reference laboratory or confirmation of resistance.
Healthcare-associated infection: As defined by WHO, an infection occurring in a patient while in the care

of a hospital or other healthcare facility, which was not present or incubating at the time of admission. Healthcare-associated infections can also appear after discharge.
Isolate data: used when referring to microbiological data.
LTCF-associated infection: An infection occurring in a patient who is a resident at a long-term care facility.
National Guidance: Recommendation from a governmental agency, a national/sub-national working group, a recognized independent organization or equivalent group/organization. It does not need to be legally binding but issued from a high trust group/organization/society whose authority is nationally recognized.
National AMR surveillance system(s): refers to the combined AMR data that is available at the national level. This information can be collected in one or several different systems.
NRL: National Reference Laboratory
Patient/case data: used when referring to data that originates from the patient, such as age and sex.
R and/or P: Refers to if a bacteria has a phenotypic resistance (R) to antibiotics regardless of the mechanism of resistance and/or genetically confirmed producer (P) of a specific enzyme that is able to break down the antibiotic.
Real-time system/data: A system that transfers data automatically/semi-automatically with minimal delay (generally no more than one week).
Routine AST: Refers to the first AST performed when a bacterial infection has been identified in a patient sample
UTI: urinary tract infection
WGS: Whole Genome Sequencing
WHO: World Health Organization

GENERAL INFORMATION

* 1 Full name

* 2 Email

* 3 Country

- AT - Austria
- BE - Belgium
- BG - Bulgaria
- HR - Croatia
- CY - Cyprus
- CZ - Czechia
- DK - Denmark
- EE - Estonia
- FI - Finland
- FR - France
- DE - Germany
- EL - Greece

- HU - Hungary
- IE - Ireland
- IT - Italy
- LV - Latvia
- LT - Lithuania
- LU - Luxembourg
- MT - Malta
- NL - Netherlands
- ID51 - Norway
- PL - Poland
- PT - Portugal
- RO - Romania
- SK - Slovak Republic
- SI - Slovenia
- ES - Spain
- SE - Sweden
- ID50 - Ukraine

* 4 Institution

* 5 Type of institution

- Ministry
- National Public Health Agency
- National reference/expert laboratory
- Other

I consent to the processing of my personal data (full name, email, institution and type of institution).

Section 1. Treatment and diagnostic guidelines, Antimicrobial Susceptibility Testing (AST) and genotypic confirmation.

Expertise/role for answering this section:
A microbiologist at the national reference laboratory or equivalent national expert laboratory with knowledge about healthcare structures relating to AMR, and the national process(es) to generate national guidance, and having some knowledge about the content of the national AMR guidance.

Important information for completing this section:
The questions are designed to be answered from a national perspective and there should be no need to contact individual laboratories.

Most relevant terms and abbreviations:
UTI: urinary tract infection. **AST:** Antimicrobial Susceptibility Testing.
Routine AST: Refers to the first AST performed when a bacterial infection has been identified in a patient

sample. **Extended AST:** Refers to any additional AST performed on an isolate that has undergone a first routine AST. Often this is performed on specific resistant phenotypes where additional treatment options might be needed. Can also be performed for surveillance purposes. Does not refer to repetition of AST at national reference laboratory or confirmation of resistance. **National Guidance:** Recommendation from a governmental agency, a national/sub-national working group, a recognized independent organization or equivalent group/organization. It does not need to be legally binding but issued from a high trust group /organization/society whose authority is nationally recognized.

Treatment and Diagnostic guidance

6 Is there national guidance for empiric antibiotic treatment when the following infections are suspected?

Suspected or confirmed infection	Yes	No	Do not know
* Bloodstream infection	○	○	○
* Uncomplicated UTI	○	○	○
* Complicated UTI	○	○	○
* Upper respiratory tract infection	○	○	○
* Lower respiratory tract infection	○	○	○
* Skin and soft tissue infection	○	○	○

* 7 You answered "yes national guidance for empiric antibiotic treatment" for one or several infections in the question above.
Which laboratory AST data are generally used when writing and/or reviewing the national treatment guidance? (Tick all that apply)

- ☐ Results from routine AST available in the national AMR surveillance system.
- ☐ Results from the extended AST available in the national AMR surveillance system.
- ☐ Results from AST data generated at the national reference/expert laboratory.
- ☐ International guidance (e.g., European association of urology).
- ☐ International AST data.
- ☐ No AST data used; guidance based on other information.
- ☐ Do not know.
- ☐ Other

* 8 You answered "no national guidance for empiric antibiotic treatment" for one or several infections in the question above.
Who or which institution(s) guide(s) and determine(s) empiric antibiotic treatment?
(Tick all that apply)

- ☐ Regional and/or local guidance (including two or more institutions).
- ☐ The healthcare facility that treats the patient.
- ☐ The treating physician(s).
- ☐ Clinical microbiologist(s) at the healthcare facility/laboratory that treats the patient.
- ☐

Do not know.

Other.

9 Is there national guidance on when to take samples for microbiological cultures and other analysis for the following suspected and/or confirmed infections?

Suspected or confirmed infection	Yes	No	Do not know
* Bloodstream infection			
* Uncomplicated UTI			
* Complicated UTI			
* Upper respiratory tract infection			
* Lower respiratory tract infection			
* Skin and soft tissue infection			

* 10 You answered “no national guidance on when to take samples for microbiological cultures” for one or several infections in the question above:
Who or which institution(s) guide(s) and determine(s) when a sample should be taken for microbiological cultures? (Tick all that apply)

Regional and/or local guidance (including two or more institutions).

Guidance at each individual healthcare facility.

The treating physician(s).

Do not know.

Other.

Guidance of Antimicrobial Susceptibility Testing (AST)

Routine AST

Routine AST: Refers to the first AST performed when a bacterial infection has been identified in a patient sample.

* 11 Is there national guidance outlining which antibiotics to include as a minimum in the routine AST?
See list of all included pathogens in the introduction.

Yes, national guidance in place for all included pathogens (excluding C. difficile).

Yes, national guidance in place for some of the included pathogens.

No national guidance in place but it is currently being developed.

No national guidance in place for any included pathogens

* 12 You answered "No national guidance outlining which antibiotics to include as a minimum in the routine AST”.
Who or which institution(s) generally guides and determines which antibiotics to include in the routine AST? (Tick all that apply)

Regional and/or local guidance (including two or more institutions).

- [ ] National reference/expert laboratory
- [ ] The clinical microbiological laboratory that performs the AST.
- [ ] The healthcare facility where the sample was taken.
- [ ] The treating physician(s)
- [ ] Do not know
- [ ] Other

* 13 In your country, which laboratories perform the routine AST? (Tick all that apply)
- [ ] All clinical microbiological laboratories.
- [ ] A subset of clinical microbiological laboratories
- [ ] National reference/expert laboratory
- [ ] Do not know
- [ ] Other

* 14 Are there clinical microbiological laboratories that store routine AST data only in paper format?
- ( ) Yes.
- ( ) No.
- ( ) Do not know.

Extended AST

Extended AST: Refers to any additional AST performed on an isolate that has undergone a first routine AST. Often this is performed on specific resistant phenotypes where additional treatment options might be needed. This can also be performed for surveillance purposes. This does not refer to repetition of AST at the national reference/expert laboratory or confirmation of resistance.

* 15 Is there national guidance outlining which antibiotics to include in an extended AST?
- ( ) Yes, national guidance in place for all included pathogens.
- ( ) Yes, national guidance in place for some of the included pathogens.
- ( ) No national guidance in place but it is currently being developed.
- ( ) No national guidance in place for any included pathogens.
- ( ) Extended AST not used.
- ( ) Do not know

* 16 You answered "No national guidance outlining which antibiotics to include in the extended AST".
Who or which institution(s) generally guides and determines which antibiotics to include in the routine AST? (Tick all that apply)
- [ ] Regional and/or local guidance (including two or more institutions).
- [ ] National reference/expert laboratory
- [ ] The clinical microbiological laboratory that performs the AST
- [ ] The healthcare facility where the sample was taken
- [ ] The treating physician(s)
- [ ] Do not know
- [ ] Other

Genotypic confirmation

* 17 Which laboratories perform molecular typing of relevant resistance gene(s) in AMR isolates? (Tick all that apply)

- ☐ All clinical microbiological laboratories.
- ☐ A subset of clinical microbiological laboratories.
- ☐ National reference/expert laboratory.
- ☐ Do not know.
- ☐ Other

Section 2. Whole genome sequencing (WGS) at national reference/expert laboratory

Expertise/role helpful for answering: Microbiologist and/or bioinformatician working at the national reference laboratory or an equivalent national expert laboratory with the responsibility to perform/manage WGS for AMR nationally.

Most relevant terms and abbreviations:
R and/or P: Refer to if the bacteria have a phenotypic resistance (R) to antibiotics regardless of the mechanism of resistance and/or genetically confirmed producer (P) of a specific enzyme that is able to break down the antibiotic. **National Guidance:** Recommendation from a governmental agency, a national /sub-national working group, a recognized independent organization or equivalent group/organization. It does not need to be legally binding but issued from a high trust group/organization/society whose authority is nationally recognized.

* 18 Is WGS and bioinformatic analysis performed in-house at the national reference/expert laboratory for some or all AMR bacteria under national surveillance?

- ○ Yes, both WGS and bioinformatics are performed in-house.
- ○ Yes, WGS is performed in-house but bioinformatics is outsourced.
- ○ Yes, WGS is outsourced but bioinformatics is performed in-house.
- ○ No, both WGS and bioinformatics are outsourced.
- ○ No, WGS is not used.
- ○ Other.

19 Which of the following pathogens routinely undergo WGS as part of the national surveillance of AMR?

Pathogen (species/genera)	WGS performed
E. coli (carbapenem R and/or P)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
E. coli (3GC- R and/or P)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested.

	○ No, not sequenced.
E. coli (colistin R)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
K. pneumoniae (carbapenem R and/or P)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
K. pneumoniae (3GC- R and/or P)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
K. pneumoniae (colistin R)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
P. aeruginosa (carbapenem R and/or P)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
A. baumanii (carbapenem R and/or P)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
S. aureus (methicillin R)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
E. faecium and/or *E. faecalis* (vancomycin R)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.
S. pneumoniae (penicillin and macrolide R)	* Select 1 option ○ Yes, all isolates sequenced. ○ Yes, for specific time periods and/or number of isolates. ○ Yes, when required/requested. ○ No, not sequenced.

H. influenzae (ampicillin- R)	* Select 1 option Yes, all isolates sequenced. Yes, for specific time periods and/or number of isolates. Yes, when required/requested. No, not sequenced.
C. difficile	* Select 1 option Yes, all isolates sequenced. Yes, for specific time periods and/or number of isolates. Yes, when required/requested. No, not sequenced.

* 20 Is there national guidance on how to prioritize AMR isolates for WGS if resources are limited?
- Yes.
- No.
- Do not know.
- Other.
- WGS not used.

* 21 Are there clinical microbiological laboratories that submit WGS data for surveillance purposes to the national reference/expert laboratory for one or several of the included pathogens? (Tick all that apply)
- Yes, raw read data.
- Yes, assembled contigs.
- No, some clinical microbiological laboratories perform WGS but data is not submitted.
- No WGS data submitted from the clinical microbiological laboratories.
- Do not know.
- Other

* 22 You answered "No, some clinical microbiological laboratories perform WGS but data is not submitted" in the question above.
What are the main reasons that the clinical microbiological laboratories do not submit WGS data? (Select max 4 options)

Maximum 4 selection(s)
- Lack of infrastructure to submit WGS data.
- Lack of capacity to process data at national reference laboratory/ national expert laboratory.
- Lack of capacity for clinical microbiology laboratory to submit data.
- Different sequencing methodologies between clinical microbiology laboratories and national expert laboratory.
- Legal obstacles; sharing of data.
- Legal obstacles; storing of data.
- Legal, other issues.
- Submission of data from clinical microbiology laboratories is voluntary.
- Do not know.
- Other

* 23 How would you describe the purpose of WGS at the national reference/expert laboratory? (Tick all that apply)
- Identification of the pathogen(s) causing infection/carriage for diagnostic purposes.

- [ ] Outbreak/transmission investigations.
- [ ] Surveillance.
- [ ] Research performed at national reference/expert laboratory.
- [ ] Other.
- [ ] WGS not used.

* 24 If WGS is used for outbreak investigations at the national reference/expert laboratory, is the WGS data used in 'real-time'?
Real-time generally refers to being completed within about 1 week, with the results used to make decisions on how to proceed.

- ( ) Yes.
- ( ) No, WGS not used in real-time.
- ( ) No but under implementation.
- ( ) No, WGS not used for outbreak investigations.
- ( ) Do not know.
- ( ) Other.
- ( ) WGS not used.

* 25 Can the national reference/expert laboratory perform a joint analysis with WGS data from another sector if e.g. an outbreak is identified?
Pick the scenario that suits your system the best concerning national outbreaks. Examples could be food production, veterinary medicine, etc.

- ( ) Yes, we have a data sharing/analysis pipeline set-up for this analysis.
- ( ) Yes, it can be done but there is no official data sharing/analysis pipeline.
- ( ) No, legal issues prevent this type of sharing and analysis.
- ( ) No joint analysis is performed with WGS data.
- ( ) Do not know.
- ( ) Other.
- ( ) WGS not used.

* 26 If applicable, which of the following methods are used for outbreak detection and/or determining relatedness of bacteria at the national reference/expert laboratory? (Tick all that apply)

- [ ] Not applicable
- [ ] Core genome multi-locus sequence typing (cgMLST).
- [ ] Whole genome multi-locus sequence typing (wgMLST).
- [ ] Single nucleotide polymorphism (SNP) analysis.
- [ ] Pulsed-field gel electrophoresis (PFGE).
- [ ] Multilocus variable-number tandem repeat analysis (MLVA).
- [ ] Do not know.
- [ ] Other, non WGS-based methods.

* 27 Which quality control (QC) parameters are used at the national reference/expert laboratory? (Tick all that apply)

- [ ] Number of reads.
- [ ] Average read length.
- [ ] Depth of Coverage.
- [ ]

Number of contigs.
- [ ] N50.
- [ ] Total bp in raw reads.
- [ ] Other.
- [ ] WGS not used.

* 28 How is the sequencing data assembled and analyzed at the national reference/expert laboratory? (Tick all that apply)
- [ ] Inhouse pipeline; open access tools only.
- [ ] Inhouse pipeline; commercial tools only.
- [ ] Inhouse pipeline; combination open access and commercial tools.
- [ ] Outsourced to private company.
- [ ] Do not know.
- [ ] Other.
- [ ] WGS not used.

* 29 If applicable, for which purpose can metagenomics sequencing of primary samples be used at the national reference/expert laboratory? (Tick all that apply)
Metagenomics sequencing refers to the analysis of the total microbial genomic from a biological sample.
- [ ] Not applicable.
- [ ] Diagnostics for individual patients.
- [ ] Specific research projects.
- [ ] Do not know.
- [ ] Other.
- [ ] WGS not used.

* 30 Does the national reference/expert laboratory participate in national and/or international external quality assessment (EQA) programs for WGS for one or several of the included pathogens?
- ( ) Yes, annually.
- ( ) Yes, less often than annually.
- ( ) No.
- ( ) Do not know.
- ( ) WGS not used.

* 31 Does the national reference/expert laboratory organize national external quality assessment (EQA) programs for WGS for one or several of the included pathogens within the country?
- ( ) Yes.
- ( ) No.
- ( ) Do not know.
- ( ) WGS not used.

* 32 Where is the WGS raw read data collected or produced by the national reference/expert laboratory stored?
- ( ) Inhouse storage.
- ( ) External storage.
- ( ) Other.

- ○ WGS not used.

* 33 Is the WGS data produced by the national reference/expert laboratory submitted to public repositories (e.g., NCBI, ENA) on a regular basis (i.e. monthly, annually)?
  - ○ Yes, all data.
  - ○ Yes, some data.
  - ○ No.
  - ○ WGS not used.

* 34 What are the main areas in need of development in the implementation and application of WGS at the national reference/expert laboratory? (Select max 4 options)

Maximum 4 selection(s)

- ☐ Technical infrastructure relating to sequencing instruments.
- ☐ Technical infrastructure relating to data processing, analysis and visualization.
- ☐ Technical infrastructure relating to data storage.
- ☐ Capacity, laboratory knowledge/skills.
- ☐ Capacity, bioinformatics.
- ☐ Capacity, use of data for management of patient treatment(s) and/or for public health surveillance.
- ☐ Funding, infrastructure.
- ☐ Funding, human resources.
- ☐ Funding, training for available personnel.
- ☐ Legal obstacles.
- ☐ Lack of political decision/willingness.
- ☐ Other

* 35 You answered other to the question: "What are the main areas in need of development in the implementation and application of WGS at the national expert laboratory?"
Please specify.

Section 3. Data flow of national AMR surveillance system(s)

Expertise/role helpful for answering: Microbiologist/epidemiologist at the national level with knowledge about the set-up and content of the national AMR surveillance system(s).

Most relevant terms and abbreviations:

National AMR surveillance system(s): refers to all the systems available at national level and the combined data from those systems.

3GC: Third-generation cephalosporins**, CML:** Clinical Microbiology Laboratory, **AST:** Antimicrobial Susceptibility Testing, **NRL:** National Reference Laboratory. **R and/or P:** Refer to if the bacteria have an (R) phenotypic resistance to antibiotics regardless of the mechanism of resistance and/or (P) genetically confirmed producer of a specific enzyme that breaks down the antibiotic. **Isolate data:** used when referring to microbiological data. **Patient/case data:** used when referring to data that originates from the patient such as age and sex.

Real-time system/data: A system that transfers data automatically/semi-automatically with minimal delay (generally no more than one week).

36 Which of the following pathogens are under national surveillance?

Mandatory: *Means that the pathogen is notifiable according to your country communicable disease legislation or an equivalent legislation.*

Voluntary: *Not mandatory/notifiable but still under national surveillance.*

Screening: *culturing to identify carriage and/or colonization. This can be different sample types but not related to clinical infection.*

Microbiological culture from: → Bacteria (species/genera):	Blood/CSF	Urine	Wound/Tissue swab	Upper respiratory tract	Lower respiratory tract	Screening	Diarrhea/stool sample
E. coli (carbapenem R and/or P)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
E. coli (3GC- R and/or P)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
E. coli (colistin R)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
K. pneumoniae (carbapenem R and/or P)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
K. pneumoniae (3GC- R and/or P)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
	* Select 1 option Yes, mandatory	* Select 1 option Yes, mandatory			* Select 1 option Yes, mandatory	* Select 1 option Yes, mandatory	

K. pneumoniae (colistin R)	Yes, voluntary No	Yes, voluntary No	Not applicable	Not applicable	Yes, voluntary No	Yes, voluntary No	Not applicable
P. aeruginosa (carbapenem R and/or P)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
A. baumanii (carbapenem R and/or P)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
S. aureus (methicillin R)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
E. faecium and/or *E. faecalis* (vancomycin R)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	Not applicable	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
S. pneumoniae (penicillin and macrolide R)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
H. influenzae (ampicillin- R)	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	* Select 1 option Yes, mandatory Yes, voluntary No	Not applicable
C. difficile	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	* Select 1 option Yes, mandatory Yes, voluntary No

37 Which laboratories submit data for AST and genotypic confirmation for the following pathogens to your national AMR surveillance system(s)?

AST data can be in any format (zones, MIC, SIR, aggregated). Genotypic confirmation refers to the identification of a resistance gene; e.g., NDM-1.

CML: Clinical Microbiological Laboratory

NRL: National Reference or Expert Laboratory

Please select NRL if it is the only provider of AST and/or genotypic data.

Pathogen (species/genera)	AST data	Genotypic confirmation data
E. coli (carbapenem R and/or P)	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted
E. coli (3GC- R and/or P)	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted
E. coli (colistin R)	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted
K. pneumoniae (carbapenem R and/or P)	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted
K. pneumoniae (3GC- R and/or P)	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted
	* Select 1 option All CMLs	* Select 1 option All CMLs

K. pneumoniae (colistin R)	○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted	○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted
P. aeruginosa (carbapenem R and/or P)	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted
A. baumanii (carbapenem R and/or P)	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted
S. aureus (methicillin R)	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted
E. faecium and/or *E. faecalis* (vancomycin R)	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted
S. pneumoniae (penicillin and macrolide R)	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted
H. influenzae (ampicillin- R)	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted	* Select 1 option ○ All CMLs ○ A subset of CMLs ○ NRL ○ Other ○ Do not know ○ Not submitted

C. difficile	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted	* Select 1 option All CMLs A subset of CMLs NRL Other Do not know Not submitted

38 Is AST data for the following pathogen part of your national surveillance, and how would you estimate the population coverage and the geographical representativeness of the submitted data?
Applies to AST data for all tested isolates (susceptible, intermediate and resistant). Can be in any format (zones, MIC, SIR, aggregated).

Estimation range of population coverage:*The percentage of the population that is roughly covered by the clinical microbiology laboratories that submit data.*
Estimation of geographical representativeness: *A rough estimation of the quantity of geographical regions that are covered by the clinical microbiology laboratories that submit data.*

Similar estimations are included in the annual report to EARS-Net. If you are unsure about the estimations, please consult the EARS-Net focal point in your country.

Microbiological culture from: Bacteria (species /genera):	If data is submitted: Estimated range of population coverage	If data is submitted: Estimated geographical representativeness
Blood/CSF *E. coli*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Blood/CSF *K. pneumoniae*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Blood/CSF *P. aeruginosa*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know

Blood/CSF *A. baumanii*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Blood/CSF *S. aureus*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Blood/CSF *E. faecium* and/or *E. faecalis*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Blood/CSF *S. pneumoniae*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Blood/CSF *H. influenzae*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Urine *E. coli*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered.

	Not part of national surveillance	Do not know
Urine *K. pneumoniae*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Urine *P. aeruginosa*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Urine *A. baumanii*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Urine *S. aureus*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Urine *E. faecium* and/or *E. faecalis*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Urine S. pneumoniae	* Select 1 option 76-100% 51-75% 26-50% 1-25%	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered.

	○ Do not know ○ Not part of national surveillance	LOW: a few geographical areas of the country are covered. ○ Do not know
Urine *H. influenzae*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Wound/tissue swab *P. aeruginosa*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Wound/tissue swab *A. baumanii*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Wound/tissue swab *S. aureus*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Upper respiratory tract *S. aureus*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
	* Select 1 option ○ 76-100% ○ 51-75% ○	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○

Upper respiratory tract *S. pneumoniae*	26-50% 1-25% Do not know Not part of national surveillance	MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Upper respiratory tract *H. influenzae*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Lower respiratory tract *E. coli*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Lower respiratory tract *K. pneumoniae*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Lower respiratory tract *P. aeruginosa*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
Lower respiratory tract *A. baumanii*	* Select 1 option 76-100% 51-75% 26-50% 1-25% Do not know Not part of national surveillance	* Select 1 option HIGH: all main geographical regions of the country are covered. MEDIUM: most geographical regions of the country are covered. LOW: a few geographical areas of the country are covered. Do not know
	* Select 1 option 76-100%	* Select 1 option

Lower respiratory tract *S. aureus*	○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Lower respiratory tract *S. pneumoniae*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Lower respiratory tract *H. influenzae*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know
Diarrhea *C. difficile*	* Select 1 option ○ 76-100% ○ 51-75% ○ 26-50% ○ 1-25% ○ Do not know ○ Not part of national surveillance	* Select 1 option ○ HIGH: all main geographical regions of the country are covered. ○ MEDIUM: most geographical regions of the country are covered. ○ LOW: a few geographical areas of the country are covered. ○ Do not know

39 How would you estimate the comparability of the microbiological culture results from the different sites that submits data to your national AMR surveillance system(s)?
Examples of differences that influence comparability in this context include: different reasons for requesting a test, different numbers of tests per patient and/or the different types of included test (e.g. urine dipstick and rapid tests).

Microbiologigal cultures from:	Comparability
Blood/CSF	* Select 1 option ○ High: Comparable methods are used ○ Medium: Different methods are used but the culture results are still considered comparable ○ Low: Large differences in methods makes the culture results hard to compare ○ Do not know ○ No data submitted

Urine	* Select 1 option High: Comparable methods are used Medium: Different methods are used but the culture results are still considered comparable Low: Large differences in methods makes the culture results hard to compare Do not know No data submitted
Wound/tissue	* Select 1 option High: Comparable methods are used Medium: Different methods are used but the culture results are still considered comparable Low: Large differences in methods makes the culture results hard to compare Do not know No data submitted
Upper respiratory tract	* Select 1 option High: Comparable methods are used Medium: Different methods are used but the culture results are still considered comparable Low: Large differences in methods makes the culture results hard to compare Do not know No data submitted
Lower respiratory tract	* Select 1 option High: Comparable methods are used Medium: Different methods are used but the culture results are still considered comparable Low: Large differences in methods makes the culture results hard to compare Do not know No data submitted
Diarrhea/stool sample	* Select 1 option High: Comparable methods are used Medium: Different methods are used but the culture results are still considered comparable Low: Large differences in methods makes the culture results hard to compare Do not know No data submitted

* 40 For the pathogens that are under national surveillance, is some patient/case data available in your national AMR surveillance system(s)?

- Yes
- No
- Do not know

41 You answered “yes to some patient/case information is available” in the question above.
Which of the following patient/case information is available in your national AMR surveillance system(s)?

Please also select available if the data are in separate systems but regularly linked with the AMR data.
Community-associated: *Infections that are contracted in the community, i.e. outside of a healthcare*

facility.

Healthcare-associated: *An infection occurring in a patient during the process of care in a hospital or other healthcare facility, which was not present or incubating at the time of admission. Healthcare-associated infections can also appear after discharge.*

Long-Term Care Facility (LTCF)-associated: *An infection in a patient who is a resident at a LTCF.*

Healthcare-associated definition:
https://www.who.int/publications/i/item/9789240101456

Microbiological culture from: Bacteria (species/genera):	Patient/case data available
Blood/CSF *E. coli* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *E. coli* (3GC- R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *E. coli* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐

Blood/CSF *K. pneumoniae* (carbapenem R and/or P)	Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *K. pneumoniae* (3GC- R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *K. pneumoniae* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *P. aeruginosa* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐ Sex

Blood/CSF *A. baumanii* (carbapenem R and/or P)	☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *S. aureus* (methicillin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *E. faecium* and/or *faecalis* (vancomycin R)	* ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Blood/CSF *S. pneumoniae* (penicillin and macrolide R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date

Blood/CSF *H. influenzae* (ampicillin- R)	☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *E. coli* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *E. coli* (3GC-R and/or P)	* ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *E. coli* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐

Urine *K. pneumoniae* (carbapenem R and/or P)	Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *K. pneumoniae* (3GC- R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *K. pneumoniae* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *P. aeruginosa* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent

Urine *A. baumanii* (carbapenem R and/or P)	☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *S. aureus* (methicillin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Urine *E. faecium* and/or *E. faecalis* (vancomycin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Wound/tissue swab *P. aeruginosa* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐

Wound/tissue swab *A. baumanii* (carbapenem R and/or P)	Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Wound/tissue swab *S. aureus* (methicillin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Upper respiratory tract *S. aureus* (methicillin R)	Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Upper respiratory tract *S. pneumoniae* (penicillin and macrolide R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐

Upper respiratory tract *H. influenzae* (ampicillin- R)	Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *E. coli* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *E. coli* (3GC- R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *E. coli* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐

Lower respiratory tract *K. pneumoniae* (carbapenem R and/or P)	Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *K. pneumoniae* (3GC- R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *K. pneumoniae* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *P. aeruginosa* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed

A. baumanii (carbapenem R and/or P)	☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *S. aureus* (methicillin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *S. pneumoniae* (penicillin and macrolide R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Lower respiratory tract *H. influenzae* (ampicillin- R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Diarrhea/stool sample	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐

C. difficile	Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *E. coli* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *E. coli* (3GC- R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *E. coli* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐

K. pneumoniae (carbapenem R and/or P)	Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *K. pneumoniae* (3GC- R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *K. pneumoniae* (colistin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *P. aeruginosa* (carbapenem R and/or P)	Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *A. baumanii* (carbapenem R and/or P)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality)

	☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *S. aureus* (methicillin R)	Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available
Screening *E. faecium* and/or *E. faecalis* (vancomycin R)	* Tick all that apply ☐ Age ☐ Sex ☐ Sample date ☐ Geographic location of patent ☐ Antibiotics administered /prescribed ☐ Patient outcome (mortality) ☐ Travel connection ☐ Community-associated ☐ Healthcare-associated ☐ LTCF-associated ☐ None of the listed patient/case data available

42 Which of the following types of surveillance systems are in place nationally and used for AMR surveillance? (Tick all that apply)
CML: *Clinical Microbiological Laboratory*
NRL: *National Reference or Expert Laboratory*

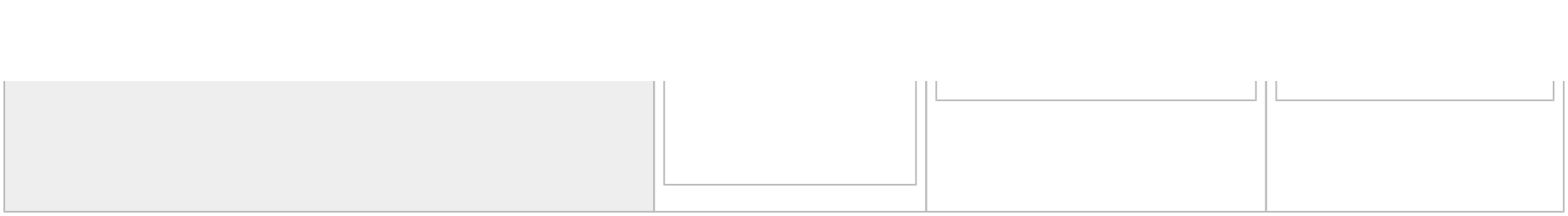
The focus of this question is on what type of systems are in place and used for AMR surveillance for at least one of the included pathogens. The focus should not be on the coverage of the submitted data in this question, (i.e. how many laboratories or hospitals contribute data to a particular system).

Type of surveillance	In place	Frequency of submission	Format for submission
Laboratory isolate based: *CMLs can submit data on pathogens under surveillance. Data is structured in one row per isolate.*	* Select 1 option ○ Yes ○ No	Tick all that apply ☐ Data is submitted continuously or with close regular intervals (at least once a month) ☐ Data is submitted once a year ☐ Other	Tick all that apply ☐ Data is submitted automatically/semi-automatically via direct integrations ☐ Data is submitted manually directly into digital system /database ☐ Data is reported digitally in electronic files (e.g., spread sheets or text) ☐ Data is reported in paper format ☐ Other
Laboratory Real-time resistance data: *CMLs can submit data for tested isolates continuously (semi-automatic or automatic*)	* Select 1 option ○ Yes ○ No	Not applicable, continuous data submission.	Not applicable, digital data submission
			Tick all that apply ☐ Data is submitted automatically/semi-

Laboratory statistics aggregated data: *CMLs can submit data on pathogens under surveillance in aggregated form.*	* Select 1 option Yes No	Tick all that apply Data is submitted continuously or with close regular intervals (at least once a month) Data is submitted once a year Other	automatically via direct integrations Data is submitted manually directly into digital system /database Data is reported digitally in electronic files (e.g., spread sheets or text) Data is reported in paper format Other
Laboratory periodic isolates: *CMLs can submit data for pathogens under surveillance during a specific time period.*	* Select 1 option Yes No	Not applicable, data submitted for a specific period.	Tick all that apply Data is submitted automatically/semi-automatically via direct integrations Data is submitted manually directly into digital system /database Data is reported digitally in electronic files (e.g., spread sheets or text) Data is reported in paper format Other
		Tick all that apply	Tick all that apply Data is submitted automatically/semi-automatically via direct integrations

Laboratory number of isolates: *CMLs can submit data for a specific number of pathogens under surveillance*	* Select 1 option Yes No	Data is submitted continuously or with close regular intervals (at least once a month) Data is submitted once a year Other	Data is submitted manually directly into digital system /database Data is reported digitally in electronic files (e.g., spread sheets or text) Data is reported in paper format Other
Laboratory NRL data: *The NRL can submit data for pathogens under surveillance.*	* Select 1 option Yes No	Tick all that apply Data is submitted continuously or with close regular intervals (at least once a month) Data is submitted once a year Other	Tick all that apply Data is submitted automatically/semi-automatically via direct integrations Data is submitted manually directly into digital system /database Data is reported digitally in electronic files (e.g., spread sheets or text) Data is reported in paper format Other
		Tick all that apply Data is submitted continuously or with	Tick all that apply Data is submitted automatically/semi-automatically via direct integrations Data is submitted manually directly

Patient/case based: *Hospitals/treating physicians (or equivalent) can submit data for cases with pathogens under surveillance. Data is structured in one row per case.*	* Select 1 option Yes No	close regular intervals (at least once a month) Data is submitted once a year Other	into digital system /database Data is reported digitally in electronic files (e.g., spread sheets or text) Data is reported in paper format Other
Hospital patient aggregated data: *Hospitals can submit aggregated data with information about the cases.*	* Select 1 option Yes No	Tick all that apply Data is submitted continuously or with close regular intervals (at least once a month) Data is submitted once a year Other	Tick all that apply Data is submitted automatically/semi-automatically via direct integrations Data is submitted manually directly into digital system /database Data is reported digitally in electronic files (e.g., spread sheets or text) Data is reported in paper format Other
Other, please enter some information regarding the set-up of the surveillance system.	Please describe	Please specify frequency	Please specify format



* 43 If there is more than one surveillance system encompassing the national AMR surveillance, can data from the different systems be linked on case/isolate level nationally? (Tick all that apply)
Question refers only to systems on national level that contains data relating to human cases with the included pathogens.

- ☐ There is no need, one system collects all information at national level
- ☐ Yes, data from all our national AMR surveillance systems can be linked.
- ☐ Yes, data from some of our national AMR surveillance systems can be linked.
- ☐ Data could be linked but legal issues prohibit the linkage.
- ☐ No, systems are lacking common identifier to link the data on case/isolate level.
- ☐ No, other reason.
- ☐ Do not know.

* 44 You answered "No, other reason" to the previous question if data from different systems can be linked on case/isolate level nationally?
Please specify the reason.

* 45 How is data from your national AMR surveillance system(s) made publicly available? (Tick all that apply).
Please select the options that best describe your situation.

- ☐ Data is published automatically in a real-time dashboard via direct integration between the AMR surveillance system and the dashboard.
- ☐ Data is published in regular intervals in a dashboard after data has been analyzed and processed. Requires manual steps for analysis and data migration.
- ☐ Data is published in regular intervals, either weekly or monthly, in e.g., tables on a webpage, or a published newsletter or report.
- ☐ Data is published annually in a non-interactive online and/or printed report format.
- ☐ A national analysis of current trends and possible explanations for increases and decreases for AMR pathogens is published with regular intervals.
- ☐ No publication of national AMR surveillance data.
- ☐ Other (free text in next question)

* 46 You answered other in the previous question regarding the publication of AMR surveillance data. Please specify.

* 47 Which are the main factors effecting completeness of the laboratory AST and/or genotypic resistance data in the national AMR surveillance system(s)? (Tick all that apply, max four options)
Data completeness in this context refers to aspects such as: Coverage (if the collected data is representative for the population under surveillance) and uniformity (if the data is collected, processed and analyzed in a comparable manner).

Maximum 4 selection(s)

- ☐ The indicators and/or frequency for when a clinical sample is taken for microbiological culture varies between healthcare facilities – makes it hard to know if measured resistance levels are representative.
- ☐ Lack of harmonization of methods at clinical microbiology laboratories – different methods generate non-comparable data.
- ☐ Lack of harmonization of what is analyzed at the clinical microbiological laboratories – different priorities create heterogenous datasets e.g., different antibiotics are included in the routine AST.
- ☐ Lack of resources to perform additional testing on all isolates with resistant phenotypes under surveillance – can be applicable for both clinical microbiology laboratories and/or national reference/expert laboratory.
- ☐ Clinical microbiology laboratories lack resources and/or capacity to connect themselves to the national AMR surveillance system.
- ☐ It is voluntary for clinical microbiological laboratories to submit data to the national AMR surveillance system (s).
- ☐ The institution(s) responsible for the national AMR surveillance system(s) are unable to connect new clinical microbiology laboratories.
- ☐ Decentralized systems make it difficult to build efficient structures.
- ☐ Lack of digitalization of the national AMR surveillance system(s) makes it difficult to expand surveillance.
- ☐ Lack of digitalization of the national AMR surveillance system(s) makes it difficult to expand surveillance.
- ☐ Legal obstacle(s) are preventing development of the national AMR surveillance system(s).
- ☐ Legal obstacle(s) are preventing development of the national AMR surveillance system(s).
- ☐ Other (free text in next question).

* 48 You answered other in the previous question on factors affecting completeness of laboratory AST data. Please specify.