Workstream 2: AMR surveillance
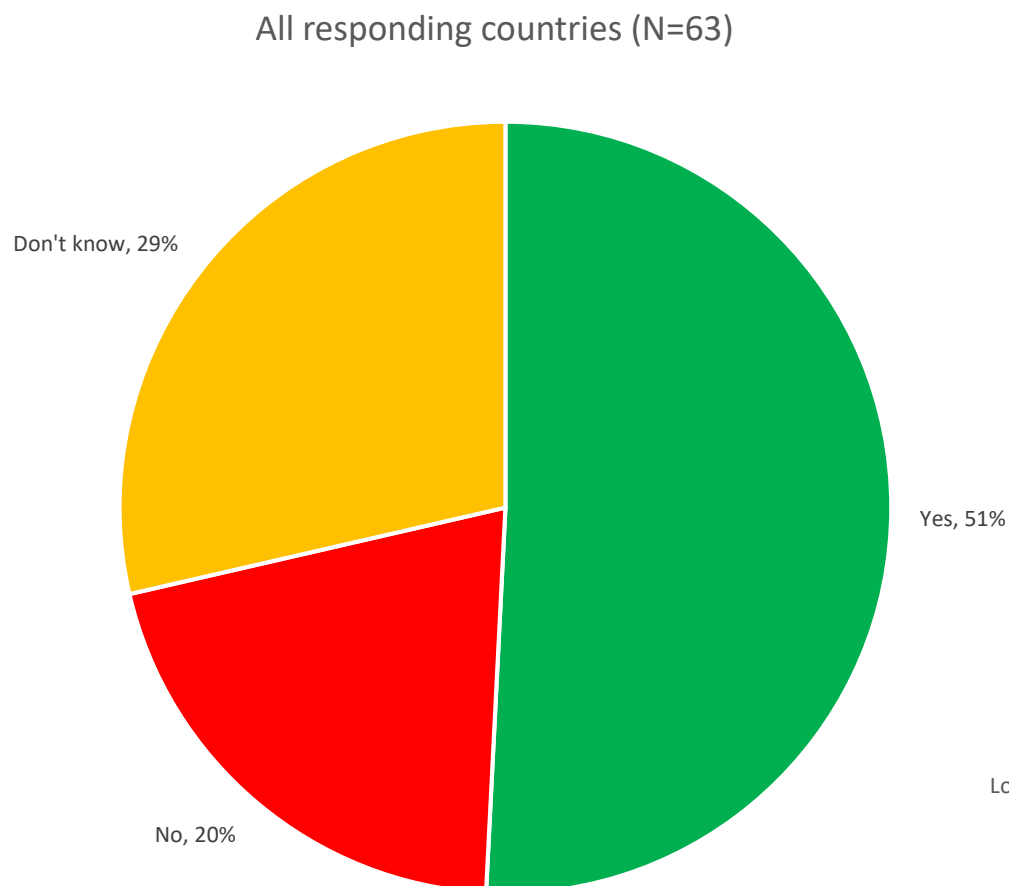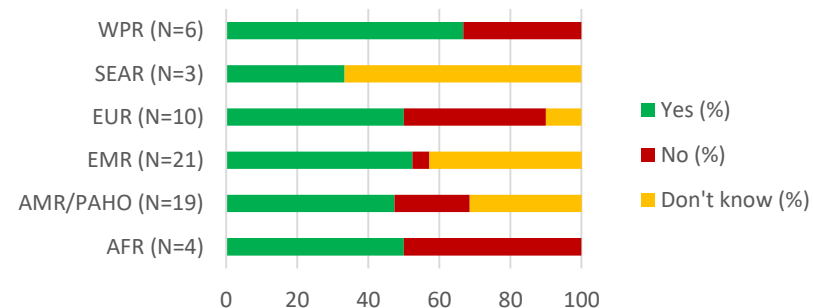
Anonymised individual-level data submission

- Aggregation of AMR data at national levels poses a major challenge:

  − accurate data analysis

  − interpretation of results

- A number of countries are already submitting individual level data

  − CAESAR, EARS-Net, and ReLAVRA

  − Even more countries collect individual AMR data at the national level.

- For the next stage of implementation: OPTION individual, line-listed anonymized AMR data

  − monitor the occurrence of multidrug resistance,

  − explore additional data analyses and stratifications,

  − analyse drivers and risk factors linked to resistance,

  − add genetic information, and

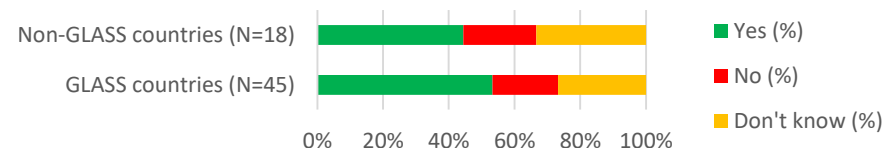 − improve interpretation of results

Q: ... would your country be capable of starting anonymised individual data submission in the next stage of the GLASS implementation?
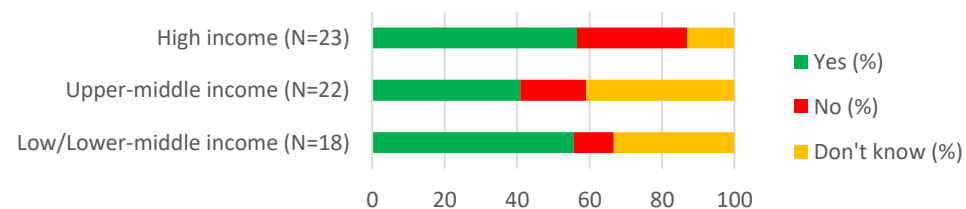
All responding countries (N=63)

Don't know, 29%

Yes, 51%

No, 20%

Results by WHO Region

- WPR (N=6)
- SEAR (N=3)
- EUR (N=10)
- EMR (N=21)
- AMR/PAHO (N=19)
- AFR (N=4)

- Yes (%)
- No (%)
- Don't know (%)

Results by GLASS status

- Non-GLASS countries (N=18)
- GLASS countries (N=45)

- Yes (%)
- No (%)
- Don't know (%)

Results by income level

- High income (N=23)
- Upper-middle income (N=22)
- Low/Lower-middle income (N=18)

- Yes (%)
- No (%)
- Don't know (%)

3

Q: ... would your country be capable of starting anonymised individual data submission in the next stage of the GLASS implementation?

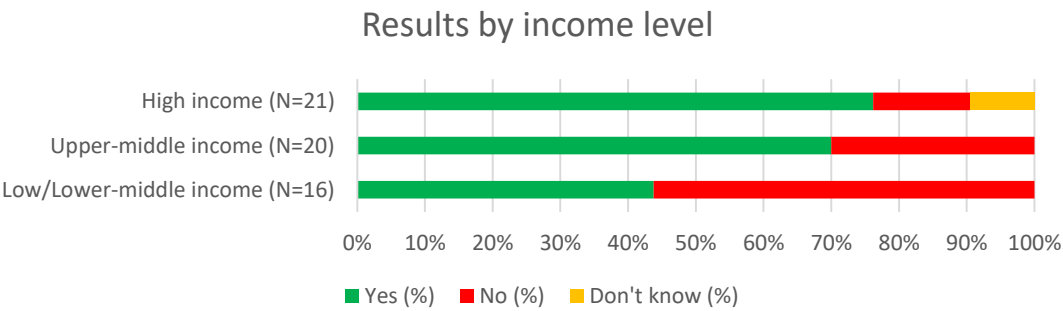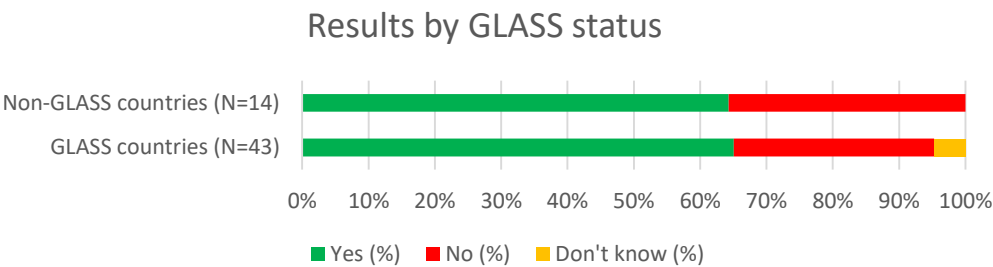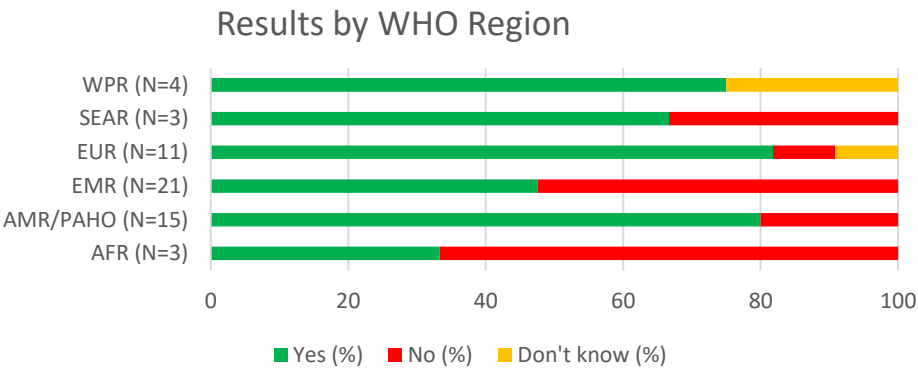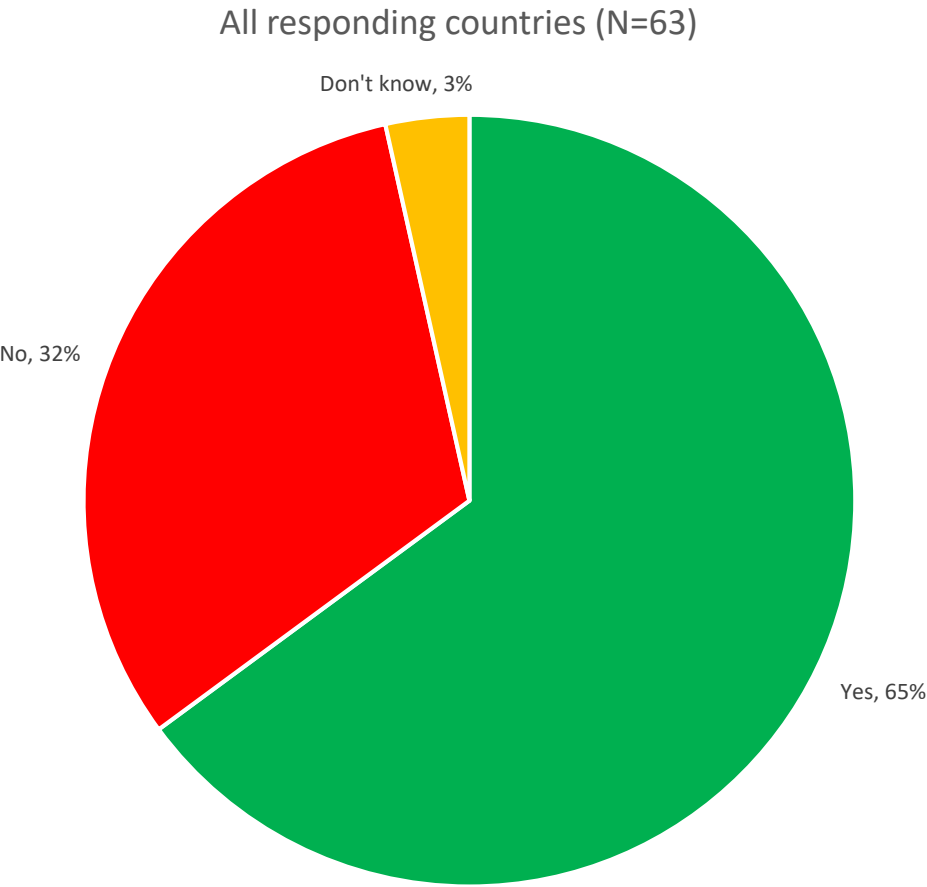| Yes	**19 countries provided comments** • Several responding countries are already submitting individual level data to international networks and more countries collect individual AMR data at the national level • Several countries noted that this will require additional efforts, improving national coordination, developing approaches for evaluation of surveillance sites, adjusting IT tools
No	**12 countries provided comments** • Responding countries explained their answer by limitations of the laboratory-centred systems, lack of human and IT resources. • Several countries were not convinced by the provided rationale
Don't know	**11 countries provided comments** • The majority of responding countries explained that further discussions/consultations with national authorities/stakeholders are required

2
INCLUSION OF MOLECULAR MARKERS

Molecular indicators

For the next stage of implementation, GLASS-AMR offers the option for submission of data generated by molecular AMR diagnostics to complement phenotypic AMR diagnostics data and improve understanding of the underlying mechanisms responsible for resistance

GLASS target pathogens	Mechanisms of resistance	Molecular targets
Acinetobacter spp. *P. aeruginosa*	Carbapenem resistance	NDM, OXA, VIM, IMP, GES, KPC
	Colistin resistance	mcr 1-10
E. coli *K. pneumoniae* *Salmonella* spp. *Shigella* spp.	Extended spectrum beta-lactamases	CTX-M, TEM, SHV
	Carbapenem resistance	NDM, OXA, VIM, IMP, GES, KPC
	Colistin resistance	mcr 1-10
S. aureus	Methicillin resistance	mecA/mecC
	Linezolid resistance	cfr

Q: Is the AMR national surveillance system in your country applying any type of molecular methods targeting specific resistance genes in support to phenotypic methods?

All responding countries (N=63)

Don't know, 3%

No, 32%

Yes, 65%

Results by WHO Region

WPR (N=4)
SEAR (N=3)
EUR (N=11)
EMR (N=21)
AMR/PAHO (N=15)
AFR (N=3)

0 20 40 60 80 100

■ Yes (%) ■ No (%) ■ Don't know (%)

Results by GLASS status

Non-GLASS countries (N=14)
GLASS countries (N=43)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ Yes (%) ■ No (%) ■ Don't know (%)

Results by income level

High income (N=21)
Upper-middle income (N=20)
Low/Lower-middle income (N=16)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

■ Yes (%) ■ No (%) ■ Don't know (%)

Q: Is the AMR national surveillance system in your country applying any type of molecular methods targeting specific resistance genes in support to phenotypic methods?

- Techniques used in countries that currently apply molecular methods targeting specific resistance genes are very diverse, including conventional and RT PCR, commercial PCR-based systems, gene sequencing, WGS, PFGE, immunocromatography, MLST, RFLP and SNP Allelic Discrimination

3
IMPROVING DATA QUALITY AND REPRESENTATIVENESS

GLASS approach to improving the quality of surveillance data

- AMR surveillance approach relying on diagnostic microbiological results routinely generated for clinical purposes:
  - Difficulties in obtaining a representative sample of the population seeking care, even when minimum sampling criteria are set
  - Lack or limited access to health care and microbiological tests
  - Selection bias when:
    - ✓ patients with suspected infection do not have a sample taken according to best clinical practices
    - ✓ microbiological tests are not performed routinely (many patients may be tested only after antimicrobial treatment failures or when severely ill)
  - Inaccurate microbiological testing distorting the estimation of frequency of AMR

GLASS approach to improving the quality of surveillance data

- **GLASS protocol for enhancing precision and representativeness of routine AMR surveillance**

- Additional surveillance approaches including syndrome-based (case-based, patient-based) surveillance, and population-based surveillance using Lot Quality Assurance Sampling (LQAS)

- **Addition of data collected by population-based studies (e.g., repeated surveys), designed specifically to fill in the gaps left by the routine surveillance**