Laboratory quality assurance: The EQASIA initiative, perspectives, and lessons learned

Wednesday, 14 July 2021
Antimicrobial resistance - A global emerging threat

“Antimicrobial resistance is a crisis that must be managed with the utmost urgency…..

….Antimicrobial resistance threatens the very core of modern medicine and the sustainability of an effective, global public health response to the enduring threat from infectious diseases…

…Without harmonized and immediate action on a global scale, the world is heading towards a post-antibiotic era in which common infections could once again kill”

Dr Margaret Chan
Director-General (former)
World Health Organization
Purpose of Surveillance

• Estimate burden of disease
  – How big is the problem?
  – Relative importance of pathogens

• Monitor trends
  – Is it getting better or worse?
  – Measure effect of interventions

• Detect outbreaks
  – Is urgent action needed?

• Assess control programs
  – How are we doing?
  – Launch target interventions

  – To obtain reliable results for surveillance, the labs need good quality assurance
WHO strategy on EQAs

• The NRL should participate in an International External Quality Assurance (EQA) program to evaluate local proficiency and capacity to identify areas for potential improvements in support to the AMR National Surveillance System
  – Ideally, the NRL should participate in International EQAs that test preferable all pathogens included in GLASS and perform recommended tests to confirm and characterize AMR mechanisms
Why participate in Quality Assurance systems (EQAs)?

• Quality assurance is commonly acknowledged best practice and underpins confidence in the results of a laboratory. AMR surveillance systems must have external quality assurance (EQA) for bacteria identification and antimicrobial susceptibility testing, which tests how well antibiotic drugs are working.

• EQAS provides the opportunity for proficiency testing, which is considered an important tool for the production of reliable laboratory results of consistently good quality.

• Increase the quality of laboratory-based surveillance of pathogens
Coverage of EQA participation in WHO GLASS

Provision of EQA to NRLs in GLASS enrolled countries, territories and areas, by region and year

Proportion of countries and territories (by region and year)

Provision of EQA to local laboratories that perform AST in GLASS enrolled countries, territories and areas, by region and year

Proportion of countries and territories (by region and year)

https://apps.who.int/gho/tableau-public/tpc-frame.jsp?id=2009
EQA deviation level based in WHO GFN (2000-2007)

6,051 (9%) of 67,229 tests incorrect
Objectives of EQASIA

Key objective: Improving the Quality of Bacteriology Diagnostics for AMR

• Address regional challenges to achieving quality assured bacteriology identification and antimicrobial susceptibility testing results in Asia
  – EQA bodies across the regions existing, however, these initiatives need supporting and strengthening
    • Challenges include cross border transfer of isolates used in proficiency testing schemes
    • Lack of national capacity to prepare standardised EQA panels
    • Challenges of resourcing sustainable EQA programmes

• Funding by the UK AID via the Fleming Fund
Organizational structure

Expansion of the consortium:
- National Institute of Health (NIH), Thailand
- The Faculty of Veterinary Science, Chulalongkorn University (CU)
- Efficient communication
- MoU

Advisory board
- Advice on alignment, capacity building activities and sustainability of the program
- WHO, FAO, OIE
- Pacific Pathology Training Centre (New Zealand), University of New South Wales (UNSW) (Australia) and The Peter Doherty Institute for Infection and Immunity (Australia)
Mapping of EQA participation

Large heterogeneity in current capacity/participation

- Most of the NRLs for human health (HH) participate in several different EQA programs for AMR
- Gaps in the content and comprehensiveness of individual programs.
- Some of the HH NRLs also provide EQAs to sentinel labs within their own country.
- Very few animal/food safety labs currently participate in EQAs.

Major challenges identified by labs:
- Cost of participation and consumables
- Lack of support for participation and corrective actions
Activity and time plan

- **Coordination**
  - Set up: consortium, charter, SAG
  - Project coordination, communication, monitoring and reporting

- **EQA provision**
  - IT module development
  - Strain procurement/preparation
  - Global proficiency testing schemes
  - Regional PT provision for Public Health
  - Regional PT provision for Food Safety & Animal Health

- **Capacity building**
  - Planning, online modules, workshops, follow up exercises

- **Evaluation & Improvement**
  - Training, visits planning, follow up visits for CAPA

- **Sustainability**
  - Donor mapping, EQA costing for sustainability, SAG meetings, interim and exit meetings

**Timeline**
- **2020**
  - Q1: Baseline symposiums
  - Q2: Workshop 1, EQA 1
  - Q3: Interim meeting, EQA 2
  - Q4: EQA 3

- **2021**
  - Q1: EQA 3
  - Q2: Project end
  - Q3: Exit meeting

**Key Dates**
- Feb 2022: Project end
EQAsia EQAs

- One-Shop EQA programme

- The system will allow the user to sign-up or deselect the EQA offered based on relevance and capacities

- The “One-Shop EQA programme” will focus on all 11 WHO GLASS pathogens

- In addition, a specific EQA to detect ampC beta-lactamases (ampC), extended-spectrum beta-lactamases (ESBL) and carbapenemase producing E. coli from samples mimicking meat background flora.

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<th>Trial</th>
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| First EQA (February 2021) | Salmonella spp.  
|                        | Escherichia coli                                                                                   |
| Second EQA (June 2021)  | Klebsiella pneumoniae  
|                        | Shigella spp.  
|                        | Acinetobacter spp.  
|                        | Staphylococcus aureus  
|                        | Matrix EQA (ampC, ESBL and carbapenemase producing Escherichia coli)                                |
| Third EQA (October 2021) | Salmonella spp.  
|                        | Escherichia coli                                                                                   |
|                        | Campylobacter (C. coli and C. jejuni) Enterococcus (E. faecium and E. faecalis), Pseudomonas aeruginosa  
|                        | Streptococcus pneumoniae                                                                          |
Lessons learned

• A large interest for the program in the region

• Need for EQAs nationally as well

• Need for building knowledge of advanced techniques

• Underperformance
  – Follow up activities
Perspectives and future of the program

• Sustainable programme

• Adoption of the EQA programme by supranational organizations

• Steering committee: Provide technical guidance and obtaining continued funding to sustain the EQA program in the region
In summary

• AMR is a global threat and there is a need for surveillance and EQAs

• Results have shown underperformance and a need for improving the laboratories capacity and knowledge in most regions of the world

• IVI, DTU, NIH Thailand and Chulalongkorn University are leading the Fleming Funds regional project, EQASIA
  – build capacity for AMR surveillance by training and site visits
  – develop EQAs for all pathogens included in GLASS and FAO priority pathogens
  – develop a system to support to the AMR National Surveillance System via NRLs
  – address underperformance and provide the support
Thank you for your attention

Rikke Braae
Research Group for Global Capacity Building
National Food Institute, Technical University of Denmark
rikb@food.dtu.dk