Experience on integrated surveillance of AMR at country level: AGISAR Country Pilot Projects and The ESBL E.coli Tricycle Project

Dr Awa AIDARA-KANE
Coordinator Foodborne and Zoonotic Diseases Unit
Department of Food Safety and Zoonoses
World Health Organization
2 WHO Global Goods for Integrated surveillance of AMR "One Health" Approach

- WHO-AGISAR guidance on integrated surveillance of AMR in foodborne bacteria - July 2017
  - AMR surveillance, Use monitoring, combined analysis and reporting

- Global Tricycle Surveillance on ESBL E.coli
  - AGISAR is currently developing a global protocol for countries to understand the magnitude of AMR across human, food chain, and environment
Integrated Surveillance of AMR in Foodborne Bacteria - From Data to Information for Action

- WHO-AGISAR
- FAO and OIE collaboration
- Application of a One Health Approach
  - AMR surveillance in humans, animals, food
  - AMU surveillance in humans and animals
  - Combined analysis and reporting

http://apps.who.int/iris/bitstream/10665/255747/1/9789241512411-eng.pdf?ua=1
Capacity building activities

- Aims to build national capacity to implement the integrated surveillance of AMR through:
  - Development of protocol, lab modules, guidance document
  - Training courses (1-week long)
  - **Pilot projects** (1 or 2 years long)
Expected outcomes

- Collaboration and communication between human, food and animal sectors
- Collaboration between academia, governmental sectors, industries or civil societies
- Policies based on the results and its interpretation
- An understanding of a need to have a further research and intervention
- Collaboration among regional/international partners (Food and Agriculture Organization (FAO), World Organization of Animal Health (OIE))

National programme on integrated surveillance of AMR
Triangulation of Antibiotic Resistance from Humans, the Food Chain and Associated Environments – A One Health Project

Sabiha Y. Essack
B. Pharm., M. Pharm., PhD
South African Research Chair in Antibiotic Resistance and One Health
School of Health Sciences, UKZN
Conceptual Framework

One Health

Surveillance
- Human
- Animal
- Environmental

AMR Burden

Interventions
- Biomedical
- Clinical/Veterinary
- Socio-Behavioural
- Drug Discovery Diagnostics
- Policy

Alleviation of AMR Burden
Optimal Treatment and Management of Infections in Humans and (Food) Animals

Adequate, Sustainable Human, Infrastructural & Financial Resources
Objectives

• Institute surveillance programmes on antibiotic use and resistance in human, veterinary, agricultural and environmental health,
• Demonstrate the phenotypic and genotypic mechanisms of antibiotic resistance
• Ascertain bacterial virulence factors and their genetic determinants by WGS,
• Mobilize relevant national government departments to improve capacities of their national systems to contain and decelerate the evolution and progress of ABR in the “One Health” context by application of research output and evidence generated through this AGISAR country project
Study Site
Study Design

- To institute phenotypic and genotypic antibiotic resistance surveillance programme across the food production chain:
  - on the farm,
  - holding areas,
  - post slaughter
  - retail meats
- Indicator bacteria:
  - *Salmonella* spp.,
  - *Campylobacter* spp.,
  - *E. coli*,
  - *Enterococcus* spp.
  - *S. aureus*
- To determine antibiotic use patterns in agriculture
Envisaged Output

Creation of an electronic platform that will:

- Triangulate, in real time, phenotypic and genotypic trends in antibiotic resistance in correlation with antibiotic use/exposure within and between the human, animal and environmental health sectors

- From robust, representative surveillance programmes

- Allowing early warning of emerging and/or escalating resistance in any/all sectors

- To inform strategies for containment and prevent dissemination between and within sectors.
Progress to Date

• Implemented surveillance in human, food animal & environmental health, i.e. :
  – Passive laboratory & active sentinel surveillance in human health at community health centre & hospital levels,
  – Surveillance from farm to fork in an intensive poultry production system (animals on farms, holding areas, post slaughter & retailed meat products),
    Surveillance in an intensive pig production system initiated
  – Surveillance in water (influent and effluent of WWTPs + upstream & downstream surface water),
  – Surveillance in soil fertilized by chicken litter

• Human Capital Development
  – 4 PhD students, and,
  – 6 Masters students affiliated to project.
Progress to Date (2)

- eAMR App Developed
  - Sample collected & patient details captured at bedside prior to antibiotic administration

  Add a new patient entry

  Add to/alter existing detail

  Enter/alter data offline

  Log out of App
From the AGISAR6 report

**Important issues raised during discussions included:**

- **Including all relevant sectors in integrated surveillance** is required to understand the full picture. The role of water, sewage, and soil in maintaining resistant bacteria as a source for animals and people, as well as allowing for contact between different populations of resistant bacteria and possible transfer of genes, was repeatedly noted. Microorganisms from these sources need to be monitored, and contamination controlled. Similarly, antibiotic usage in crops and resistance in plant-derived foods would have to be included in any comprehensive, integrated surveillance plan.
Global Tricycle Surveillance

ESBL E.coli

Environment
Food chain
Human
ESBL Ec Tricycle project: protocol development

Simple surveillance across the three main sectors
Simple microorganism and resistance mechanism as indicator

ESBL E. coli

Human

Food chain

Environment

World Health Organization
Objectives

• To establish an Integrated Surveillance System to monitor ESBL producing E. coli in three main areas, human, food chain and the environment across Member States
• To establish a simple and standardized methodology to isolate and monitor ESBL producing E. coli
• To compare the prevalence of ESBL Ec in each of the 3 sectors among Member States and
• To monitor effect of interventions