FAO strategy and initiatives in Antimicrobial resistance

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Consumption is growing rapidly...

Source: FAO-SOFA 2009
Meat production is growing

Source: FAO-SOFA 2009
Antimicrobial usage in humans, animals and agriculture, and resulting dispersion of antimicrobial residues into aquatic and terrestrial environments (Berkner et al., 2014)
Abuse
Overuse
Misuse
EPIDEMIOLOGY OF ANTIMICROBIAL RESISTANCE

ANIMAL FEEDS
MEAT
DIRECT CONTACT
EXTENDED CARE
HOSPITALIZED HUMAN
COMMERCIAL ABATTOIRS / PROCESSING PLANTS
RENDERING FOOD ANIMALS
SHEEP
CATTLE
SWINE
POULTRY
VEAL
CALVES
OFFAL

COMPANION ANIMALS

AQUACULTURE

DRINKING WATER
RIVERS AND STREAMS
SOIL
WILDLIFE

VEGETATION,
SEED CROPS, FRUIT

SEA / LAKES
DRINKING WATER

INDUSTRIAL & HOUSEHOLD ANTIBACTERIAL CHEMICALS

FARM EFFLUENTS AND MANURE SPREADING

RENDERING

DEAD STOCK

ANIMAL FEEDS

COMMERCIAL ABATTOIRS / PROCESSING PLANTS

MEAT

HANDLING PREPARATION CONSUMPTION

HUMAN
COMMUNITY - URBAN - RURAL
EXTENDED CARE FACILITIES

after Linton AH (1977), modified by Irwin RJ
The FAO-OIE-WHO Collaboration

Sharing responsibilities and coordinating global activities to address health risks at the animal-human-ecosystem interfaces

A Tripartite Concept Note

April 2010
General Assembly of the United Nations - High-Level Meeting on Antimicrobial Resistance
FAO Action Plan on AMR - supporting the Global Action Plan in addressing the food and agriculture sectors

1. Improve **awareness** on AMR
2. Develop capacity for **surveillance** and monitoring of AMR and AMU
3. Strengthen **governance**
4. Promote **good practices** in food and agricultural systems
AMR and One Health at FAO

FAO implements an integrated “One Health” and “food chain” approach when addressing AMR as a cross-sectoral issue.
FAO/OIE/WHO work on AMR since 1997

- International collaboration established
  - **Codex Alimentarius** (1963)
  - FAO, WHO and OIE
- > 40 expert meetings and consultations
- Roles
  - Codex and OIE: normative work
  - FAO: raise public awareness, consumer confidence, practical guidance and capacity building
  - OIE: professional awareness
  - WHO: raise public awareness, monitoring, leading the debate
- Publications

15
Main texts:

- Code of Practice to **Minimize and Contain** Antimicrobial Resistance (CAC/RCP 61-2005)
- Guidelines for **Risk Analysis** of Foodborne Antimicrobial Resistance (CAC/GL 77-2011)

Other Codex texts relevant to AMR includes:

- Code of Practice on **Good Animal Feeding** (CAC/RCP 54-2004)
- General Principles of **Food Hygiene** (CAC/RCP 1-1969)
- Several Codes of hygienic practices for different commodities (e.g. milk and milk products, fish and fishery products)

The **39th Session** of the Codex Alimentarius Commission (June 2016)
Key Messages for Countries

1. Improve overall coordination
2. Improve regulatory framework
3. Reduce the need for and promote prudent use of antibiotics
4. Improve surveillance
5. Advocate and communicate
6. Build capacity and provide training
7. Address knowledge gaps and research needs
1. Intersectoral Coordination

- National interdisciplinary cooperation
- National intersectoral
  - holistic strategy
  - action plan
  - intergovernmental steering committee or task force
- Formal mechanism between health and food/feed safety/veterinary authorities.
- Environment
- Private sector (pharmaceutical, food production)
2. Improved Regulatory Framework

- Reducing and eliminating antimicrobials/antibiotics for growth promoters
- Requiring that antibiotics be administered to animals only when prescribed by a veterinarian
- Requiring that antibiotics identified as critically important in human medicine - especially fluoroquinolones and third/fourth generation cephalosporins - only be used in food animals when justified
Legislation

working at country level on animal, plant health and food safety legislation.

www.fao.org/legal
3. Reduce Usage and Promote Prudent Use

- Reducing the need by improving animal health through biosecurity measures, disease prevention (including vaccine use), and good hygienic and management practices.

- Eliminating economic incentives that facilitate the inappropriate prescription of antimicrobials.
4. Surveillance

- Establishing a surveillance system for the use of antimicrobials in food animals, in feed, and environment.
- Establishing an integrated (among public health, food and veterinary sectors) surveillance system to monitor antimicrobial resistance in selected food-borne bacteria.
5. Advocacy and Communication

- Basic information for **stakeholders**
- Videos and infographics
- Stakeholder events at national level
- Internal **technical networks** – raise awareness among all FAO staff
- External events – **Private sector** (IDF, IFIF, Pharma …), Academia, **professional associations** … OIE and WHO,
6. Training and Capacity Building

- Develop **guidelines** on the prudent use of antimicrobials in food animals
- Provide the **training** needed to **implement** them
7. Opinion, Knowledge gaps and research needs

- Evidence vs. confounding results
  - Precautionary Principle / precautionary approach
  - Science based
- Food and Agriculture – contribution to the problem?
  - “Finger Pointing” – not helpful
  - 20% of the problem: 80% of the knowledge gap
- Studies to provide comparable data on antibiotic resistance and usage for risk assessment and risk management
- Strengthen research on the epidemiology of resistance
- Development of new medicines
- Alternative approaches to antibiotic therapy
- Vaccine development. improved vaccines, strengthened vaccinations regimes
- Point-of-care diagnostics - affordable
From **global** commitment to **local** action

- **Cambodia, Ghana, Kenya, and Zimbabwe** currently under implementation, to assist targeted countries to develop relevant sections of a National Action Plan to reduce the threat of AMR related to agriculture, livestock production, fisheries and food under the ‘One Health’ approach.

- **35 countries in Asia and sub-Saharan Africa** in a 3-year project (2016-2019) on AMR, to be implemented by the WHO/FAO/OIE Tripartite.

- **China, India, Viet Nam, Thailand, Indonesia** in a USAID funded project (2016-2018) “Addressing Antimicrobial Usage in Asia’s Livestock Production Industry” as a part of the Emerging Pandemic Threats program. (Inception workshop, Bangkok, January 2016).

- **Armenia, Belarus, Kazakhstan, Kyrgyzstan, Tajikistan and Russia** (pipeline 3-year project on AMR to be funded by the Russian Federation.)
Integrated Surveillance
The Food and Agriculture Sector
- Antimicrobial Use and in Antimicrobial Resistance -

14 SECTORS

- Aquaculture fish
- Crustaceans
- Mollusks
- Dairy
- Beef
- Sheep, mutton and lamb
- Goat
- Swine

- Poultry – layers
- Poultry – broilers
- Turkey
- Rabbit
- Fruit
- Crops
  - Legumes
  - Grains
  - …
The Food and Agriculture Sector
- Antimicrobial Use and in Antimicrobial Resistance -

SECTORS

3
• Smallholder farms
• Medium commercial operators – local markets
• Intensive, large commercial entities – national and international scope
The Food and Agriculture Sector
- Antimicrobial Use and in Antimicrobial Resistance -

- Aquaculture fish
- Crustaceans
- Mollusks
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  - Legumes
  - Grains
  - ...
The Food and Agriculture Sector
- Antimicrobial Use and in Antimicrobial Resistance -

- Food production chain – critical control points for surveillance
- Feed Industry
- Effluents and waste management
- Rivers, streams, ponds, lakes
- Pharmaceutical Companies

>50 Sectors
The Food and Agriculture Sector
- Antimicrobial Use and in Antimicrobial Resistance -

- Integrated surveillance? … a **sound** idea
- Complex implementation
- Mosaic of understanding
- Difficult compliance

- Need to start somewhere
Progressive Management Pathway (PMP) on AMR
Why are we developing this?

“To assist and guide countries in undertaking concrete steps towards developing and implementing a “One Health” National Action Plan on AMR (in line with what is stated in the GAP)”
Who is PMP for?

Governments (several ministries, agencies, or services)

Other stakeholders and professionals

food producing sector

food safety specialists

environmental and sanitation engineers
Why are we developing this?

✓ provides a status (or stage) in which a particular sector or country is in terms of addressing AMU and AMR regarding the GAP objectives

✓ Promotes the institution of inter-sectoral collaboration, public-private collaboration, stakeholder consultations, timely information sharing, including collation and dissemination

✓ and information to enhance their process towards judicious use of antimicrobials in all sectors
Experience with roadmaps and progressive work on infectious diseases (i.e., foot-and-mouth disease and peste des petits ruminants, brucellosis, rabies)

Based on the following principles:

- **Baseline** and **Vision** or target (international standards?)
- **Active** monitoring for AMU and AMR detection, better understanding the epidemiology of AMR and transmission **risks**
- **Foundation** for a management program
- The improved information generated is of **benefit nationally** (and regionally).
- The monitoring of **outcomes** (indicators of effectiveness), within a national management system, is included at the higher stages;
Progressive Management Pathway - PMP (2/2)

- Activities in each PMP stage are appropriate to the required reduction or incidence of AMR and judicious AMU;
- Activities and their impacts are measurable in each Stage, comparable between countries, and generate information and potential benefits to national as well as international stakeholders;
- Need targets and measures in the various food/agriculture systems and critical risk points where the impact on management will be greatest.
- The PCP parallels a HACCP approach applied to antimicrobial use/management, focusing on the surveillance or intervention points most critical to success and then measuring their performance and outcome.
Prudent use of antimicrobials in agriculture production systems

In terrestrial animal production systems and health and animal feed

- Good husbandry and Good hygiene practices
- Improved biosecurity
- Animal welfare, proper animal handling and stress avoidance to decrease susceptibility to diseases
- Feed processing/presentation and use of appropriate feed ingredients to promote growth
- Infection control
- Vaccination regimes
Prudent use of antimicrobials in agriculture production systems

In aquatic animal production systems and health

- Biosecurity a priority for the work of COFI/SCA
- AMR as a priority research topic
- CCRF Technical Guidelines: Prudent and Responsible Use of Veterinary Medicines
- Bacterial diseases in Aquaculture
Prudent use of antimicrobials in agriculture production systems

- Good Agriculture Practice
- Regulation of antimicrobials used for crop production
- Integrated Pest Management (IPM) for reducing use of antimicrobials
- Management and use of microbial pesticides (pesticide life-circle management)
- Management and use of pesticides including microbial pesticides
- Registration of pesticides including assessment of microbial pesticides
To (self)assess individual laboratories on their capacity of:

- pathogen isolation & identification
- antimicrobial resistance testing

Focusing on 6 major categories:

- Technical capacities
- Data and biological material management activities
- Quality Assessment
- Governance
- Prospective

### FAO Laboratory Mapping Tool

#### Annual Laboratory assessment data for 24 laboratories in the S/SE Asia region

| Geographic location | Laboratory Budget | Basic supply | Organization | Infrastructure | Equipment | Reagent supply | Staff skills + availability | Sample accession | Available technology | Training, including IATA | Quality Assurance | Biosafety/Biosecurity | Staff Security/Health | Communication means | National lab networking | Laboratory collaboration | Use of databases/platforms | Grand Total assessment |
|---------------------|-------------------|--------------|--------------|----------------|-------------|----------------|---------------------------|-------------------|-----------------------|-----------------------------|---------------------|--------------------------|------------------------|-------------------------|-------------------------|-----------------------------|--------------------------|-------------------------|-------------------------|
|                     |                   |              |              |                |             |                |                           |                   |                       |                             |              |                          |                        |                         |                         |                          |                         |                         |
| 2011                | 88                | 77           | 99           | 88             | 89          | 100            | 88                        | 78                | 89                    | 88                          | 67                  | 78                       | 55                     | 44                      |                         |                         |                         |
| 2012                | 69                | 69           | 91           | 69             | 69          | 56             | 16                        | 44                | 33                    | 16                          | 67                  | 78                       | 16                     | 0                       |                         |                         |                         |
| 2014                | 90                | 90           | 90           | 90             | 89          | 100            | 79                        | 56                | 78                    | 79                          | 78                  | 89                       | 16                     | 16                      |                         |                         |                         |
| 2011                | 90                | 90           | 90           | 90             | 89          | 100            | 57                        | 100               | 67                    | 57                          | 67                  | 67                       | 24                     | 90                      |                         |                         |                         |
| 2012                | 57                | 44           | 69           | 34             | 54          | 54             | 29                        | 48                | 46                    | 27                          | 33                  | 38                       | 0                      | 0                       |                         |                         |                         |
| 2014                | 46                | 46           | 63           | 16             | 67          | 50             | 16                        | 60                | 73                    | 27                          | 28                  | 44                       | 6                      | 15                      |                         |                         |                         |
| 2011                | 58                | 53           | 62           | 45             | 67          | 63             | 28                        | 48                | 88                    | 26                          | 42                  | 46                       | 8                      | 18                      |                         |                         |                         |
| 2012                | 93                | 66           | 81           | 89             | 88          | 83             | 81                        | 56                | 79                    | 73                          | 79                  | 86                       | 27                     | 20                      |                         |                         |                         |
| 2014                | 69                | 69           | 63           | 47             | 89          | 85             | 47                        | 87                | 33                    | 42                          | 61                  | 49                       | 12                     | 26                      |                         |                         |                         |
| 2011                | 61                | 54           | 64           | 58             | 59          | 52             | 50                        | 60                | 71                    | 30                          | 26                  | 41                       | 0                      | 17                      |                         |                         |                         |
| 2012                | 81                | 49           | 69           | 41             | 71          | 67             | 41                        | 47                | 38                    | 41                          | 33                  | 38                       | 39                     | 15                      |                         |                         |                         |
| 2014                | 87                | 87           | 87           | 67             | 83          | 88             | 67                        | 67                | 71                    | 58                          | 31                  | 29                       | 31                     | 17                      |                         |                         |                         |
| 2011                | 52                | 29           | 46           | 38             | 67          | 56             | 32                        | 73                | 83                    | 29                          | 39                  | 50                       | 21                     | 12                      |                         |                         |                         |
| 2012                | 45                | 45           | 45           | 45             | 67          | 44             | 45                        | 33                | 67                    | 33                          | 56                  | 56                       | 0                      | 0                       |                         |                         |                         |
| 2014                | 66                | 74           | 82           | 66             | 50          | 83             | 41                        | 83                | 67                    | 66                          | 75                  | 58                       | 24                     | 8                       |                         |                         |                         |
| 2011                | 44                | 55           | 66           | 88             | 89          | 89             | 55                        | 50                | 56                    | 88                          | 89                  | 89                       | 25                     | 14                      |                         |                         |                         |
| 2012                | 90                | 70           | 70           | 90             | 93          | 93             | 83                        | 87                | 93                    | 70                          | 67                  | 73                       | 15                     | 25                      |                         |                         |                         |
| 2014                | 64                | 56           | 72           | 50             | 25          | 25             | 33                        | 100               | 83                    | 33                          | 75                  | 67                       | 45                     | 14                      |                         |                         |                         |
| Grand Total assessment | 69              | 60           | 71           | 56             | 72          | 69             | 48                        | 63                | 67                    | 45                          | 48                  | 54                       | 18                     | 16                      |                         |                         |                         |

### + LMT Biological risk and AMR modules. Also available Mobile App