Control of Foodborne Antimicrobial Resistance in the Agri-Food Sector

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THE BURDEN OF AMR

Deaths Distribution Dollars

https://amr-review.org
THE IMPACT OF AMR BY 2050 WOULD BE WIDE-RANGING

28 MILLION PEOPLE
projected to fall into poverty because of AMR

UP TO 7.5%
decline in global livestock production

UP TO 1 TRILLION US$
global increases in healthcare cost

UP TO 3.8%
decline in global exports
THE COST OF INACTION IS NOT AFFORDABLE - ESPECIALLY FOR THE POOREST COUNTRIES

- Improve public and veterinary health systems against major disease outbreaks
- Improve antimicrobial stewardship and reduce overuse for both animal and human health
EPIDEMIOLOGY OF ANTIMICROBIAL RESISTANCE

AQUACULTURE

Drinking water

Rivers and Streams

Sea / Lakes

Drinking Water

Industrial & Household Antibacterial Chemicals

SOIL

Sewage

Vegetation, Seed Crops, Fruit

HUMAN

HOSPITALIZED

COMMUNITY - URBAN - RURAL

EXTENDED CARE FACILITIES

Handling Preparation Consumption

Meat

Food Animals

Commercial Abattoirs / Processing Plants

POULTRY

SHEEP

CATTLE

SWINE

OTHER FARMED LIVESTOCK

VEAL CALVES

Dead stock

Rendering

Offal

Footnotes:

after Linton AH (1977), modified by Irwin RJ
BUT HUMAN ACTION IS MAKING AMR WORSE

- Misuse or overuse of antimicrobial drugs in health care and in the breeding of crops and animals
- Poor sanitary conditions
- Inappropriate food handling
- Poor infection prevention and control practices in hospitals
The AMR Global Action Plan
• World Health Assembly - May 2014
• World Health Assembly - May 2015, endorsed

World Organization for Animal Health (OIE)
• Resolution May 2015

Food and Agriculture Organization of the United Nations (FAO)
• Resolution - June 2015
• FAO Action Plan on AMR

UN General Assembly
• Declaration - September 2016
FAO Action Plan on AMR
AMR and One Health

Livestock Production

Animal Health

Feed Safety

Food Safety

Communication

FAO Action Plan

Legal Framework

Regional / Sub-regional level

National level

Water

Plant health

Fisheries and aquaculture

Codex Alimentarius

The FAO-OIE-WHO Collaboration

Sharing responsibilities and strengthening global animal, plant and food health for all at the national, regional and international levels

A Tripartite Concept Note

April 2010
1. Increased Awareness

2. Practices

- **Pre-harvest**
  - Reducing use
    - Not for growth promotion
    - Only when needed (OWN)
  - Improving animal health
    - Biosecurity
    - Disease prevention
      - E.g. vaccine use
  - Hygienic and management practices

- **Post harvest**
  - Food hygiene and sanitation

http://www.indiaspend.com/cover-story/keeping-chicken-healthy-threatens-indias-health-25011
(A) Largest five consumers of antimicrobials in livestock in 2010.

Thomas P. Van Boeckel et al. PNAS 2015;112:5649-5654
3. Improved Regulations and Guidelines

National Legal Framework
- Eliminating use as growth promoters
- Requiring veterinary prescriptions
- Justification of use of critically important antibiotics in animals
- Environmental Discharge
Codex Alimentarius
- International group to establish standards guidelines and practices for food (1961)
- 186 countries + 219 observers

FAO/WHO Joint Expert Committee on Food Additives (JECFA)
  Establish Maximum Residual Limits (MRLs)

FAO/WHO Joint Expert Meeting on Microbiological Risk Assessment (JEMRA)

FAO/WHO Joint Meeting on Pesticide Residues (JMPR)

Codex Task Force on Antimicrobial Resistance (TFAMR5)
Electrical Working Groups (EWG)

(i) revision of the Code of practice to contain and minimise antimicrobial resistance; and (USA; CL, CN and UK)

(ii) develop guidelines on surveillance of foodborne antimicrobial resistance. (NL; CN, KY NZ)
4. Surveillance

Antimicrobial Use

Antimicrobial Resistance

Integrated Approaches

- Humans
- Animals
- Foods
- Environment
Achieving Integrated Surveillance

- Build on existing framework
  - National
  - WHO, OIE

- Tailored to Country
  - Situational Analysis
  - Laboratory Assessment
Assessment Tool for Laboratories and AMR Surveillance Systems **ATLASS**

- **Mapping**: Activities, Capacity
- **Monitoring**: Compliance, Progress
- **Evidence**: Action, Advocacy
- **Linkages**: National, GLASS
Progressive Management Pathway to Combat AMR

- **Roadmap (Guide) for progress and goals**
  - Awareness
  - Governance
  - Practices (Infection Control)
  - Leadership
  - Research and Development
  - Evidence
    - Surveillance
    - Laboratory Capacity
    - Reporting, Coordination, Integration

![Diagram showing stages of progression with time and comprehensiveness axes.](Image)
Progressive Management Pathway

Laboratory Complexity

- WGS
- Campylobacter
- Broth dilution
- PCR
- Enterococcus
- AST-KB
- CRE
- ESBL
- E.coli

Programme Complexity and Integration

- Chicken
- Poultry
- Meat
- Inter-agency communications
- Water
- Vegetables
- Integrated Analysis

Limited by Capacity (ATLASS)

Dictated by Needs (Situational Analysis)
AMR: 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
RESPONSIBLE USE OF ANTIMICROBIALS IN AGRICULTURE SAVES LIVES
ATLASS Structure

ATLASS-Surveillance module

ATLASS-Lab module

ATLASS-Lab-Activity

ATLASS-Lab-LMT

➤ filled once for each country, answers from several respondents

Lab 2

Etc.

Lab 2

Etc.

filled for each laboratory assessed
Assessment Tool for Laboratories and AMR Surveillance Systems

ATLASS

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