AMR containment: snapshot of global efforts

Pan-Africa Workshop on Effective Implementation of National Action Plan on Antimicrobial Resistance
January 22-24, 2020
Lusaka, Zambia

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- A public interest research and advocacy organisation based in New Delhi, India
  - It researches into, lobbies for and communicates the urgency of development that is both sustainable and equitable
  - Helped shape policies and build public awareness to bring change for over three decades
  - Is recognized for its role in capacitating public institutions and regulatory agencies
  - Plays an important role of think tank that articulates the perspectives and policies of the global south
## Modalities adopted

### Research and advocacy
- Clean Air and Sustainable Mobility
- Climate Change
- Environment Education
- **Food Safety and Toxins**
- Renewable Energy
- Sustainable Water Management and Sanitation
- Sustainable Industrialization
- Sustainable Buildings and Habitat

### Communication for awareness
**Down To Earth:**
- English fortnightly on environment and development issues since 28 years
- Hindi (national language) monthly editions

**India Environmental Portal:**
- One stop shop for open access information on environment

### Pollution monitoring
- **Pollution Monitoring Laboratory (PML)** generates evidence through monitoring environment pollution and food contamination
- Independent information in public domain for ecological security

### Education and Training
- Building capacities across stakeholders from India and the developing world
- About **20 thousand trained in 10 years (~25% International)**
- Dedicated residential training centre at Nimli, Rajasthan
• A learning, innovation and training centre, designed to find appropriate and affordable solutions to some of the most pressing environmental problems of developing countries; About 50 week-long trainings conducted in a year

• Water positive, energy efficient, zero-waste campus
Lab studies conducted

<table>
<thead>
<tr>
<th>FOOD</th>
<th>CONSUMER PRODUCTS</th>
<th>ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2003</strong>: Pesticide residues in bottled water</td>
<td><strong>2009</strong>: Lead in paints</td>
<td><strong>2001</strong>: Endosulphan poisoning</td>
</tr>
<tr>
<td><strong>2003 &amp; 2006</strong>: Pesticides in soft drinks</td>
<td><strong>2010</strong>: Pthalates in toys</td>
<td><strong>2005</strong>: Pesticides in the blood of Punjab cotton farmers</td>
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<tr>
<td><strong>2009</strong>: Transfats in edible oil</td>
<td><strong>2014</strong>: Heavy metals in cosmetics</td>
<td><strong>2009</strong>: Ground water contamination in and around UCIL, Bhopal</td>
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<td><strong>2010</strong>: Antibiotics in honey</td>
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<td><strong>2012</strong>: Mercury poisoning in Sonbhadra, UP</td>
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<td><strong>2011</strong>: Caffeine in energy drinks</td>
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<td><strong>2017</strong>: Antibiotic resistance in poultry environment</td>
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<td><strong>2012</strong>: Nutritional analysis of junk food</td>
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<tr>
<td><strong>2014</strong>: Antibiotic residues in chicken meat</td>
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<tr>
<td><strong>2016</strong>: Potassium bromate/iodate in bread</td>
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<tr>
<td><strong>2018</strong>: Genetically modified processed foods in India</td>
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<tr>
<td><strong>2019</strong>: Salt, total fat, trans fat and carbohydrates in junk food</td>
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</tbody>
</table>
CSE’s engagement in Africa and South-Asia

CSE programmes presently work in 13 countries in Africa and Asia

- **ZAMBIAM**
  - AMR, Environmental governance, Impact Assessment
- **ETHIOPIA**
  - Environmental Regulation: Compliance & Enforcement; Clean Air & Sustainable Mobility
- **KENYA**
  - Clean Air & Sustainable Mobility
- **RWANDA**
  - Sustainable Water Management & Sanitation
- **BANGLADESH**
  - Sustainable Water Management & Sanitation
- **INDONESIA**
  - Coal-based Thermal Power Plants; Continuous Emission Monitoring Systems (CEMS); Renewable Energy
- **GHANA**
  - Sustainable Water Management & Sanitation
- **NIGERIA**
  - Clean Air & Sustainable Mobility
- **NAMIBIA**
  - Environmental Governance: Impact Assessment
- **SOUTH AFRICA**
  - Sustainable Water Management & Sanitation
- **SWAZILAND**
  - Waste Management
- **TANZANIA**
  - Environmental Governance: Impact Assessment; Renewable Energy; Sustainable Water Management & Sanitation
CSE’s focus areas w.r.t Antimicrobial Resistance (AMR)

AMR: a One Health issue

- Policy research
- Laboratory studies
- National and State Action Plans
- Capacity building
- Advocacy at national and international levels

Animal

Human

Environment

Agriculture
AMR related reports: India
AMR related reports: global
CSE’s engagement with Ministry of Health Zambia

• **January, 2018**
  - CSE invites Ministry of Health, Zambia to participate in Africa-Asia Workshop on Implementation of NAP-AMR

• **March-May, 2018**
  - CSE offers to collaborate with Ministry of Health, Zambia to support the implementation of Zambia’s Multi-sectoral NAP-AMR. Offer agreed upon

• **October, 2018**
  - MoU between ZNPHI-CSE signed

• **August, 2018 - January 2020**
  - ZNPHI-CSE co-organize four workshops aimed at helping the implementation of Zambia’s MAP-AMR
Major global efforts to contain AMR

Global guidance
Global Action Plan on AMR, 2015

- **Endorsed** at the 68th World Health Assembly in 2015

- Outlines **five strategic objectives** to address AMR
  - Awareness and understanding
  - Surveillance and research
  - Infection prevention through sanitation, hygiene
  - Optimized use of antimicrobials
  - Economic case for sustainable investment

- Called for countries to develop their own **National Action Plans on AMR**

- **Beginning of global momentum on NAPs**
- **Greater focus on human and animal aspect of AMR as compared to the environment sector**
United Nations high-level meeting on AMR, 2016

- AMR only health topic to be discussed fourth time in the history of United Nations General Assembly (HIV, NCDs and Ebola were others)

- Political Declaration of the High-Level Meeting of the General Assembly on AMR adopted

- Interagency Coordination Group (IACG) on AMR conceived to provide practical guidance for sustained effective global action to address AMR

AMR issue receives global attention and highest level of political commitment
The FAO Action Plan on AMR, 2016

- Resolution on AMR at 39th Session of the FAO Conference in June 2015

- FAO Action Plan to support food and agriculture sectors in implementing GAP-AMR (Nov 2016)

- Four key focus areas
  - Generate awareness on AMR and related threats
  - Develop capacity for surveillance and monitoring of AMR and antimicrobial use in food and agriculture
  - Strengthen governance related to AMR and antimicrobial use in food and agriculture
  - Promote good practices in food and agriculture systems and the prudent use of antimicrobials

[Link to document]
The OIE Strategy on AMR and the prudent use of antimicrobials, 2016

The 84th General Assembly of the World Organization for Animal Health (OIE)’s adopted a Resolution that mandates OIE to compile AMR activities into a strategy.

Four key objectives

- Improve awareness and understanding
- Strengthen knowledge through surveillance and research
- Support good governance and capacity building
- Encourage implementation of international standards

OIE’s Terrestrial Code and Aquatic Code provides standards for improvement of animal and aquatic health worldwide, including AMR.
WHO guidelines on use of medically important antimicrobials in food-producing animals, 2017

- Aimed at preserving the effectiveness of medically important antimicrobials (MIAs), particularly critically important antimicrobials (CIAs) in human medicine and antimicrobials for veterinary medicine

- Key recommendations:
  - Overall reduction in use of all classes of MIAs
  - Complete restriction of use of all classes of MIAs for growth promotion and prophylaxis
  - Complete restriction of use of all classes of MIAs for prevention of infectious diseases (not yet clinically diagnosed)
  - CIAs should not be used to control dissemination of a clinically diagnosed infectious disease identified within a group
  - Highest priority critically important antimicrobials should not be used for treatment

Note: Medically important antimicrobials are those antimicrobials used in human medicine.
• Aims to assist in the establishment and development of integrated surveillance programmes of AMR in foodborne bacteria

• Focus on AMR and antimicrobial use in relevant food chain sectors

• Integrated surveillance of AMR in foodborne bacteria
  – Sample sources, target bacteria, sampling design, testing methods etc.

• Surveillance of antimicrobial use
  – Surveillance in humans and animals

Link to document
**WHO model list of essential medicines**

*(20^{th} List, 2017)*

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**WHO Model List of Essential Medicines**

20th List

(March 2017)

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**AWaRe Classification** of antibiotics:

- **ACCESS** group: those available at all times as treatments for a wide range of common infections, for e.g., Betalactams etc.

- **WATCH** group: those which are recommended as first- or second-choice treatments for a small number of infections, for e.g., Quinolones, Macrolides, Carbapenems etc.

- **RESERVE** group: those which should be considered last-resort options, and used only in most severe circumstances when other alternatives have failed, for e.g., 4^{th}, 5^{th} gen Cephalosporins, Polymixins etc.

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**AWaRe categorization in view of rising AMR burden**
WHO list of critically important antimicrobials for human medicine (6th revision, 2018)

- Ranks antimicrobials as per their relative importance in human medicine

- First developed in 2005. The WHO Advisory Group on Integrated Surveillance of Antimicrobial Resistance (AGISAR) reviews and updates the list every two years

- Antimicrobials categorized as:
  - Critically important (e.g., Cephalosporins, Glycopeptides, Macrolides and ketolides, Polymyxins, Quinolones, aminoglycosides, carbapenems, penicillins)
  - Highly important
  - Important

Link to document
WHO list of critically important antimicrobials for human medicine: categorization

- **Medically important antimicrobials**
  - **Apply Criteria (C1, C2)**
    - **C1**: Sole, or one of the limited available therapies, to treat serious bacterial infections in people
    - **C2**: Used to treat infections caused by bacteria (1) possibly transmitted from non-human sources, or (2) with resistance genes from non-human sources
  - **Both criteria met** → **Critically important antimicrobials**
  - **Only one criterion met** → **Highly important antimicrobials**
  - **No criteria met** → **Important antimicrobials**

**Highest priority CIAs and High priority CIAs**
Global Antimicrobial Resistance Surveillance System (GLASS)

- A platform for **collection, integrated analysis and sharing** of standardized and validated data on AMR

- Initial focus
  - **human priority bacterial pathogens**
  - To progressively incorporate other systems (food, environment, antimicrobial use)

- During early implementation phase (2015–2019), GLASS will provide countries with:
  - surveillance and laboratory guidance
  - support to develop effective AMR surveillance systems

As on February 2019, 73 countries were enrolled in GLASS
Inter-Agency Coordination Group on Antimicrobial Resistance report to UN Secretary General, 2019

A. ACCELERATE PROGRESS IN COUNTRIES A1, A2, A3
B. INNOVATE TO SECURE THE FUTURE B1, B2, B3
C. COLLABORATE FOR MORE EFFECTIVE ACTION C1, C2
D. INVEST FOR A SUSTAINABLE RESPONSE D1, D2
E. STRENGTHEN ACCOUNTABILITY AND GLOBAL GOVERNANCE E1, E2, E3, E4

Highlights:

- Accelerate the development and implementation of One Health National AMR Action Plans (A2)
- Phase out use of antimicrobials for growth promotion in animals, starting with HPCIAAs (A3)
- Need for waste management and greater focus on AMR in the environment
OIE list of antimicrobials of veterinary importance, 2019

Key recommendations:

- Responsible and prudent use of antimicrobial agents does not include their use for growth promotion in the absence of risk analysis

- **HPCIAs: highest priorities** for such phase out

- **Colistin**, antibiotics under **fluoroquinolones**, and **3rd & 4th generation cephalosporins**:
  - Not be used for preventive treatment (by feed or water) in the absence of clinical sign of a disease
  - Not be used as a first line treatment unless justified
  - Use as second line treatment to be based on bacteriological tests
  - Use as growth promoters to be **urgently prohibited**
Guidelines on regional AMR monitoring and surveillance (Southeast Asia)

Focus on surveillance in healthy animals reaching consumers, and on protection of public health

Provides guidance on design of AMR monitoring and surveillance, with emphasis on epidemiology and laboratory methods, AMR data management

Aims at regional harmonization and a standardized approach to ensure comparability

The guideline encourages countries to initiate AMR surveillance regardless of their capacity
Guidance from CODEX ALIMENTARIUS

- The **CODEX ALIMENTARIUS** is a collection of standards, guidelines and codes of practice (CoP) adopted by the Codex Alimentarius Commission, to ensure food is safe and can be traded.

- **AMR related texts in Codex**
  - Code of Practice to Minimize and Contain Antimicrobial Resistance (2005)
  - Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance (2011)
  - Maximum Residue Limits and Risk Management Recommendations for residues of veterinary drugs in foods; 9 of these belong to 4 classes of CIAs.

- **Ad hoc Codex Intergovernmental Task Force on Antimicrobial Resistance (TFAMR)** working to revise the CoP and develop Guidance on Integrated Surveillance of AMR.
Major global efforts to contain AMR

Reports
Frontiers 2017: Emerging issues of environmental concern

- Covers six key emerging issues; AMR one of them

- Antimicrobial Resistance: Investigating the environmental dimension
  - AMR recognized as an environmental concern
  - Identifies contributors, mechanisms of AMR
  - Highlights the need for considering the environmental exposure to antimicrobials in order to curb AMR

- Environmental aspect gaining global traction
- WHO-FAO-OIE Tripartite involves UNEP; expands to Tripartite Plus
Data submitted by **155 Countries**

**110** countries (71%) did not use any antimicrobial growth promoters (AGPs) in animals as of 2017, either with or without legislation or regulations.

Lack of regulatory framework, and lack of tools and human resources identified as major barriers in reporting quantitative data on antimicrobial use.

**African scenario**
- 54 Member countries from Africa; 44 responded
- 10/44 reported AGP use; 7/10 provided list of AGPs used. Tetracyclines most common
- Lowest tonnage of antimicrobial agents intended for use in animals among all OIE regions
- Tetracyclines: largest proportion of all reported antimicrobial classes
2015 data on consumption of systemic antibiotics in humans from 65 countries and areas

Some key observations:

- Bulk of data from European region (46/65)
- Wide intra- and interregional variation
- Amoxicillin and amoxicillin/ clavulanic acid most frequently consumed (ACCESS)
- Great diversity in consumption of WATCH antibiotics
- RESERVE group antibiotics accounted for <2% of total antibiotic consumption in most HIC; not reported by most LIC and middle-income countries (MIC)

African Scenario

- Burkina Faso, Burundi, Côte d’Ivoire, Tanzania (4/65)
- Beta-lactam antibacterials, penicillins —most commonly used
- ACCESS group antibiotics most commonly used followed by WATCH group. No RESERVE group identified
Recognizes that **foods of plant origin may serve as vehicles of AMR**

- Identifies needs in food-production environment to reduce antimicrobial use
  - **Biosecurity** and waste management
  - Improved methods for **infection prevention and control**
  - Adherence to **best management practices**

**Surveillance of AMR and antimicrobial use**
- Plant and aquatic animal food products and their production environments should be integrated into existing AMU and resistance surveillance programmes
Major global efforts to contain AMR

Other initiatives
# Country level AMR surveillance initiatives

<table>
<thead>
<tr>
<th>Programme</th>
<th>Country</th>
<th>Human</th>
<th>Animal</th>
<th>Food products</th>
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<tbody>
<tr>
<td>Danish Integrated Antimicrobial Resistance Monitoring and Research Programme <em>(DANMAP)</em></td>
<td>Denmark</td>
<td>●</td>
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<tr>
<td>Norwegian Surveillance System for Antimicrobial Drug Resistance <em>(NORM/NORM-VET)</em></td>
<td>Norway</td>
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<tr>
<td>Swedish Veterinary Antimicrobial Resistance Monitoring <em>(SVARM)</em></td>
<td>Sweden</td>
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<tr>
<td>Swedish Antibiotic Utilization and Resistance in Human Medicine <em>(SWEDRES)</em></td>
<td>Sweden</td>
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<tr>
<td>European Antimicrobial Resistance Surveillance Network <em>(EARS-Net)</em></td>
<td>Europe</td>
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<tr>
<td>European Surveillance of Antimicrobial Consumption Network <em>(ESAC-Net)</em></td>
<td>Europe</td>
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<tr>
<td>Monitoring and analysis of food-borne diseases in Europe <em>(EFSA)</em></td>
<td>Europe</td>
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<tr>
<td>The Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents report <em>(FINRES-VET)</em></td>
<td>Finland</td>
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## Country level AMR surveillance initiatives

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<th>Country</th>
<th>Human</th>
<th>Animal</th>
<th>Food products</th>
</tr>
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<tbody>
<tr>
<td>Monitoring of Antimicrobial Resistance and Antibiotic Usage in Animals in the Netherlands (MARAN)</td>
<td>Netherlands</td>
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<tr>
<td>National Antimicrobial Resistance Monitoring System (NARMS)</td>
<td>United States</td>
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<tr>
<td>Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)</td>
<td>Canada</td>
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<tr>
<td>L’Observatoire National de l’Épidémiologie de la Résistance Bactérienne aux Antibiotiques (ONERBA)</td>
<td>France</td>
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<tr>
<td>The Japanese Veterinary Antimicrobial Resistance Monitoring System (JVARM)</td>
<td>Japan</td>
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<tr>
<td>Japanese Nosocomial Infections Surveillance (JANIS)</td>
<td>Japan</td>
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<tr>
<td>Colombian Integrated Program for Antimicrobial Resistance Surveillance (COIPARS)</td>
<td>Colombia</td>
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</table>
Thank you

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<table>
<thead>
<tr>
<th>Critically Important Antimicrobials</th>
<th>Highest Priority Critically Important Antimicrobials (HPCIA)</th>
<th>Cephalosporins (3\textsuperscript{rd}, 4\textsuperscript{th}, 5\textsuperscript{th} generation), Glycopeptides, Macrolides and ketolides, Polymyxins, Quinolones</th>
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<tbody>
<tr>
<td>High Priority Critically Important Antimicrobials</td>
<td>Aminoglycosides, Ansamycins, Carbapenems and other penems, Glycylcyclines, Lipopeptides, Monobactams, Oxazolidinones, Penicillins (antipseudomonal), Penicillins (aminopenicillins), Penicillins (aminopenicillins with ß-lactamase inhibitors), Phosphonic acid derivatives, Drugs used solely to treat tuberculosis or other mycobacterial diseases</td>
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<tr>
<td>Highly Important Antimicrobials</td>
<td>Amphenicols, Cephalosporins (1\textsuperscript{st} and 2\textsuperscript{nd} generation) and cephemycins, Lincosamides, Penicillins (amidinopenicillins), Penicillins (anti-staphylococcal), Penicillins (narrow spectrum), Pseudomonicacids, Riminofenazines, Steroid antibacterials, Streptogramins, Sulfonamides, Dihydrofolatereductase inhibitors and combinations, Sulfones, Tetracyclines</td>
<td></td>
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<tr>
<td>Important Antimicrobials</td>
<td>Aminocyclitols, Cyclic polypeptides, Nitrofuran derivatives and Nitroimidazoles, Pleuromutilins</td>
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