Global Action Plan to combat antimicrobial resistance

Water and Sanitation and Environmental Drivers



Five strategic objectives:

- 1. Improve awareness and understanding (WAAW)
- 2. Strengthen knowledge through surveillance & research
- 3. Reduce the incidence of infection (IPC/Sanitation)
- 4. Optimize the use of antimicrobial medicines
- 5. Ensure sustainable investment (R&D)
- National Action Plans

Six Guiding Principles:

- Whole of society engagement
- Actions based on best available knowledge and evidence
- Prevention first
- Access not excess
- Sustainability
- Incremental targets for implementation



Summary of progress

Action

- Ongoing high-level political interest
- Action at all levels of WHO
- Action across GAP objectives
- Increasing focus on intersectoral action

Challenges

- Implementation
- Sustaining interest broadening engagement
- Building AMR into plans and programmes
- Intersectoral action in practice
- Resources



High-Level Political Interest and Commitment Sustained

Global Action Plan adopted 2015

UNGA Political Declaration in September 2016

Interagency AMR Group convened March 2017. Co-chaired by Deputy SG and DG. First meeting 2-3 May

G20 Discussions

May 2017 WHA agenda
OIE and FAO Governing Bodies





Responsibl

Global Development & Stewardship Framework

Resolution 68.7 / UN Political Declaration

- development, control, distribution and appropriate use _
- affordable access
- initial focus on antibacterials
- Covering the whole pharmaceutical value chain
- Reflects intersectoral issues





Annual Campaigns – in 6 languages









Surveillance

Global Antimicrobial Surveillance System (GLASS)

WHONET adapted for GLASS

Implementation package developed (with focus on LMICs)
 WHO AMR Surveillance Collaborating Centres Network

FAO ATLASS assessment tool piloted

Preventing Infections

Infection Prevention and Control

- Core components guidelines
- Core Components implementation manuals and assessment framework
- Guidelines to come on infection control for TB & carbapenem resistance
- Surgical site infections

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- Surgical antibiotic prophylaxis guidelines
- CRE prevention guidelines
- Country support through collaboration with RFPs
- Hand hygiene: 5 May 2017 "Fight antibiotic resistance: it's in your hands"
- Sepsis: support to the Resolution & focus on prevention of sepsis in health care (link with MCH)

Vaccines

- AMR in new vaccine development
- Modelling



Regulation: database of substandard and falsified medicines







Starting point: R&D

Priority pathogens: systematic assessment

WHO publication in April 2017

Antibiotic R&D pipeline:
WHO publication end of 2017

New R&D expert committee on health R&D will validate priorities

WHO/DND*i* Global Antibiotic R&D Partnership (GARDP) can tackle R&D priorities

Global funding mechanism – G20?



Country progress with developing NAP on AMR (as of 12.05.17)





National Action Plans

77 Member States have completed NAPs
 A further 53 are in the process of doing so
 These represent the largest and most populous countries and include all regions
 More than 6.5 billion people (>90% of world's pop.) live in a country that has or will soon have a NAP









Underappreciated Role of Regionally Poor Water Quality on Globally Increasing Antibiotic Resistance

David W. Graham, $*'^{\dagger}$ Peter Collignon,[‡] Julian Davies,[§] D. G. Joakim Larsson,^{||} and Jason Snape[⊥]



"We contend the only way of curbing AR is by recognizing it is not solely an issue of antibiotic use, but is also rooted in how we manage our wastes."

Environmental Health Barriers to Combat AMR





Objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training

 Water and sanitation aspects mainstreamed in AMR training and communication materials



AMR reflected in WASH materials (e.g. GDWQ and others)



Objective 2: Strengthen the knowledge and evidence base through surveillance and research

WASH and AMR research agenda

ESBL e.coli tricycle (envt, food, human) surveillance





Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures

Universal assess to WASH (SDG6)

Universal WASH in health facilities



Including WASH in AMR National Action Plans



Objective 4: Optimize the use of antimicrobial medicines in human and animal health

Standards for presence (residues/bacteria/genes) in the environment, food and water



Priorities for research and action?



Thank you



Benefits of antimicrobial medicines have been enormous



Penicillin increased survival from 10% to 90% among patients with pneumonia & bacteria in their blood



But resistance was foreseen early

"The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily under dose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant" • Alexander Fleming, Nobel Lecture, December 1945





Data is Patchy



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. Data Source: World Health Organization Map Production: Health Statistics and Information Systems (HSI) World Health Organization



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Available National Data* on Resistance for Nine Selected Bacteria/Antibacterial Drug Combinations, 2013

But things are getting worse

Proportion of Fluoroquinolones Resistant (R+I) Escherichia coli Isolates in Participating Countries in

Proportion of Fluoroquinolones Resistant (R) Klebsiel Proportion of Fluoroquinolones Resistant (R) *Klebsieli* pneumoniae Isolates in Participating Countries in 200

Proportion of Fluoroquinolones Resistant (R) Klebsiel ecoc proportion of Fluoroquinoiones Resistant (R) *Klebsieli* pneumoniae Isolates in Participating Countries in 201

- Resistant infections currently claim at least 50,000 lives each year across Europe and the US alone.
- AMR is a problem that should concern every country irrespective of its level of income

The Review on Antimicrobial Resistance, Chaired by Jim O'Neill, 2014

Impact will be greatest in developing countries

Deaths attributable to AMR every year by 2050

Treatment costs go up when first line antimicrobials can't be used

Figure 1.1 Escalating costs as recommendations for treatment change

Source: Reproduced from ¹² with permission.

- Infections more difficult to treat
 - More deaths, more chronic infection
 - Longer hospital stays
 - Higher costs
- Increasing risk for other conditions
 - Surgery, injuries ...
 - Chronic conditions like cancer (therapy), diabetes, malnourishment...
- Decreased productivity

AMR is a natural phenomenon accelerated by use of antimicrobial medicines. Resistant strains survive & aggregate.

Medicines for treating infections lose effect because the microbes change;

- 1. mutate
- 2. acquire genetic information from other microbes to develop resistance

Types of AMR

Antibacterial resistance (e.g. to antibiotics)
 Antiviral resistance (e.g. to anti-HIV medicines)
 Antiparasitic resistance (e.g. to anti-malaria medicines)
 Antifungal resistance (e.g. to medicines for *Candidiasis*)

- For decades, considered scientific & health issue
- Focus on understanding complex microbiological, pharmacological, behavioural aspects
- Focus on clinical & health system based solutions & newer antibiotics
- Essential elementsbut not enough

1. Communication challenge

- Changes in cultural norms, expectations & behaviour will be fundamental for addressing <u>root cause</u> of AMR:
- Overuse of antibiotics
- "Buy in" among many (general public, patients, farmers, policy makers etc) needed for this
- Terms like "antimicrobial resistance" are a barrier
- Easy to understand explanations which are meaningful to people is an urgent priority

2. Research & development issue

- Open-ended need for new antibiotics, new treatment modalities & diagnostics
- But many manufacturers have left the field
- At same time, parallel challenge
- Distribution of available antibiotics is profit based
- In settings with poor or no regulation, this approach will drive over use & misuse of antibiotics

Research & development challenge

- How do we solve both challenges?
 - Initiatives focused on incentives for industry?
 - Public-private partnerships?
 - Novel initiatives such as DNDi?
 - Legal frameworks?

What is AMR? Challenges in drug stewardship

- Strengthened management of systems for Antibiotic procurement, management, distribution, price setting and use in all countries
- Technical guidelines are evidence based, reflect essential drugs list and local antibiotic resistance patterns.
- Access to essential first line antibiotics improved
- Enhanced regulation limits to over the counter sales, internet sales etc Enhanced collaboration with FAO
- Quality & counterfeit of AB:
- Monitoring use of AB:
- AMR risks and opportunities considered in GMP approvals

What is AMR? Agriculture & food issue

- 1. Antibiotics fed to animals to promote growth in some countries
- 2. Varies by country & type of meat industry
- 3. Considered necessary by some but reduced or abolished in other countries
- 4. Such foods can expose people to antibiotics or already resistant bacteria

Strengthening Educational Provision

What is happening

- Courses and educational materials in ALL regions
- In-service and pre-service training
- All cadres, but mainly generic, physicians and pharmacists
- Expert meeting

✤What WHO is doing

- Competency framework- minimal requirements
- Curricula
- Repository of materials/ community of practice
- Standardizing survey of health worker knowledge and attitudes
 - Qualitative studies looking at HW knowledge and attitudes

Norms

- Update of the antibiotic chapter of the WHO Essential Medicines List
- 5th revision of the list of critically important antimicrobials (CIA) for human health just published

Review of resistance information in clinical practice guidelines

- How guidelines consider resistance patterns as a driver of clinical decision making
- How resistance influences recommendations
- How to better incorporate information on resistance in recommendations
- Review of appropriateness (evidence based) of messages used in public awareness campaigns

Access and Price

Survey on availability and price of medicines

- Methodology developed
 - Availability and price in central drug stores, hospitals and pharmacies
 - Basket of medicines includes some antibiotics
- Methodology piloted
- To improve the methodology
 - By increasing the number of sites sampled within a country
 - By developing an antibiotic-specific basket in addition to the general basket

To conduct surveys in 2017

AMR and Disease Specific Programmes

HIV, TB and Malaria: part of the overall approach

- HIV drug resistance strategy
- Strong links with TB politically and operationally
- Malaria resistance important, although following a different approach

Operationalizing AMR through programmes

- Sexually Transmitted Infections: Gonorrhoea surveillance
 - New STI Guidelines

GARDP new medicines for gonorrhoea

Maternal & Neonatal Health: Sep up work on maternal and neonatal

sepsis

• Situation analysis neonatal health Position paper

GARDP new medicines neonatal sepsis

One Health - organizational roles in addressing antimicrobial resistance

WHO	FAO	OIE
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Provides international leadership and coordinates the response to addressing AMR, as well as implementing technical activities as set out in the Global Action Plan on AMR Supports governments, producers, traders and other stakeholders to move towards the responsible use of antimicrobials in agriculture, thus helping reduce antimicrobial resistance in agricultural systems. International reference organization for standards related to animal health and zoonotic diseases

Developing a database for global surveillance on antimicrobial use in animals

WHO / FAO / OIE collaboration examples

- Joint development of training materials for National Action Plans (NAPs).
- Joint development of World Antibiotic Awareness Week campaign materials.
- Linking Surveillance Systems: GLASS (human) and ATLASS (livestock)
- Collaborated with World Bank 2016 report on AMR.
- Tripartite Survey for monitoring progress in addressing AMR in human and animal sectors
- Tripartite Monitoring Framework

Global monitoring questionnaire

Purpose

- Summarize country capacity and monitor improvement
- Encourage multi-sectoral discussion at country level on progress
- Enable progress report to WHA in May 2017

Approach

- Questionnaire developed jointly by WHO, OIE & FAO
- Countries to submit one response online after multisectoral self assessment
- Regions and WCOs have key role in facilitating and encouraging responses

• Hope to use JEE for validation, and stay consistent with

Response : 144 country

Global monitoring questionnaire

7.1 ratio	National monitoring system for consumption and one of antimicrobials in human health
А	No national plan or system for monitoring use of antimicrobials.
В	System designed for surveillance of antimicrobial use, that includes monitoring national level sales or consumption of antibiotics and rational use of antibiotics in health services.
С	Total sales of antimicrobials are monitored at national level and/or some monitoring of antibiotic use at sub- national level.
D	Prescribing practices and antibiotic use are monitored in a national sample of healthcare settings.
E	On a regular basis (every year/two years) data is collected and reported on: a) antimicrobial sales or consumption at national level for human use b) antibiotic prescribing and appropriate use, in a representative sample of health facilities, public and private.

WHO Research Agenda on WASH and AMR

Identification and quantification of sources, occurrence and transport:

- Quantify concentrations and total loads AMR bacteria, genes and residues from humans and animals to the environment;
- Identify and quantify AMR bacteria, genes and residues in different (water related) exposure routes and
 determine the importance of each route in order to focus research capacity and to support guidance and advice
 to stakeholders and the public on adequate actions. Identify, quantify and locate in time and space the sources
 that are hotspots of release such as health care facilities;
- Set up a uniform system and methodology for identification and quantification (HACCP as a suggested approach);
- Perform meta-analysis to determine and quantify the persistence of AMR bacteria, genes and residues in different environmental matrices;
- Determine the occurrence, loads and persistence of AMR bacteria, genes and residues in the environment.

Understanding the risk to human health:

- Identify health impacts associated with reductions in drug usage or drug concentrations.
- Identify health impacts associated with ARB/ARG concentrations and loading to the environment;
- Conduct risk assessment strategies to identify acceptable environmental concentrations or acceptable biological
 entities (i.e., certain bacteria or ARGs are acceptable whereas others are not);
- Determine concentrations or loads (in wastewater effluent and biosolids) that are necessary to protect the
 receiving environment and ultimately benefit the clinical settings.

Efficiency of water and waste water treatment technologies:

- Provide criteria and guidance on waste and wastewater management for the reduction of AMR bacteria, genes and residues in relevant settings, e.g. clinical, agricultural, household and the environment;
- Quantify the role of AMR horizontal gene transfer in waste and wastewater;
- Identify ways of optimizing onsite waste treatment for reduction of AMR bacteria, genes and residues;
- Address exposure risks by determining reduction efficiencies of applied water, waste treatment and human and animal excreta treatment processes for AMR bacteria, genes and residues and other WaSH-related settings and facilities, including household water treatment processes, water reuse practices and alternative sanitation systems;
- Identify simple microbial measurements (such as bacterial indicators) for system verification;
- Incorporate AMR bacteria, genes and residues in WHO Water Safety Plans and Sanitation Safety Plan concepts, programs and practices. Identify critical control points to utilize in such Safety Plans.
- Develop criteria and guidance to water utilities, wastewater treatment plants and other AMR-relevant treatment facilities (antimicrobial production and aquaculture facilities) on the reduction efficiencies of their applied treatment processes and overall treatment for AMR bacteria, genes and residues;
- Develop criteria and guidance to different communities such as rural communities on the reduction efficiencies
 of AMR bacteria, genes and residues by local waste and wastewater practices and processes.

Development of practical risk management systems and tools:

- Develop, exchange and link information, data and experiences from the environmental domain to industrial, clinical and veterinary domains and vice versa (epidemiology);
- Identify target communities such as septic tank communities in rural settings as well as health care facilities and their professionals (e.g. nurses) and educational institutions (schools and their teachers) in clinical, educational and rural settings for awareness raising on what to do with waste and wastewater and AMs with respect to AMR and produce community specific educational materials;
- Collect and provide evidence based information to the public on safety of drinking water and wastewater used in
 agriculture and aquaculture with respect to AMR.

Identification of policies, practices and tools: