

Antimicrobial Resistance (AMR) Global Overview Global & National Action Plans

Combatting Antimicrobial Resistance: Public Health Challenges & Priorities

Sirenda Vong, MD, PhD, HDR
Program Area Manager,
Health Emergency Information and Risk Assessment Unit
Department of Health Emergencies
World Health Organization Regional Office for South-East Asia (WHO SEARO)
vongs@who.int

What's at Stake with AMR and Antibiotic Resistance

- AMR refers to viruses, bacteria, parasites and fungus
- Antibiotic resistance (ABR) refers to common bacteria vs. the case of *Mycobacteria* spp.
- Current rise of ABR poses the threat of ***POST-ANTIBIOTIC ERA?***
 - Resistance to GNB is worrisome (MDR, XDR or PDR)
 - MRSA & VRE is spreading
 - Life threatening and untreatable common infections
 - Skin infections, urinary tract infections, pneumonia, bloodstream infections, cancer treatment, surgery
 - ABR-associated costs: extra-hospital days, treatment costs, productivity losses
 - Carbapenem resistance, colistin resistance are spreading
- Estimated yearly US costs **today** (by CDC): Direct up to \$20 billion; Indirect up to \$35 billion
- **By 2050**, World Bank estimates annual loss of 1% - 3.8% global GDP

Antibiotic Resistance Requires Global Action

SUPER RESISTANT BACTERIA: PROBLEM TODAY, CRISIS TOMORROW

Limited data on Burden
Of ABR



In **INDIA**, over
58,000 babies
died in one year as a result of
infection with super-resistant
bacteria usually passed on from
their mothers¹

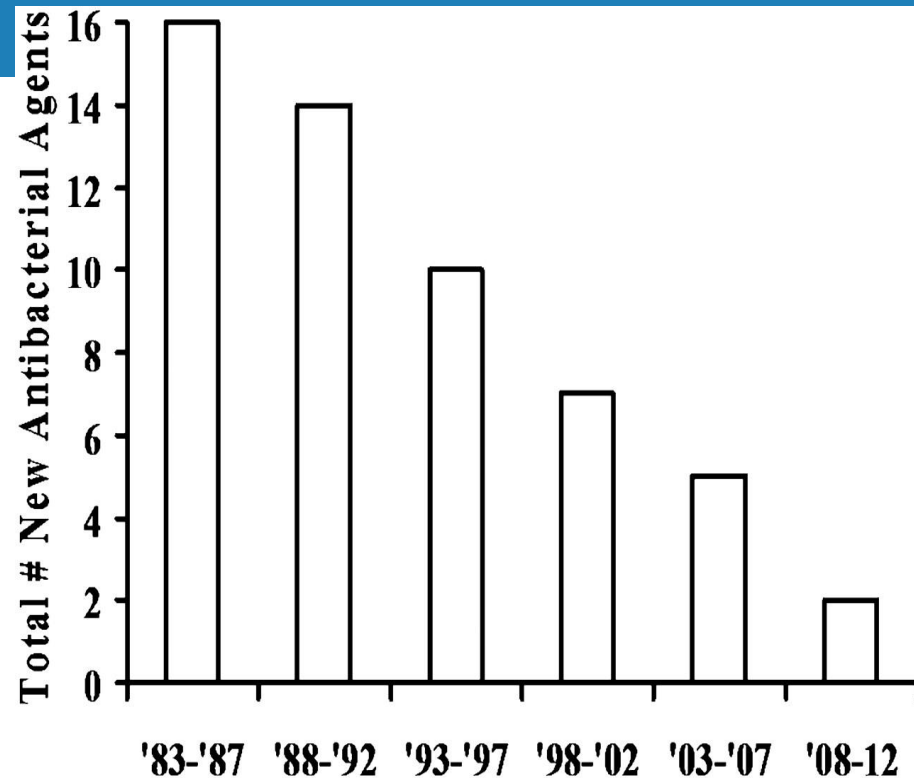
Silent/invisible threat



Source: Antibiotic resistance: the global threat, CDC (2013)

Antibiotic Resistance

- ABR is a natural phenomenon
- Overuse and misuse of antibiotics in human, animal and environmental sectors
- Spread accelerated by drivers
 - Poor infection control practices in hospitals and agriculture
 - Inadequate sanitary conditions
 - Inappropriate food-handling,
 - Few sewage treatment plants
- **Safety Net is shrinking**
 - Against Gram-neg. bacteria+++
 - Limited incentives for new atb discovery
- Global efforts needed to mitigate spread



Number of New Molecular Entity (NME) Systemic Antibiotics Approved by the US FDA Per Five-year Period, 1983 – 2012

Source: CID, 2012

Risk assessment for antibiotic resistance in South East Asia

Fanny Chereau and colleagues assess the risk of the emergence and spread of antibiotic resistance in South East Asia and suggest it is the highest of the World Health Organization regions

AMR is a Complex Issue:

1. Multifaceted:

- Multiple sectors
- Multiple drivers, barriers

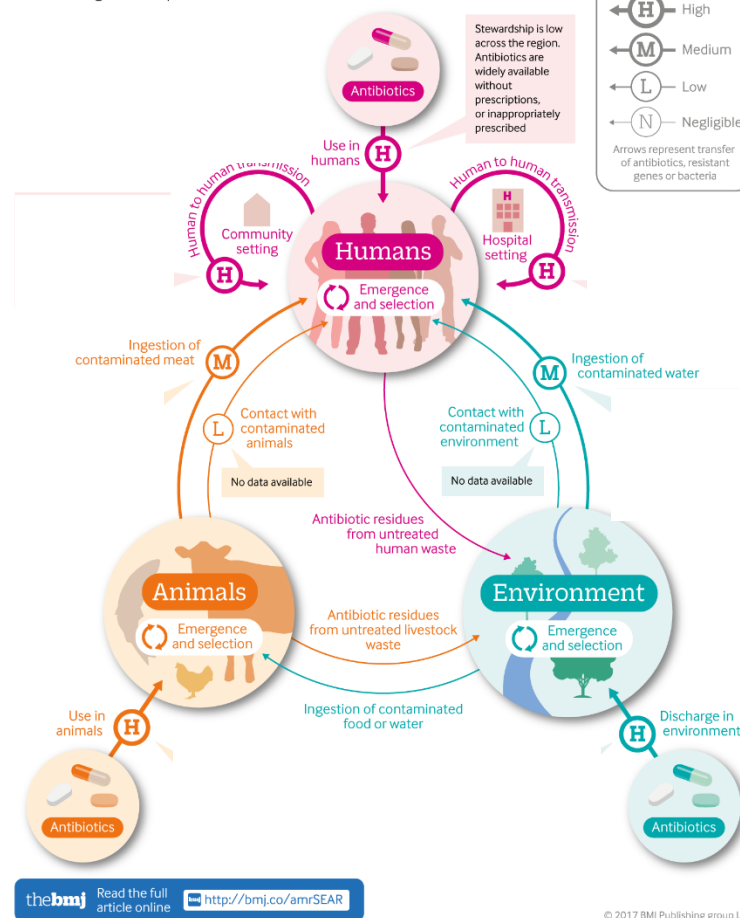
2. Limited BOD data and limited surveillance in LMICs

3. Uncertainties on contribution of animal and environmental sectors on BOD AMR in humans

Visual summary

SEAR's antibiotic challenge

Risks of emergence and spread of antibiotic resistance in South-East Asia



*Chereau F, Opatowski L, Tourdjman M, Vong S. Risk assessment for antibiotic resistance in South East Asia. BMJ. 2017 Sep 5;358:j3393.

AMR Surveillance data are complex to analyze and report

8 priority pathogens

1. *Acinetobacter* spp.
2. *E. Coli*
3. *K. Pneumoniae*
4. *N. Gonorrhoeae*
5. *S. Pneumoniae*
6. *S. aureus*
7. *Salmonella* spp.
8. *Shigella* spp.

4 specimen types

Urine
Blood
Genital
Stool

Clinical &
demographic
Data

Atb Susceptibility Testing

>10 antibiotic classes
>50 antibiotics

Origin:

Healthcare facility
Community
Animal types
Environmental types



Global Action Plan - AMR

- **WHO's GLOBAL POLICY initiatives since 2015, endorsed by FAO, OIE**
- **An obligation or major drive to developing GAP-aligned NAPs**
- **GAP implementation:**
 - **Five strategic objectives**
 - **Guiding principles**



Global Action Plan - AMR

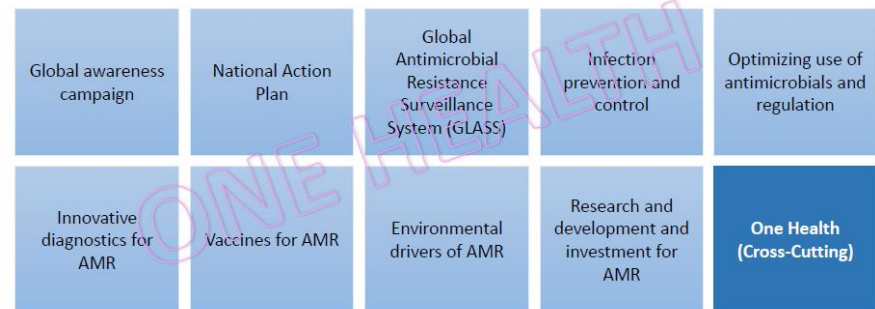
- **Five strategic objectives**

- Improve awareness and understanding
- Strengthen knowledge thru surveillance and research
- Reduce incidence of infection
- Optimize the use of antimicrobials
- Ensure sustained investment

- **Guiding principles re surveillance**

- 10 Work Stream approaches including One-health
- Partnership with OIE and FAO
- Accounting for different capacities of member States

 GAP Implementation: 10 Work Streams



Global Momentum – High Level Awareness

- Public Health agriculture communities have recognized AMR to be an economic and health problem for decades
- Global Security Threat (2016, United Nations General Assembly)
 - Global solutions via political and intersectoral approach
- Interagency Coordination Group (IACG) on AMR recommended building partnerships beyond the Tripartite:
 - Go beyond traditional One-Health Tripartite Partners
 - Supranational governance ~Intergovernmental Panel on Climate Change
- Many Champions and funders incl. G7 countries, BMGF, World Bank etc
- Growth of knowledge on AMR: <2,000 papers per year the 90s to 11,000 in 2018

Why aren't We winning?

Major Global Policy Challenges

Translating Evidence and Political Will to Impact

- Substantial progress in past years:
 - Establishing enabling environment
 - Reducing need for antibiotic usage
 - Limiting the use of antibiotics
- Significant gap between solutions and implementation in LMICs
- Implementation gaps needing local solutions (HOW):
 - low level of implementation, fragmented interventions,
 - poor capacity for enforcement
- Major gap: investment case highlighting the needs for potential co-benefits or AMR-sensitive interventions
- Focus on research agendas and implementation research
- Model to follow: SDG 3 (Health) and elimination of HIV, TB and malaria?



Pulling Together to Beat Superbugs

Knowledge and Implementation Gaps in Addressing Antimicrobial Resistance



Implementation Research

Maximizing Impact with best use of resources

Leads to WHO recommendations

What MoH wants to know

Discovery & product development Research

New tools & technologies (WHAT):

- new vaccines
- new vector control methods
- new diagnostics
- new drugs
- new information and communication
- new technologies
- etc

Implementation research (HOW)

HOW to optimize implementation for rapid uptake and scale up of new tools

and

How much it costs?
COST-EFFECTIVENESS ANALYSIS

Health Outcomes

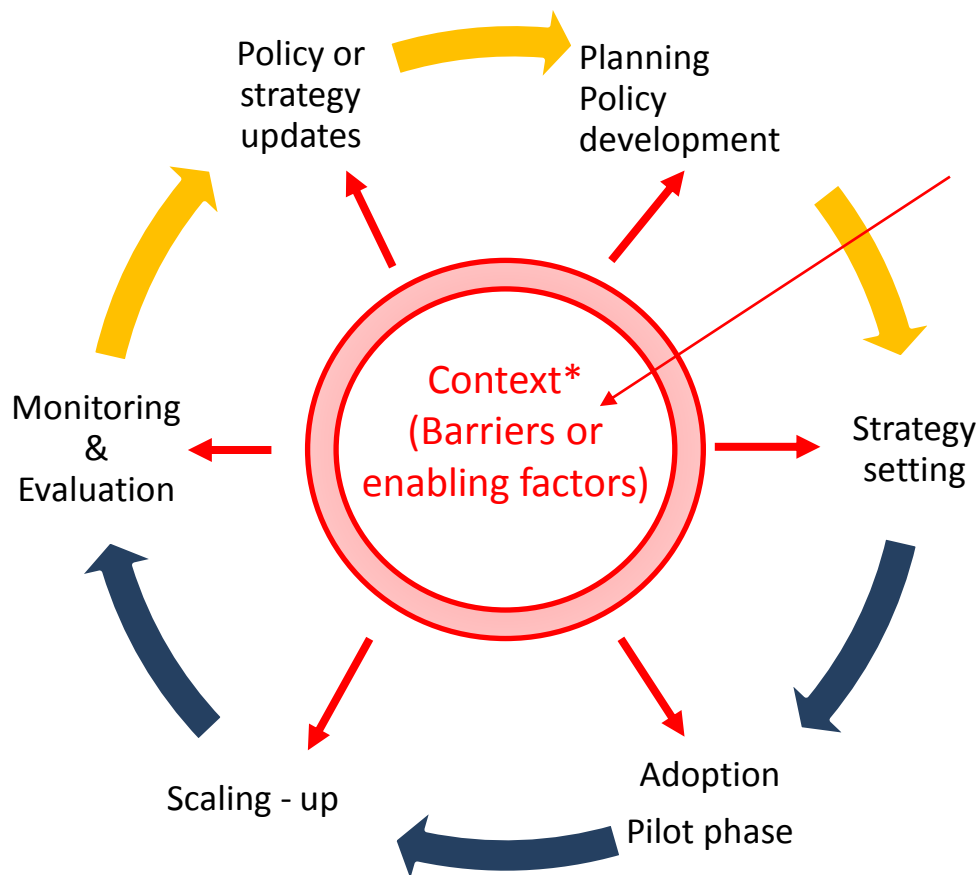
- **Service coverage**
95% prevention coverage
- **Equity:** vulnerables & UHC
- **Effectiveness**
95% diagnosed/screened
95% treated; 95% cured
- **Responsiveness**

Impact

Incidence
mortality
Satisfaction

Implementation Research to solve Implementation Problems

IR question – key to address each Step of Program Cycle



IR questions on identifying bottlenecks:
Political, social, costs, cultural,
Managerial or organizational
factors

IR question on each step:
*acceptability, adoption,
appropriateness, feasibility,
implementation cost,
sustainability*

Other IR questions

1. Test approaches to improve strategies, policies, interventions
2. What is the likely course of future implementation?
(prediction)

Program Cycle

Conclusions

- *V Cholerae* and Azithromycin and other macrolides are not global priorities within Global AMR Surveillance System (GLASS)
- Needs for GTFCC to promote and guide:
 - Surveillance of Azithromycin resistance in cholera-affected countries adopting chemoprophylaxis
 - Monitor the extent and effectiveness of any prophylaxis strategy
- Major progress at global level but early implementation phase in LMICs
- Needs to address local priority needs thru implementation research prioritization (local solutions)