

### Sameeksha\* – Antimicrobial Resistance (AMR)

\**Sameeksha* is a Hindi word, meaning review. This compilation of publications and resources (along with a brief summary) aims to review and share information to facilitate containment of antimicrobial resistance in India, grouped according to the strategic priorities of India's National Action Plan on Antimicrobial Resistance. Kindly note, inclusion of publications and resources in this review/compilation does not imply an endorsement by WHO.

#### Key highlights of volume 11

- World Antimicrobial Awareness Week 2022
- Fish as effective bioindicators of surface water contamination with antimicrobial resistant bacteria and genes
- Large multi-centric hand hygiene compliance study from India
- Study on consumption of systemic antibiotics in 2020, in India
- Bacterial vaccines in clinical and preclinical development
- Quadripartite (FAO-WHO-WOAH-UNEP) releases joint action plan on One Health

### Strategic priority 1: Awareness and understanding

#### World Antimicrobial Awareness Week 2022

- This global AMR awareness campaign is celebrated annually on 18-24 November to raise awareness and understanding of AMR and encourage best practices among the public, One Health stakeholders and policymakers.
- Theme of WAAW 2022 is "Preventing Antimicrobial Resistance Together" and the slogan remains the same – Antimicrobials: Handle with Care; and campaign guide, resources and details of events are available online.
- **24 November** is *Go Blue day* – and you are requested to wear light blue, post your photos wearing blue on social media and share why you are Going Blue using #waaw and #antimicrobialresistance.

WHO | Global awareness campaign | 18-24 November 2022 | [Online link](#)

#### The TAP manual

- Provides guidance to design and implement behaviour change interventions for specific target groups to contain drivers of AMR through the Tailoring Antimicrobial Resistance Programmes (TAP).
- The [TAP Quick Guide](#) distils information on the five stages of the TAP process and the [TAP Toolbox](#) provides exercises and tools to assist with each stage of the process.

WHO Regional Office for Europe | Manual | 23 September 2022 | [Online link](#)

#### Antimicrobial resistance 101

- This webinar covers the basic concepts of AMR, development of antibiotics, stewardship, infection prevention and control, impact of COVID-19 on AMR, and communication strategies for rational use of antimicrobials.

Pan American Health Organization | Video | 10 August 2022 | [Online link](#)

## Swimming with superbugs: exploring how AMR moves in our environment

- The webinar focusses on the environmental dimension of AMR and discusses AMR pathways in the environment domain.
- Covers AMR development, monitoring and mitigation.

*Livestock and Poultry Environmental Learning Community* | Webinar | 22 August 2022 | [Online link](#)

## Awareness-raising on antimicrobial resistance: report of global consultation meetings

- This quadripartite (FAO-WHO-WOAH-UNEP) report summarizes the deliberations of two global consultations on raising AMR awareness.
- Describes key target audiences, core elements, and cross-cutting opportunities across sectors.

*FAO-WHO-WOAH-UNEP* | Report | 22 August 2022 | [Online link](#)

## What if all countries could tackle antimicrobial resistance? CGD moonshot in a minute

- This one minute video highlights AMR as a global public health threat.
- Includes CGDs launch of multi-disciplinary working group to develop policies to change the way antibiotics are developed and procured in LMICs.

*Center for Global Development* | Video | 22 August 2022 | [Online link](#)

## Prevent antibiotic resistance

- A series of five short videos to raise AMR awareness in India.
- Key messages include – use antibiotics wisely only on a doctors' prescription, complete the antibiotic dose, dispose antibiotics properly, do not share antibiotics and use antibiotics wisely in animals.

*Prevent It* | Video | 23 August 2022 | [Online link](#)

## Policy brief and infographics on antimicrobial resistance in Africa

- Summarizes the findings of the Mapping Antimicrobial Resistance and Antimicrobial Use Partnership project that collected and analysed antimicrobial resistance and antimicrobial consumption data from 14 countries of sub-Saharan Africa.
- Provides recommendations for African governments, the African Union Taskforce on AMR, and regional and global health partners working in Africa on AMR.

*ASLM* | Policy brief | 14 September 2022 | [Online link](#)

## Antimicrobial resistance and importance of better surveillance methods

- This short video highlights the importance of evidence based treatment.
- Highlights the importance of sustaining surveillance capacity developed during COVID-19 to tackle future pandemics.

*European Society for Paediatric Infectious Diseases* | Video | 14 October 2022 | [Online link](#)

## Antimicrobial resistance, COVID-19 and pandemic preparedness

- Webinar focussed on recent research on AMR and COVID-19 and updates in Joint External Evaluation Tool.
- Also covers why and where antimicrobial resistance interventions could be included under the International Health Regulations.

*WHO* | Webinar | 2 November 2022 | [Online link](#)

## Strategic priority 2: Laboratories and surveillance

### Fish as sentinels of antimicrobial resistant bacteria, epidemic carbapenemase genes, and antibiotics in surface water

- The study assesses and establishes the role of fish as effective bioindicators of contamination of surface water with antimicrobial resistant bacteria, genes and antibiotics.

*Plos One* | Research article | 2 September 2022 | [Online link](#)

### Molecular identification of diarrheagenic *Escherichia coli* pathotypes and their antibiotic resistance patterns among diarrheic children and in contact calves in Bahir Dar city, Northwest Ethiopia

- Studied the characteristics of various diarrheagenic *E. coli* strains among children and calves in Ethiopia, in order to establish a possible zoonotic transmission and their resistance patterns.
- Six diarrheagenic *Escherichia coli* strains were found widely with ETEC as the predominant type.

*Plos One* | Research article | 28 September 2022 | [Online link](#)

### Antibiotic resistance genes of public health importance in livestock and humans in an informal urban community in Nepal

- This study assessed AMR genes in humans, animals and water in an urban informal settlement in Nepal.
- Highlights potential One Health transmission pathways and underscores the importance of community based intervention for prevention.

*Nature* | Research article | 15 August 2022 | [Online link](#)

### Risk factors for antimicrobial resistance in patients with *Escherichia coli* bacteraemia related to urinary tract infection

- Recommends not to use trimethoprim to treat UTI in patients with risk factors for MDR in *E. coli* bacteraemia.

*Infection Prevention in Practice* | Research article | 3 September 2022 | [Online link](#)

## Strategic priority 3: Infection prevention and control

### Impact of conducting hand hygiene audit in COVID-19 care locations of India – a large scale national multicentric study – HHAC study

- This national multi-centric study assessed hand hygiene compliance rates in public, private, teaching and non-teaching COVID healthcare facilities using a mobile application based on WHO's hand hygiene audit tool.
- Discusses the role of hand hygiene audits to ensure sustainable adherence in the long term.

*Indian Journal of Medical Microbiology* | Research article | 1 October 2022 | [Online link](#)

### Epidemiology of ventilator-associated pneumonia in ICU COVID-19 patients: an alarming high rate of multidrug-resistant bacteria

- This study found that COVID-19 patients have a higher occurrence of VAP compared with other ICU patients.
- Emphasizes importance of IPC, antimicrobial stewardship and avoidance of empirical antibiotic use to reduce the selection pressure.

*Journal of Anesthesia, Analgesia and Critical Care* | Research article | 19 August 2022 | [Online link](#)

## Strategic priority 4: Optimise use of antimicrobials

### Systemic antibiotic sales and WHO recommendations, India

- Analysed 2020 sales data of systemic antibiotic as per AWaRe classification, and whether they were approved fixed-dose combinations, on National Essential Medicines List and WHO list of not recommended antibiotics.
- Recommends investigation and regulation of Watch antibiotics, as well as banned/unapproved antibiotics.

*WHO Bulletin* | Research article | 1 October 2022 | [Online link](#)

### Consumption of systemic antibiotics in India in 2019

- The study used the WHO AWaRe classification and defined daily dose (DD) metrics to analyse per-capita consumption of systemic antibiotics using private sector drug sales dataset from 9,000 stockists across India.
- Key findings include lower per-capita antibiotic consumption rates than earlier, but higher consumption of broad-spectrum and fixed dose combinations of antibiotics not included in National Essential Medicines List.

*The Lancet Regional Health* | Research article | 22 June 2022 | [Online link](#)

### Does diagnostic testing always decrease antibiotics prescriptions?

- The study uses a statistical model to assess the impact of use of point-of-care tests (POCTs) on antibiotic prescriptions.
- Although POCTs are linked with better health outcomes, the authors urge caution in using POCTs to reduce antibiotic prescriptions.

*The European Journal of Health Economics* | Research article | 3 August 2022 | [Online link](#)

### The 2021 Dutch working party on antibiotic policy (SWAB) guidelines for empirical antibacterial therapy of sepsis in adults

- The updated SWAB guidelines have 55 evidence-based recommendations on antibacterial treatment of sepsis in Dutch adults.
- The recommendations of the multi-disciplinary committee are based on source of infection, causative pathogen and pathogen resistance patterns.

*BMC Infectious Diseases* | Research article | 11 August 2022 | [Online link](#)

### Ethical challenges in mass drug administration for reducing childhood mortality: a qualitative study

- Assessed ethical challenges of mass drug administration (MDA) to reduce child mortality, including development of antimicrobial resistance.
- The authors conclude that role of MDA needs be reviewed in view of ethical double standards regarding antibiotic use in high-income versus low- and middle-income countries.

*BMC Infectious Diseases of Poverty* | Research article | 16 September 2022 | [Online link](#)

### Antimicrobial dispensing process in community pharmacies: a scoping review

- Assessed the antimicrobial dispensing practices in community pharmacies.
- Highlights the need for multi-pronged strategies including educational, regulatory and administrative strategies to improve the antimicrobial dispensing process and optimising the use of antimicrobials.

*BMC Antimicrobial resistance & Infection Control* | Review article | 17 September 2022 | [Online link](#)

## Toolkit to improve antibiotic use in ambulatory care

- A new framework that explains the four moments of antibiotic decision making to guide antibiotic use in ambulatory care; including resources to support implementation of the four moments and improve antimicrobial use based on antimicrobial stewardship, communication strategies and best practices for managing common infectious diseases and allergies.

*Agency for Healthcare Research and Quality* | Toolkit | October 2022 | [Online link](#)

## Strategic priority 5: Research, innovations, and finance

### Bacterial vaccines in clinical and preclinical development 2021

- The first WHO analyses and report of vaccine candidates in preclinical and clinical development in 2021, in order to guide action and investments in the context of AMR.
- Focusses on 61 vaccine candidates in clinical development and 94 in pre-clinical development against pathogens in the WHO Bacterial Priority Pathogen list, *Clostridioides difficile* and *Mycobacterium tuberculosis*.

*WHO* | Technical document | 12 July 2022 | [Online link](#)

### Teixobactin kills bacteria by a two-pronged attack on the cell envelope

- Teixobactin belongs to a new class of antibiotics with a unique structure and lack of detectable resistance
- It's a newer antibiotic that has a dual mechanism of action on the bacterial cell envelope – acting against cell wall synthesis and cytoplasmic membrane.
- Earlier antibiotics that act on the cell membrane also damage human cells leading to undesirable side effects, but teixobactin solves this issue as it damages only membranes containing lipid II, which is absent in eukaryotes.

*Nature* | Research article | 3 August 2022 | [Online link](#)

### Exploring the intersection of racism, antimicrobial resistance, and vaccine equity

- Provides historical context of the impact of racism on healthcare inequities and racial and ethnic disparities in AMR and vaccine equity in the United States.
- Offers recommendations to address the known aspects of AMR racial differences.

*Cambridge University Press* | Research article | 5 August 2022 | [Online link](#)

### Nanobiotics against antimicrobial resistance: harnessing the power of nanoscale materials and technologies

- Reviews the mechanisms of AMR and emerging applications of nanoscale materials as substitutes for conventional antibiotics.
- Details the potential, promises, challenges and prospects of nanobiotics to combat AMR.

*BMC Journal of Nanobiotechnology* | Review article | 12 August 2022 | [Online link](#)

### Early appropriate diagnostics and treatment of MDR Gram-negative infections

- Reviews the need for rapid diagnostics for bacterial infections and diagnostic workflows in compliance with antimicrobial stewardship protocols, to ensure early diagnosis and de-escalation to targeted therapy for MDR gram-negative infections.

*JAC Antimicrobial Resistance* | Research article | 13 September 2022 | [Online link](#)

## Highly efficient and durable antimicrobial nanocomposite textiles

- Documents the development and testing of antimicrobial zinc nanocomposite textiles as an antimicrobial fabric to prevent healthcare associated infections.
- The fabric is non-irritating and hypoallergenic and showed promising antimicrobial activity despite repeated washing.

*Nature* | Research article | 15 October 2022 | [Online link](#)

## CARB-X launches new funding rounds for critical global health needs

- New funding launched by CARB-X, focussed on diagnostics, preventives and treatment options for oral therapeutics, vaccines for neonatal sepsis and gonorrhoea.

*Boston University* | News | 3 October 2022 | [Online link](#)

## Probiotics beyond the farm: benefits, costs, and considerations of using antibiotic alternatives in livestock

- Reviews efficacy, feasibility, and limitations of probiotics, and probiotic-derived compounds as antibiotic alternatives for livestock.
- And evaluates their impact on the animal microbiome and resistome and their potential to influence AMR in the environment.

*Frontiers* | Review article | 12 October 2022 | [Online link](#)

## Germany and other funders pledge support to GARDP to ramp up efforts in countering antibiotic resistance

- The German Ministry of Education and Research announced an additional funding of EUR 50 million to support GARDPs work over the next five years (2023-2027) at the recent World Health Summit in Berlin.
- These funds shall support development and access to new treatments for drug-resistant infections.

*GARDP* | News | 17 October 2022 | [Online link](#)

## Strategic priority 6: Collaborations

### Measures taken to address challenges posed by antimicrobial resistance in India

- The Union Minister of State for Health and Family Welfare outlined the measures undertaken by the Government of India to address AMR in India, in a written reply to a Parliament question.
- It describes the national action plan on AMR and various activities undertaken for AMR surveillance, stewardship, awareness and research.

*MoHFW* | Press release | 5 August 2022 | [Online link](#)

### Third progress analysis of implementation of antimicrobial resistance national action plans in the WHO South-East Asia region

- Details the progress in implementation of national action plans on AMR in 11 WHO Member States, including experiences, good practices, gaps and challenges, and recommendations for effective implementation through a One Health approach.

*WHO* | Report | 22 August 2022 | [Online link](#)

## **Major new NIHR Global Health Research Unit to focus on data science and genomic surveillance of antimicrobial resistance**

- The Centre for Genomic Pathogen Surveillance at the University of Oxford has been awarded funding worth £7m for their work as an NIHR Global Health Research Unit for the next five years.
- The Centre's work focuses on strengthening genomic surveillance in LMICs (India, Philippines, Nigeria and Colombia) and developing a global network of AMR labs to generate actionable data.

*Big Data Institute* | News | 22 September 2022 | [Online link](#)

## **The Global Leaders Group host side event at UN General Assembly on AMR**

- The Global Leaders' Group urges specific actions including developing and funding the countries' national action plans on AMR, supporting financial incentives for the development of new antimicrobials, vaccines, diagnostics, waste management tools, and effective alternatives to antimicrobials, and monitoring their progress annually.

*WHO* | News | 22 September 2022 | [Online link](#)

## **Multi-sectoral collaboration contributed to halving the sale of antibiotics in the UK livestock industry**

- UK's successful collaborative approach to antimicrobial stewardship has led to halving the sale of antibiotics for food-producing animals since 2014.
- Highlights the importance of responsible antimicrobial use across all sectors of livestock production, including the government, vets and farmers.

*FAO* | Report | 28 September 2022 | [Online link](#)

## **One Health joint plan of action launched to address health threats to humans, animals, plants and environment**

- The Quadripartite (FAO-WHO-WOAH-UNEP) released the first joint action plan on One Health, which provides an operational framework to integrate systems and capacities for effective action against health threats for humans, animals, and the environment.

*WHO* | News | 17 October 2022 | [Online link](#)