

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

### Key highlights

- World Antimicrobial Awareness Week (WAAW) rebranded as World AMR Awareness Week
- Surveillance of carbapenem-resistant organisms using next-generation sequencing
- How can lessons from the COVID-19 pandemic enhance antimicrobial resistance surveillance and stewardship?
- Global research agenda for antimicrobial resistance in human health
- Progress update of the Global Burden of Animal Diseases programme towards data for One Health

### Strategic priority 1: Awareness and understanding

#### **World Antimicrobial Awareness Week (WAAW) will now be World AMR Awareness Week**

- The Quadripartite has announced the rebranding of WAAW as World AMR Awareness Week; the theme for 2023 will remain “Preventing Antimicrobial Resistance Together” as in 2022.
- The acronym remains as WAAW, which is celebrated from 18 to 24 November every year.

*WHO* | News | 6 June 2023 | [Online link](#)

#### **Antimicrobial stewardship in veterinary medicine: a review of online resources**

- Assessed the currently available educational resources for veterinary antimicrobial stewardship.
- Details five online courses – highlighting key features, including time required, resource type, focus and source.

*JAC Antimicrobial Resistance* | Review article | 26 May 2023 | [Online link](#)

#### **Exploring the potential for children to act on antimicrobial resistance in Nepal: valuable insights from secondary analysis of qualitative data**

- Suggest that age-inclusive community engagement projects could be effective in tackling AMR at community level in low resource settings with children as change agents.

*PLoS One* | Research article | 2 June 2023 | [Online link](#)

#### **Livestock producers' knowledge, attitude, and behavior (KAB) regarding antimicrobial use in Ethiopia**

- This cross-sectional study assessed farmers on livestock disease management practices and knowledge on AMR, antimicrobial (AM) use and AM residues.
- It found low level of awareness as well as undesirable attitudes about AMU and AMR, which highlight that more awareness efforts are needed for livestock disease management practices among farmers.

*Frontiers in Veterinary Science* | Research article | 19 May 2023 | [Online link](#)

## Strategic priority 2: Laboratories and surveillance

### Surveillance of carbapenem-resistant organisms using next-generation sequencing

- Describes use of next-generation sequencing (NGS) combined with bioinformatics tools to survey resistant genes and disease clusters.
- This methodology overview shows the usefulness of phenotypic and molecular AMR tests for a genomic surveillance workflow to detect resistance genes, and relatedness of strains and their source.

*Frontiers in Public Health* | Methods article | 15 May 2023 | [Online link](#)

### Anaerobic gram-negative bacteria: role as a reservoir of antibiotic resistance

- Assessed genotypic and phenotypic resistance in anaerobic gram-negative bacteria (AGNB).
- Since AGNB act as reservoirs of specific AMR genes, there is need to monitor local and institutional susceptibility trends and rational therapeutic strategies for empiric antimicrobial use.

*Antibiotics* | Research article | 22 May 2023 | [Online link](#)

### Prevalence of antimicrobial resistance in urine, blood, and wound pathogens among rural patients in Karnataka, India

- Retrospective analysis of clinical isolates from community acquired infections shows high levels of resistance for quinolones, penicillin and cephalosporins.
- Highlights the need of AMR interventions in rural prescribing practices, AMU in agriculture and health seeking behaviour.

*Antimicrobial Stewardship & Healthcare Epidemiology* | Research article | 15 May 2023 | [Online link](#)

## Strategic priority 3: Infection prevention and control

### Sameeksha – Infection Prevention and Control for COVID-19

Key highlights of volume 29:

- A pandemic within a pandemic – higher AMR in COVID-19 patients
- KAP study about COVID-19 amongst pregnant women and healthcare staff in Haryana
- Perceptions about COVID-19 vaccination and appropriate behaviour among adolescents
- Guidance on operational microplanning for COVID-19 vaccination
- Bacterial coinfection and antibiotic resistance in hospitalized COVID-19 patients

*WCO India* | Publication | 19 May 2023 | [Online link](#)

## Strategic priority 4: Optimise use of antimicrobials

### Loss of exclusivity of ceftazidime/avibactam in low- and middle-income countries: a test for antibiotic stewardship practice

- Outlines the situation and implications of ceftazidime/avibactam becoming a generic drug in India.
- Proposes ensuring government control in supply chain and drawing on successful stewardship experiences, such as the Revised National Tuberculosis Programme.

*Lancet Regional Health Southeast Asia* | Viewpoint | 27 May 2023 | [Online link](#)

## How can lessons from the COVID-19 pandemic enhance antimicrobial resistance surveillance and stewardship?

- COVID-19 pandemic negatively impacted the AMR response, but also presented opportunities to strengthen it.
- Outlines successes during the pandemic that may be leveraged to strengthen AMR efforts including committed centralized leadership, localized implementation, access to diagnostics and vaccines, etc.

*Lancet Infectious Diseases* | Research article | 5 June 2023 | [Online link](#)

## What should we be recommending for the treatment of enteric fever?

- Review of randomised control trials indicate lack of evidence-based treatment options for enteric fever.
- Suggests that choice of antimicrobial should be guided by local resistance patterns and national guidelines with future research on alternative antimicrobial agents.

*Open Forum Infectious Diseases* | Review article | 2 June 2023 | [Online link](#)

## The state of current research on COVID-19 and antibiotic use: global implications for antimicrobial resistance

- Performs a bibliometric analysis to survey current research trends related to COVID-19 and antibiotic use – India is one of the top 5 countries in terms of scientific productivity.
- Hotspots for research themes included 'AMS during COVID-19' and 'COVID-19 and emergence of AMR'.

*Journal of Health, Population and Nutrition* | Review article | 12 May 2023 | [Online link](#)

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

### Global research agenda for antimicrobial resistance in human health

- Prioritizes 40 research topics to generate evidence on AMR to guide policy-makers, researchers, funders, implementing partners, industry and civil society
- Focusses on human health sector, especially WHO list of bacterial and fungal priority pathogens and drug resistant *Mycobacterium tuberculosis*.

*WHO* | Publication | 22 June 2023 | [Online link](#)

### Health and economic impacts of antimicrobial resistance in the Western Pacific Region, 2020–2030

- Quantifies health and economic impacts of AMR for seven priority bacteria, models future spread and cost in 8 countries and calls for government action for data-driven policies to reduce future AMR burden.
- Between 2020-2030, AMR-related deaths were estimated to be 450,000 and AMR-related costs to be US\$148 billion, which is higher than total health expenditures in some countries.

*WHO* | Publication | 13 June 2023 | [Online link](#)

### The economic burden of antibiotic resistance: a systematic review and meta-analysis

- Synthesises recent evidence on economic burden of AMR and reveals higher attributable costs for resistant infections, highlighting the need for more economic analyses in LMICs and at primary and secondary care levels.
- Offers recommendations for economic modelling and cohort studies on AMR.

*PLoS One* | Research article | 8 May 2023 | [Online link](#)

## Whole-genome sequencing of *Alcaligenes* sp. strain MMA: insight into the antibiotic and heavy metal resistant genes

- Investigates the structure and function of the genome of *Alcaligenes* sp. MMA in relation to bioremediation.
- Analysis shows amoxicillin degradation and capacities to remove multiple heavy metals, underscoring usefulness of whole-genome sequencing in environmental clean-up and AMR surveillance.

*Frontiers in Pharmacology* | Research article | 11 May 2023 | [Online link](#)

## Inhibition of multidrug efflux pumps belonging to the major facilitator superfamily in bacterial pathogens

- Reviews recent efforts to modulate antimicrobial efflux transporters, specifically in *Enterococcus faecium*, *Staphylococcus aureus*, *Acinetobacter baumannii*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Enterobacter* species, and *Escherichia coli*.
- Modulation of bacterial antimicrobial efflux pump alteration in expression by nanoparticles shows promise in generating new treatment strategies for potentially untreatable MDR infections.

*Biomedicines* | Review article | 15 May 2023 | [Online link](#)

## Incentivising the development of new antibacterial treatments 2023: progress report by the Global AMR R&D Hub and WHO

- Progress report for the G7 Finance and Health Ministers on incentivizing the development of new antibiotics.
- Outlines key recommendations to renew priorities and timelines, encourage alignment and targeted action on financial mechanisms, including 'push and pull' incentives, and prioritise global equity and access to priority antimicrobials.

*Global AMR R&D Hub and WHO* | Progress report | 15 May 2023 | [Online link](#)

## Strategic priority 6: Collaborations

### Formation of the Quadripartite Technical Group on the Economics of Antimicrobial Resistance

- The Quadripartite Technical Group on the Economics of Antimicrobial Resistance has been established.
- It will provide advice on economic cost of AMR, optimal interventions across One Health sectors, calculating return on investment from interventions, and help countries to select AMR interventions to tackle AMR, organize economic analysis on AMR and develop country investment case to support AMR containment.

*WHO* | News | 21 June 2023 | [Online link](#)

### Characterizing the One Health workforce to promote interdisciplinary, multisectoral approaches in global health problem-solving

- Formative study aims to characterise the One Health workforce by surveying perspectives from various groups, including students, workers and employers from different One Health sectors.
- Evolution of One Health to include food security and AMR solicits an effective interdisciplinary workforce to address complex, global health challenges.

*PLoS One* | Research article | 16 May 2023 | [Online link](#)

## Informatics progress of the Global Burden of Animal Diseases programme towards data for One Health

- Shares progress on the Global Burden of Animal Diseases (GBAD) programme, which aims to build metrics for animal health, welfare and costs, for One Health response to challenges such as AMR and climate change.
- GBAD data is now explained in the form of dashboards, data-driven narratives, website and a handbook.

WOAH | Research article | 24 May 2023 | [Online link](#)

## OH-EpiCap: a semi-quantitative tool for the evaluation of One Health epidemiological surveillance capacities and capabilities.

- Describes the piloting of a generic One Health evaluation tool (OH-EpiCap) – complementary to the existing EU-LabCap tool – and is designed to enable institution/governments to assess and monitor their own One Health surveillance capacities.
- The tool identifies strengths and weaknesses in epidemiological capacities and helps to identify actions to improve collaborative activities for surveillance.

Frontiers in Public Health | Methods article | 11 May 2023 | [Online link](#)

## Quotable quote

***Antimicrobial resistance is an urgent public health and economic challenge,  
and good quality research is a vital part of the response***

- Dr Hanan Balkhy, WHO Assistant Director-General for 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.