

*Sameeksha** – Antimicrobial Resistance (AMR)

Key highlights

- Updated WHO AWaRe tool 2023
- National action plans for AMR and variations in international surveillance data platforms
- Association between air pollution and antibiotic resistance
- Computational guided drug targets identification against ESBL *E. coli*
- Quadripartite guidance for monitoring and evaluation plan for AMR national action plans

Strategic priority 1: Awareness and understanding

Role of sensitization and awareness program on knowledge, attitude, views, and practice of self-medication among MBBS students in a medical college of Bihar

- Survey of medical students before and after sensitization shows improved self-medication awareness.
- Highlights value of awareness about self-medication among medical students which can benefit society.

Cureus | Scientific article | 22 June 2023 | [Online link](#)

ASM policy recommendations to combat antimicrobial resistance

- Targets policymakers to address AMR through scientific approaches at domestic and global level.
- Identifies eight key recommendations related to research, surveillance, antimicrobial stewardship and strengthening the roles of microbiologists, within a One Health framework.

American Society for Microbiology | Policy recommendations | 19 July 2023 | [Online link](#)

Use of antibiotics in poultry and poultry farmers – a cross-sectional survey in Pakistan

- Assesses antibiotic use practices and health seeking behaviour among commercial poultry farmers.
- Demonstrates poor knowledge and improper practices, highlighting the need for training of farmers and integration of AMR mitigation with food safety policies.

Frontiers in Public Health | Scientific article | 11 July 2023 | [Online link](#)

Strategic priority 2: Laboratories and surveillance

National action plans for antimicrobial resistance and variations in surveillance data platforms

- Compares three international AMR surveillance platforms based on usability and completeness of data, and reports heterogeneity of national data submissions which compromises platform validity and strategies.
- Highlights need to understand and address mechanisms for variability of AMR surveillance platforms.

Bulletin for the World Health Organization | Scientific article | 1 August 2023 | [Online link](#)

Evaluation of uropathogens isolated in the outpatient department of a tertiary care hospital in South India

- Prospective study assesses prevalence of bacterial pathogens associated with urinary tract infections (UTIs).
- Findings show an increase in AMR among uropathogens, notably *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*, underscoring the need for local and regional surveillance.

Indian Journal of Microbiology Research | Scientific article | July 2023 | [Online link](#)

Mortality associated with third-generation cephalosporin resistance in Enterobacterales bloodstream infections at eight sub-Saharan African hospitals (MBIRA): a prospective cohort study

- Findings show patients with bloodstream infections with *Enterobacteriaceae* had higher mortality compared to uninfected matched patients.
- Proposes focus on reducing transmission of *Enterobacterales* within hospitals and improving quality of care for sepsis patients.

The Lancet Infectious Diseases | Scientific article | 13 July 2023 | [Online link](#)

Strategic priority 3: Infection prevention and control

Sameeksha – Infection Prevention and Control | volume 2

- Perioperative infection control practices and incidence of surgical site infections in rural India
- Review of carbapenem-resistant *Klebsiella pneumoniae* causing neonatal infections
- Effect of immediate kangaroo mother care on neonatal sepsis
- Global incidence of drug-resistant hospital-associated infections
- SHEA/IDSA/APIC practice recommendations to prevent MRSA transmission and infection in acute-care hospitals

WCO India | Publication | 7 August 2023 | [Online link](#)

Association between particulate matter (PM)_{2.5} air pollution and clinical antibiotic resistance: a global analysis

- Reveals PM_{2.5} as one of the biggest drivers of global AMR, causing 0.48 million premature deaths and 18.2 million years of life lost in 2018 globally.
- Provides new pathways for control of AMR from an environmental perspective.

The Lancet Planetary Health | Scientific article | August 2023 | [Online link](#)

Strategic priority 4: Optimise use of antimicrobials

AWaRe classification of antibiotics for evaluation and monitoring of use, 2023

- AWaRe classification is a tool for monitoring antibiotic consumption, defining targets and monitoring the effects of stewardship policies that aim to optimize antibiotic use and curb antimicrobial resistance.
- WHO recommends a country-level target of at least 60% of total antibiotic consumption from Access group of antibiotics.

World Health Organization | Guidance | 26 July 2023 | [Online link](#)

The impact of influenza and pneumococcal vaccination on antibiotic use: an updated systematic review and meta-analysis

- Demonstrates that influenza vaccine significantly reduces antibiotic use, while pneumococcal vaccination had a less pronounced effect.
- Supports the use of influenza vaccination as an important public health intervention to reduce antibiotic use.

Antimicrobial Resistance & Infection Control | Systematic review | 14 July 2023 | [Online link](#)

The selection and use of essential medicines 2023. Executive summary of the report of the 24th WHO Expert Committee on Selection and Use of Essential Medicines

- Reports updates in 22nd WHO model list of essential medicines (EML) and the 8th WHO model list of essential medicines for children (EMLc).
- Specifies the changes made to EML and EMLc including anti-infective medicines, and WHO AWaRe classification of antibiotics for evaluation and monitoring of use.

World Health Organization | Executive summary | 26 July 2023 | [Online link](#)

A survey of Asian eye institutions on perioperative antibiotic prophylaxis in cataract surgery

- Survey of 26 key eye experts shows variability across Asia in antimicrobial prophylaxis for cataract surgery.
- Recommends development of evidence-based guidelines for ophthalmologists to help reduce incidence of infection and AMR.

International Ophthalmology | Scientific article | 1 August 2023 | [Online link](#)

Best practice guidance for antibiotic audit and feedback interventions in primary care: a modified Delphi study from the Joint Programming Initiative on Antimicrobial resistance: Primary Care Antibiotic Audit and Feedback Network (JPIAMR-PAAN)

- Reports development of best practice guidelines for peer comparison audit and feedback of antibiotic prescribing in primary care, based on expert advice from 15 high income countries.
- Identifies 13 recommendations for best practices and provides a toolkit to guide its implementation.

Antimicrobial Resistance & Infection Control | Scientific article | 29 July 2023 | [Online link](#)

Strategic priority 5: Research, innovations, and finance

Computational guided drug targets identification against extended-spectrum beta-lactamase-producing multi-drug resistant uropathogenic *Escherichia coli*

- Identification of new drug targets may help in designing new antimicrobial agents for UTIs caused by extended-spectrum beta-lactamase (ESBL) producing *E. coli* and prevent increasing resistance.
- Authors used a hierarchical, in silico technique using computational tools to identify and describe two potential therapeutic drug targets against ESBL-producing *E. coli*.

Biomedicines | Scientific article | 19 July 2023 | [Online link](#)

Determinants of worldwide antibiotic resistance dynamics across drug-bacterium pairs: a multivariable spatial-temporal analysis using ATLAS

- Longitudinal analysis of determinants of AMR rates in 51 countries from Pfizer's Antimicrobial Testing Leadership and Surveillance (ATLAS) database shows heterogeneity across drug-bacterium pairs.
- Recommends tailored AMR interventions considering species, resistance and epidemiological patterns.

The Lancet Planetary Health | Scientific article | July 2023 | [Online link](#)

Genomic analysis of *Enterococcus faecium* strain RAOG174 associated with acute chorioamnionitis carried antibiotic resistance gene: is it time for precise microbiological identification for appropriate antibiotic use?

- Used a hybrid genome assembly and genetic analysis to identify and study *E. faecium* strain as a pathogen associated with acute histologic chorioamnionitis in women with preterm premature rupture of the membranes.
- Highlights value of genomic approach for swift pathogen identification and enabling appropriate antibiotic use.

BMC Genomics | Scientific article | 19 July 2023 | [Online link](#)

The pharmacokinetic–pharmacodynamic modelling framework as a tool to predict drug resistance evolution

- Illustrates value of integration of pharmacokinetic and pharmacodynamic (PK-PD) models with population genetic models to develop treatment regimens that reduce AMR evolution.
- Presents a comprehensive framework, including applications that enable better predictions of bacterial escape.

Microbiology | Review article | 31 July 2023 | [Online link](#)

A systematic literature review of economic evaluation studies of interventions impacting antimicrobial resistance

- Shows a paucity of economic evaluations and cost utility analyses of AMR interventions in low-income settings.
- Highlights need for more economic evaluations with metrics that facilitate informed decision-making.

Antimicrobial Resistance & Infection Control | Systematic review | 13 July 2023 | [Online link](#)

Epidemiology of antimicrobial resistance genes in *Staphylococcus aureus* isolates from a public database in a One Health perspective — sample characteristics and isolates' sources

- Global epidemiological analysis identifies clusters of specific antibiotic resistance gene patterns of *S. aureus*.
- Proposes greater use of the database for surveillance by public health and veterinarian authorities.

Antibiotics | Scientific article | 24 July 2023 | [Online link](#)

Interaction of microbes with microplastics and nanoplastics in the agroecosystems — impact on antimicrobial resistance

- Describes existing knowledge on horizontal gene transfer and propagation of AMR between microbes due to presence of micro-nano plastics (MNPs) in environment.
- Highlights lack of standardized protocols for extraction and detection of microplastics and need for more research on MNP contamination in agroecosystems and impacts on human health.

Pathogens | Review article | 29 June 2023 | [Online link](#)

Strategic priority 6: Collaborations

Guidance to facilitate monitoring and evaluation for antimicrobial resistance national action plans

- Emphasizes the need for effective governance for NAP-AMR development, implementation and monitoring.
- Targets implementers of NAPs including AMR multisectoral coordination committees, M&E experts and One Health coordination committee members at national and sub-national levels.

FAO-WHO-UNEP-WOAH | Guidance | 3 August 2023 | [Online link](#)

Foodborne antimicrobial resistance (AMR): an economic concern

- Summarises economic costs of foodborne AMR, including losses in productivity, agriculture and trade.
- Outlines key public policies for countries to reduce AMR and optimise health and prosperity.

FAO | Policy brief | July 2023 | [Online link](#)

Scope and applicability of social-ecological resilience to antimicrobial resistance

- Socio-ecological systems describe interlinkages between social human systems and ecological natural systems.
- Study presents a social-ecological resilience framework for AMR, discusses its applicability, and links current AMR strategies with theoretical and empirical evidence from literature.

The Lancet Planetary Health | Personal view | July 2023 | [Online link](#)

Quotable quote

***Widespread use of antibiotics promotes the spread of antibiotic resistance.
Smart use of antibiotics is the key to controlling its spread.***

– Dr APJ Abdul Kalam,
Former President of India

**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.