

AMR Sameeksha*

Highlights

- Antimicrobial Resistance Diagnostic Initiative
- Antibacterial agents in clinical and preclinical development
- Implementing the global action plan on AMR
- Youth Manifesto on AMR
- Optimal use of β -lactams in neonates
- Review of online gaming resources for information, education and communication of AMR

1) Awareness and understanding

The role of gaming for information, education and communication of AMR: full review of online education resources

- Compiles 103 AMR awareness resources and evaluates 12 games.
- Provides suggestions for game development that considers complexity of AMR and engagement of user.

JAC-Antimicrobial Resistance | Journal article | 11 June 2024 | [Online link](#)

Developing a logic model for communication-based interventions on antimicrobial resistance (AMR)

- Describes the development of a logic model to design, implement and evaluate AMR communication interventions to support national action plans.
- Framework can be adapted to a range of contexts in collaboration with local stakeholders.

PLoS Global Public Health | Research article | 13 June 2024 | [Online link](#)

Antimicrobial resistance: a looming threat to public health and global well-being

- Comprehensive, reader-friendly overview of AMR that explains the multiple, complex factors driving AMR.

Indian Journal of Community and Family Medicine | Review article | 26 June 2024 | [Online link](#)

Combatting antibiotic resistance: identifying gaps in knowledge, attitude, and practice among medical interns

- Cross-sectional survey finds MBBS interns have a solid understanding of AMR but report improper AMR practices, such as overusing antibiotics and failing to check expiry dates.
- Proposes rational prescription practices and stewardship modules be included in medical curriculum.

Cureus | Original article | 12 July 2024 | [Online link](#)

2) Laboratories and surveillance

Antimicrobial Resistance Diagnostic Initiative

- WHO's AMR Diagnostic Initiative aims to improve global diagnosis and management of bacterial and fungal infections and drug resistance.
- Presents the initiative's 4 building blocks (i) strategic and operational framework, (ii) standardized assessment tools, (iii) global AMR laboratory network and (iv) research and innovation in diagnostics.

WHO | Policy brief | 27 June 2024 | [Online link](#)

Implementation of the WHO Tricycle protocol for surveillance of extended-spectrum β -lactamase producing *Escherichia coli* in humans, chickens, and the environment in Madagascar: a prospective genomic epidemiology study

- WHO's Tricycle protocol for multisectoral surveillance of extended spectrum beta-lactamase (ESBL) producing *E. coli* detects a high level AMR prevalence among the three sectors.
- Evidence of circulation of ESBL *E. coli* strains and ESBL-carrying plasmids between sectors highlights the need to address transmission of AMR from a One Health perspective.

The Lancet Microbe | Articles | 19 June 2024 | [Online link](#)

Complete genome sequence, phenotypic correlation and pangenome analysis of uropathogenic *Klebsiella* spp

- Genomic analysis indicates phylogroup kp3 is a carbapenem-resistant, virulent pathogen.
- Demonstrates concordance of genotypic and phenotypic AMR profiling, and identifies the need of virulome and phenotypic virulence markers for diagnosis and treatment of high-risk *K. pneumoniae* clones.

AMB Express | Original article | 4 July 2024 | [Online link](#)

Pathogen diversity and antimicrobial resistance transmission of *Salmonella enterica* serovars Typhi and Paratyphi A in Bangladesh, Nepal, and Malawi: a genomic epidemiological study

- Presents a protocol to develop a sustainable surveillance of AMR for community-acquired infections.
- Pilot study indicates an effective protocol that aligns with WHO AMR guidelines, which generates baseline data to assess the impact of future immunisation programmes with typhoid conjugate vaccines.

The Lancet Microbe | Articles | 9 July 2024 | [Online link](#)

Outbreak of waterborne acute diarrheal disease in a south district village of Tripura: a public health emergency in the Northeast region of India

- Retrospective descriptive study conducted as part of ICMR-FoodNet taskforce quickly identifies causative pathogen and antimicrobial resistance pattern to ensure rational antibiotic treatment and recovery.
- Underscores the need to maintain integrity of water distribution systems, timely intervention to prevent fecal contamination, and surveillance of water quality and collaboration across sectors to prevent outbreaks of water-borne diseases.

Heliyon | Research article | 26 May 2024 | [Online link](#)

3) Infection prevention and control

Sameeksha – Infection Prevention and Control | volume 11

- WHO guidance on regulations for transport of infectious substances
- Operational framework for WASH, waste and electricity in the health sector
- Quality improvement initiative to reduce neonatal sepsis
- Plastic wound protectors reduce incidence of surgical site infections
- Infection prevention and control of *Candida auris*
- Use of contact tracing technologies for IPC in nosocomial settings

WCO India | Publication | 2 August 2024 | [Online link](#)

4) Optimise use of antimicrobials

Optimal use of β -lactams in neonates: machine learning-based clinical decision support system

- Clinical decision support system has prediction accuracy of over 80% for five β -lactam antibiotics to treat neonatal sepsis.
- The clinical decision support system was successfully constructed, which needs validation in clinical practice.

eBioMedicine | Article | 24 June 2024 | [Online link](#)

Community pharmacists as antimicrobial resistance stewards: a narrative review on their contributions and challenges in low- and middle-income countries

- Identifies key challenges for community pharmacists to advance antimicrobial stewardship, including resource constraints, inadequate training, weak regulations and patient non-compliance.
- Calls for community pharmacists to adopt a One Health approach to stewardship that emphasizes collaborations with other healthcare providers and policymakers.

Journal of Pharmacy & Pharmaceutical Sciences | Review | 13 June 2024 | [Online link](#)

Antimicrobial stewardship programs in neonates: a meta-analysis

- Review of 70 moderate to low-certainty quality studies finds antimicrobial stewardship programs are associated with lower exposure to antimicrobials in NICU and post-natal settings.
- Proposes future research to use prospective study designs and evaluate drug resistance and economic burden.

Pediatrics | Review article | 20 May 2024 | [Online link](#)

Rationalizing irrational prescribing—infection-related attitudes and practices across paediatric surgery specialties in a hospital in South India

- Mixed methods study finds surgeons tend to overprescribe antibiotics while the antimicrobial stewardship team has limited influence in decision-making.
- Suggests engagement with senior clinicians about risk perceptions of infections.

JAC-Antimicrobial Resistance | Journal article | 13 July 2024 | [Online link](#)

Implementation of the pharmacovigilance database in the usage of antibiotics in a tertiary care hospital: a pilot study

- Using pharmacovigilance data from monitoring of adverse drug reactions, study finds widespread antibiotic use and a high prevalence of adverse drug reactions among patients on antibiotics.
- Calls for greater integration of pharmacovigilance in antimicrobial stewardship programs.

Health Science Reports | Original research | 17 July 2024 | [Online link](#)

PeRinatal, neOnatal, and Maternal OuTcomEs with azithromycin prophylaxis in pregnancy and labour (PROMOTE-PROPHYLAXIS): systematic review and meta-analysis

- Indicates azithromycin prophylaxis may not reduce maternal and neonatal mortality while a single dose administered to pregnant women has probable reduction in maternal and neonatal infections.
- Cautions that the available evidence is low quality and lacks data on AMR.

eClinicalMedicine | Articles | 21 June 2024 | [Online link](#)

5) Research, innovations and finance

2023 Antibacterial agents in clinical and preclinical development: an overview and analysis

- Assesses extent that the current research and development pipeline addresses infections caused by pathogens identified in the 2024 WHO bacterial priority pathogen list.
- Evaluates whether traditional antibacterial agents meet criteria for innovation and outlines agents newly authorized since 2017.

WHO | Technical document | 14 June 2024 | [Online link](#)

Biogenic amine tryptamine in human vaginal probiotic isolates mediates matrix inhibition and thwarts uropathogenic *E. coli* biofilm

- Finds probiotic, Lactobacillus-derived tryptamine, potential for antibiotic-free treatment of recurrent UTIs caused by *E. coli*, based on a sample of 54 healthy women.
- Highlights potential therapeutic uses of probiotics in preventing biofilm formation.

Scientific Reports | Article | 4 July 2024 | [Online link](#)

Risk factors associated with increasing prevalence of gonorrhea and the antimicrobial susceptibility profiles of *Neisseria gonorrhoeae* among adolescents: a decade-long, hospital-based study from India

- Retrospective study finds high resistance to standard treatments of sexually transmitted infections (STIs) among adolescents, including penicillin, ciprofloxacin and tetracycline.
- Suggests resistance is rising due to irrational use of antibiotics for non-STIs and calls for stewardship programs.

Indian Journal of Sexually Transmitted Diseases and AIDS | Original article | 6 June 2024 | [Online link](#)

Assessment of the reversibility of resistance in the absence of antibiotics and its relationship with the resistance gene's fitness cost: a genetic study with *mcr-1*

- In vitro study using a reverse genetics approach shows that removal of antibiotics decreases AMR prevalence in situations where AMR cannot be addressed by mutations.
- Limiting use of antibiotics may be useful when AMR genes have high enough fitness cost.

The Lancet Microbe | Articles | 10 June 2024 | [Online link](#)

A metabolomics pipeline highlights microbial metabolism in bloodstream infections

- Presents a generalizable workflow for investigating disease-associated metabolism for bacterial infections that can guide microbially targeted therapies.
- Finds elevated levels of bacteria-induced acetylated polyamines that can be reduced by blocking the enzyme responsible (SpeG) in culture and *in vivo*.

Cell | Article | 16 June 2024 | [Online link](#)

The resistome of the food chain: a One Health perspective

- Reviews metagenomic evidence of AMR in the food chain and associated environment, by type of food product (dairy, vegetable, meat, etc.).
- Calls for multipronged strategy that includes global policies in restricting AMR use in the animal sector, surveillance of animals, food and environment and strategies to modulate microbiomes in food production.

Microbial Biotechnology | Review | 17 July 2024 | [Online article](#)

Quantifying cost of disease in livestock: a new metric for the Global Burden of Animal Diseases

- Presents the Animal Health Loss Envelope (AHLE) which connects disease to economic productivity of farms.
- AHLE metric will enable studies of farm-level productivity change in relation to burden of animal diseases in context of wider economy and environment.

The Lancet Planetary Health | Articles | May 2024 | [Online link](#)

Candida glabrata (*Nakaseomyces glabrata*): a systematic review of clinical and microbiological data from 2011 to 2021 to inform the World Health Organization Fungal Priority Pathogens List

- Finds high incidence of fungal disease and increasing resistance rates notably to first line agents, such as azoles.
- Calls for systematic surveillance of *N. glabrata* and the development of new antifungal agents.

Medical Mycology | Journal article | 27 June 2024 | [Online link](#)

Mucorales: a systematic review to inform the World Health Organization priority list of fungal pathogens

- Mucorales is linked with high mortality, resistance to voriconazole and variable susceptibility to other triazoles.
- Calls for better epidemiological data on Mucorales, including linking laboratory and clinical data.

Medical Mycology | Journal article | 27 June 2024 | [Online link](#)

6) Collaborations

Implementing the global action plan on antimicrobial resistance: first quadripartite biennial report

- Summarizes progress in national action plans (NAPs) and global governance actions in combatting AMR.
- Presents metrics on implementation of NAPs and illustrative country case studies.

WHO | Report | 4 July 2024 | [Online link](#)

Youth manifesto

- Created by global youth leaders led by the Quadripartite Working Group on Youth Engagement for AMR.
- Outlines youth priorities for AMR and recommendations for UNGA-AMR.

WHO | Manifesto | 18 June 2024 | [Online link](#)

Tracking progress on antimicrobial resistance by the quadripartite country self-assessment survey (TrACSS) in G7 countries, 2017–2023: opportunities and gaps

- Analyses demonstrate progress in addressing AMR in the health sector, but significant gaps remain.
- Low implementation of AMR containment strategies observed in animal, food and agricultural sectors.

Pharmacological Research | Research article | 20 May 2024 | [Online link](#)

Stopping the grand pandemic: a framework for action – addressing antimicrobial resistance through World Bank operations

- Describes packages of interventions across 4 thematic areas (i) reduce infections, (ii) strengthen surveillance, (iii) improve rational use of antibiotics and (iv) enhance multisectoral action.
- Aims to improve understanding of AMR interventions among policymakers to advance funding options.

World Bank | Publication | 9 May 2024 | [Online link](#)

Antimicrobial resistance challenge to Sustainable Development Goals and targets: a One-Health perspective

- Overview of One Health perspective on AMR that advocates strategic, synchronized action across sectors.
- Maps AMR to the relevant sustainable development goals, targets and indicators.

Journal of Integrative Medicine and Public Health | Review article | 16 July 2024 | [Online link](#)

Quotable quote

Young people should have a seat at the table in shaping responses to global threats such as AMR.

– Youth Manifesto, 2024

**Sameeksha* is a Hindi word, meaning review. This is a compilation of open access publications and resources on One Health containment of AMR (along with a brief summary) – 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.