

AMR Sameeksha*

Highlights

- National Medical Commission releases AMR module for prescribers
- White paper on AMR in animal sector
- Regional variations in AST of uropathogenic *E. coli* highlight need for local antibiograms
- Assessment of three antibiotic combinations against common neonatal sepsis pathogens
- Reformulated cefepime-sulbactam is a promising alternative
- National bridging workshop for One Health
- Economic evaluations to better model optimizing antibiotics

1) Awareness and understanding

Understanding the lived-experience and support-needs of people living with antimicrobial resistance in the UK through interpretative phenomenological analysis

- In-depth understanding of people living with AMR reveals three key themes (i) feelings of shame and stigma, (ii) feeling isolated and having to self-advocate and (iii) desire to share their AMR story.
- Outlines recommendations for clinical practice, such as having support groups for AMR.

Scientific Reports | Article | 10 February 2024 | [Online link](#)

Influencing attitudes towards antimicrobial use and resistance in companion animals the – impact on pet owners of a short animation in a randomized controlled trial

- Educational animation finds a positive impact on pet owners' attitudes towards antimicrobial stewardship.
- Proposes animation can help reinforce AMR awareness in multifaced strategy for reducing antimicrobial use.

JAC – Antimicrobial Resistance | Journal article | 6 May 2024 | [Online link](#)

Prevalence of self-medicated use of antibiotics among the population in Ernakulam district in Kerala, India

- Cross-sectional survey finds 18% of urban and rural community members reported self-medicating, with sore throat and cough being the major reasons for self-use.
- Self-medication was mainly due to previous successful experiences, convenience and affordability.

Medical Sciences Forum | Proceeding paper | 26 January 2024 | [Online link](#)

Awareness and knowledge of antibiotics and antimicrobial resistance among beneficiaries attending the general outpatient clinic of a tertiary-level hospital in India

- Survey of patients at Kolkata Medical College Hospital finds about 70% of respondents were aware of antibiotics but only 15% knew about AMR.
- Multiple gaps in knowledge were reported including information about expiry dates.

Journal of Comprehensive Health | Original article | 8 March 2024 | [Online link](#)

2) Laboratories and surveillance

Regional variations in antimicrobial susceptibility of community-acquired uropathogenic *Escherichia coli* in India: findings of a multicentric study highlighting the importance of local antibiograms

- Study finds diverse antibiotic susceptibility rates across 10 States and 3 UTs highlighting that UTI treatment should be guided by local antibiograms.
- Use of fosfomycin and nitrofurantoin are preferred empirical choices for uncomplicated cystitis due to *E. coli* while use of fluoroquinolones and third generation cephalosporins is discouraged for cystitis.

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

Global trends in carbapenem- and difficult-to-treat-resistance among World Health Organization priority bacterial pathogens: ATLAS surveillance program 2018–2022

- Analysis covers 157 medical centres across 49 countries focusing on carbapenem-resistant Enterobacterales (CRE), *P. aeruginosa* (CRPA) and *A. baumannii-calcoaceticus* complex (CRAB).
- CRE is increasing globally, with high rates of CRAB in India and Brazil.

Journal of Global Antimicrobial Resistance | Research article | 8 May 2024 | [Online link](#)

Changes in antimicrobial resistance of *Escherichia coli* isolated from community-associated urinary tract infection before and during the COVID-19 pandemic in India

- *E. coli* was found among 82% of isolates tested, with increased susceptibility to nitrofurantoin observed during the pandemic and reduced susceptibility to first-line antibiotics and carbapenems during the second wave.
- Recommends considering fosfomycin and nitrofurantoin as empirical options for treating UTIs.

Journal of Global Antimicrobial Resistance | SARS-CoV-2 dispatches | 8 May 2024 | [Online link](#)

3) Infection prevention and control

Sameeksha – Infection Prevention and Control | volume 10

- World Hand Hygiene Day 2024 focuses on training and education
- WHO IPC-in service education and training curriculum
- Evaluation of World Hand Hygiene Day 2023
- Pathogen reduction approaches to prevent AMR and healthcare-associated infections
- Strategic framework for prevention and control of monkeypox
- Videos to promote hand hygiene

WCO India | Publication | 9 July 2024 | [Online link](#)

4) Optimise use of antimicrobials

National action plan on antimicrobial resistance (NAP-AMR) Module for Prescribers

- NMC issues guidelines to curb AMR by underscoring the need for testing before prescribing antibiotics.
- Includes details on prescribing, diagnosing and interpreting antimicrobial sensitivity results.

National Medical Commission | Module | 14 June 2024 | [Online link](#)

Overcoming challenges in the economic evaluation of interventions to optimise antibiotic use

- Discusses how economic methods may be better adapted to address antimicrobial stewardship interventions.
- Proposes a threshold-based approach that explicitly considers uncertainties and costs related to resistance.

Communications Medicine | Perspective | 25 May 2024 | [Online link](#)

Expert consensus on the management of acute otitis media in India: a Delphi study

- Adopts a 3-step modified Delphi study for expert consensus on addressing AMR and pediatric ear infections.
- Presents clinical recommendations on evidence-based management of acute otitis media while optimizing use of antibiotics complementing current national guidelines.

Pediatric Infectious Disease | Original article | 15 May 2024 | [Online link](#)

Time is running out. No excuses to delay implementation of antimicrobial stewardship programmes: impact, sustainability, resilience and efficiency through an interrupted time series analysis (2017–2022)

- Study finds a reduction of 14% of overall antibiotic consumption among a hub and major spoke hospital following the implementation of an antimicrobial stewardship program in north-east Italy.
- Showed that AMS programs integrated within hospital culture can operate efficiently even during a pandemic.

JAC - Antimicrobial Resistance | Journal article | 15 May 2024 | [Online link](#)

Identifying excessive length of antibiotic treatment duration for hospital-acquired infections: a semi-automated approach to support antimicrobial stewardship

- Using electronic record data and clinical notes, study finds semi-automated surveillance to be an effective and reliable approach for hospital-acquired infections.
- Potential tool for antimicrobial stewardship programs.

Antimicrobial Resistance & Infection Control | Research | 20 May 2024 | [Online link](#)

5) Research, innovations and finance

Assessment of three antibiotic combination regimens against Gram-negative bacteria causing neonatal sepsis in low- and middle-income countries

- Tested combinations of flomoxef, amikacin and fosfomycin against common pathogens of neonatal sepsis, which showed good activity against *K. pneumoniae* and *E. coli*.

Nature Communications | Article | 10 May 2024 | [Online link](#)

Cefepime/sulbactam combination as a treatment alternative for extended spectrum beta-lactamase producing Enterobacterales: a multicentric study from India

- Evaluates in-vitro activity of cefepime with increased sulbactam ratios against *K. pneumoniae* and *E. coli*.
- Proposes reformulated cefepime-sulbactam combination as a carbapenem sparing option in India.

Clinical Epidemiology and Global Health | Original article | 10 May 2024 | [Online link](#)

Discovery of antimicrobial peptides in the global microbiome with machine learning

- Uses machine learning to identify almost a million antimicrobial peptides (short sequences of amino acid residues that can modulate microbial interactions) from metagenomes and prokaryotic genomes.
- Creates a comprehensive, open access catalogue useful for antibiotic discoveries.

Cell | Resource | 5 June 2024 | [Online link](#)

Antimicrobial resistance in the wild: insights from epigenetics

- Reviews evidence of epigenetic mechanisms, such as hetero-resistance and phase variation, that may generate resistance among bacteria and microscopic fungi in natural environments.
- Even antimicrobials at sub-inhibitory concentrations in the wild can increase risk of resistance.

Evolutionary Applications | Review | 29 May 2024 | [Online link](#)

Targeted next-generation sequencing to diagnose drug-resistant tuberculosis: a systematic review and meta-analysis

- Shows targeted next-generation sequencing has high diagnostic accuracy for drug-resistant tuberculosis, particularly for first-line drugs and fluoroquinolones.
- Recommends addressing barriers to using sequencing technology in resource constrained settings and to evaluate second-line drugs.

The Lancet Infectious Diseases | Article | 22 May 2024 | [Online link](#)

More superbugs, fewer drugs. How can pharma companies ensure the handful of promising antimicrobials make it to the frontlines of drug resistance?

- Presents recommendations derived from case studies of 5 innovative, late-stage research and development projects, including 2 projects involving India in clinical trials (gepotidacin and aztreonam-avibactam).
- Companies use a range of strategies for improving access and stewardship but lack standardized planning, and the report identifies opportunities and recommendations for companies in focus and sets out actionable steps in antimicrobial R&D to promote widespread adoption of advance access and stewardship planning.

Access to Medicine Foundation | Report | 23 May 2024 | [Online link](#)

Genome analyses of colistin-resistant high-risk *bla*_{NDM-5} producing *Klebsiella pneumoniae* ST147 and *Pseudomonas aeruginosa* ST235 and ST357 in clinical settings

- Finds extensive drug-resistant and pan drug-resistant strains of colistin isolates from sepsis and tuberculosis patients in an Indian hospital.
- Calls for enhanced real-time surveillance and infection control measures.

BMC Microbiology | Research | 20 May 2024 | [Online link](#)

Estimation of country-specific tuberculosis resistance antibiograms using pathogen genomics and machine learning

- Estimates drug resistance rates of *M. tuberculosis* across 29 countries, correcting for drug resistance and outbreak oversampling bias.
- Finds highest rate of mono-resistance to fluoroquinolones in South Asia.

BMJ Global Health | Original research | 28 March 2024 | [Online link](#)

Global burden associated with 85 pathogens in 2019: a systematic analysis for the Global Burden of Disease Study 2019

- Comprehensive assessment of infectious diseases considers the 'pathway to death burden' by calculating the full burden of pathogens, including the role of intermediate causes, such as comorbidities.
- Demonstrates underappreciated impact of less known pathogens (e.g., specific Gram-negative bacterial species) that requires greater global attention for clinical and public health interventions.

The Lancet Infectious Diseases | Article | 16 April 2024 | [Online link](#)

6) Collaborations

Implementing National Bridging Workshop roadmaps for One Health collaboration: successes and challenges from 17 countries

- Overview of the national bridging workshop, which involves bringing together human, animal and environmental health sectors to develop a roadmap of collaborative, short-term activities between sectors.
- Shares lessons learned from selected countries of the program.

WHO | Handbook | 5 May 2024 | [Online link](#)

White paper: antimicrobial resistance in the animal sector in India

- Describes AMR usage in the animal sector, the spread of AMR in the food chain and the surveillance performed by the Indian Network for Fisheries and Antimicrobial Resistance.
- Outlines collaborative strategies and public policies to contain AMR.

FAO | White paper | 12 June 2024 | [Online link](#)

Antimicrobial resistance: an enormous, growing, and unevenly distributed threat to global health

- Compiles key facts and figures from The Lancet series on antimicrobial resistance.
- Proposes global targets to achieve sustainable access to effective antibiotics.

The Lancet | Infographics | 23 May 2024 | [Online link](#)

Characterising global antimicrobial resistance research explains why One Health solutions are slow in development: an application of AI-based gap analysis

- Comprehensive review of over 2 lakh studies from multiple disciplines yielding global maps of AMR research.
- Calls for harmonizing research methods across regions and sectors to develop robust One Health solutions.

Environment International | Research article | 20 April 2024 | [Online link](#)

The impacts of animal agriculture on One Health—bacterial zoonosis, antimicrobial resistance, and beyond

- Describes AMR and key bacterial zoonoses in animal agriculture.
- Emphasizes the need for surveying, preventing and managing infections in animals to advance One Health.

One Health | Review article | 9 May 2024 | [Online link](#)

Operationalising 'One Health' through primary healthcare approach

- Describes rationale and potential operationalization of One Health into primary health care through capacity building, advocating for One Health and leveraging technology.
- Presents examples of countries that have successfully integrated One Health in primary health care and highlights shared principles, such as community participation and intersectoral action.

Preventive Medicine Research & Reviews | Review article | 17 May 2024 | [Online link](#)

Quotable quote

We have a small, but effective, arsenal in the race to combat drug resistance.

— Jayasree K Iyer, CEO, Access to Medicine Foundation

**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.