World Health Organization India

sameeksha

ANTIMICROBIAL RESISTANCE (AMR) | Volume 37 | July 2025

AMR *Sameeksha**

Highlights

- National treatment guidelines for antimicrobial use in infectious disease syndromes
- The Kerala experience with state-wide antimicrobial resistance mitigation efforts
- AMR infection landscape in Bihar: implications for strengthening policy and clinical practice
- Assessment of antibiotic utilization patterns in an Indian Trauma Centre
- Genomic insights into bacteriophages: a new frontier in AMR detection and phage therapy

1) Awareness and understanding

What and why to enhance community awareness on antimicrobial resistance

- Explores the importance of engaging communities for changing people's behaviour towards antimicrobial use.
- Highlights the need for context-specific and evidence-based communication strategy that demystifies AMR.

WHO South-East Asia Journal of Public Health | Letter to Editor | 31 July 2025 | Online link

SAS campaign – Resisting AMR: one farm at a time

- Aims to reduce the use of antibiotics in dairy farms in Ludhiana, Punjab.
- Focusses on biosecurity-driven solutions such as vaccination, animal nutrition, and better livestock care.

Superheroes Against Superbugs | Campaign | 17 July 2025 | Online link

Wrong diagnosis – wrong antimicrobials: rise in antimicrobial resistance in developing countries

- Discusses challenges of diagnostic errors and AMR escalation, including misclassification of infections, sample contamination, empirical treatment without microbiological confirmation, etc.
- Highlights the need for strengthening diagnostic accuracy and diagnostic stewardship to address AMR.

IDCases | Letter to the Editor | 6 July 2025 | Online link

2) Laboratories and surveillance

In vitro diagnostic tests for serious bacterial infection, including neonatal sepsis, among infants aged 0–59 days: target product profile

- Defines characteristics of tests to support early, accurate diagnosis among infants, with the aim to guide development of tools to improve clinical decision-making and reduce unnecessary antibiotic use.

WHO | Publication | 25 July 2025 | Online link

Mapping the AMR infection landscape in Bihar: implications for strengthening policy and clinical practice

- Characterizes AMR trends across five tertiary hospitals in Bihar (2022–2024) and provides a framework for integrating AMR surveillance into routine workflows – that show high levels of resistance to beta-lactams, carbapenems, and fluoroquinolones across pathogens.
- Demonstrates utility of antibiograms for empirical therapy and digital integration for improving culture testing compliance, data completeness and turnaround times.

MDPI | Article | 5 July 2025 | Online link

Azithromycin resistance in *Salmonella Typhi*: navigating diagnostic uncertainties and clinical decision-making

- Reveals false resistance (major error) in 2% isolates while assessing association between azithromycin MIC distribution and disc inhibition zone size in 353 *Salmonella Typhi* isolates.
- Advocates for careful interpretation of susceptibility results and supports the continued use of azithromycin in uncomplicated cases.

JAC – Antimicrobial Resistance | Article | 2 July 2025 | Online link

The antibiotic resistance profiles of Staphylococcus in the Asia Cornea Society infectious keratitis study

- Analyzes 490 Staphylococcus isolates from keratitis cases across Asia using broth microdilution to assess susceptibility to 11 antibiotics from 7 classes, following CLSI guidelines.
- Reveals high rates of resistance to commonly used fluoroquinolones and prevalence of MDR in methicillin-resistant isolates, although vancomycin was universally effective.

Int Ophthalmol | Original paper | 22 July 2025 | Online link

Characterization of *Enterococcus faecalis* associated with root canal failures: virulence and resistance profile

- Analyzes virulence factors and antibiotic resistance profiles of *E. faecalis* isolates obtained from unsuccessful root canal procedures.
- Shows that strains capable of biofilm production exhibited greater resistance to antibiotics, highlighting the need for enhanced disinfection methods and alternative treatment strategies to reduce risk of reinfection.

Journal of Conservative Dentistry and Endodontics | Original article | 2 July 2025 | Online link

Emergence of β-lactamase-producing *Proteus mirabilis* in clinical settings: a genotypic investigation of resistance mechanisms and carbapenemase genes bla NDM-1 and bla KPC-2

- Characterises resistance mechanism of *P. mirabilis* strains to inform targeted treatment strategies and antimicrobial stewardship programs.
- Underscores the need for continuous surveillance, strict IPC measures, and prudent antibiotic use to curb the emergence and spread of resistant *P. mirabilis* strains in clinical settings.

Biotechnology Notes | Research article | 10 July 2025 | Online link

Genomic and functional characterization of multidrug-Resistant *E. coli*: insights into resistome, virulome, and signaling systems

- Whole-genome sequencing of *E. coli* strain ECG015 from a human gut sample reveals multiple antibiotic resistance genes, virulence factors, and efflux pump components.
- The comprehensive genomic profile finds CpxAR – a two-component system as a potential central regulator coordinating antimicrobial resistance, stress kinase signalling, and programmed cell death, providing novel intervention targets.

Antibiotics | Article | 30 June 2025 | Online link

3) Infection prevention and control

Sameeksha – Infection Prevention and Control | volume 20

- WHO's practical guidance on developing & implementing national action plans for IPC
- Role of gowns in preventing nosocomial transmission of respiratory viruses
- Digital feedback to improve hand hygiene compliance
- Multiple determinants influencing infection prevention and control
- Future of HAI surveillance – automated surveillance and using artificial intelligence
- SHEA white paper on IPC and healthcare epidemiology curriculum for ID fellows

WCO India | Newsletter | June 2025 | Online link

4) Optimise use of antimicrobials

National treatment guidelines for antimicrobial use in infectious disease syndromes

- Provides evidence-based recommendations for empiric antibiotic therapy in common infectious disease syndromes, emphasizing diagnostic stewardship, early sample collection, targeted therapy based on culture results, and de-escalation – to optimize antimicrobial use and minimize antimicrobial resistance.
- Covers a wide range of clinical syndromes (infections in cardiovascular, CNS, gastrointestinal, respiratory, skin, musculoskeletal, ocular, reproductive, neonatal, dental, etc. as well as febrile cases and healthcare associated infections), outlining first-line and alternative treatments, dosing, and duration, while stressing alignment with local antibiograms and institutional policies.

NCDC-ICMR | National treatment guidelines | July 2025 | Online link

Assessment of antibiotic utilization patterns in an Indian level-1 trauma center: a pilot study exploring days of antibiotic spectrum coverage and defined daily doses using WHO AWaRe classification trends

- Assessment of antibiotic use at AIIMS Trauma Centre shows that Watch group antibiotics dominated usage with a low Access-to-Watch ratio (0.47), highlighting the need of policy reform to enforce adherence to WHO AWaRe classification.
- Reports Days of Antibiotic Spectrum Coverage (DASC) tool as a transformative tool for antibiotic stewardship, supporting targeted de-escalation and improved benchmarking.

Frontiers in Antibiotics | Original research article | 15 July 2025 | Online link

Ceftazidime-avibactam plus aztreonam for extensively drug-resistant gram-negative infections in critically ill patients

- Evaluates clinical efficacy of ceftazidime-avibactam plus aztreonam (CZA/ATM) in treating metallo-β-lactamase-producing Gram-negative infections.
- Shows that CZA/ATM has significant in vitro synergy against XDR pathogens with a promising trend towards improved clinical outcomes in critically ill patients, highlighting the need for a larger clinical trial.

Journal of Critical Care | Article | 29 July 2025 | Online link (abstract only)

Aztreonam-avibactam for the treatment of serious infections caused by metallo- β -lactamase-producing Gram-negative pathogens: a Phase 3 randomized trial

- Multicentric study compares aztreonam-avibactam to best available therapy (BAT) in treating serious infections caused by metallo-β-lactamase-producing Gram-negative bacteria.
- Shows that Aztreonam-avibactam had a better clinical cure rate, lower 28-day mortality and no treatment-related serious adverse events, supporting its potential as a safe, effective option for MBL-producing Gram-negative bacterial infections.

JAC – Antimicrobial Resistance | Journal article | 28 July 2025 | Online link

5) Research, innovations and finance

Genomic insights into bacteriophages: a new frontier in AMR detection and phage therapy

- Explores bacteriophage genomics and holo-transcriptomics to detect AMR genes, characterize phage-host interactions, and identify transcriptionally active phages.
- Analysis reveals novel phage genes, AMR markers, and host-specific dynamics, leading to transformation of phage therapy through phage cocktail and phage genome engineering.

Briefings in Functional Genomics | Journal article | 28 July 2025 | Online link

Smart wound dressing with real-time colorimetric detection of antimicrobial resistance and infection

- Presents a hydrogel-based smart wound dressing embedded with pH-sensitive and chromogenic indicators to detect infection and AMR in real time.
- Concludes that smart wound dressings are suitable for point-of-care (POC) applications, as they aid timely interventions, reduce reliance on traditional antibiotics, and address AMR.

ACS Infectious Diseases | Article | 17 July 2025 | Online link

Gold nanocluster-based biosensing for rapid detection of carbapenem-resistant organisms in bloodstream infections

- Presents a biosensor using bovine serum albumin-stabilized gold nanoclusters (BSA-AuNCs) to detect carbapenem-resistant Gram-negative bacteria (CR-GNB) directly from blood samples.
- Validates BSA-AuNCs against 400 clinical isolates using fluorescence assays and real-time PCR, showing 96% sensitivity in blood samples within 2 hours – enabling rapid, culture-independent detection of CR-GNBs.

Springer Nature Link | Article | 2 August 2025 | Online link (abstract only)

Probiotic-derived postbiotics: a perspective on next-generation therapeutics

- Explores literature on postbiotics (bioactive metabolites produced by probiotics) as a promising alternative to live microbial therapy.
- Analyzes key classes, discusses formulation advances, and highlights post-biotics as a sustainable and functionally rich alternative to probiotics.

Frontiers | Perspective article | 17 July 2025 | Online link

Microbiological profile of airway in Indian children with cystic fibrosis: a multicenter prospective cohort study

- Presents the first nationwide microbiological profile of the airway in Indian children with cystic fibrosis, with *P. aeruginosa* as the most common isolated organism followed by *S. aureus, E. coli* and *K. pnemoniae.*
- Provides antibiotic sensitivity patterns to common organisms, to help promote antibiotic stewardship and formulate policies for children with cystic fibrosis.

Pediatric Pulmonology | Original article | 22 July 2025 | Online link (abstract only)

Adaptive laboratory-evolved MRSA with PPEF manifests cross-susceptibility to oxacillin and hypersensitivity to ciprofloxacin

- Reports the development of a new small molecule – PPEF (2′-[4-ethoxyphenyl]-5-[4-propylpiperazin-1-yl]-1H,1′H-2,5′-bibenzo[d]imidazole) targeting bacterial type IA topoisomerase – as a novel drug target in bacteria.
- Shows that PPEF-evolved MRSA demonstrated downregulation and deletion of key resistance genes, resulting in regained susceptibility to oxacillin, ciprofloxacin, gentamicin, and imipenem – highlighting PPEF's potential to reverse resistance phenotypes.

Microbiology Spectrum | Research article | 15 July 2025 | Online link

Investigating RND efflux pumps in *Sphingobium yanoikuyae* P4: the role of nonpathogenic bacteria in antibiotic resistance gene spread amid environmental contamination

- Studies RND efflux pump systems in *Sphingobium yanoikuyae* P4, a nonpathogenic environmental bacterium, to assess its role in antibiotic resistance gene mobilization under pollutant stress.
- Confirms that non-pathogenic microbes in contaminated ecosystems can function as reservoirs and vectors for AMR and need to be monitored.

Journal of Biomolecular Structure and Dynamics | Research article | 30 July 2025 | Online link (abstract only)

AI-prediction of *Neisseria gonorrhoeae* resistance at the point of care from genomic and epidemiologic data

- Uses a hybrid machine learning, a deep learning framework and clinical metadata from 3,786 *N. gonorrhoeae* isolates to predict antimicrobial resistance.
- The AI model outperformed genome-wide association study benchmarks, highlighting the potential of ML-driven approaches to enhance the real-time prediction of AMR in *N. gonorrhoeae*.

Healthcare | Article | 8 July 2025 | Online link

Marine bacteriophages as next-generation therapeutics: insights into antimicrobial potential and application

- Explores therapeutic potential of marine bacteriophages in combating microbial infections.
- Reviews their ecological diversity, infection mechanisms, and therapeutic applications, highlighting their role as a promising alternative to conventional antibiotics in clinical and environmental settings.

Viruses | Review | 10 July 2025 | Online link

Actinomycetes from high altitude salt lake Tso-Kar of Ladakh offers bright prospects for antimycobacterial drug discovery especially for drug resistant mycobacteria

- Studies 145 strains of actinomycetes from the hypersaline Tso-Kar Salt lake in Ladakh to explore their antibacterial potential.
- Found extracts that showed potent bactericidal activity against *M. tuberculosis* including drug-resistant strains, highlighting untapped potential for developing novel anti-TB drugs for MDR infections.

Springer Nature Link | Article | 1 August 2025 | Online link (abstract only)

6) Collaborations

When policy-makers have your back: the Kerala experience with state-wide antimicrobial resistance mitigation efforts

- Documents AMR containment initiatives in Kerala led by the state government – Antibiotic Literate Kerala Campaign, Antibiotic Smart Hospital Initiative, KARSNET for AMR surveillance, and Operation AMRITH.
- The Kerala initiatives model fostered antibiotic literacy, improved surveillance, and catalyzed community engagement – highlighting the role of political and administrative will in state-led AMR mitigation efforts.

Antimicrobial Stewardship & Healthcare Epidemiology | Commentary | 11 July 2025 | Online link

Prevalence, characterization and antibiogram of *Staphylococcus aureus* isolates from bovine and swine population in Bareilly, Uttar Pradesh, India

- Assesses prevalence, biofilm genes, and resistance markers in *S. aureus* isolates from livestock.
- Shows that overall prevalence of *S. aureus* was 18%, with 86% isolates showing multidrug resistance, highlighting zoonotic risks and the need for AMR surveillance in livestock.

Scientific Reports | Article | 1 August 2025 | Online link

Genomic insights into antibiotic-resistant *Vibrio species* from clinical and coastal environmental sources in India

- Comparison of virulence and AMR profiles of *Vibrio cholerae* from clinical and environmental sources shows that environmental *V. cholerae* were resistant to fluoroquinolones and macrolides, while clinical isolates were resistant to aminoglycosides and sulphonamides.
- Highlights the public health risk due to frequent human interactions with coastal waters, and the risk of horizontal gene transfer.

Marine Pollution Bulletin | Article | 29 July 2025 | Online link (abstract only)

First report of *Stenotrophomonas maltophilia* from canine dermatological infections: unravelling its antimicrobial resistance, biofilm formation, and virulence traits

- Documents virulence, biofilm formation, and antimicrobial susceptibility *of S. maltophilia* in dogs.
- Highlights zoonotic potential of *S. maltophilia* from dogs and the need for a One Health approach to mitigate infection risks and spread of resistant pathogens.

Antibiotics | Article | 23 June 2025 | Online link

Antimicrobial resistance in equines: a growing threat to horse health and beyond – a comprehensive review

- Details the history and types of antimicrobials used in horses and provides recommendations for combating drug-resistant bacterial infections in horses.
- Highlights the epidemiology of AMR in horses – including public health significance and transmission dynamics between horses and other animals – with a One Health lens.

Antibiotics | Article | 29 July 2025 | Online link

Detection of Salmonella pathogenicity islands and antimicrobial-resistant genes in *Salmonella enterica Serovars Enteritidis* and *Typhimurium* isolated from broiler chickens

- Studies the prevalence of *S. enterica* serovars Enteritidis and Typhimurium and their antibiotic resistance profiles in broiler chicken faeces.
- Reveals that *S. enterica* serovar Typhimurium is the most prevalent serotype detected in chicken faeces and highlights the need for stringent public health and food safety policy.

Antibiotics | Article | 16 May 2025 | Online link

Quotable quote

"... there is a pressing need for high-quality, affordable diagnostic tools tailored to meet the specific requirements of the healthcare system"

– Dr Rajiv Bahl,
Secretary DHR & Director General ICMR
(Validation of rapid diagnostics for pathogen identification and AST, 2025)

Sameeksha is a Hindi word, meaning "review". Publications and resources on AMR (with a bulleted summary and online link) are compiled 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.