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sameeksha

ANTIMICROBIAL RESISTANCE (AMR) | Volume 35 | May 2025

AMR *Sameeksha**

Highlights

- Attitudes and practices for antibiotic prescription and AMR among general physicians
- Epidemiology and clinical outcomes of carbapenem-resistant Enterobacteriaceae in Kerala
- GLASS report on antibiotic use data for 2022
- Operation antimicrobial resistance intervention for total health in Kerala
- Estimated undertreatment of carbapenem-resistant Gram-negative bacterial infections in eight LMICs
- The future of antibiotic use in livestock

1) Awareness and understanding

Attitudes and practices for antibiotic prescription and antimicrobial resistance among general physicians – findings from a multi-country survey

- Assesses attitudes and practices of general physicians regarding antibiotic prescribing and AMR in respiratory infections through an online cross-sectional survey across 9 countries, including India.
- Identifies current practices and possible gaps in appropriate antibiotic prescribing for respiratory tract infections, and specific training needs of general physicians to use antibiotics in an outpatient setting.

PLOS Global Public Health | Research article | 7 May 2025 | Online link

The social burden of antimicrobial resistance: what is it, how can we measure it, and why does it matter?

- Explores the concept of the social burden of AMR, proposing frameworks to measure its societal, psychological, and economic impacts beyond clinical outcomes.
- Emphasizes that AMR exacerbates health inequities, disrupts livelihoods and burdens caregivers – which need integration of social dimensions into AMR policy and research.

JAC – Antimicrobial Resistance | Journal article | 10 March 2025 | Online link

2) Laboratories and surveillance

Epidemiology and clinical outcomes of monomicrobial carbapenem-resistant Enterobacteriaceae (CRE) from a metropolitan area of Kerala, India

- Prospective observational study analyses regional epidemiology, resistance patterns and clinical outcomes of CRE infections in two private and one government hospital in Ernakulum district.
- Reports notable incidence and all-cause mortality due to CRE – and the need to optimize treatment practices.

JIDC | Original article | 29 April 2025 | Online link

Antimicrobial susceptibility trends of *S.* Typhi and *S.* Paratyphi in a post-COVID-19 pandemic India, from a multicenter surveillance network

- Assesses antimicrobial susceptibility of *Salmonella* Typhi and Paratyphi from seven cities across India – nearly all isolates were resistant to ciprofloxacin.
- Reports emergence of third-generation cephalosporin-resistant *Salmonella* Typhi in Western India and increase in mean/median and 90th percentile of azithromycin MICs in *S.* Typhi and Paratyphi isolates across India.

Scientific Reports | Article | 21 April 2025 | Online link

Incidence risk factors and drug resistance patterns of bacterial isolates in patients with catheter-associated urinary tract infections

- Prospective observational study of catheterized patients with UTIs in the intensive care unit of a tertiary care hospital in Maharashtra.
- Identifies *E. coli*, *K. pneumoniae* and *Candida* species as the main pathogens, with high levels of antibacterial resistance.

Indian Journal of Critical Care Medicine | Original article | 31 March 2025 | Online link

Dynamics of antimicrobial susceptibility and risk factors associated with infections caused by colistin-resistant bacteria: a study from the northern region of Haryana, India

- Reveals highest resistance to colistin in *Pseudomonas* spp. and *Acinetobacter* spp., and significant associations between colistin resistance and level of education, prolonged hospital stay and comorbidities.
- Emphasizes the need for enhanced surveillance, infection prevention and control, and antimicrobial stewardship programs.

Sciendo | Original paper | 26 March 2025 | Online link

Antimicrobial resistance among children in Southeast Asia: a systematic review

- Analyses studies from Southeast Asia region to assess prevalence, patterns and drivers of antimicrobial resistance in children.
- Reports significant resistance to antibiotics used for common paediatric infections, highlighting need for enhanced clinical surveillance and targeted pediatric antibiotic trials and drug development.

BMJ Public Health | Original research | 1 May 2025 | Online link

3) Infection prevention and control

Sameeksha – Infection Prevention and Control | volume 18

- Risk factors for health care-associated bloodstream infections in NICUs
- Spreading of hand hygiene change package across an acute hospital
- Prevalence of fungi and their antifungal and disinfectant resistance in hospital environments
- Review of HAIs: the role of microbial and environmental factors in infection control
- Water and sanitation technologies for health-care facilities
- IPC pre-service education and training curriculum

WCO India | Newsletter | 13 May 2025 | Online link

4) Optimise use of antimicrobials

Global Antimicrobial Resistance and Use Surveillance System (GLASS) report: antibiotic use data for 2022

- Presents antibiotic use data from 60 countries, collected through WHO GLASS, focusing on trends in Access, Watch, and Reserve (AWaRe) antibiotic categories.
- Use of Watch antibiotics remains high in many settings, while some LMICs reported very little or no use of Reserve antibiotics, indicating the need to improve access to essential antibiotics.

WHO | Global report | 29 April 2025 | Online link

Operation antimicrobial resistance intervention for total health – a path forward

- Outlines Government of Kerala's Operation Amrith (AMR Intervention for Total Health) launched on 6 January 2024 to combat over-the-counter sale of antibiotics.
- Mentions other initiatives like the antibiotic literate Kerala campaign, Kerala AMR surveillance network (KARS-Net) and programme on removal of unused drugs (PROUD) and roles of key stakeholders in addressing misuse of antibiotics and AMR in India.

National Journal of Pharmacology and Therapeutics | Review article | 26 April 2025 | Online link

GP or ChatGPT? Ability of large language models (LLMs) to support general practitioners when prescribing antibiotics

- Evaluates how well ChatGPT performs compared to general practitioners (GPs) in prescribing antibiotics, using clinical vignettes to assess appropriateness and safety.
- Shows comparable performance of ChatGPT to GPs in many scenarios but concludes that GPs remain best placed to interpret clinical nuances, apply national guidelines and prescribe the right dose and duration.

Journal of Antimicrobial Chemotherapy | Journal article | 13 March 2025 | Online link

Antibiotic use and misuse in maritime settings: challenges and implications for global antimicrobial resistance response

- Reviews antibiotic use practices in maritime environments – including ships and offshore facilities – and highlights challenges like resource constraints, diverse populations, regulatory gaps and inadequate training.
- Identifies widespread antibiotic misuse due to limited oversight, inconsistent guidelines, and poor access to diagnostics, posing a significant but underrecognized risk to global AMR containment efforts.

Current Infectious Disease Reports | Article | 18 March 2025 | Online link

Harnessing the power of antimicrobial peptides: from mechanisms to delivery optimization for topical infections

- Reviews antimicrobial peptides (AMPs), focusing on their mechanisms, immunomodulatory effects, and innovative delivery systems like nanoparticles to enhance topical infection treatment.
- Shows that AMPs effectively combat resistant microbes and gives directions for future research.

MDPI | Review | 4 April 2025 | Online link

Serum-stable, cationic, α -helical AMPs to combat infections of ESKAPE pathogens and *C. albicans*

- Evaluates serum-stable, cationic, α -helical AMPs to overcome limitations like protease degradation and cytotoxicity, targeting multidrug-resistant ESKAPE pathogens and *Candida albicans*.
- Shows that engineered AMPs demonstrate strong antimicrobial activity, enhanced serum stability, and reduced toxicity, showing promise as treatment options.

ACS Applied Bio Materials | Research article | 30 April 2025 | Online link (abstract only)

5) Research, innovations and finance

Estimated undertreatment of carbapenem-resistant Gram-negative bacterial infections in eight low-income and middle-income countries: a modelling study

- Estimates treatment gap for carbapenem-resistant Gram-negative (CRGN) infections across eight LMICs, analyzing data from the GRAM study using computational modelling.
- Shows that only about 6.9% of CRGN infections received appropriate treatment across the 8 countries (including India), highlighting the need for improved access to antibiotics and diagnostics, strengthening of health systems and research to identify gaps in treatment pathways.

The Lancet Infectious Diseases | Article | 30 April 2025 | Online link

Domestic laundering of healthcare textiles: disinfection efficacy and risks of antibiotic resistance transmission

- Assesses six domestic laundering machines for their ability to disinfect healthcare textiles, using microbial bioindicators, detergent assays and metagenomic analysis.
- Suggest domestic laundering of healthcare uniforms may be inadequate for decontamination, posing risks for transmission of healthcare associated infections and AMR.

PLOS One | Research article | 30 April 2025 | Online link

Assessment of seasonal variations in antibiotic resistance genes and microbial communities in sewage treatment plants for public health monitoring

- Analyzes microbial communities and antibiotic resistance genes (ARGs) across six sewage treatment plants in Pune (India) to assess seasonal variations and public health risks.
- Shows that ARG abundance and microbial diversity varied seasonally, with high resistance gene levels in all three seasons.

Environmental Pollution | Research article | 2 May 2025 | Online link (abstract only)

6) Collaborations

The future of antibiotic use in livestock

- Projects global antibiotic use in livestock using a novel Livestock Biomass Conversion method.
- Highlights that without intervention, antibiotic use could rise 29.5% by 2040 from the 2019 baseline – that need coordinated global efforts targeting both livestock biomass and antibiotic use intensity.

Nature Communications | Article | 1 April 2025 | Online link

'Mind the gaps': stakeholder perspectives on addressing antimicrobial resistance in the environment in the Indian context

- Explores Indian stakeholders' views on managing pharmaceutical manufacturing waste and its role in environmental AMR.
- Reveals fragmented policies, limited capacity and economic constraints affecting industry behaviour and regulatory enforcement.

Global Health Action | Research article | 1 May 2025 | Online link

Ploidy plasticity drives fungal resistance to azoles used in agriculture and clinics

- Investigates how exposure to agricultural fungicides induces ploidy changes in *Candida tropicalis,* using genomic and phenotypic analyses to understand resistance mechanisms.
- Shows that ploidy plasticity led to haploid strains with cross-resistance to clinical and agricultural azoles, highlighting environmental fungicide use as a driver of antifungal resistance.

PLOS Biology | Primer | 2 April 2025 | Online link

Fish are poor sentinels for surveillance of riverine antimicrobial resistance

- Assesses whether two riverine fish species (Brown trout and European bullhead) could serve as sentinels for monitoring AMR in rivers across a wastewater treatment plant in Germany.
- Shows that fish microbiomes reflected environmental microbial shifts, however their resistomes were less responsive to antimicrobial resistance gene levels, indicating their limited utility for AMR surveillance in freshwater environments.

Science Direct | Article | 1 April 2024 | Online link

Quotable quote

"The irony of AMR is that it's driven by the inappropriate use of antimicrobials, and yet a large number of people also die because they can't access these medicines at all"

– Dr Tedros Adhanom Ghebreyesus
Director-General WHO

****Sameeksha*** is a Hindi word, meaning "review". Publications and resources (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.