

## AMR Sameeksha\*

### Highlights

- AMR curriculum assessment tool for pharmacy education
- Surveillance of AMR by a global network of WHO collaborating centres
- ESCMID position statement: Integrating planetary health into IPC in healthcare settings
- Empirical antibiotic prescriptions in suspected UTI in peripheral hospitals of West Bengal
- Advancements in microalgae-mediated technologies for antibiotic removal from wastewater
- Economic burden of typhoid fever by antimicrobial resistance in India

### Quotable quote

*Across the WHO South-East Asia Region, health threats are becoming more complex and interconnected, driven by the spillover of zoonotic pathogens, climate change, environmental pollutants, and the growing burden of antimicrobial resistance (AMR).*

– Dr Catharina Boehme  
Officer-in-Charge, WHO South-East Asia

[World Health Day 2026: Together for health. Stand with science](#)

\*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 objectives of India's National Action Plan on Antimicrobial Resistance 2.0. Kindly note, inclusion of publications and resources in this review/compilation does not imply an endorsement by WHO.

## 1) Improve Awareness and understanding

### Impact of WHO AWaRe Antibiotic Handbook training on antibiotics prescribing knowledge among private primary care providers: a vignette-based, prep-post pilot study in Patna, India

- Assesses the impact of WHO AWaRe Antibiotic Handbook training on antibiotic prescribing knowledge among private primary care providers (PCPs), including informal providers (IPs).
- The training significantly reduced unnecessary antibiotic prescribing for acute diarrhoea and UTI, especially among IPs, with decreased Watch-category use, improving rational prescribing knowledge for some conditions.

*Antimicrobial Resistance and Infection Control* | Article | 27 March 2026 | [Online link](#)

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## Antimicrobial resistance curriculum assessment tool for pharmacy education

- Enables a rapid, systematic review of pharmacy curricula at the national or institutional level to evaluate their robustness in delivering the expected content and competencies.
- Assists institutions in designing a strategy or reviewing existing processes and structures to enhance the AMR-specific and sensitive content of a curriculum for pharmacy students and trainees.

WHO | Publication | 16 April 2026 | [Online link](#)

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## Prevent health care-associated infections – webinar

- Fourth webinar in the global webinar series on the implementation of the World Patient Safety Day Goals for safe care for every newborn and every child, scheduled on 7 May 2026 at 5:30 pm (IST).

WHO | Webinar | May 2026 | [Registration link](#)

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## Knowledge and practice regarding antibiotic usage in dogs among pet owners in a district in South India

- A cross-sectional survey of 427 owners in a South Indian district found over half followed correct access, use, and storage practices, with awareness linked to education, residence, and years as a pet owner.
- Authors call for targeted education of dog owners about AMR and antimicrobial use.

*The Journal of Infection in Developing Countries* | Original article | 31 March 2026 | [Online link](#)

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## 2) Strengthen laboratory capacity

### Surveillance of AMR by a global network of WHO collaborating centres

- Describes how a global network of WHO Collaborating Centres coordinates standardized surveillance of AMR across regions, integrating laboratory, epidemiological, and public-health data to monitor AMR trends.
- Authors highlight the network's role in harmonizing methods, strengthening national capacities, and supporting WHO initiatives such as GLASS to inform global and country-level AMR policies and interventions.

WHO Bulletin | Article | April 2026 | [Online link](#)

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### Factors influencing antibiotic-resistant bacteria colonization among community and hospitalized individuals in Chennai, India: an Antibiotic Resistance in Communities and Hospitals (ARCH) study

- Study found high gut colonization with multi-drug-resistant Enterobacterales; prior antibiotic exposure and invasive healthcare procedures were associated with higher colonization in hospitalized patients.
- Authors recommend strengthening IPC, diagnostics and stewardship to limit transmission and infections.

*Antimicrobial Resistance and Infection Control* | Article | 18 April 2026 | [Online link](#)

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### Genomic insights into antimicrobial resistance in ocular pathogens from India

- Analysis of 291 ocular bacterial genomes from Indian patients shows >45% multidrug resistance and >15% extensively drug-resistant strains, with *Pseudomonas aeruginosa* and *Staphylococcus aureus* most prevalent.
- Genomic insights uncovered a novel mecA-negative MRSA strain resistant to vancomycin and teicoplanin, underscoring the need for broader genomic surveillance and stewardship in eye care.

*Communications Biology* | Article | 3 April 2026 | [Online link](#)

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## Wild-type MIC distribution and evaluation of epidemiological cut-offs of second-line TB-drugs in susceptible and MDR-TB clinical isolates from Chennai, India

- Broth microdilution MIC testing of 220 *Mycobacterium tuberculosis* isolates revealed deviations from WHO epidemiological cut-offs (ECOFFs), with widespread sub-therapeutic exposures in resistant strains.
- Regionally calibrated ECOFFs are essential to avoid misclassification, improve regimen design, and strengthen surveillance, particularly given high fluoroquinolone resistance in Chennai MDR-TB isolates.

*Frontiers in Microbiology* | Original research article | 11 March 2026 | [Online link](#)

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## Vancomycin MIC creep and the emergence of oxacillin-susceptible MRSA: a three-year surveillance study from a tertiary care centre

- Surveillance study at a tertiary care centre in India found a gradual increase in vancomycin minimum inhibitory concentrations (“MIC creep”) among MRSA isolates, raising concerns about reduced efficacy.
- Unexpected emergence of oxacillin-susceptible MRSA strains was observed, indicating shifting resistance patterns and the need for vigilant monitoring and tailored treatment strategies.

*New Microbes and New Infections* | Article | 27 March 2026 | [Online link](#)

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## Metagenomic profiling of antimicrobial resistance in wastewater from metropolitan cities of India

- Shotgun metagenomics of wastewater from 19 sites across four Indian metropolitan cities (2022–2024) reveal city-specific microbial communities but broadly similar antimicrobial resistance gene (ARG) profiles.
- High proportions of novel metagenome-assembled genomes and strong associations of tetracycline and  $\beta$ -lactam resistance genes with mobile genetic elements underscore wastewater as a key reservoir for AMR spread, supporting wastewater-based surveillance for guiding mitigation strategies in India.

*Nature Communications* | Article | 17 March 2026 | [Online link](#)

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## Genetic characterization of tigecycline and carbapenem resistant *Acinetobacter baumannii* in a tertiary care hospital of Northern India

- Among 160 *Acinetobacter baumannii* isolates from a North Indian tertiary hospital, 20% were multidrug-resistant to both carbapenems and tigecycline, with transferable carbapenem resistance genes.
- Highlights the need for infection-control and antimicrobial stewardship to curb plasmid-mediated spread of carbapenem resistance in *A. baumannii*.

*BMC Microbiology* | Article | 20 April 2026 | [Online link](#)

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## Pathotype-specific antimicrobial resistance in diarrheagenic *Escherichia coli*: gene variants, resistance mechanisms, and evolution of treatment strategies

- Review shows diarrheagenic *E. coli* pathotypes (ETEC, EPEC, EAEC, STEC, EIEC, AIEC) have distinct resistance gene profiles.
- High resistance seen to ampicillin and co-trimoxazole and rising fluoroquinolone, azithromycin, and cephalosporin resistance, driven by ESBLs and mobile genes.

*Frontiers in Microbiology* | Review article | 27 March 2026 | [Online link](#)

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## Molecular characterization and transmission pattern of tetracycline resistance determinants in tigecycline and carbapenem resistant *Klebsiella pneumoniae* isolates at a tertiary care hospital in India

- Characterizes multidrug-resistant *Klebsiella pneumoniae* isolates, identifying tetracycline resistance mainly driven by tet(A) variants coexisting with plasmid-encoded carbapenemase genes (bla<sub>NDM</sub> and bla<sub>OXA-48</sub>).
- Highlights clonal spread and limited horizontal transfer of tigecycline resistance, underscoring serious therapeutic and infection-control challenges in hospital settings.

*Access Microbiology* | Research article | 12 March 2026 | [Online link](#)

## A decade of antimicrobial resistance in *Vibrio* spp.: genomic and functional insights

- Over the past decade, *Vibrio* species have shown increasing antimicrobial resistance driven by genomic diversification, mobile genetic elements, and environmental pressures across clinical and aquatic settings.
- Genomic and functional studies highlight rising resistance to  $\beta$ -lactams and tetracyclines, and need for integrated surveillance to guide treatment and public-health interventions.

*Antimicrobial Chemotherapy* | Research article | 2 April 2026 | [Online link](#)

### 3) Reduce Incidence of Infection

#### Position statement: Integrating planetary health into infection prevention and control in healthcare settings – toward a balanced and evidence-based approach

- This position paper by the ESCMID Study Group for Nosocomial Infections argues that IPC should integrate planetary health principles to reduce healthcare's environmental footprint without compromising patient safety.
- Calls for evidence-based, risk-balanced IPC policies that align sustainability goals with effective infection control, supported by research, stewardship, and system-level innovation.

*Clinical Microbiology and Infection* | Guidelines | 24 April 2026 | [Online link](#)

#### Enhancing hand hygiene compliance to reduce healthcare-associated infections in a coronary care unit: a quality improvement initiative in a tertiary hospital in South India

- This quality improvement initiative implemented WHO's multimodal hand hygiene strategy using iterative PDSA cycles, increasing compliance from 63.8% to over 80% within 20 weeks.
- Sustained improvement was achieved with no reported bloodstream infections during the intervention, demonstrating the effectiveness of low-cost, team-based quality improvement approaches.

*BMJ Open Quality* | Original research | 2 April 2026 | [Online link](#)

#### The missing thread of One Health efforts: improper drug disposal as an overlooked driver of antimicrobial resistance

- Highlights improper household disposal of unused antimicrobials as a neglected but critical driver of AMR, as discarded drugs contaminate soil and water, promoting resistance selection and horizontal gene transfer.
- Calls for integrating safe drug-disposal policies, ecopharmacovigilance, and environmental surveillance into AMR action plans to reduce environmental selection pressure and resistance propagation.

*mSphere* | Minireview | 13 April 2026 | [Online link](#)

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## Customizing infection prevention and control modules for combating healthcare-acquired infections in low-resource hospitals or resource-constrained healthcare settings: a local and global approach

- This multicentre quality-improvement study evaluated a WHO-aligned, customizable IPC model implemented in 11 resource-constrained tertiary hospitals in India, demonstrating significant improvements in IPC assessment scores, hand-hygiene compliance, and adherence to care bundles.
- Highlights that structured, adaptable IPC modules are feasible, scalable, and effective for strengthening HAI prevention in low-resource healthcare settings locally and globally.

*Antimicrobial Resistance and Infection Control* | Article | 11 March 2026 | [Online link](#)

## 4) Optimise use of antimicrobials

### Clinico-epidemiological determinants for empirical antibiotic prescriptions in suspected urinary tract infection cases attending peripheral hospitals of West Bengal, India – a cross sectional analysis

- This study in peripheral hospitals of West Bengal found that 60% of patients with suspected UTI received empirical antibiotics, largely driven by contextual and severity-related factors rather than consistent clinical predictors.
- Inpatient status, recurrent UTI episodes, and symptoms such as urinary urgency influenced multiple and broader-spectrum (Watch) antibiotic prescriptions, underscoring the need for diagnostic-supported antimicrobial stewardship in resource-limited settings.

*Scientific Reports* | Article | 25 April 2026 | [Online link](#)

### A diagnostic stewardship bundle approach to facilitate same-day optimal antimicrobial therapy in gram-negative sepsis: a quasi-experimental study

- Evaluated a diagnostic stewardship bundle in Gram-negative sepsis, combining optimized blood-culture workflows with rapid identification and EUCAST (European Committee on Antimicrobial Susceptibility Testing) rapid antimicrobial susceptibility testing (RAST) to deliver provisional reports within 24 hours.
- The intervention significantly reduced laboratory turnaround times and enabled same-day antimicrobial review, leading to early therapy modification in nearly two-thirds of patients in a resource-limited ICU setting.

*Scientific Reports* | Article | 12 April 2026 | [Online link](#)

### The role of electronic medical record systems and pharmacovigilance databases in the surveillance of antimicrobial use and resistance in low- and middle-income countries: protocol for a multistudy project

- This research protocol describes a multi-study project evaluating how electronic medical record systems and pharmacovigilance databases, can strengthen surveillance of antimicrobial use and resistance in LMICs.
- Through hospital-based studies, surveys, and systematic reviews, it aims to generate evidence on how digital data sources can complement traditional surveillance and inform antimicrobial stewardship and AMR policies.

*JMIR Research Protocols* | Protocol | 28 April 2026 | [Online link](#)

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## Confronting bla<sub>NDM-5</sub> in *Salmonella Typhi*: from molecular epidemiology, resistance mechanism to clinical management

- Reviews the global emergence of bla<sub>NDM-5</sub>-producing *Salmonella Typhi*, detailing its plasmid-mediated resistance mechanisms, and rapid spread from South Asia through international travel and trade.
- Highlights severe therapeutic challenges due to extensive drug resistance and emphasizes the need for whole-genome surveillance, infection-control measures, and optimized clinical treatment.

*Infect Drug Resist* | Review | 16 April 2026 | [Online link](#)

## 5) Promote research and innovations

### Advancements in microalgae-mediated technologies for antibiotic removal from wastewater: a review

- Synthesizes recent advances in microalgae-mediated technologies for removing antibiotics from wastewater, through mechanisms such as adsorption, bioaccumulation, biodegradation, photodegradation, and hydrolysis.
- Discusses how operational factors and hybrid systems combining microalgae with bacteria or advanced oxidation processes enhance removal efficiency, while outlining key challenges and future directions.

*Biodegradation* | Article | 17 March 2026 | [Online link](#)

### Synergistic potential of bacteriophage and blue light therapy against biofilm-associated *Klebsiella pneumoniae* in postoperative gynaecological infections

- This experimental study demonstrates the synergistic effect, of combining lytic bacteriophages with antimicrobial blue light therapy, against biofilm-forming *Klebsiella pneumoniae*.
- The dual approach significantly enhanced biofilm disruption and bacterial killing compared with either modality alone, highlighting a promising non-antibiotic strategy for managing difficult healthcare associated infections.

*Photodiagnosis and Photodynamic Therapy* | Article | 18 February 2026 | [Online link](#)

### Probiotics and prebiotics as alternatives to antibiotics in aquaculture: a systematic and bibliometric review of antimicrobial and antioxidant mechanisms

- Analyses global research on probiotics and prebiotics as antibiotic alternatives in aquaculture, highlighting their antimicrobial and antioxidant mechanisms against aquatic pathogens.
- Shows that these feed interventions improve immunity, growth and stress tolerance in aquatic species, while reducing antibiotic use and resistance, supporting sustainable and health-conscious aquaculture practices.

*Frontiers in Microbiology* | Systematic review article | 1 April 2026 | [Online link](#)

### Dental devices and antimicrobial resistance: challenges, innovations, and regulatory compliances

- This narrative review examines how dental devices contribute to AMR through biofilm formation, inadequate reprocessing, and the oral resistome, increasing the risk of multidrug-resistant infections.
- Highlights emerging non-antibiotic innovations such as antimicrobial coatings and smart surfaces, emphasizing the importance of stringent regulatory frameworks, validated sterilization, and antimicrobial stewardship.

*Frontiers in Medical Technology* | Review article | 20 March 2026 | [Online link](#)

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## 6) Strengthen governance, coordination and collaborations

### Economic burden of typhoid fever by antimicrobial resistance in India: a modelling study 2023

- Quantifies the economic burden of typhoid fever in India attributable to AMR, showing substantially higher healthcare costs, longer illness duration, and productivity losses compared with drug-susceptible infections.
- Findings show that resistant typhoid markedly increases national economic burden and highlight the cost-effectiveness of investing in vaccination, improved diagnostics, sanitation and antimicrobial stewardship.

*The Lancet Regional Health – Southeast Asia* | Article | 20 March 2026 | [Online link](#)

### Burden of antimicrobial resistance in culture-confirmed *Salmonella Typhi* isolates in India from 1977 to 2024: A systematic review and meta-analysis

- Multidrug resistance in Indian *Salmonella Typhi* isolates peaked in the early 1990s, but has declined to near zero since 2020, while fluoroquinolone resistance rose sharply and now shows recent decline.
- Resistance to third-generation cephalosporins, azithromycin, and carbapenems remained consistently low, underscoring the need for continued surveillance and vaccine-led control strategies.

*PLoS Neglected Tropical Diseases* | Research article | 16 April 2026 | [Online link](#)

### 2026 Antimicrobial Resistance Benchmark

- Finds modest progress in how 25 pharmaceutical companies address AMR across research and development, responsible manufacturing, and access and stewardship.
- Documents few innovative antibiotics and improved registrations but warns that a shrinking R&D pipeline and weak access in LMICs leave industry efforts far behind the rapidly growing AMR threat.

*Access to Medicines Foundation* | Report | April 2026 | [Online link](#)

### Waste-ing antibiotics: antimicrobial resistance, environmental pollution and unsettled science in the governance of pharmaceutical manufacturing

- This social science analysis examines how antibiotic waste from pharmaceutical manufacturing contributes to environmental pollution and AMR, while highlighting persistent scientific uncertainties around exposure thresholds and causal pathways.
- Argues that regulatory governance remains fragmented and precautionary action is delayed, calling for stronger environmental oversight, transparency, and global accountability to address manufacturing-driven AMR risks.

*Social Science and Medicine* | Article | 22 April 2026 | [Online link](#)

### Antimicrobial resistance in India's dairy value chain: an investigation of risk factors in Haryana and Assam, India

- Investigates AMR across India's dairy value chain in Haryana and Assam, identifying widespread non-therapeutic antibiotic use, poor farm biosecurity, and inadequate veterinary oversight as key risk factors.
- Highlights how informal markets, limited farmer awareness, and weak regulatory enforcement promote resistant bacteria transmission from cattle to milk, emphasizing the need for integrated surveillance, farmer training, and policy reforms.

*One Health* | Article | 23 March 2026 | [Online link](#)

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## **Gender and other intersecting factors in antimicrobial resistance for infectious diseases of poverty: a systematic evidence gap analysis in low- and lower-middle-income countries**

- Examines how gender and intersecting social factors influence antimicrobial resistance in infectious diseases of poverty in low- and lower-middle-income countries, while reviewing over 38,000 records.
- Found evidence almost entirely limited to tuberculosis, with no studies applying true intersectional analyses, highlighting major gaps in understanding gendered, social, and structural drivers of AMR.

*BMC Public Health* | Article | 16 March 2026 | [Online link](#)

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