

## AMR Sameeksha\*

### Highlights

- Two new online courses on key approaches to addressing AMR
- Landscape map of antibiotic resistance for six WHO priority pathogens in east and north-east India
- Estimating the impact of vaccines in reducing AMR and antibiotic use
- Economic impacts of AMR in humans
- Global burden of AMR 1990-2021
- Rates of resistance for Ceftazidime-Avibactam compared to Ceftolozane-Tazobactam
- Addressing gender inequalities in national action plans

## 1) Awareness and understanding

### An introduction to the people-centred approach to addressing AMR in human health

- This free online course of approximately 90 minutes defines a people-centred approach to addressing AMR in human health through 13 interventions that can be integrated into national action plans on AMR.
- Intended for national and subnational policymakers responsible for prioritizing and leading AMR interventions in the human health sector, through multisectoral AMR action plans.

*OpenWHO* | Course | 2024 | [Online link](#)

### Contribution of veterinary sector to antimicrobial resistance in One Health compendium: an insight from available Indian evidence

- Farmers are generally unaware of the use of antibiotic-growth promoters in animal feed, and this lack of knowledge is often misused by manufacturers.
- Calls for greater collaboration between agencies, such as the Bureau of Indian Standards and Food Standards and Safety Authority of India.

*Frontiers in Veterinary Science* | Systematic review | 26 August 20224 | [Online link](#)

### “Determinants of antibiotic use/misuse from patients’ and health providers’ perspective – a descriptive analysis from coastal Karnataka, India”

- Cross-sectional study finds poor awareness among patients but relatively good practices, notably completing full antibiotic course as prescribed.
- Strong awareness and practices were found among physicians and nurses although about 60% of doctors report prescribing based on patient demand rather than clinical rationale.

*Clinical Epidemiology and Global Health* | Original article | 22 August 2024 | [Online link](#)

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## Antimicrobial Resistance in the environment: key concepts and interventions

- This free online course of approximately 90 minutes describes environmental drivers of AMR.
- Outlines an environmental approach to prevent, mitigate and control AMR.

*OpenWHO* | Course | 2024 | [Online link](#)

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## Knowledge attitude and practice of antibiotic use among medical students in Bangladesh: a cross-sectional study

- Study of 501 medical students finds knowledge of antibiotics varied across students, including year of study and whether students came from urban or rural area.
- Calls for targeted, education reforms and enhanced curricula focused on AMR training.

*Health Science Reports* | Original research | 30 August 2024 | [Online link](#)

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## 2) Laboratories and surveillance

### A systematic review and meta-analysis to develop a landscape map of antibiotic resistance for six WHO priority pathogens in east and north-east India (2011 to 2022)

- Findings broadly confirm bacterial AMR trends from the ICMR AMR Surveillance Network while flagging important data gaps in east and north-east regions.
- Calls for regional headquarters for AMR surveillance and training, with sub-centres in each state.

*Indian Journal of Medical Microbiology* | Review article (abstract) | 25 September 2024 | [Online link](#)

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### Microbiology testing capacity and antimicrobial drug resistance in surgical-site infections: a post-hoc, prospective, secondary analysis of the FALCON randomised trial in seven low-income and middle-income countries

- Attributes whole-systems weaknesses to subpar identification and prevention of AMR in surgical wards.
- Recommends refining testing strategies and developing local guidelines for prophylaxis to better target surgical site infections.

*Lancet Global Health* | Articles | 5 September 2024 | [Online link](#)

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### Technical consultation on the WHO Antimicrobial Resistance Diagnostic Initiative

- Aims to develop an operational framework for improving global bacteriology & mycology diagnostics.
- Identifies four strategic goals (i) strengthen governance and resource allocation, (ii) promote equitable access to diagnostic services across health systems, (iii) ensure high-quality services and (iv) optimize use of data.

*WHO* | Meeting report | 19 September 2024 | [Online link](#)

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### Presence of emerging organic contaminants and microbial indicators in surface water and groundwater in urban India

- Finds 125 emerging organic contaminants (EOCs) with high concentration levels and potential for AMR development, although surface waters that were environmentally restored had lower EOCs and risk of AMR.
- Proposes EOC and AMR approach to screening of different water sources in urban settings.

*Environmental Pollution* | Research article | 21 September 2024 | [Online link](#)

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### 3) Infection prevention and control

#### Sameeksha – Infection Prevention and Control | volume 13

- Novel alcohol-based antiseptic is effective for prevention of surgical site infections
- Global burden of disease due to unsafe WASH is declining but disproportionately high in LMICs
- Operational guide for WASH measures for infectious diarrhoea in healthcare settings
- Guidance to reduce risk of infection in people exposed to avian influenza viruses
- Smallpox and mpox (orthopoxviruses) WHO position paper
- Factsheet for health professionals on mpox

*WCO India* | Publication | 30 September 2024 | [Online link](#)

### 4) Optimise use of antimicrobials

#### Rates of resistance to Ceftazidime-avibactam and Ceftolozane-tazobactam among patients treated for multidrug-resistant *Pseudomonas aeruginosa* bacteremia or pneumonia

- Single centre study of 113 patients finds higher resistance among patients treated with Ceftazidime-Avibactam compared to Ceftolozane-Tazobactam.
- Calls for validation of findings through multi-centre studies.

*Clinical Infectious Diseases* | Brief report | 21 June 2024 | [Online link](#)

#### Antimicrobial utilization in a paediatric intensive care unit in India: a step towards strengthening antimicrobial stewardship practices

- Demonstrates high level of antimicrobial use and resistance patterns, notably for meropenem.
- Establishes baseline data to flag areas for improving antimicrobial stewardship, including reducing the overuse of WHO's 'Reserve' group antimicrobials.

*PLoS One* | Research article | 19 September 2024 | [Online link](#)

#### Coverage of policies to improve antimicrobial stewardship in human medicine in low and middle income countries: results from the Global Survey of Experts on AMR

- A survey of 118 low and middle-income countries finds despite adoption of national AMR policies there are gaps in implementing and enforcing policies.
- Recommends countries adopt monitoring processes that include robust accountability metrics.

*BMC Public Health* | Research | 23 August 2024 | [Online link](#)

#### Antibiotic consumption in hospitals in humanitarian settings in Afghanistan, Bangladesh, Democratic Republic of Congo, Ethiopia and South Sudan

- Finds high antibiotic consumption, as measured by Defined Daily Doses per 1,000 beds among six hospitals supported by Médecins sans Frontières.
- Highlights need for antimicrobial stewardship programs in humanitarian settings.

*Antimicrobial Resistance & Infection Control* | Research | 15 August 2024 | [Online link](#)

## 5) Research, innovations and finance

### Estimating the impact of vaccines in reducing antimicrobial resistance and antibiotic use: technical report

- In-depth evaluation of the role of 44 vaccines (licensed and under development) in reducing AMR – by preventing infections, curbing the spread of resistant strains, thereby reducing use of antibiotics.
- Estimates that better use of vaccines can reduce antibiotic use by 2.5 billion doses and prevent ~515,000 deaths every year.

*WHO* | Technical document | 10 October 2024 | [Online link](#)

### Forecasting the fallout from AMR: economic impacts of AMR in humans

- Comprehensive modelling estimates economic burden based on five aspects i) healthcare costs, (ii) economic resilience, (iii) macroeconomic modelling, (iv) intervention costs and (v) GDP based health valuation.
- If countries fail in controlling AMR, annual global economic losses could amount to 1.7 trillion USD annually by 2050 whereas investing in robust AMR interventions could boost the global economy while improving health.

*WOAH and World Bank* | Report | 26 September 2024 | [Online link](#)

### Global burden of bacterial AMR 1990–2021: systematic analysis with forecasts to 2050

- Modelling reveals deaths associated with bacterial AMR will increase by 2050, notably in South Asia and among populations aged 70 years and older.
- Declines in AMR deaths among children under five years are due to decreasing pathogens spread via faecal-oral routes and drug-resistant *S. pneumoniae*, which is associated with improvements in IPC and WASH.
- Calls for prioritizing new antimicrobials for Gram-negative bacteria due to increasing carbapenem resistance.

*The Lancet* | Articles | 16 September 2024 | [Online link](#)

### Antimicrobial resistance: a concise update

- Comprehensive review of bacterial AMR covers epidemiology, mechanisms of resistance, strategies to mitigate AMR and potential roles of artificial intelligence.
- Describes emerging non-antibiotic antimicrobial therapies, such as antimicrobial peptides and gene therapy.

*The Lancet Microbe* | Review | 18 September 2024 | [Online link](#)

### BWC0977, a broad-spectrum antibacterial clinical candidate to treat multidrug resistant infections

- Animal studies and Phase I clinical trial assess BWC0977, a Novel Bacterial Topoisomerase Inhibitor (NBTI).
- Demonstrates BWC0977 is safe and effective against major WHO priority pathogens.

*Nature Communications* | Article | 18 September 2024 | [Online link](#)

### Mining human microbiomes reveals an untapped source of peptide antibiotics

- A list of over 400,000 small peptides from the Human Microbiome Project was used to identify 323 small open reading frames, subsequently finding 70% of the 78 peptides tested *in vivo* displays antimicrobial activity.
- Supports potential of human microbiome for identifying new antimicrobials for clinical application.

*Cell* | Article | 19 September 2024 | [Online link](#)

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## Screening of the Pandemic Response Box library identified promising compound candidate drug combinations against extensively drug-resistant *Acinetobacter baumannii*

- Evaluates Medicines for Malaria Venture's Pandemic Box Response, which contains 400 compounds that are a potential source for novel antimicrobials, against 2 extensively drug-resistant *A. baumannii*.
- Identifies seven drugs that suppress growth as well as promising drug combinations.

*Scientific Reports* | Article | 17 September 2024 | [Online link](#)

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## Drivers of virulence and antimicrobial resistance in Gram-negative bacteria in different settings: a genomic perspective

- Outlines factors contributing to antimicrobial resistance using a One Health framework.
- Describes the role of genomics and machine learning in addressing AMR.

*Infection, Genetics and Evolution* | Review | 12 September 2024 | [Online link](#)

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## Antimicrobial resistance among migrants in Europe: a systematic review and meta-analysis – update from 2017 to 2023

- AMR among migrants in Europe is increasing, especially for gram-negative bacteria in community settings, such as refugee camps or detention facilities.
- Calls for systematic screening and treating of AMR in migrants, culturally appropriate education and stewardship programs and general improvements in migrant living conditions.

*eClinicalMedicine* | Articles | 5 September 2024 | [Online link](#)

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## 6) Collaborations

### Addressing gender inequalities in national action plans on antimicrobial resistance

- Presents key findings linking gender and AMR, including biological, social and health systems factors.
- Outlines 20 short, medium and long-term recommendations to guide countries in adopting a gender lens in implementing national action plans.

*WHO* | Publication | 16 September 2024 | [Online link](#)

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### A global call to action to fight antimicrobial resistance: IDSA and ESCMID Joint White Paper

- Calls on high-income countries to contribute to the fight against AMR in low and middle-income countries.
- Recommends that 70% of antibiotics consumed globally by humans arise from the WHO's 'Access' group and a 30% reduction in antibiotic use in the agri-food system by 2030.

*CMI Communications* | Commentary | 10 September 2024 | [Online link](#)

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### Locating "community" in antimicrobial resistance governance

- Argues for greater community engagement in AMR programs to foster trust with and buy-in from communities.
- Assesses levels of community engagement in India's NAP and state specific strategies.

*WHO South-East Asia Journal of Public Health* | Editorial | 21 August 2024 | [Online link](#)

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## Catastrophic floods and antimicrobial resistance: interconnected threats with wide-ranging impacts

- Highlights links between AMR and floods, such as resistant bacteria samples in groundwater following 2015 floods in Chennai.
- Underscores need for integrated strategies that considers AMR in context of climate change.

*One Health* | Opinion | 10 September 2024 | [Online link](#)

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## Preventing and controlling global antimicrobial resistance — implementing a whole-system approach

- Describes the rationale for developing and implementing a whole system approach for addressing global AMR.
- Key steps include scaling-up up and sustaining national plans, convening peer learning systems for AMR teams and promoting leapfrog innovations, technologies that can be adapted for low-income contexts.

*New England Journal of Medicine* | Perspective | 17 August 2024 | [Online link](#)

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### Quotable quote

*Educate. Advocate. Act now.*

*WAAW (18–24 November) theme for 2024  
Go Blue Day 24 November*

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*\*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.