World Health Organization India

sameeksha

ANTIMICROBIAL RESISTANCE (AMR) | Volume 31 | 18 November 2024

AMR *Sameeksha**

Highlights

- Antimicrobial resistance curriculum assessment tool for medical education
- AMRColab – a user-friendly AMR detection and visualization tool
- WHO guideline on the prevention and diagnosis of rheumatic fever and rheumatic heart disease
- Nanotechnology as a cutting-edge solution to combat AMR
- Limited evidence of spillover of AMR *Klebsiella pneumoniae* from animal/environmental reservoirs
- Political declaration of the high-level meeting on AMR

1) Awareness and understanding

Antimicrobial resistance curriculum assessment tool for medical education

- Provides guidance on developing strategies to improve AMR content in university and national contexts.
- Aims to enable rapid reviews of medical curriculum to help identify gaps in AMR content and competencies.

WHO | Publication | 20 October 2024 | Online link

A global investigation into antimicrobial knowledge in medicine, pharmacy, nursing, dentistry and veterinary undergraduate students

- Review of 144 articles (17% from India) finds little multidisciplinary education and inadequate understanding of antimicrobial stewardship among health professionals.
- Calls for interprofessional education on stewardship especially in nursing, veterinary and dentistry sectors.

BMC Medical Education | Research | 29 October 2024 | Online link

Consumer acceptance of bacteriophage technology for microbial control

- Surveys public knowledge and acceptance of using bacteriophages as a non-antibiotic intervention to control bacterial infections in the context of poultry production and consumption.

Scientific Reports | Article | 25 October 2024 | Online link

2) Laboratories and surveillance

AMRColab – a user-friendly antimicrobial resistance detection and visualization tool

- Open-access bioinformatics analysis suite enables users with little to no bioinformatic skills to detect and visualize AMR determinants in pathogen genomes using a plug-and-play approach.

Microbial Genetics | Research article | 21 October 2024 | Online link

Characterization of *Staphylococcus aureus* isolated from milk samples for their virulence, biofilm, and antimicrobial resistance

- Finds *Staphylococcus aureus* in one-third of milk samples tested (in Chennai), with Methicillin resistant *S. aureus* in over a quarter of isolates.
- Proposes greater surveillance and hygienic practices across milk production and distribution systems.

Scientific Reports | Article | 27 October 2024 | Online link

The global burden of enteric fever, 2017–2021: a systematic analysis from the global burden of disease study 2021

- Global burden of enteric disease study finds AMR is contributing to spatial patterning of enteric fever and driving case fatality, notably in South Asia.
- Calls for enhanced vaccination programs that include typhoid conjugate vaccines.

EClinicalMedicine | Articles | 18 October 2024 | Online link

Prevalence of Extended-Spectrum Beta-Lactamase (ESBL)–producing *Escherichia coli* in humans, food, and environment in Kathmandu, Nepal: findings from ESBL *E. coli* tricycle project

- Describes findings from Nepal's implementation of WHO's Tricycle Protocol which monitors ESBL-producing *E. coli* across human, veterinary and environment sectors.
- The highest prevalence of AMR was detected in environment samples indicating a particular need for interventions to improve wastewater management and sewage treatment.

International Journal of Microbiology | Research article | 16 October 2024 | Online link

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

WHO guideline on the prevention and diagnosis of rheumatic fever and rheumatic heart disease

- Describes the pathology and epidemiology of rheumatic fever and rheumatic heart disease – caused by *Streptococcus* pyogenes, a group A beta-haemolytic Streptococcus (GAS).
- Provides up-to-date guidance on prevention and treatment, including long-term antibiotic prophylaxis.

WHO | Guideline | 29 October 2024 | Online link

Routine immunization against *Streptococcus pneumoniae* and *Haemophilus influenzae* type B and antibiotic consumption in India: a dynamic modeling analysis

- Using IndiaSim, model estimates that if coverage of *S. pneumoniae* and *H. influenza* type b vaccines were at the same level for children as DTP3, there would be a 61% decrease in antibiotic consumption.
- Increased vaccination efforts could promote antimicrobial stewardship and reduce health inequities.

Lancet Regional Health Southeast Asia | Articles | 15 October 2024 | Online link

Identifying AWaRe indicators for appropriate antibiotic use: a narrative review

- A review of 773 indicators for antibiotic use shows few indicators are based on the AWaRe system.
- Proposes developing new AWaRe quality indicators using robust techniques to guide antimicrobial stewardship.

Journal of Antimicrobial Chemotherapy | Journal article | 18 October 2024 | Online link

A systematic review of antibiotic drug shortages and the strategies employed for managing these shortages

- Analysis of 74 studies determines most shortages reported were from the WHO's "Watch" category, with the highest shortage for piperacillin-tazobactam.
- Identifies the main causes for and clinical implications of these shortages.

Clinical Microbiology and Infection | Systematic review | 26 September 2024 | Online link

Evaluation of antibiotics returned for safe disposal during and after a community pharmacy antibiotic amnesty campaign

- Evaluates impact of an antibiotic amnesty campaign in the UK.
- Demonstrates increase in number of antibiotics (roughly 3% of all returned medicines) returned to community pharmacies for safe disposal.

JAC - Antimicrobial Resistance | Journal article | 24 October 2024 | Online link

5) Research, innovations and finance

Nanomedicines as a cutting-edge solution to combat antimicrobial resistance

- Describes how nanotechnology can target multiple biological mechanisms of AMR.
- Reviews the diverse nanomaterials available (e.g. metallic nanostructures, lipid nanocarriers) as well as the challenges and potential for use nanomedicines for treatment.

RSC Advances | Review article | 22 October 2024 | Online link

Limited evidence of spillover of antimicrobial-resistant *Klebsiella pneumoniae* from animal/environmental reservoirs to humans in Vellore, India

- Assessment of *Klebsiella pneumoniae* from three sources – (i) clinical, (ii) livestock and (iii) hospital effluents – finds higher AMR genes, and virulence in clinical and hospital sewage isolates.
- Challenges the current view of AMR transmission in *K. pneumoniae* in the One Health context.

Journal of Epidemiology and Global Health | Research article | 12 November 2024 | Online link

Protecting healthcare and patient pathways from infection and antimicrobial resistance

- Identifies how conventional infection research methods fail to adequately consider complex pathways leading to healthcare acquired infections (HAIs) and AMR in hospital settings.
- Describes how to better analyze patient pathways to HAIs and AMR, including how to conduct clinical trials.

British Medical Journal | Analysis | 7 October 2024 | Online link

Evaluation of *mrk*D, *pga*C and *wca*J as biomarkers for rapid identification of *K. pneumoniae* biofilm infections from endotracheal aspirates and bronchoalveolar lavage

- Uses biomarkers and real time PCR to develop an approach to rapidly test for biofilm forming *K. pneumoniae.*
- Useful to guide clinicians, especially those working in critical-care units, to select the optimal antibiotic therapy for managing biofilm infections.

Scientific Reports | Article | 9 October 2024 | Online link

Diversity, functional classification and genotyping of SHV β-lactamases in *Klebsiella pneumoniae*

- Aims to clarify *K. pneumoniae* genomes using a collaborative approach with the KlebNET-GSP AMR Genotype-Phenotype Group demonstrating ESBL- and BLI-resistant variants of bla_{SHV} have evolved.
- Findings are presented in an open-source AMR dictionary, a tool that could be used for other AMR genes.

Microbial Genomics | Research article | 21 October 2024 | Online link

Global quantification and distribution of antibiotic resistance genes in oceans and seas: anthropogenic impacts and regional variability

- Using novel PCR assays, study finds high levels of ARGs in marine areas, including remote areas and with hotspots linked to human activity.
- Calls for future studies to examine additional geographical areas and a wider range of ARGs.

Science of the Total Environment | Research article | 16 October 2024 | Online link

High mortality of *Acinetobacter baumannii* infection is attributed to macrophage-mediated induction of cytokine storm but preventable by naproxen

- Describes immunological mechanisms that can trigger sepsis due to MDR *Acinetobacter baumannii.*
- Highlights the usefulness of immunosuppressive drugs, notably naproxen in reducing mortality rates.

eBioMedicine | Articles | 19 September 2024 | Online link

6) Collaborations

Political declaration of the high-level meeting on antimicrobial resistance

- Proposes at least 70 per cent overall human antibiotic use globally to be from the Access group.
- Calls for reducing global deaths associated with bacterial AMR by 10 percent by 2030.

United Nations | Political declaration | 30 September 2024 | Online link

Multidisciplinary collaboration in combatting antimicrobial resistance: insights and outcomes from the National Alliance of Medical Professionals on Antimicrobial Resistance (NAMP-AMR) initiative

- Describes the NAMP-AMR including the inaugural meeting held in Delhi in July 2024 that established a roadmap of collaboration to address AMR nationally.
- Identified individual and collaborative actions by Indian professional associations as per the six key priorities of India's National Action Plan on AMR.

Cureus | Original article | 8 September 2024 | Online link

Time to define One Health approaches to tackling antimicrobial resistance

- Argues for greater attention to environmental hygiene and context in the One Health AMR approach.
- Calls for whole system approach to address AMR in the context of high levels of bacterial contamination in low and middle-income country environments.

Nature Communications | Comment | 10 October 2024 | Online link

AMR and Sustainable Development Goals: at a crossroads

- Assesses the role of SDG 17, which focuses on partnerships for sustainable development, in relation to AMR.
- Proposes expanding SDG17 to facilitate global antimicrobial stewardship programs, technology transfer, surveillance systems and investments in drug and vaccine research.

Globalization and Health | Review | 17 October 2024 | Online link

From ignorance to awareness: quality of collaborative governance enhances public awareness of AMR

- Draws on survey data from experts and civil servants working on AMR policy across Europe and finds "collaborative governance" can have positive impacts on public awareness.
- Argues that a One Health approach can enhance public awareness of AMR.

Social Science & Medicine | Research article | 11 October 2024 | Online link

Quotable quote

Go Blue for AMR – ***on 24 November***

– to raise AMR awareness – as an individual, organization or community

#AMR #WAAW

– World Antimicrobial Awareness Week
18–24 November 2024

****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.