

*Sameeksha** – Antimicrobial Resistance (AMR)

**Sameeksha* is a Hindi word, meaning review. This compilation of publications and resources (along with a brief summary) aims to review and share information to facilitate containment of antimicrobial resistance in India, 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.

Key highlights of volume 6

- Antimicrobial resistance and human mobility
- Surveillance of AMR in the European Region
- Antimicrobial resistance following prolonged use of hand hygiene products
- Short-course postoperative antibiotic therapy in complicated intra-abdominal infections
- Mapping twenty years of antimicrobial resistance research trends
- Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

Strategic priority 1: Awareness and understanding

Antimicrobial resistance and human mobility

- Examines the existing literature regarding various types of human mobility including short-term travellers, forcibly displaced persons, migrant populations, and their association with global rates of AMR.
- Short-term international travel may be a risk factor for AMR, particularly in relation to multidrug-resistant *Enterobacterales*. AMR may also affect migrant populations.

Infection and Drug Resistance | Review | 13 January 2022 | [Online link](#)

Comparing public attitudes, knowledge, beliefs and behaviours towards antibiotics and antimicrobial resistance in Australia, United Kingdom, and Sweden (2010-2021)

- National antimicrobial stewardship policies in Australia, Sweden, and the UK were reviewed, and 26 KAP studies were included in the review.
- Neither antibiotic consumption nor community knowledge and attitudes are changing significantly in Australia and UK despite a focus on raising public awareness. Relative success of policy approaches in Sweden suggests practice level interventions may also be needed to activate prescribers as well as the public.

PLOS ONE | Research Article | 14 January 2022 | [Online link](#)

No time to wait – the work of the ad hoc Task Force for Antimicrobial Resistance

- The Codex Task Force on Antimicrobial Resistance (TFAMR) has worked to update and broaden the Code of Practice to minimize and contain AMR and also to establish guidelines, both of which are important instruments for governments to help the fight against AMR in the veterinary and agricultural sectors.

FAO | YouTube video | 10 Nov 2021 | [Online link](#)

Antimicrobial susceptibility of commensal *Neisseria* in a general population and men who have sex with men in Belgium

- Non-pathogenic *Neisseria* from MSM were significantly less susceptible to azithromycin and ciprofloxacin.
- Surveillance of antimicrobial susceptibility of non-pathogenic *Neisseria* may be a sensitive way to assess impact of antimicrobial exposure in a population.

Scientific reports | Article | 7 January 2022 | [Online link](#)

Diagnostics for AMR: building back better from the COVID-19 pandemic

- Online training course from London School of Hygiene and Tropical Medicine for anyone interested in the public health aspects of AMR control – including policy and decision-makers, healthcare professionals, students, and educators.

Future Learn/LSHTM | Online training course | [Online link](#)

Battling the superbugs: Drug-resistant infections kill almost 1.3m people a year

- Fighting superbugs may be costly but failing to do so is even costlier.
- Advocates better sanitation and health care to reduce demand for antibiotics; and better medical training to curb over prescription, and thereby slow the spread of AMR.

The Economist | News article | 22 January 2022 | [Online link](#)

Strategic priority 2: Laboratories and surveillance

Antimicrobial resistance surveillance in Europe 2022 (2020 data)

- Regional report based on AMR data of 2020 from invasive isolates reported to the Central Asian and European Surveillance of Antimicrobial Resistance (CAESAR) network and the European Antimicrobial Resistance Surveillance Network (EARS-Net).
- A north-to-south and west-to-east gradient was generally observed, with higher AMR percentages in the southern and eastern parts of Europe. Carbapenem resistance in *Escherichia coli* and *Klebsiella pneumoniae* and vancomycin resistance in *Enterococcus faecium* showed a significant increase during 2016–2020.

WHO & ECDC | Publication | January 2022 | [Online link](#)

Epidemiology, molecular characteristics, and virulence factors of Carbapenem-resistant *Pseudomonas aeruginosa* isolated from patients with urinary tract infections

- Carbapenems are drugs of choice for treatment of urinary tract infections caused by *P. aeruginosa*.
- High levels of carbapenem resistance in *P. aeruginosa* were found which highlight the need for continuous monitoring to prevent the further spread of resistant organisms.

Infection and Drug Resistance | Original Research | 14 January 2022 | [Online link](#)

Nosocomial outbreak of carbapenemase-producing *Proteus mirabilis* with two novel *Salmonella* genomic island 1 variants carrying different *bla*_{NDM-1} gene copies in China

- Six *P. mirabilis* clonally related strains from the same ward were identified in a nosocomial outbreak.
- Characterizes two novel *bla*_{NDM-1}-harboring SGI1 variants in *P. mirabilis* and provides a new insight into resistance gene copy number variation in bacteria.

Frontiers in Microbiology | Original Research | 13 January 2022 | [Online link](#)

Extensive outbreak of colistin resistant, carbapenemase (*bla*_{OXA-48}, *bla*_{NDM}) producing *Klebsiella pneumoniae* in a large tertiary care hospital, India

- 45 isolates of *K. pneumoniae* were studied from NICU (14 cases of neonatal sepsis), ICU (18 cases), other wards (7 cases) along with 6 isolates from hospital environment and human colonizers.
- Large hospital outbreaks with considerable mortality can be caused by colistin resistant carbapenem resistant *K. pneumoniae* harbouring multiple carbapenemases.

ARIC | Article | 6 January 2022 | [Online link](#)

Two phenotypes of *Klebsiella pneumoniae* ST147 outbreak from neonatal sepsis with a slight increase in virulence

- An outbreak of carbapenem-resistant NDM-1-producing *Klebsiella pneumoniae* in neonatal wards was investigated.

Infection and Drug Resistance | Original Research | 4 January 2022 | [Online link](#)

Recent advances in rapid antimicrobial susceptibility testing

- Reviews the new generation of methods and describes what is still urgently needed for their implementation in day-to-day management of the treatment of infectious diseases.

Clinical Chemistry | Mini-Review | 30 December 2021 | [Online link](#)

Reservoir of antibiotic residues and resistant Coagulase Negative Staphylococci in a healthy population in the Greater Accra Region, Ghana

- Study investigated the occurrence of resistant coagulase-negative staphylococci and antibiotic residues in urine samples of 401 healthy individuals.
- Shows that healthy individuals could serve as reservoirs of resistant strains of CoNS as well as antibiotic residues at the community level.

Antibiotics | Article | 17 January 2022 | [Online link](#)

Strategic priority 3: Infection prevention and control

Antimicrobial resistance following prolonged use of hand hygiene products

- Systematic review on whether antimicrobial resistance (AMR) occurs following prolonged use of antimicrobial hand hygiene (HH) products, and, if so, in what magnitude. Out of 339 full-text articles assessed for eligibility, only four studies between 1986 and 2015 were found eligible and included.
- Prolonged use of HH products may cause AMR in health care settings, but perhaps not in other settings.

Pharmacy | Review | 4 January 2021 | [Online link](#)

Divergences between healthcare-associated infection administrative data and active surveillance data in Canada

- Active surveillance of HAIs produced the most accurate results and remains the gold-standard.
- Integration between active and passive surveillance data can be optimized by using administrative data to enhance traditional active surveillance of HAI.

CCDR | Scoping review | January 2022 | [Online link](#)

Approaches to multidrug-resistant organism prevention and control in long-term care facilities for older people: a systematic review and meta-analysis

- Investigated the effects of IPC interventions on MDRO colonization and infections in long term care facilities.
- Meta-analysis did not show any beneficial effects from IPC interventions on MRSA reductions in LTCFs.
- Effectiveness of interventions was found to be dependent on resource availability – particularly decolonization and barrier precautions – therefore, administrative engagement is crucial for effective IPC programmes.

AMR & Infection Control | Review | 15 January 2022 | [Online link](#)

Community engagement: The key to tackling Antimicrobial Resistance (AMR) across a One Health context?

- Based on six low- and middle-income countries based projects who co-designed and answered a series of research questions on using community engagement for AMR containment.
- Community engagement can facilitate AMR behaviour change especially in LMICs, through a contextualised approach supporting communities to develop locally meaningful solutions.

Global Public Health | Research Article | 9 December 2021 | [Online link](#)

Costs of hand hygiene for all in household settings: estimating the price tag for the 46 least developed countries

- An estimated US\$ 12.2 – 15.3 billion over 10 years is needed for universal hand hygiene in household settings in 46 least developed countries (LDCs).
- The average annual cost of behavioural change promotion to those with no HWF represents 4.7% of median government health expenditure in LDCs, and 1% of their annual aid receipts.

BMJ Global Health | Original Research | November 2021 | [Online link](#)

Strategic priority 4: Optimise use of antimicrobials

Retrospective cohort analysis of the effect of antimicrobial stewardship on postoperative antibiotic therapy in complicated intra-abdominal infections: short-course therapy does not compromise patients' safety

- Compared the outcome of short vs. long postoperative antibiotic therapy (PAT) in complicated intra-abdominal infections (cIAIs) without sepsis.
- Short-course antibiotic therapy after successful surgical source control in cIAIs is safe, and long-duration PAT has no beneficial effects.

Antibiotics | Article | 17 January 2022 | [Online link](#)

What does antimicrobial stewardship look like where you are? Global narratives from participants in a massive open online course

- Comments from 1464 learners from 114 countries, enrolled in massive open online course were analysed.
- Common challenges to antimicrobial stewardship (AMS) implementation included the role of non-physician healthcare workers, resource limitations, gaps in knowledge of AMR, and patient engagement and involvement in AMS.

JAC-AMR | Article | 28 December 2021 | [Online link](#)

Antimicrobial and antibiotic resistance from the perspective of Polish veterinary students: an inter-university study

- Survey to assess knowledge and attitude of veterinary students on use of antibiotics and antibiotic resistance.
- 82% students identified antibiotic resistance to be a significant problem, but only 59% believed it to be global, and only one-third had heard about the One Health approach.

Antibiotics | Article | 17 January 2022 | [Online link](#)

Strategic priority 5: Research, innovations and finance

Mapping twenty years of antimicrobial resistance research trends

- Study mapped 20 years (1999–2018) of AMR research using data-driven text-based techniques.
- AMR publications increased by 450% over the 20 years.

Artificial Intelligence in Medicine | Article | 20 November 2021 | [Online link](#)

The future of healthcare workers and antimicrobial stewardship – educate, innovate, or pay the price

- Education and training of the healthcare workforce underpins the implementation of AMS and the effective use of existing and new health care technologies, treatments and informatics.
- Proposes several novel strategies for AMR learnings from the significant developments and support for education during the COVID-19 pandemic.

JAC | Article | 11 January 2022 | [Online link](#)

Crumbling the castle: targeting DNABII proteins for collapsing bacterial biofilms as a therapeutic approach to treat disease and combat antimicrobial resistance

- Highlights a humanized monoclonal antibody (CMTX-101) that targets a universal component of bacterial biofilms, leading to pathogen-agnostic rapid biofilm collapse with three modes of action.
- CMTX-101 has a strong potential to enhance the effectiveness of existing first-line antibiotics to fight infections while promoting antimicrobial stewardship.

Antibiotics | Perspective | 14 January 2022 | [Online link](#)

Antimicrobial resistance: time to repurpose the Global Fund

- Based on the existing burden of AMR and its future threat, proposes a review of the fundamental purpose of The Global Fund on its 20th anniversary this year.

The Lancet | Editorial | 22 January 2022 | [Online link](#)

Strategic priority 6: Collaborations

Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis

- Comprehensively assess the global AMR burden, by estimating deaths and disability-adjusted life-years (DALYs) attributable to and associated with bacterial AMR for 23 pathogens and 88 pathogen–drug combinations in 204 countries and territories in 2019.
- The global burden associated with drug-resistant infections was an estimated 4.95 million deaths, of which 1.27 million deaths were directly attributable to drug resistance.

The Lancet | Article | 19 January 2022 | [Online link](#)

“One Health” approach for revealing reservoirs and transmission of antimicrobial resistance

- Highlights the need for understanding the epidemiology, characteristics, mechanisms and elements of resistance in different microenvironments for successful control of global spread of resistant bacteria and resistance genes between the three components of One Health: humans, environment and animals.

Frontiers in Microbiology | Editorial | 17 January 2022 | [Online link](#)

Antimicrobial resistance and environmental health: a water stewardship framework for global and national action

- Highlights the need to broaden the scope of water-related AMR concerns beyond water, sanitation, and hygiene (WASH) infrastructure for water supply and wastewater treatment, and account for environmental waters in AMR development and dissemination, particularly in low-income countries.
- The integration of water resources and One Health for AMR stewardship is vital for the protection of human and environmental health through safe and secure water resource management and protection.

Antibiotics | Article | 5 January 2022 | [Online link](#)

Comparison of national antimicrobial treatment guidelines, African Union

- Reviewed 31 treatment guidelines from 20 of the 55 African Member States.
- Most African countries lack antimicrobial treatment guidelines that meet internationally accepted methods.

WHO Bulletin | Article | 26 November 2021 | [Online link](#)

BD, Pfizer, Wellcome collaborate to improve global hospital antimicrobial stewardship practices

- Collaboration on understanding the role of diagnostics in advancing antimicrobial stewardship practices.
- Highlights how diagnostic best practices can improve patient care, clinical practice and health care economics.

BD | News | 11 January 2022 | [Online link](#)

Decades of emerging infectious disease, food safety, and antimicrobial resistance response in Vietnam: the role of One Health

- Reflects on the challenges and opportunities of One Health in the context of zoonoses, food safety, and AMR, based on One Health training, policy, and research in Vietnam.

One Health | Article | 14 December 2021 | [Online link](#)