

EDITORIAL

NOVEL APPROACHES TO COMBAT ANTIMICROBIAL RESISTANCE IN DEVELOPING COUNTRIES

Raja Kamran Afzal, Ali Khalid

Armed Forces Institute of Pathology, National University of Medical Sciences, Rawalpindi Pakistan

Copyrights: ©2026. The Author(s).

Antimicrobial resistance (AMR) is an emerging public health crisis whose threat to present-day antimicrobial efficacy and global progress in the control of infectious diseases has rapidly escalated. It presents as an even graver situation in developing countries, whose underdeveloped healthcare infrastructure, limited laboratory capacity, weak regulation in antimicrobial prescription and consumption, as well as restricted access to novel antimicrobials accelerates selection and proliferation of multidrug resistant organisms. Traditional methods such as the use of surveillance systems, infection prevention and control, and antimicrobial stewardship are vital but are insufficient by themselves. We must advance beyond incremental changes to the problem of the increasing AMR crisis, instead committing to the use of novel and locally appropriate solutions. This change is enabled by quick and low-cost diagnostics that circumvent poor laboratory infrastructure which leads to empirical wide-spectrum antibiotic prescription. Rapid and cost-effective diagnostics such as loop-mediated isothermal amplification (LAMP), lateral flow immunoassays and low cost molecular platforms can all be deployed to facilitate identification of the target pathogen as well as its susceptibility pattern at the bedside.¹ Establishment and reinforcement of sentinel laboratory networks; integration of genomic surveillance; and creation of a centralised repository for AMR data are also critical for tracking resistance patterns and informs interventions. Likewise, antimicrobial stewardship programs are also facing the challenge to adapt to the resource-limited settings and can overcome them through rational

application of interventions, as described.² Evidence based rational interventions include restrictive antimicrobial formularies, ongoing audit-and-feedback and syndrome specific treatment algorithms designed based on local antibiograms. Integration of electronic decision support platforms in hospital information systems can aid in oversight of prescriptions without use of infectious diseases specialists; it would be impossible for a small cohort of ID specialists to adequately oversee and influence prescriptions in limited resource countries.³ Mobile diagnostic tools and concise prescribing guideline local in context can equip health practitioners to combat the crisis through judicious antimicrobial prescription and can be more scalable solutions for curbing the problem of its overuse. Investment in new therapeutic avenues is as essential since the current pipeline for antimicrobials remains slim. Biologics like bacteriophage therapy, endolysins, bacteriocins and antimicrobial peptides are proving effective for Gram-negative multidrug resistant infections, and are best suited for immunocompromised and hospital-acquired conditions.⁴ Production of these biologics would require development of specific local strain libraries and established production methods; they also require specific regulatory frameworks. Monoclonal antibodies directed at key virulence factors can supplement existing antibiotics, a form of passive immunisation. However, developing countries are best suited for such innovative approaches because of their high burden of disease and biodiversity of pathogens, if they establish effective regulatory mechanisms. Lastly, collaboration across sectors is vital for the sustainability of the crisis management system. AMR does not exist solely in human health; antibiotics are heavily used in veterinary practice, fish farming and agriculture, driving selection and spread. The adoption of a One Health approach, integrating the surveillance data from human, animal and environmental sources, would provide a holistic approach to containing the spread of resistant organisms.¹ Strategies to include vaccination of

Correspondence:

Dr. Ali Khalid

Armed Forces Institute of Pathology, National University of Medical Sciences, Rawalpindi Pakistan

Email: dr-alikhaliid@hotmail.com

DOI: <https://doi.org/10.33897/fumj.v8i1.306>

How to Cite: Afzal RK, Khalid A. Novel approaches to combat antimicrobial Resistance in developing countries. Foundation University Medical Journal. 2026; 8(1): 1-2

livestock, a phased ban on non-therapeutic use of antibiotics, and surveillance of environmental sites for resistant genes can aid significantly in reducing selection pressures. In summary, an approach to tackling the AMR crisis in developing countries should incorporate state-of-the-art diagnostics, novel therapeutics, optimized

antimicrobial stewardship, and multi-sectoral partnership. By utilizing their strengths and coordinating with their peers globally, developing countries can greatly influence global efforts to mitigate AMR, as well as create sustainable model approaches applicable in their specific contexts.

REFERENCES

1. Gulumbe BH, Haruna UA, Almazan J, Ibrahim IH, Faggo AA, Bazata AY. Combating the menace of antimicrobial resistance in Africa: a review on stewardship, surveillance and diagnostic strategies. *Biol Methods Protoc.* 2022;7(1):bpac021. DOI:10.1186/s12575-022-00182-y
2. Abdelwahab MT, Ebomah KE, Okoh AI. The challenges of implementing infection prevention and antimicrobial stewardship programs in resource-constrained settings. *Antimicrob Steward Healthc Epidemiol.* 2024;4(1):e45. doi:10.1017/ash.2024.35
3. Ehsan M, Khan R, Perveen K. Antibiotic resistance in developing countries: emerging threats and policy responses. *Public Health Challenges.* 2025;4(1):e70034. doi:10.1002/puh2.70034
4. Hitchcock NM, Gomes Nunes DD, Shiach J, Hodel KVS, Atkinson RM, Lazenby JJ, et al. Current clinical landscape and global potential of bacteriophage therapy. *Viruses.* 2023;15(4):1020. doi:10.3390/v15041020