Editorial

Antimicrobial Resistance: A Global Health Crisis

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Antimicrobial resistance (AMR) stands as one of the most urgent health threats of our time, jeopardizing the foundation of modern medicine. The World Health Organization (WHO) recognizes AMR as one of the top 10 global public health threats facing humanity [1]. In 2019 alone, an estimated 1.27 million deaths were directly attributable to bacterial AMR, a figure projected to escalate to 10 million per year by 2050 if urgent measures are not taken—surpassing even cancer-related mortality [2]. This stark forecast underscores the need to address AMR head-on, lest we lose the gains achieved through decades of medical progress.

AMR can affect anyone, at any age, and in any region, yet its impact is most pronounced in low- and middle-income countries (LMICs). These regions face disproportionately high AMR-related mortality, a consequence of poverty, limited healthcare resources, and restricted access to quality clinical services. South Asia, Latin America, and Sub-Saharan Africa already shoulder much of the global burden of AMR and are predicted to experience the highest mortality rates by 2050 [3].

While resistant infections can strike any population, neonates and individuals over 50 years of age are particularly vulnerable. Neonatal sepsis caused by drug-resistant pathogens claims a significant number of lives globally, far exceeding mortality in older pediatric groups. Gram-positive organisms such as Group A Streptococcus commonly predominate in high-income settings, whereas Gram-negative bacteria—Escherichia coli, Acinetobacter and Klebsiella pneumoniae, among others—pose the greatest threat in LMICs [4].

Although AMR can arise naturally—Staphylococcus aureus famously developed resistance to penicillin shortly after its introduction—human activity substantially accelerates resistance. The overuse and misuse of antimicrobials in human and to a lesser extent in animals and agriculture constitute principal drivers [5]. Meanwhile, inadequate infection prevention and control (IPC) in healthcare facilities, coupled with insufficient access to clean water, sanitation, and hygiene (WASH), fuel the rapid spread of resistant organisms via person-to-person contact and the gastrointestinal tract. Notably, improvements in WASH alone can potentially decrease the water and sanitation related diarrhea. Vaccination also plays a pivotal role in reducing antimicrobial demand; for example, communities immunized with conjugated pneumococcal vaccine experienced a 45% drop in antibiotic prescriptions [6]

Primary health care (PHC) settings are where the seeds of AMR are often sown. Approximately 80% of antibiotic prescriptions originate at this level, frequently driven by diagnostic uncertainty, lack of rapid point-of-care tests, inadequate AMR awareness among healthcare providers, and pressure for quick patient recovery. Between 2000 and 2015, global antibiotic consumption rose by 65%, with usage doubling in LMICs [7]. Over-the-counter availability of antibiotics, self-medication, and weak surveillance systems further exacerbate this challenge

Clinically, AMR transforms once-manageable infections—such as urinary tract infections, pneumonia, typhoid, malaria, tuberculosis, and sepsis—into life-threatening conditions. Even routine medical procedures,

including cesarean sections, surgical interventions, and cancer chemotherapy, become precarious in the absence of reliable antibiotic prophylaxis. From an economic standpoint, the global toll could approach USD 100 trillion by 2050, driven by diminished labor productivity and soaring healthcare costs [8].

Confronting AMR requires a concerted, multi-sectoral response. The WHO has outlined steps for healthcare professionals, individuals, and policymakers to curb AMR, such as implementing antimicrobial stewardship programs, bolstering IPC measures, and promoting vaccination [1,2,4]. Research investment for the development of novel antibiotics, vaccines, and diagnostic tools remains critical, and innovative reimbursement models to delink antibiotic revenues from sales have been proposed to encourage pharmaceutical innovation [8]. Critically, a "One Health" approach that integrates human, animal, and environmental perspectives is essential for sustaining the effectiveness of antimicrobials. Only through unified global efforts can we preserve these life-saving drugs for future generations.

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