

Antimicrobial Resistance: A Growing Threat to Global Health

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DESCRIPTION

Antimicrobial resistance (AMR) has emerged as one of the most serious threats to global health in the modern era. It occurs when microorganisms such as bacteria, viruses, fungi, and parasites evolve mechanisms that enable them to survive exposure to antimicrobial drugs that were previously effective. As a result, common infections become more difficult to treat, leading to prolonged illness, increased healthcare costs, and higher mortality rates. The rapid spread of antimicrobial resistance threatens to undermine decades of progress in medicine and public health, making once-manageable infections potentially deadly again.

One of the primary drivers of antimicrobial resistance is the misuse and overuse of antimicrobial agents. In many parts of the world, antibiotics are prescribed unnecessarily, used inappropriately, or obtained without prescription. Patients may fail to complete prescribed courses, allowing partially resistant organisms to survive and multiply. In addition to human medicine, the widespread use of antibiotics in agriculture and animal husbandry to promote growth and prevent disease has significantly contributed to the emergence of resistant strains. These resistant organisms can spread to humans through direct contact, the food chain, and the environment, highlighting the interconnected nature of the problem.

The impact of antimicrobial resistance on global health systems is profound. Infections caused by resistant pathogens often require longer hospital stays, more expensive and toxic drugs, and intensive care support. Diseases such as multidrug-resistant tuberculosis, methicillin-resistant *Staphylococcus aureus* (MRSA), and drug-resistant malaria present significant challenges to treatment and control. AMR also threatens the safety of medical procedures that rely on effective antimicrobials, including surgeries, chemotherapy, organ transplantation, and care of premature infants. Without reliable antimicrobial therapies, the risk of infection-related complications in these settings increases substantially.

Antimicrobial resistance disproportionately affects low- and middle-income countries, where healthcare infrastructure, diagnostic capacity, and access to effective medicines may be

limited. Poor infection prevention and control practices, inadequate sanitation, and overcrowding facilitate the spread of resistant organisms. At the same time, limited access to quality-assured antibiotics can drive inappropriate use, such as substandard dosing or reliance on counterfeit drugs, further accelerating resistance. However, AMR is a global problem that respects no borders, as resistant pathogens can spread rapidly through international travel and trade.

Addressing antimicrobial resistance requires coordinated action at local, national, and global levels. Surveillance systems are essential for monitoring resistance patterns, guiding treatment guidelines, and detecting emerging threats. Strengthening laboratory capacity and data-sharing mechanisms enables timely and accurate identification of resistant organisms. International collaboration, supported by organizations such as the World Health Organization (WHO), plays a critical role in harmonizing surveillance efforts and promoting best practices.

Prevention is a key component of the response to AMR. Infection prevention and control measures, including hand hygiene, safe water and sanitation, vaccination, and environmental hygiene, reduce the overall burden of infections and, consequently, the need for antimicrobial use. Antimicrobial stewardship programs promote the responsible use of antibiotics by ensuring that patients receive the right drug, at the right dose, for the right duration. Education of healthcare professionals, patients, and the public is essential to change behaviors and improve understanding of the risks associated with inappropriate antimicrobial use.

Research and innovation are also vital in the fight against antimicrobial resistance. Investment in the development of new antimicrobial agents, vaccines, rapid diagnostic tools, and alternative therapies is urgently needed. At the same time, economic and regulatory incentives must be aligned to encourage pharmaceutical innovation while ensuring equitable access to effective treatments.

CONCLUSION

In conclusion, antimicrobial resistance is a growing and complex global health threat driven by biological, social, and economic

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factors. Combating AMR requires sustained political commitment, global cooperation, and integrated strategies that emphasize prevention, responsible antimicrobial use,

surveillance, and innovation. Without decisive action, antimicrobial resistance risks reversing medical progress and placing an enormous burden on future generations worldwide.