

ANTIMICROBIAL RESISTANCE: THE LOOMING THREAT OF MODERN MEDICINE

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Will the medicine that once saved millions soon become powerless..!!

A minor cut, a sore throat, or even a routine surgery was once considered easily manageable, thanks to the remarkable power of antibiotics. Today, that reassurance is rapidly disappearing. Across the globe, bacteria, viruses, fungi, and parasites are evolving to withstand the very medicines designed to eliminate them. This alarming phenomenon, known as Antimicrobial Resistance (AMR), has emerged as one of the most formidable threats to modern medicine, global health, food security, and sustainable development.

Antimicrobials are powerful disease - fighting medicines ~ including antibiotics, antivirals, antifungal and antiparasitic drugs - that play a vital role in preventing and treating infections diseases across humans, animals and plants.

Although antimicrobial resistance is a natural consequence of microbial evolution, human actions have transformed it into a global health crisis. The indiscriminate and excessive use of antimicrobials in human medicine, veterinary practice, agriculture, and horticulture has hastened the evolution and dissemination of drug-resistant pathogens.

A Threat That knows No borders

Antimicrobial medicines are among the greatest achievements of modern medicine. They have transformed once-deadly infections into treatable conditions, made complex surgeries safer, and revolutionized both human and veterinary healthcare. However, this remarkable success is now under serious threat. As antimicrobial resistance continues to spread across the world, the miracle medicines that once revolutionized healthcare are steadily losing their power. Infections that were once easily cured are becoming increasingly difficult—and, in some cases, impossible—to treat as drug-resistant microorganisms outsmart the very medicines designed to eliminate them. The consequences extend far beyond infectious diseases. Behind every successful surgery, every organ

transplant, and every cancer treatment stands an often-overlooked hero—effective antimicrobial medicines. As antimicrobial resistance erodes their power, the safety of these medical miracles is being compromised, placing millions of patients at an ever-growing risk of serious, and sometimes untreatable, infections.

The consequences of AMR extend well beyond hospitals, posing a serious threat to agriculture and animal health. Drug-resistant infections reduce livestock productivity, escalate treatment expenses, compromise animal welfare, and endanger food security. As resistant microorganisms circulate among humans, animals, food, and the environment, antimicrobial resistance has evolved into a borderless challenge that no country can afford to ignore.

Beyond its health consequences, AMR places an enormous economic burden on societies. Patients often require prolonged hospital stays, more expensive medicines, intensive medical care, and longer recovery periods. Families lose income, healthcare systems face rising costs, and farmers suffer economic losses due to reduced productivity. What begins as a microscopic change in a microorganism ultimately affects livelihoods, national economies, and global development.

The battle against antimicrobial resistance extends far beyond hospitals and laboratories. It is a fight to protect healthy lives, secure our food systems, sustain global economies, and preserve the medical breakthroughs that humanity has achieved over the past century. The responsibility to protect these precious medicines belongs to all of us.

Where do we stand today?

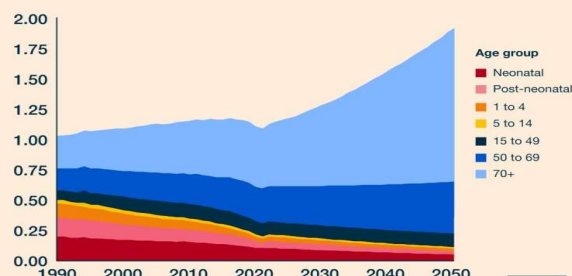
Between 1990 and 2021, AMR killed more than 1 million people directly each year. In 2021, bacterial AMR was directly responsible for 1.14 million deaths and played a role in an additional 4.71 million deaths. If current trends continue unmitigated, direct deaths from AMR are projected to rise by 67.5%, reaching 1.91

million annual deaths by 2050. Total deaths associated with drug-resistant bugs will hit 8.22 million per year.

Between 2025 and 2050, AMR is projected to cause 39 million direct deaths and be linked to 169 million broader deaths.

Antimicrobial resistance could kill 1.9 million people a year by 2050

Estimates in millions of deaths attributable to bacterial antimicrobial resistance (AMR) by age group, globally between 1990 and 2050



(Source: The Lancet, Global burden of bacterial antimicrobial resistance 1990-2021)

The frontline of the antimicrobial resistance crisis is being fought against bacteria—and the microbes are steadily gaining ground. Across the world, once-reliable antibiotics are losing their power as disease-causing bacteria evolve into formidable “superbugs”.

The warning signs are impossible to ignore. WHO's Global Antimicrobial Resistance and Use Surveillance System (GLASS) reports that nearly 42% of *Escherichia coli* infections no longer respond to third-generation cephalosporins, while 35% of *Staphylococcus aureus* infections are methicillin-resistant (MRSA). Even routine urinary tract infections, once treated with a short course of antibiotics, are becoming increasingly difficult to cure, with one in every five *E. coli* infections showing reduced susceptibility to commonly prescribed drugs. [Source: https://who.int/tap_]

The reach of antimicrobial resistance extends well beyond bacteria, jeopardizing the control of HIV, tuberculosis, and malaria—three of the world's deadliest infectious diseases. As resistance to antiretroviral medicines grows, sustaining effective HIV treatment increasingly depends on robust surveillance and evidence-based treatment strategies.

The warning extends beyond bacteria. Tuberculosis is fighting a tougher battle as multidrug-resistant TB (MDR-TB) evades the two most powerful first-line medicines, yet only two in five affected patients received treatment in 2022. Meanwhile, malaria is showing early cracks in its strongest defence, with partial resistance to artemisinin-based

combination therapies (ACTs) emerging across Asia and parts of Africa. Though ACTs remain effective, the spread of resistance threatens to erode decades of hard-won success against one of the world's deadliest diseases.

Decade of coordinated actions against Antimicrobial Resistance:

The global fight against antimicrobial resistance (AMR) has been reinvigorated following the adoption of the Global Action Plan on Antimicrobial Resistance (GAP-AMR) 2026–2036 at the 79th World Health Assembly (WHA79). Designed to guide global action through 2036, the updated framework transforms political commitments into a practical agenda for strengthening prevention, surveillance, responsible antimicrobial use, innovation, and multisectoral collaboration.

Developed through an inclusive multi-stakeholder consultation coordinated by the Quadripartite alliance—the Food and Agriculture Organization (FAO), United Nations Environment Programme (UNEP), World Health Organization (WHO), and World Organisation for Animal Health (WOAH)—the updated action plan advances the foundation laid by the 2015 framework. The plan incorporates the latest scientific evidence, practical lessons from implementation, and the evolving recognition that antimicrobial resistance is an interconnected One Health challenge impacting human, animal, plant, and environmental health, as well as global food systems.

Stopping Resistance before it starts:

A strong consensus emerged at the World Health Assembly that preventing infections remains the most effective and sustainable strategy for reducing antimicrobial use and slowing the spread of resistance. Anchored in a prevention-first philosophy, the updated Global Action Plan prioritizes strategic investments in infection prevention and control (IPC), water, sanitation and hygiene (WASH), expanded immunization, strengthened biosecurity, and environmental measures aimed at limiting the emergence and spread of antimicrobial resistance. Member States further underscored the importance of promoting the responsible, equitable, and sustainable use of antimicrobials in both human and animal health sectors. The framework further calls for stronger surveillance systems, accelerated research and innovation, and the

promotion of sustainable agrifood practices to support a resilient One Health response to antimicrobial resistance.

Shaping the Next Decade of Action (2026-2036)

The GAP-AMR 2026–2036 lays the foundation for a coordinated global response to antimicrobial resistance, equipping countries with a strategic framework to develop, finance, and implement effective multisectoral national action plans. Strategic Priorities for the Next Decade. The plan sets forth a bold and forward-looking strategy centered on five key priorities:

- Catalyzing global action to achieve AMR Targets .
- Reinforcing surveillance and monitoring capacity for timely risk identification and strategic action.
- Expanding long term financing mechanisms to strengthen AMR preparedness and response.
- Advancing accountable governance by ensuring transparency and evidence based performance monitoring.
- Advancing international collaboration under the One Health approach, integrating human, animal and environmental health.

By fostering synergy among policies across healthcare, agriculture, food production, and environmental sectors, the strategy seeks to safeguard the effectiveness of existing antimicrobials, curb the spread of resistance, and stimulate innovation in the

development of next-generation therapeutics, diagnostics, and preventive solutions. Taken together for a healthier, more resilient, and sustainable future.

Conclusion

Antimicrobial resistance is emerging as one of the defining challenges of the twenty-first century, reshaping medicine, agriculture, and global health. Its consequences extend well beyond hospitals and research laboratories, reaching every society, every country, and every generation. The extraordinary medicines that once revolutionized healthcare are a finite resource, and preserving their effectiveness is a responsibility that transcends borders and disciplines.

Safeguarding the future of modern medicine requires far more than the discovery of new antimicrobials. It demands a steadfast commitment to infection prevention, responsible antimicrobial stewardship, robust surveillance, continuous innovation, and the One Health approach. The Global Action Plan (2026–2036) offers an unprecedented opportunity to transform scientific knowledge into coordinated global action.

History has not yet delivered its enduring legacy on antimicrobial resistance. Whether it is remembered as the crisis that outpaced modern medicine or the challenge that united the world in collective action depends entirely on the decisions we make now.

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