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An Overview on Resistance to Antimicrobials

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Commentary

An antimicrobial is a substance that kills or inhibits the growth of bacteria. Antimicrobial drugs are classified by the bacteria against which they are most effective. Antibiotics, for example, are used to treat bacteria, whereas antifungals are used to treat fungi. They can also be categorised based on their function. Microbicides are those that kill microorganisms, while bacteriostatic agents are those that simply restrict their growth. Antimicrobial chemotherapy is the use of antimicrobial drugs to treat infection, whereas antimicrobial prophylaxis is the use of antimicrobial medicines to prevent infection.

Antimicrobial resistance (AMR) has emerged as one of the most serious public health issues of the twenty-first century, posing a threat to the effective prevention and treatment of an ever-widening range of infections caused by bacteria, parasites, viruses, and fungi that are no longer susceptible to common antibiotics. Antibiotic resistance in bacteria makes the problem of AMR even more important. Bacteria that cause common or serious infections have developed resistance to each new antibiotic that comes to market over several decades, to variable degrees. Faced with this fact, immediate action is required to avert a looming global health-care crisis.

The World Health Organization (WHO) has long recognised the need for a more effective and well-coordinated global response to AMR. The WHO Global Strategy for Antimicrobial Resistance Containment, published in 2001, established a framework of measures to prevent the emergence and spread of antimicrobial-resistant microorganisms. The Evolving Threat of Antimicrobial Resistance –Options for Action was published by WHO in 2012, and it recommended a combination of interventions, including strengthening health systems and surveillance, improving antimicrobial use in hospitals and the community, infection prevention and control, encouraging the development of appropriate new drugs and vaccines, and political commitment.`

Following the declaration of surveillance as a primary role, WHO issued the first global report on AMR surveillance in April 2014, compiling data from national and international surveillance networks. Surveillance data can be particularly valuable for orienting treatment options, assessing AMR trends, selecting priority regions for interventions, and monitoring the impact of measures to control resistance, as shown in this research. The lack of adequate surveillance in many regions of the world leaves enormous gaps in our understanding of the phenomenon's distribution and scope.

Antibiotic resistance's influence on mortality and public health costs is difficult to quantify, and few research have been conducted on the subject. Antibiotic-resistant illnesses impact more than two million individuals in the United States each year, according to the US Centers for Disease Control and Prevention (CDC), with at least 23 000 people dying as a result of the infection.

Chemotherapy for cancer treatment, organ transplantation, hip replacement surgery, critical care for pre-term neonates, and many more tasks would be impossible to undertake without efficient antibiotics. In fact, multidrug-resistant bacterial infections are one of the leading causes of morbidity and mortality in patients undergoing these treatments. Infections among cancer patients with chemotherapy-related neutropenia have significant antibiotic resistance rates, according to a 2014 paper from the University of Texas. Infections after orthotopic liver transplantation were found to have a significant proportion of antibiotic-resistant bacteria, according to a recent study from the Medical University of Warsaw.

In neonatal intensive care, common infections are becoming increasingly difficult, if not impossible, to treat. Staphylococcal species, most notably *S. epidermidis* and *S. aureus*, because 60–70% of infections, and methicillin-resistant *S. aureus* (MRSA) outbreaks have been documented in these units on several occasions.

Antifungals are drugs that destroy or stop fungus from growing. They're used to treat diseases like athlete's foot, ringworm, and thrush in medicine, and they function by exploiting distinctions between mammalian and fungal cells. Fungi and humans are both eukaryotic, unlike bacteria. As a result, at the molecular level, fungal and human cells are comparable, making it more difficult to locate a target for an antifungal treatment that does not also present in the host organism. As a result, some of these medications have a lot of negative effects. If the medicine is not used properly, some of these adverse effects might be fatal [1-5].

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