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Antimicrobial Resistance: An Emerging Public Health Threat on One Health Perspectives

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The emergence of multidrug-resistant (MDR) superbugs is extremely alarming. In most cases, infections arising from MDR superbugs do not respond to treatment with a few antimicrobial agents. This issue is on the verge of establishing pre- and post-antimicrobial agent eras. In the latter, last-resort antibiotics will be unable to treat infections caused by Gram-positive and Gram-negative MDR bacteria [1]. The magnitude of this human health issue has been described by the World Health Organization (WHO) through the 2014 "Global Report on Antimicrobial Resistance Surveillance," which is based on reports from 114 countries. The main findings include the high resistance to third generation cephalosporins and fluoroquinolones reported for *Escherichia coli* and *Klebsiella pneumoniae*, and the high resistance to carbapenems displayed by K. pneumoniae for both nosocomial and community-acquired infections. Similarly, high resistance to methicillin has been reported for a strain of Staphylococcus aureus [2]. The recognition of antimicrobial resistance among humans, animals, and ecosystems has led to the concept of "One Health," a holistic term that distinguishes the important links between human, animal, and ecosystem health. As a public health issue, it involves implementing programs, policies, and research that carry out multidisciplinary work, bringing several sectors together to achieve better results. This approach englobes three essential points: understanding the mechanisms of bacterial resistance, using combined therapeutic approaches as clinical options, and discovering new antimicrobial agents [1,3].

The "One Health" approach is necessary to control and prevent infectious diseases, including emerging infections and antimicrobial resistance. This approach is crucial for antibiotic resistance because many antibiotics used in human medicine are also used in veterinary medicine and livestock production, leading to antimicrobial resistance selection. In addition, there is evidence indicating that at least some clinically relevant resistant bacteria and/or their resistance genes can be transferred between animals and humans across ecological and geographic barriers [4]. Given the dimensions of antimicrobial resistance in human-animal-ecosystem health, it seems reasonable to adopt a One Health approach to this problem. This approach includes taking steps to preserve the continuous efficacy of existing antimicrobials by eliminating their inappropriate use and limiting the spread of infection. The agriculture and veterinary sectors are particularly concerned about mass medicating animals with antimicrobials that are also used in humans, such as third generation cephalosporins and fluoroquinolones. Another concern is the use of medically important antimicrobials added to animal feed as growth promoters. These include colistin, quinolones, tetracyclines, and macrolides, and may cause the development of bacterial resistance in animals, which can be transmitted to humans directly or indirectly [5,6].

In conclusion, the concept of antimicrobial resistance and a "One Health" approach is crucial for understanding and mitigating the transmission of resistance genes among the human-animal-ecosystem interface. Despite significant new findings regarding antimicrobial resistance at this interface, other aspects must be explored to fully understand the origin, emergence, dissemination, and evolution of antimicrobial resistance.

Conflict of Interest

The author declares that she has no conflict of interest.

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