

# Bacterial and Fungal Superbugs: The Looming Threat to Public Health

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## Abstract

In recent years, the emergence and spread of bacterial and fungal superbugs have become a growing concern for public health worldwide. Superbugs, a term used to describe strains of bacteria and fungi that have developed resistance to multiple antibiotics and antifungal drugs, pose a significant threat to human health. The nature of bacterial and fungal superbugs, their causes, the challenges they present and the urgent need for a multifaceted approach to address this global crisis. Bacterial superbugs are strains of bacteria that have developed resistance to multiple antibiotics, making them difficult to treat and control. These resilient bacteria have become a significant concern in healthcare settings and communities worldwide. Understanding bacterial superbugs, their causes and the implications they have is crucial in addressing this growing public health threat.

**Keywords:** Bacterial superbugs • Fungal superbugs • Antibiotics

## Introduction

Bacterial superbugs, such as Methicillin-Resistant *S. aureus* (MRSA), Carbapenem-Resistant Enterobacteriaceae (CRE) and Vancomycin-Resistant Enterococcus (VRE), have become increasingly prevalent in healthcare settings [1]. Overuse and misuse of antibiotics have accelerated the development of bacterial resistance, rendering many commonly used drugs ineffective. Superbugs can cause a range of infections, including pneumonia, bloodstream infections and urinary tract infections and they pose a particular risk to vulnerable populations, such as the elderly, immunocompromised individuals and patients in intensive care units. The misuse of antibiotics is a primary driver behind the rise of bacterial superbugs. Inappropriate prescribing practices, patient non-compliance with treatment regimens and the extensive use of antibiotics in agriculture contribute to the selection and spread of drug-resistant bacteria. Additionally, the global interconnectedness facilitated by travel and trade has accelerated the global dissemination of superbugs, making them a pressing issue that transcends national borders [2].

## Literature Review

The primary cause of bacterial superbugs is the overuse and misuse of antibiotics. When antibiotics are used excessively or inappropriately, bacteria can adapt and develop resistance mechanisms to survive the drug's effects. Bacteria can acquire genetic mutations that make them resistant to the action of antibiotics. These mutations can occur naturally or be acquired through gene transfer between different bacterial strains. Bacteria have the ability to transfer genetic material, including resistance genes, to other bacteria through mechanisms such as conjugation, transformation and transduction. This enables the rapid spread of resistance within bacterial populations [3]. Inappropriate use of antibiotics, such as not completing a full course of treatment or using antibiotics for viral infections, contributes to the development of resistant bacteria. Additionally, the use of antibiotics in livestock farming and agriculture can promote the emergence

of resistant strains.

The emergence of bacterial superbugs has severe implications for public health. Treating infections caused by these resistant bacteria becomes challenging, as the available treatment options are limited and often less effective. This can result in prolonged hospital stays, increased healthcare costs and higher mortality rates. The rise of multidrug-resistant bacteria also undermines the success of medical procedures such as surgeries, chemotherapy and organ transplants, which depend on the availability of effective antibiotics to prevent and treat infections [4]. In addition to bacterial superbugs, the rise of fungal superbugs, such as *C. auris* and *A. fumigatus*, poses an equally alarming threat. Fungal infections are often difficult to diagnose and treat and the limited number of antifungal drugs exacerbates the problem.

## Discussion

Fungal superbugs primarily affect immunocompromised individuals and can cause invasive infections with high mortality rates. Their ability to persist on environmental surfaces and survive harsh conditions further contributes to their emergence and persistence. Combating bacterial and fungal superbugs requires a comprehensive approach involving healthcare providers, researchers, policymakers and the public [5]. Promoting appropriate prescribing practices, improving diagnostic tools and educating healthcare professionals on the prudent use of antibiotics and antifungal drugs. Implementing stringent infection control measures in healthcare facilities, including hand hygiene, proper sterilization and disinfection protocols and surveillance of drug-resistant infections.

Investing in the discovery and development of new antibiotics and antifungal agents, as well as alternative treatment modalities, such as phage therapy and immunotherapies. Recognizing the interconnectedness of human, animal and environmental health to address the misuse of antibiotics in agriculture, promote responsible antibiotic stewardship and reduce the transmission of superbugs between animals and humans [6]. Raising awareness among the general public about the risks of antibiotic and antifungal resistance, promoting adherence to prescribed treatments and fostering a global understanding of the importance of responsible antibiotic use.

## Conclusion

The rise of bacterial and fungal superbugs represents a grave threat to global public health. Urgent and coordinated efforts are necessary to prevent the further emergence and spread of these drug-resistant pathogens. By implementing comprehensive strategies encompassing appropriate antibiotic and antifungal use, infection prevention and control, research and development, a one health

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approach and public education, we can work together to mitigate the impact of superbugs and safeguard the effectiveness of antibiotics and antifungal drugs for future generations. By implementing these strategies, we can mitigate the spread of bacterial superbugs and preserve the effectiveness of antibiotics for current and future generations.

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## Conflict of Interest

None.

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## References

1. Li, Wenliang, Frederic Coulon, Andrew Singer and Yong-Guan Zhu, et al. "Paper-based devices as a new tool for rapid and on-site monitoring of "Superbugs"." *Environ Sci Technol* 55 (2021): 12133-12135.
2. Nagarajan, Krishnanand, Sathish Kumar Marimuthu, Selvamani Palanisamy and Latha Subbiah. "Peptide therapeutics versus superbugs: Highlight on current research and advancements." *Int J Pept Res Ther* 24 (2018): 19-33.
3. Viana, Ana Teresa, Tânia Caetano, Cláudia Covas and Tiago Santos, et al. "Environmental superbugs: The case study of *Pedobacter* spp." *Environ Pollut* 241 (2018): 1048-1055.
4. Tu, Jie, Na Liu, Yahui Huang and Wanzhen Yang, et al. "Small molecules for combating multidrug-resistant superbug *C. auris* infections." *Acta Pharm Sin B* (2022).
5. Wang, Hui, Daijie Chen and Hui Li. "Anti-bacterial monoclonal antibodies: Next generation therapy against superbugs." *Appl Microbiol Biotechnol* 106 (2022): 3957-3972.
6. Algammal, Abdelazeem, Helal F. Hetta, Mahmoud Mabrok and Payam Behzadi. "Emerging multidrug-resistant bacterial pathogens "superbugs": A rising public health threat." *Front Microbiol* 14 (2023): 1135614.

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