

# The Growing Threat of Multidrug-Resistant Human Mycobacterium: A Looming Public Health Crisis

Macroni Laco\*

Department of Surgery, University of California, Irvine, USA

## DESCRIPTION

Mycobacterium is a genus of bacteria known for causing a range of diseases, including Tuberculosis (TB) and leprosy, among others. Over the years, the emergence of multidrug-resistant strains of mycobacterium has posed a significant threat to public health systems worldwide. In particular, human *Mycobacterium tuberculosis* and *Mycobacterium leprae*, the causative agents of TB and leprosy, respectively, have exhibited alarming levels of resistance to conventional antibiotic treatments. This article delves into the reasons behind the development of multidrug-resistant human mycobacterium and the urgent need for effective strategies to combat this growing crisis.

### Understanding multidrug resistance

Multidrug Resistance (MDR) occurs when a microorganism becomes resistant to two or more antimicrobial drugs that are commonly used to treat infections caused by that particular pathogen. In the case of human mycobacterium, the development of MDR strains has been primarily attributed to the improper use of antibiotics, incomplete treatment regimens, and inadequate infection control practices.

### Factors contributing to multidrug resistance

**Misuse and overuse of antibiotics:** The misuse and overuse of antibiotics in both clinical and non-clinical settings have played a significant role in the emergence of MDR human mycobacterium. Inadequate prescribing practices, patient non-compliance with treatment regimens, and the widespread availability of antibiotics without proper prescription and supervision have fueled the development of resistance.

**Incomplete treatment regimens:** Mycobacteria have a unique characteristic of slow growth and the ability to persist in the body for extended periods. When antibiotic treatment courses are prematurely discontinued or not completed as prescribed, the surviving bacteria can mutate and develop resistance to the drugs being used. This creates an environment for the emergence of MDR strains that are difficult to eradicate.

**Lack of diagnostic tools:** Limited access to rapid and accurate diagnostic tools for detecting drug-resistant mycobacterium strains has also contributed to the escalation of MDR cases. In many resource-limited settings, traditional diagnostic methods such as microscopy or culture-based techniques may not detect drug resistance, leading to delayed or inappropriate treatment.

### Consequences of multidrug resistance

The rise of MDR human mycobacterium strains has severe consequences for both individual patients and public health systems globally. MDR strains require longer and more complex treatment regimens, which are often associated with higher costs, increased toxicity, and reduced treatment success rates. The prolonged duration of treatment not only places a heavy burden on patients but also strains healthcare resources and compromises the overall effectiveness of disease control programs.

### Combating multidrug resistance

**Improved antibiotic stewardship:** Implementing robust antibiotic stewardship programs is crucial to combating multidrug resistance. This involves promoting appropriate prescribing practices, raising awareness among healthcare professionals and the general public about the risks of antibiotic misuse, and ensuring strict adherence to treatment guidelines.

**Strengthened infection control measures:** Implementing effective infection control measures, such as proper isolation protocols, healthcare worker education, and improved sanitation practices, can help limit the transmission of drug-resistant mycobacterium strains within healthcare facilities and communities.

**Enhanced diagnostics:** Developing and deploying rapid, accurate, and affordable diagnostic tools to identify drug-resistant mycobacterium strains is essential. Advancements in molecular techniques, such as nucleic acid amplification tests and whole-genome sequencing, hold promise for faster and more reliable diagnosis, allowing for timely initiation of appropriate treatment.

**Correspondence to:** Macroni Laco, Department of Surgery, University of California, Irvine, USA, E-mail: macronilaco@uci.edu

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## CONCLUSION

The emergence and spread of multidrug-resistant human mycobacterium strains represent a grave threat to global public health. The factors contributing to the development of drug resistance, such as antibiotic misuse, incomplete treatment regimens, and limited diagnostic tools, must be urgently addressed to prevent further escalation of this crisis. Efforts to

combat multidrug-resistant human mycobacterium require a multi-faceted approach. Improving antibiotic stewardship practices, including appropriate prescribing and patient education, is essential to prevent the misuse and overuse of antibiotics. Strengthening infection control measures within healthcare facilities and communities is vital to limit the transmission of drug-resistant strains and protect vulnerable populations.