

# Drug-resistant neisseria gonorrhoeae: A growing threat to public health.

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## Introduction

In the ever-evolving landscape of infectious diseases, *Neisseria gonorrhoeae*, the bacterium responsible for gonorrhea, has emerged as a formidable adversary. Once easily treatable with antibiotics, this Sexually Transmitted Infection (STI) has developed resistance to multiple drugs, challenging healthcare providers and public health officials worldwide. Drug-resistant *Neisseria gonorrhoeae* presents a serious threat to public health, demanding increased awareness, research, and effective intervention strategies. Gonorrhea, a Sexually Transmitted Infection (STI), is a growing global public health concern. This escalating issue demands immediate international attention and resources due to the increasing global burden of infection. *Neisseria gonorrhoeae*, the bacterium responsible for gonorrhea, is evolving into a superbug, posing a grave threat as it develops resistance to all available antimicrobial classes used for treatment [1].

*Neisseria gonorrhoeae*, the bacterium responsible for gonorrhea, is progressively transforming into a superbug, displaying resistance to previously and currently recommended antimicrobial treatments. This alarming development poses a substantial global public health concern. Several factors contribute to the gravity of this issue, making it imperative to address and understand the evolution, emergence, and spread of Antimicrobial Resistance (AMR) in *N. gonorrhoeae*. Gonorrhea's worldwide prevalence, coupled with the widespread usage of antimicrobial drugs, creates an environment conducive to the emergence of AMR. The suboptimal control and monitoring of AMR and treatment failures, along with the slow updates to treatment guidelines in many regions, further exacerbate the problem. Additionally, the remarkable adaptability of the gonococci in developing and retaining AMR mechanisms underscores the urgency of this issue [2].

To effectively combat this escalating challenge, it is crucial to gain a comprehensive understanding of the molecular and phenotypic mechanisms driving AMR in *N. gonorrhoeae*. Anticipating resistance to clinically used antimicrobials, developing region-specific and tailored genetic testing for AMR, and designing innovative antimicrobial therapies to overcome resistance are essential steps in addressing this pressing public health concern. For nearly eight decades, gonorrhea has been effectively treated with antimicrobial drugs. However, there is now a high prevalence of *N. gonorrhoeae* strains displaying resistance to a wide range

of previously and currently available antimicrobials, including sulfonamides, penicillins, earlier cephalosporins, tetracyclines, macrolides, and fluoroquinolones. Disturbingly, there have been documented cases of treatment failures with Extended-Spectrum Cephalosporins (ESCs) like cefixime and ceftriaxone, and the emergence of gonococcal strains exhibiting high-level resistance to all ESCs is a cause for great concern [3].

Ceftriaxone remains the last viable option for empirical first-line antimicrobial monotherapy in most settings worldwide, raising fears of gonorrhea becoming untreatable with antimicrobial monotherapy. To address this concern, recommendations for dual-antimicrobial therapy, typically involving ceftriaxone and azithromycin, have been introduced in various countries. However, the efficacy of these dual-antimicrobial regimens is dwindling, and resistance to azithromycin is becoming widespread. The impending public health crisis of antimicrobial-resistant gonorrhea is of paramount importance. As treatment regimens become more expensive and treatment failures increase, medical costs will surge due to severe complications that jeopardize the overall and reproductive health of affected individuals. The global nature of this problem, coupled with high and often unregulated antimicrobial usage, insufficient control and monitoring of Antimicrobial Resistance (AMR) and treatment failures, slow updates to treatment guidelines, and *Neisseria gonorrhoeae*'s remarkable capacity to develop and retain AMR, all contribute to the worsening of this issue. The severe complications of gonorrhea may soon emerge as a silent epidemic

Addressing this crisis requires concerted international efforts, increased research, and the development of new treatment strategies. Without immediate and sustained action, the problem of antimicrobial-resistant gonorrhea will continue to escalate, posing severe threats to public health worldwide [4,5].

## Conclusion

Drug-resistant *Neisseria gonorrhoeae* is a pressing public health concern that demands immediate attention. The erosion of effective treatment options for gonorrhea is a sobering reminder of the importance of responsible antibiotic use, ongoing research, and global cooperation in the fight against drug-resistant infections. To safeguard public health, we must prioritize the prevention and control of drug-resistant *Neisseria gonorrhoeae* on a global scale.

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