

**COMMENTARY: THE ESCALATION OF ANTIMICROBIAL RESISTANCE IN
CONFLICT ZONES: A CASE STUDY OF GAZA'S HEALTHCARE CRISIS**Jawad A. M.^{1*}

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ABSTRACT

This commentary contends that the escalation of antimicrobial resistance is a healthcare crisis and a reflection of broader human rights failings, particularly in conflict-ridden areas. A robust international response is imperative, extending beyond immediate medical aid to uphold the inherent right to healthcare. The discourse demands rigorous global action, advocating for the implementation of sustainable health strategies that integrate the provision of essential services with the reinforcement of health-related human rights. Doing so emphasizes the importance of peace as a foundational element for health and human rights. It calls for international cooperation to address the root causes of AMR in these regions. The argument presented here underlines the urgent need to protect human rights by mitigating the AMR threat, which is inextricably tied to the consequences of armed conflict and the ensuing breakdown of healthcare systems.

KEYWORDS: Antimicrobial Resistance; Right to Healthcare; International Cooperation; Gaza.**INTRODUCTION**

Antimicrobial resistance (AMR) is a daunting public health challenge with profound ramifications for the global fulfilment of 'human rights'.^[1] The discourse contends that the provision of fundamental healthcare transcends being a mere attribute of a just society; it is a vital basis for fully realising the 'right to healthcare' and individual well-being.^[2] This right is fundamental, forming the very foundation of human rights, which is threatened by the escalating catastrophe of AMR—exacerbated by the devastation of armed conflict.

In conflict-afflicted zones such as Syria, warfare exacerbates the proliferation of AMR, casting a shadow on the indirect toll of war.^[3,4] Notably, in the Gaza Strip, the Great March of Return in 2018 has precipitated a shocking 300% rise in antibiotic resistance among those injured in the demonstrations, a figure starkly contrasted by the rates in those not wounded.^[3,5] Preceding the conflict intensification on October 7, 2023, Gaza's already fragile healthcare infrastructure was marred by inadequate wastewater management, resulting in bacterial contamination of hospital samples and heightened antibiotic resistance, such as *carbapenems* and *cephalosporins*.^[3,6] This war scenario set the stage for the current catastrophe, spotlighting the deep-seated impact of conflict on health systems.

This commentary will delve into the complex relationship among armed AMR and conflict, particularly examining the exacerbating factors contributing to the crisis. It will discuss the compound effects of 'right to healthcare' challenges, infrastructural damage, and environmental conditions that collectively catalyses the rise of AMR in Gaza. It will address the need for a multi-faceted international response beyond immediate medical intervention to include sustainable healthcare strategies and uphold the 'right to healthcare' amidst war-induced crises. Through this exploration, the paper seeks to underline the necessity of urgent global action to confront these intertwined issues, emphasizing a call for peace and humanity in the face of such adversity.

The Impact of Conflict and Blockade on Public Health

The conditions in Gaza, shaped by persistent conflict and severe blockades, have unintentionally fostered an environment conducive to the growth of AMR.^[3] The contributing elements are complex and interconnected, each intensifying the presence and impact of the others within a complicated causality network. Overcrowded living conditions resulting from mass displacements have created environments where poor sanitation is prevalent, and infectious diseases can spread rapidly.^[7] These conditions facilitate the transmission of bacteria, increasing the opportunities for resistant strains to develop and proliferate. The ongoing blockade

exacerbates this crisis by severely constricting the flow of essential medications, with antibiotic availability reducing to a critical 45%, dependent almost entirely on irregular donations.^[3,8] This shortage is more than an economic crisis; it is a public health catastrophe perpetuating the malicious cycle of resistance. The complications are further aggravated by a hindered national AMR surveillance system, crippled by scarce resources and the chaos brought by war.^[4] The absence of reliable data and monitoring render the development of effective interventions nearly impossible, leaving the populace at the mercy of a dangerous threat that flourishes in the disarray of conflict.

The healthcare infrastructure in Gaza, already fragile, has been further compromised by the conflict. This has strained the ability to offer precise diagnoses and appropriate treatments, leading to a reliance on broad-spectrum antibiotics as a substitute.^[7] Such practices encourage the emergence of AMR, as bacteria are exposed to various antibiotics and may develop mechanisms to survive them. The challenges Gaza faces are not confined to the medical sector alone; the entire living situation contributes to the escalation of AMR. The blockade has led to a scarcity of medical supplies, compelling healthcare providers to make do with limited resources, often resulting in the misuse or suboptimal deployment of antibiotics.^[9] The blockade enforced since 2007 has only intensified the strife, severely limited movement and plunging Gaza into a protracted humanitarian crisis.^[10]

Incomplete or incorrect treatments encourage the growth and spread of resistant bacterial strains.^[11] The crisis in Gaza extends well-beyond the realm of healthcare; the prevalent issue of food insufficiency and its lack of nutritional value weakens the immune response of the citizens, thereby increasing their risk of contracting infections that might lead to a greater dependence on antibiotic treatments. The water supply, compromised by damage to infrastructure, is often contaminated, increasing the risk of waterborne diseases that are difficult to treat effectively in the context of AMR.^[12]

The living conditions in Gaza, further deteriorated by the destruction caused by bombings, contribute to unsanitary environments that are conducive to the spread of infections.^[13] The pollution resulting from the conflict, including releasing toxic substances from damaged buildings and unexploded ordnance, introduces additional health hazards that can lead to increased reliance on antibiotics, further fostering AMR.^[13] Each aspect of daily life in Gaza, strained by conflict and limited resources, plays a role in the complex web of factors that facilitate the rise of antimicrobial resistance.^[3] The convergence of these factors creates a public health emergency that necessitates a comprehensive and multi-faceted international response, addressing medical needs and the essential determinants

of health, such as nutrition, clean water, and safe living conditions.

The psychological toll of living under these conditions, alongside the physical effects of malnutrition, weakens the immune systems of the Gazan population, making them more susceptible to infections.^[13] The subsequent increase in antibiotic used to combat these infection creates a cycle that furthers the development and spread of AMR. The cumulative effect of these factors is a perfect storm for the development of AMR in Gaza. Therefore, the region's public health concerns are immediate and humanitarian and represent a long-term global health threat. The intersection of conflict, compromised healthcare, environmental degradation, and weakened population resilience highlights the urgent need for a coordinated international response. Such a response must address the humanitarian needs while simultaneously implementing strategies to combat the rise of antimicrobial resistance, ensuring that global health 'security' is maintained and the 'right to healthcare'^[16] for the Gazan population is upheld.

CONCLUSION

The humanitarian crisis in Gaza, stemming from relentless conflict and an oppressive blockade, has culminated in an unsafe rise in antimicrobial resistance (AMR), signalling an urgent global health concern. The compounded effects of war, a crippled healthcare system, and environmental degradation have not only precipitated an immediate healthcare emergency but also posed a significant threat to long-term global health security. As this commentary underscores, the crisis extends beyond the borders of Gaza, demanding a concerted international effort that addresses the fundamental human right to healthcare. The obligation to act is clear: the international community must mobilize to implement comprehensive strategies that confront the proliferation of AMR, ensure the availability of essential medicines, and support the necessary infrastructure to restore and maintain health services. Above all, this commentary calls for a humanitarian response that prioritizes the dignity and well-being of individuals, advocating for an end to the conflict and a steadfast commitment to uphold the right to health for all, particularly in regions beset by war.

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