

The Impact of Climate Change on Vector-Borne Diseases in the USA

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Abstract- Climate change is significantly influencing the transmission of vector-borne diseases in the USA, posing a substantial threat to public health. Rising temperatures and changing precipitation patterns are altering the distribution, abundance, and behavior of vectors, increasing the risk of human exposure. This article reviews recent research on the impact of climate change on vector-borne disease transmission, highlighting the need for sustainable solutions to mitigate its effects. Thus, a recommendation of enhanced vector surveillance, human disease tracking, and evidence-based interventions to address the growing burden of vector-borne diseases was made. Urgent action is necessary to address the far-reaching consequences of climate change on public health.

I. INTRODUCTION

Vector-borne diseases, such as Lyme disease, dengue fever, and Zika virus, are a significant public health concern in the USA (Eisen et al., 2016). Climate change is influencing vector-borne disease transmission in several ways (Eisen et al., 2016). Vectors such as ticks, mosquitoes, and fleas are sensitive to temperature and precipitation changes, which alter their distribution, abundance, and behavior (Paz, 2024).

II. CLIMATE CHANGE AND VECTOR-BORNE DISEASES

Warmer temperatures and changing precipitation patterns alter the distribution and abundance of vectors, increasing the likelihood of human exposure (Paz, 2024). For example, the geographic range of the tick vector *Ixodes scapularis* has expanded northward in recent decades, coinciding with an increase in Lyme disease cases (Eisen et al., 2016). Similarly, the mosquito vector *Aedes aegypti* has expanded its range into new areas, increasing the risk of dengue fever and Zika virus transmission (Watts et al., 2019).

III. RECENT RESEARCH AND FINDINGS

Recent research has highlighted the impact of climate change on vector-borne disease transmission (Allan et.al, 2023; Rocklöv and Dubrow, 2020; Obame-Nkoghe, 2024; Tidman et.al., 2021). In Africa, climate change is projected to increase the burden of vector-borne diseases, emphasizing the need for sustainable solutions (Obame-Nkoghe, 2024; Tidman et.al., 2021). The Intergovernmental Panel on Climate Change (IPCC) has also highlighted the impact of climate change on vector-borne disease transmission, noting that changing community structures and demographics can increase vulnerability to these diseases (Cissé et.al., 2022; Allan et.al, 2023). Furthermore, climate change poses an enduring challenge for vector-borne disease prevention and control, requiring innovative strategies to mitigate its impacts (Breedlove, 2022; Rocklöv and Dubrow, 2020).

IV. CONSEQUENCES FOR PUBLIC HEALTH

The consequences of climate change on vector-borne disease transmission are far-reaching, with significant implications for public health (IPBES, 2019). The spread of vector-borne diseases into new areas, coupled with the increasing severity of outbreaks, poses a significant threat to global health security (WHO, 2019).

V. RECOMMENDATIONS AND SOLUTIONS

Urgent action is needed to address the impact of climate change on vector-borne disease transmission. It is recommendable to have enhanced vector surveillance, human disease tracking, and sustainable solutions to mitigate the effects of climate change on vector-borne disease transmission (Tozan et.al., 2020; EPA, 2020).

Reducing greenhouse gas emissions and transitioning to renewable energy sources can help mitigate the effects of climate change on vector-borne disease transmission (Allan et.al, 2023). Additionally, public health interventions such as vector control programs and vaccination campaigns can help reduce the spread of vector-borne diseases (WHO, 2020).

CONCLUSION

The impact of climate change on vector-borne diseases in the USA is a pressing public health concern. Urgent action is needed to address the increasing spread of vector-borne diseases and the concurrent rise of antimicrobial resistance. Enhanced vector surveillance, human disease tracking, and sustainable solutions to mitigate the effects of climate change on vector-borne disease transmission are recommended.

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