Webinar Report

The rise of vector-borne diseases: how climate change is expanding their reach

> 25th March 2025 Event code: W51 VBD



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About this report

This report presents the key findings and discussions from the webinar "The rise of vector-borne diseases: how climate change is expanding their reach," organized by the Infectious Disease Alliance (IDA) on March 20, 2025. The webinar convened leading experts in infectious diseases, epidemiology, and climate science to examine the growing threat of vector-borne diseases (VBDs) driven by climate change.

As rising temperatures, shifting precipitation patterns, and environmental changes create more favorable conditions for disease-carrying vectors such as mosquitoes and ticks, VBDs—including malaria, dengue, Zika virus, and Lyme disease—are expanding beyond their historical geographic boundaries. The webinar explored the latest research on these shifting disease patterns, the implications for public health, and urgent strategies for mitigation and adaptation.

The event featured presentations by Dr. Neelika Malavige on Public Health Preparedness for Dengue in a changing climate and Majani Edward on he impact of climate change on vector-borne diseases. A panel discussion and a moderated Q&A session provided attendees with an opportunity to engage directly with experts, addressing pressing challenges and collaborative solutions.

This report is structured to reflect the core themes of the webinar. It outlines the event's objectives, speakers, and structure while summarizing key discussions and findings. Additionally, it highlights engagement metrics and presents actionable recommendations for policymakers, researchers, and public health stakeholders. By compiling these insights, this report aims to support efforts to strengthen surveillance, prevention, and response strategies for the rising threat of climate-driven vector-borne diseases.

This webinar report was compiled by Iris Klaasse, Committee Manager NTDs



Background on vector - borne diseases

Vector-borne diseases (VBDs) pose a growing global health challenge, affecting millions of people each year, particularly in low-resource settings. These diseases—transmitted by vectors such as mosquitoes, ticks, and sandflies—include malaria, dengue fever, Zika virus, Lyme disease, and Chikungunya. Historically confined to tropical and subtropical regions, VBDs are now expanding into new geographic areas due to climate change, urbanization, and global travel.

Warmer temperatures, changing rainfall patterns, and altered ecosystems are creating more favorable conditions for disease-carrying vectors to thrive. This shift has led to increased outbreaks in regions previously unaffected, putting new populations at risk. Vulnerable communities, often with limited healthcare infrastructure and inadequate vector control measures, are disproportionately impacted. Despite the significant public health burden of VBDs, they frequently receive less attention and funding compared to other infectious diseases, highlighting the need for stronger surveillance, prevention, and mitigation strategies.



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Introduction

On March 25, 2025, the Infectious Disease Alliance (IDA) hosted a webinar titled "The Rise of Vector-Borne Diseases: How Climate Change is Expanding Their Reach." The event brought together experts to discuss how climate change is driving the spread of diseases like malaria, dengue, and Zika into new regions. The webinar highlighted the latest research, emerging public health challenges, and innovative strategies to mitigate the growing threat of vector-borne diseases.



The objective of this webinar

This webinar will promote awareness of the ID Alliance's action on Climate Change, Health, and Vector-Borne Diseases, broaden stakeholder outreach to ensure maximum participation and attendance at the event and encourage and increase registration to encourage high levels of engagement and involvement.

The webinar aimed to:

- Highlight novel diagnostic tools, treatment approaches, and elimination strategies.
- Discuss the role of social and community-driven interventions in combating vector-borne diseases.
- Promote the collaboration between stakeholders to accelerate progress toward vector-borne disease eradication.
- Identify policy recommendations and research priorities to enhance global health responses.

Key speakers & topics

- Dr. Neelika Malavige Public Health Preparedness for Dengue in a changing climate
- Majani Edward The impact of climate change on vector-borne diseases





Summary & key takeaways of the webinar

Dr. Neelika Malavige - Public Health Preparedness for Dengue in a changing climate

Professor Neelika Malavige, an expert in immunology and molecular medicine at the University of Sri Jayewardenepura, examines the impact of climate change on the global rise of dengue fever and other vector-borne diseases. Dengue has now been classified as a Grade 3 Emergency by the WHO, with mortality rates continuing to increase.

The discussion highlights how climate change directly influences the transmission dynamics of dengue, with rising temperatures accelerating mosquito development, increasing biting frequency, and enhancing virus replication. Additionally, the geographical range of Aedes mosquitoes is expanding, leading to longer transmission seasons in tropical regions and the emergence of dengue in high-altitude areas previously protected by cooler temperatures. This shift increases the global burden of dengue and raises concerns about other arboviruses, which are also becoming more prevalent due to climate change.

Despite the growing threat, several challenges hinder effective dengue control. The lack of affordable and sensitive diagnostic tools makes early detection difficult, while current vaccines remain ineffective against all dengue serotypes and have limited efficacy in individuals unexposed to prior infections. Additionally, funding for dengue research and control efforts remains insufficient, particularly in high-income countries that were previously unaffected but are now experiencing sporadic outbreaks. The increasing strain on healthcare systems due to rapid urbanization, fragile infrastructure, and large-scale population movements further complicates disease management.

To combat these challenges, there is a need for enhanced viral surveillance, research into severe disease markers, and improved vector control strategies. Surveillance efforts are critical for tracking emerging dengue strains, understanding their virulence, and adapting diagnostic tools accordingly. A deeper understanding of risk factors for severe dengue could pave the way for biomarker discovery and improved treatment options. Furthermore, investment in novel mosquito control techniques and community-based prevention programs is essential to reduce disease transmission in high-risk areas.

A key concern raised in the discussion is the broader impact of climate change on vector-borne diseases, as rising temperatures and extreme weather events create conditions conducive to outbreaks. The global expansion of dengue and other arboviruses signals an urgent need for international collaboration, increased funding for research, and stronger public health preparedness. Experts stress that a coordinated effort—spanning scientific research, policy development, and community engagement—is essential to mitigating the escalating threat posed by vector-borne diseases in a rapidly changing climate.

How can we face these challenges?

1. Increased viral surveillance

- · Monitoring of emergence of more virulence dengue strains
- To see if the emerging strains would evade immunity to liciences and vaccines being developed
- Non-detection by existing diagnostics

2. Better understanding of what causes severe disease

- Crucial for biomarker discovery
- · For developing dengue therapeutics and clinical trial design

3. Need to understand correlates of protection

- · For development of safe and effective vaccines
- · To measure vaccine efficacy, without conducting large clinical trials, for 5 years
- 4. Better vector control strategies



Figure 1: Solutions for adressing dengue and other vector-borne diseases





Majani Edward - The impact of climate change on vector-borne diseases

Majani Edward explores how climate change is driving the spread of vector-borne diseases (VBDs) by influencing pathogens, vectors, and hosts. Rising temperatures, altered precipitation patterns, and extreme weather events are accelerating disease transmission, expanding the geographic range of vectors, and increasing their activity.

Higher temperatures boost mosquito breeding and biting rates, fueling the spread of dengue, Zika, and chikungunya. Malaria parasites develop faster in warmer conditions, while milder winters allow diseasecarrying ticks to move into new regions. Changing rainfall patterns create more breeding sites for mosquitoes, while droughts push them into urban areas. Floods and hurricanes further disperse disease vectors, leading to outbreaks in previously unaffected locations.

To mitigate these risks, experts emphasize environmental management, biological and chemical vector control, and strengthening public health systems. Surveillance, early warning systems, and improved diagnostics are crucial in combating VBDs. Climate-resilient infrastructure, urban planning, and One Health initiatives—integrating human, animal, and environmental health—are also key. Research into new vector control tools, vaccines, and predictive climate models is vital for long-term prevention. The discussion underscores the urgency of global collaboration, funding, and innovation to tackle the escalating threat of VBDs in a warming world.

Integrated Vector Management (IVM)

• Environmental management- Removing stagnant water, improving drainage, and

cleaning up debris.

• Biological control- Using Bacillus thuringiensis israelensis (Bti) to kill mosquito

larvae.

• Chemical control -Using insecticides like pyrethroids in a targeted and responsible

manner.

Figure 2: Integrated vector management in VBD

Plan for continued engagement

- Follow-up communication: Share a post-event package with participants, including the event report, recording, and next steps.
- Stakeholder network development: Establish a platform for continued dialogue and collaboration among participants.
- Periodic webinars and workshops: Organize follow-up events to monitor progress and explore new innovations in addressing NTDs.
- Annual convening: Build momentum for an annual event to evaluate progress and share best practices in combating NTDs.



Call to action

Strengthening Global Health security through sustained investment in Vector-Borne Disease prevention and control

Dear Global Health advocates, leaders and organizations,

Vector-borne diseases (VBDs) continue to pose a significant threat to global health, accounting for more than 17% of all infectious diseases and causing over 700,000 deaths annually. Recent outbreaks and emerging threats underscore the urgent need for sustained investment and coordinated action to prevent and control these diseases.

The crisis at hand

- Emerging threats: In late 2023 and early 2024, the Oropouche virus, an emerging vector-borne disease with symptoms similar to dengue, began spreading beyond the Amazon basin. Travel-associated cases appeared in the United States, with infections during pregnancy linked to fetal death and possible birth defects.
- Recent Outbreaks: In early 2025, a 'mystery disease' in northwestern Congo resulted in at least 60 deaths and over 1,000 infections across five villages. The World Health Organization suspects a contaminated water source as the cause, with poisoning being a strong possibility.
- Re-emergence of Diseases: In March 2025, New South Wales, Australia, recorded its first Japanese encephalitis death since 2022. A man in his 70s from Sydney died after contracting the virus, likely during a regional vacation. This marks the third confirmed JE-related death in NSW since the virus's detection in 2022.

Challenges amplifying the crisis

- Climate change: Warmer temperatures and altered precipitation patterns expand the habitats of vectors like mosquitoes and ticks, increasing the risk of disease transmission.
- Funding gaps: Despite the escalating threats, investments in VBD prevention and control remain insufficient. For instance, in 2023, the UK government, in collaboration with the Department for Environment, Food and Rural Affairs invested £7 million to combat VBDs. While commendable, such funding needs to be sustained and scaled to meet the growing challenges.
- Urbanization and mobility: Rapid urbanization and increased global travel facilitate the spread of VBDs to new regions, challenging existing public health infrastructures.

IDA's call to action

We urge immediate and sustained global action to bolster the fight against VBDs:

- Governments: Increase funding for VBD research, surveillance, and control programs. Implement policies addressing environmental factors contributing to the spread of these diseases.
- International organizations: Enhance coordination and resource mobilization to support countries heavily burdened by VBDs.
- Research institutions: Prioritize the development of innovative tools and strategies for VBD prevention and control, including vaccines and vector management techniques.
- Private sector and philanthropy: Invest in public-private partnerships to accelerate the development and distribution of interventions targeting VBDs.
- Communities and individuals: Engage in local initiatives to reduce vector habitats and adopt protective measures against vector bites.



Time is of the essence

The resurgence and emergence of VBDs highlight the critical need for sustained investment and collaborative action. Failure to act promptly risks reversing decades of progress in global health. By uniting our efforts and resources, we can strengthen global health security and protect vulnerable populations from the devastating impacts of vector-borne diseases.

Join us in demanding urgent action. Sign this call to action and help us protect the world's most vulnerable populations from preventable diseases.

The IDA thanks all speakers, participants, and partners for their contributions to this insightful discussion. By working together, we can drive meaningful change in global health and combat neglected tropical diseases effectively.

Sign here the Call to Action on Vector-Borne Diseases

Watch here this webinar recording on Vector-Borne Diseases



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