



VECTOR BORNE ILLNESS



Emergency Preparedness and Response to Climate Change: The Role of the Environmental Health Professional

The National Environmental Health Association (NEHA) aims to raise awareness of the impacts of climate change. These changes, including the effects of extreme weather events on infrastructure and human health, have increased the need for preparedness and response across every sector of public health, especially environmental health (EH). EH professionals play an integral role in mitigation, preparedness, response, and recovery. Clearly, NEHA's mission, *to advance the environmental health professional for the purpose of providing a healthful environment for all*.

Climate change is the greatest threat to global health.⁸ It affects human health through air quality, extreme heat, drought, wildfires, extreme storms, floods, vector borne illnesses, and changing local weather patterns.

Though global, the effects of climate change are inherently local. All people are susceptible to physical and mental health impacts; however, certain groups carry a heavier burden. These populations include children, people of color, older adults, people with disabilities, and people in impoverished communities.

! FAST FACTS !

Worldwide, vector-borne diseases account for more than **17%** of all infectious diseases, causing more than 700,000 deaths annually.¹

From 2004 to 2016, disease cases from mosquito, tick, and flea bites **TRIPLED** in the U.S.²

Tickborne diseases more than doubled in 13 years and were **77%** of all vector-borne disease reports.²

The national burden of Lyme disease ranges from \$786 million to **\$1.3 BILLION** annually.⁶

CLIMATE CHANGE AND VECTOR-BORNE ILLNESS

Increasing temperatures and precipitation are expanding the habitats and changing the migration patterns of disease-carrying vectors such as ticks, mosquitoes, and fleas. Deforestation also plays a role in vector distribution. Less frequent freezing temperatures, especially at higher altitudes, lengthens the breeding season of mosquitoes and increases their chance of survival from one season to the next. Mosquitoes transmit viruses such as Zika, West Nile, Dengue, Chikungunya, and Yellow fever, and transmission is projected to increase. In February 2016, the World Health Organization identified Zika virus as a public health emergency of international concern due to its rapid spread.¹ Vectors and illnesses can affect many aspects of human health. For example:

- Expanded geographic range and number of vectors and vector-borne diseases have increased exponentially. These diseases include Lyme disease, West Nile virus, Zika virus, Yellow fever, and Dengue
- Increased temperature and wet environments caused by increased precipitation create excellent breeding grounds for mosquitos
- Throughout the decades, the geographical range of habitats and vector populations has grown

All health effects caused by vector-borne illness contribute to school and work absences, decrease workplace productivity, and affect the quality of life.



MOSQUITOS

West Nile virus
Zika virus
Yellow fever
Dengue fever
Malaria
Chikungunya virus

IMPACTS ON THE INCREASE OF VECTORS

Increased temperatures
Increased precipitation
Deforestation
Longer warm seasons
Human migration and global travel
Expanded geographic range

TICKS



Lyme disease
Anaplasmosis
Ehrlichiosis
Powassan virus
Borrelia mayonii
Colorado Tick fever



ENVIRONMENTAL HEALTH WORKFORCE ROLE

EH professionals play an essential role in action planning for outbreaks, disease recovery efforts, and reducing public health risks of vector-borne diseases. Vector-borne illness increases the need for preparedness and response from EH professionals. An EH professional specializing in vector control has the appropriate education and training needed to support local impacts and protect human health from vector-borne disease.

In order to address the health threats of vectors and vector-borne diseases, EH professionals must be able to:

- Provide recommendations, interventions, guidelines, and policies to protect and control vectors and vector-borne illnesses
- Review active vector seasons to track potential risk for public health
- Interpret vector and health research utilizing science and the impact on each other
- Educate on decreasing exposure to vectors, prevention of illnesses, and signs of active illness and when to seek medical attention
- Monitor high populations of vectors and work to decrease their habitats
- Understand the impact that systems, social and structural inequities, institutional power and structural racism can have on climate change

EH professionals are uniquely qualified to respond to vector disease impacts due to their in-depth knowledge of the relationship between vectors, health, and the environment.



RECOMMENDATIONS

- Health departments should utilize CDC's Building Resilience Against Climate Effects (BRACE) Framework to estimate the burden of health outcomes and vulnerabilities associated with exposure to ticks, mosquitos, and other vectors.³
- Academic EH programs should develop a highly skilled and well-trained workforce to monitor vector populations, pest and vector management.

Resources

- 1 World Health Organization. (2017, October 31). Vector-borne diseases. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases>
- 2 Centers for Disease Control and Prevention. (2018, May 4). Vital Signs: Trends in Reported Vectorborne Disease Cases - United States and Territories, 2004–2016 | MMWR. Retrieved from <https://www.cdc.gov/mmwr/volumes/67/wr/mm6717e1.htm>
- 3 Centers for Disease Control and Prevention. (2019, September 9). Climate and Health - CDC's Building Resilience Against Climate Effects (BRACE) Framework | CDC. Retrieved from <https://www.cdc.gov/climateandhealth/BRACE.htm>



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ASSESSMENT

EH professionals identify, assess, and help recommend solutions for decreasing vector populations and illnesses.

- Assess and investigate current community health needs by identifying vector trends and vulnerabilities across jurisdictions. For example, trace and monitor prevalent vectors and assess emerging threats.

POLICY DEVELOPMENT

EH professionals support community efforts to address vector control through policy.

- Develop an alert system of high-risk locations and seasons for vector exposure, parks, lakes, rivers, playgrounds, and other natural areas. Communication can be done through signage, social media updates, and blocking off unsafe communal areas.
- Address precipitation and standing water trends through local legislation to prevent habitats that support vectors. For example, develop a policy to eradicate standing water within 48 hours of reporting.

ASSURANCE

EH professionals have an essential role in protecting the public's health by ensuring local vector preparedness, management, and response.

- To address vector-related outbreaks, issue alerts to the public using multiple media outlets and different languages is critical to connect with all populations.
- Ensure that the reports and outbreaks are addressed quickly and consistently; operating with a system of checks and balances is critical.

- EH professionals should undergo the Environmental Health Training in Emergency Response (EHTER) training. The Awareness Level training focuses on environmental health responders' role to prepare for, respond to, and recover from air pollution emergencies, and the Operations Level involves hands-on operation practice and response to simulated events.

4 Centers for Disease Control and Prevention. (2019, September 12). Tickborne Diseases of the United States. Retrieved from <https://www.cdc.gov/ticks/diseases/index.html>.

5 Climate Nexus. (2019, October 28). Climate Risk and Spread of Vector-Borne Diseases. Retrieved from <https://climatenexus.org/climate-issues/health/climate-change-and-vector-borne-diseases/>.

6 Limaye, V., Max, W., Constible, J., & Knowlton, K. (2019, September 17). Estimating the Health-Related Costs of 10 Climate-Sensitive U.S. Events During 2012. Retrieved September 29, 2020, from <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2019GH000202>