

The National Environmental Health Association (NEHA) represents more than 7,000 governmental, private, academic, and uniformed services sector environmental health professionals in the U.S., its territories, and internationally. NEHA is the profession's strongest advocate for excellence in the practice of environmental health as it delivers on its mission to build, sustain, and empower an effective environmental health workforce.

## **Policy Statement on Vector Control**

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Vectors, such as mosquitoes, ticks, and fleas, are pests that carry and transmit diseases to hosts (humans or animals) and pose a significant public health threat to human health and wellness globally. In the U.S., there is evidence of ticks, mosquitoes, rodents, and cockroaches being present in every state but vector control is not considered to be a high priority. Deficiencies in funding, research, and surveillance, paired with increased contact between humans, animals, and the environment, make preventing vectorborne diseases a challenge that the U.S. is not currently equipped to handle. NEHA advocates incorporating the vector management framework outlined by the Centers for Disease Control and Prevention (CDC), American Mosquito Control Association, and World Health Organization while also integrating a One Health approach. One Health is a transdisciplinary, collaborative effort across all government levels with the goal of achieving optimal health outcomes including addressing environmental sources of current and emerging diseases and their connections between humans, animals, and the environment (Centers for Disease Control and Prevention [CDC], 2018a). As such, NEHA supports efforts to increase funding at the federal, state, and local levels to improve vector surveillance, research, and management programs, as well as efforts to increase awareness among the public about steps that can be taken to protect against vectorborne disease.

### **NEHA's Policy Statement**

NEHA supports the following actions and recommendations:

- Sustained funding for the organizations such as CDC and the U.S. Environmental Protection Agency (U.S. EPA) to be directed toward capacity building for vector control research and integrated pest management (IPM).
- Take a One Health approach toward understanding origins and transmission of disease and for sharing data across veterinary and animal, environmental, and public health sectors and parties.
- Updated technology for recordkeeping of pests and surveillance of outbreaks and disease.

- Improved surveillance to monitor the changes in vector ranges related to climate change and human population changes.
- Increased coordination at national, state, and local health agency levels to share data and findings, and to establish more uniform regulation and response.
- Increased training for environmental health professionals to improve awareness of and plans to protect public health against pests through inspection and action plans, and relevant and effective education to the public about individual practices and methods that are effective for minimizing risks in their jurisdictions.

## Analysis

Although everyone is at risk for vectorborne disease, vector control in the U.S. is not considered to be as large of a priority as it should. This lack of concern may stem from a number of reasons, such as beliefs that the risk of contracting vectorborne disease is low or a lack of awareness that the risk of contracting a vectorborne disease has been increasing due to environmental changes. The risk of vectorborne illness continues to increase, with numbers of reported disease cases having tripled from 2004 to 2016, and tickborne disease accounted for over 60% of all mosquito-borne, tickborne, and fleaborne diseases during this time (CDC, 2018b). This increase is due in part to our changing relationship with the environment as globalization and expansion of human populations into previously uninhabited areas disrupts animal and wildlife habitats and increases contact between humans and nature.

Underreporting of vectorborne disease is a major issue, with estimates that reported cases of Lyme disease and West Nile virus likely only represent 10% of all estimated cases (CDC, 2020a). This underreporting contributes to the downplaying of the risks that vectors pose to public health. Viruses commonly associated with distant countries and regions, such as the West Nile and Zika viruses and dengue, are well established in the U.S. and their presence is only increasing (CDC, 2020a). Vectorborne illness is made even more dangerous when paired with the lack of curatives for many of these viruses. There are no available vaccines to treat vectorborne disease pathogens found in the U.S. and treatment is not available for all types of vector bites (CDC, 2020a). For this reason, although reported cases are statistically low, estimated cases prove that vectorborne diseases are a much greater risk and absent a vaccine for such diseases, prevention and control are all the more important in keeping the public safe.

There is currently insufficient and inconsistent funding for organizations such as CDC and U.S. EPA to dedicate toward research and surveillance efforts. Vector control data are also not standardized in a manner that would allow the data to be shared across different sectors, such as the private or public sector (CDC, 2020a). Generally, health officials have become overburdened and may not have the financial means to “accurately monitor human disease incidence and to monitor changes in vector populations that can predict increased risk,” which is critical to vector control (CDC, 2020a, p. 6). Given the increasing trends of vectorborne disease in the U.S., underfunding and lack of standardization will only become a greater issue if there are no changes to the resources granted to health agencies and to the way that data is collected.

Individuals may also be concerned about the use of pesticides as a method of pest control (IPM Institute of North America, 2021). Although pesticides are a method for managing pests, and are included in IPM, it is not the only way to control or minimize risk. There is a high need for people to be aware that vectorborne diseases can be mitigated by other measures, such as changes in behaviors and habits, and attentiveness toward the level of contact a person is having with animals and the environment.

## **Justification**

Taking a One Health approach toward pest management would help to ensure that researchers and environmental health professionals are capturing a fuller picture of the spread and origins of vectorborne diseases. One Health refers to a public health strategy that emphasizes coordination at global, national, and local levels, and across human, veterinary, and environmental health sectors, to better understand public health issues and optimize health outcomes (CDC, 2018a). One Health also recognizes the constant interaction between these three sectors due to human contact with animals in the home, whether as pets or as food; expanded human settlement and habitat disruption; and increased globalization and trade (CDC, 2018a). Such contact can have negative health impacts on people if the risks are not well understood. By taking a One Health approach and collaborating with others in different areas of expertise, researchers gain a more holistic idea of what kinds of interactions increase the risk of vectorborne disease. Similarly, the public may be better informed of how their individual actions and habits put them at a higher risk and of what steps they may be able to take to mitigate these risks in the home. Overall, a One Health approach helps people to identify points of contact and exposure to disease may be preventable.

CDC has established an e-learning program on Vector Control for Environmental Health Professionals (VCEHP) that provides free training courses on a number of relevant vector and vector control subjects. This program was developed by credible establishments, such as NEHA, Tulane University, the National Center for Environmental Health within CDC, and other relevant subject matter experts (CDC, 2020b). Upon conducting surveys of environmental health, vector control, and pest management staff who took the training, 4 out of 5 people said that the knowledge acquired through the program would be applicable to their work and 4 out of 5 people noted that the information learned would improve their ability to do their jobs (CDC, 2020b). This training program is divided into 11 distinct courses that can be chosen by environmental health professionals based on the challenges and needs of their respective jurisdictions. NEHA encourages proper training for environmental health professionals through trusted organizations such as CDC to better serve their communities and protect public health. NEHA also supports the allocation of proper funding to national organizations for capacity building so that programs like VCEHP can continue to be offered.

A primary method of minimizing the risk of vectorborne disease is through IPM, an approach toward pest management that includes monitoring, control, and prevention. Practices include using pest-proof building materials to keep pests out, eliminating food sources that can attract

pests, and making environments hostile to pests (Marshall, 2009). Pesticide use is included in IPM but monitoring and identification of pests, which precedes pesticide use, is effective in determining whether pesticides are actually needed and if so, that the right kinds are being used in a given area (U.S. Environmental Protection Agency, 2021). Additionally, pesticide use can be helpful in response to emergencies, such as natural disasters, that can disrupt habitats and increase the public's risk of vectorborne disease, particularly mosquito-borne diseases (Connelly et al., 2020). Although a useful tool, a small number of pesticides have also been known to contaminate waterways and marine life (IPM Institute of North America, 2021). For this reason, NEHA supports all aspects of IPM to evaluate and identify present risks including prevention methods as needed, but also encourages capacity building for emergency preparedness and natural disaster response apart from pesticide use.

Public awareness of vectors, causes of vectorborne disease, and prevention is also an effective way to decrease unnecessary health risks that might occur if people are not knowledgeable and vigilant. One way to improve awareness is through public outreach and education about how people can protect themselves and their homes. Examples include conducting tick checks (on people and pets) after going outside, caring for lawns so as not to attract ticks, and taking action if a tick is found in the home or on the body (Massachusetts Department of Public Health, 2015). Educational materials and information distributed by local health departments are effective in that they pertain to specific risks that people in certain jurisdictions should be more aware of. Other effective, developing methods of pest management include applications, such as the Fight the Bite app from Beaufort County in South Carolina, that allows people to request information for mosquito control and even to request inspections (National Environmental Health Association, 2021). By educating individuals on vector control and prevention, health agencies can effectively emphasize the risks present and support the community in managing such risks.

Health departments, and environmental health professionals generally, play a crucial role in vector surveillance and research on vectors. Collection and testing of vectors for certain diseases is an effective way to determine the characteristics of certain pests in a given area (Tulsa Health Department, 2021). A CDC study of Lyme disease from 2008 through 2015 revealed that of the Lyme cases reported to CDC, most continued to come from states with high incidence, such as Mid-Atlantic, upper Midwest, and Northeast states, but that an increasing number of cases were reported in states neighboring the high incidence states; that is, of the 11 states classified as neighboring, 8 of them reported an increasing trend in the number of reported cases (Schwartz et al., 2017). The study also reported on seasonality of Lyme disease cases and the more common symptoms associated with these cases in the spring and summer months versus the fall and winter months (Schwartz et al., 2017). Robust research on pests and where they are located, what diseases they are known to carry, and when they are active can help to paint a fuller picture of where and when people are at risk.

Although everyone in the U.S. is at risk of vectorborne disease and the risk of vectorborne disease continues to increase, there are ways to minimize risks and protect against exposure. NEHA supports current and additional efforts to improve vector control and prevention, as well as the

proper appropriation of funds for research, training, and public education to help reduce such preventable diseases.

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