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VECTOR-BORNE
DISEASE NETWORK

# VECTOR-BORNE DISEASE PREVENTION AND MANAGEMENT RECOMMENDATIONS

*Transition Document*

## THE PROBLEM

Illnesses such as Lyme disease, Zika, dengue, and West Nile virus are caused by pathogens transmitted by blood-feeding insects and arthropods. These arthropods are known as "vectors" because they ingest disease-causing agents (viruses, bacteria, parasites, etc.) when biting an infected animal or human and later inject them into a new host during a subsequent bite. Some of these diseases cause long-term health problems and even death, and thus they pose a threat to individual well-being and productivity as well as domestic public health and economic security. Disease vectors also pose threats to livestock and companion animals.

Between 2004 and 2017, reported human disease cases in the U.S. resulting from bites from arthropods—primarily ticks and mosquitoes—tripled, according to the Centers for Disease Control and Prevention (CDC). Meanwhile, nine new diseases spread by ticks and mosquitoes were discovered or introduced in that same timeframe.

The underlying causes for these trends are varying and complex. However, we know a changing climate will continue to exacerbate these challenges as vectors expand into new regions where they weren't previously found while invasive insects also threaten to become established in the U.S. Furthermore, for most vector-borne diseases, no effective vaccines or therapeutics exist to prevent or treat these diseases. Therefore, the solution is better management of these vectors to prevent the disease at the point of transmission, rather than trying to respond to the wide range of existing and emerging disease threats.

## THE SOLUTIONS

The Vector-Borne Disease Network (VBDN), a coalition of scientific organizations, trade associations, and researchers, recommends the following actions to protect U.S. public health in a more cost-effective manner than trying to respond individually to every existing and emerging disease:

**1. Fully fund the Kay Hagan Tick Act and the Strengthening Mosquito Abatement for Safety and Health (SMASH) Act, authorizing bills already approved by Congress.**
Congress voted both of these bills into law in 2019, demonstrating strong bipartisan and bicameral support for managing these two public health threats. These bills reauthorize the CDC Centers of Excellence (COE) on Vector-Borne Disease, initially created following the 2016 Zika crisis, and the bills also support the underfunded Epidemiology and Laboratory Capacity (ELC) grants, which flow to state departments of health. The COEs play a critical role in linking academic institutions with state and local departments of health, as well as local vector control, to create a more efficient and effective system of collaboration on research and dissemination of findings to get information and solutions to communities more rapidly.

**2. Invest in public outreach and education campaigns at the local, state, and federal levels.**
While some management of mosquitoes occurs at the local-government level, most individuals are left to their own devices to protect themselves from ticks. Educating individuals on the best ways to prevent vectors from flourishing on private lands and how to protect themselves from bites goes a long way toward reducing the transmission of vector-bone diseases. Additionally, helping the public understand why certain control tools and active ingredients are used promotes greater trust in local, state, and federal agencies. Engaging with key community members and stakeholders is key for the successful implementation of new tools. Social media and print documents are both powerful educational tools that need to be combined with other traditional media to raise awareness.

**3. Create a sustainable infrastructure for responding to public health emergencies and epidemics.**
The boom-and-bust cycle of public health funding leads to the creation of new infrastructure for physical resources and a highly skilled workforce, which then cannot be sustained, leaving a void in facilities and technical expertise when new emergencies arise. Stable funding is vital for state and federal agencies to plan and develop effective strategies to respond when emergencies arise. When individuals leave these jobs because they don't have stable salary support, they often move into other fields and can't easily return when an epidemic strikes. It is crucial that federal funding be dedicated to personnel that are experts in this field. Often, federal funding is strictly reserved for items such as surveillance tools and lab equipment, but sustainable funding for personnel is lacking. During periods between outbreaks, personnel can be dedicated to prevention activities to create public awareness, engage community members, and evaluate new and more effective tools. Building human capacity is key for a fast and effective response to mitigate an outbreak early on, before it becomes an epidemic.

**4. Invest in technology to grow the number of tools in the vector management toolkit.**
Invasive species, insecticide resistance, and climate change all pose challenges to controlling the number and types of insects and arthropods that spread disease. There is also a need for more efficient ways of rapidly testing trapped pests to see what diseases are being spread, and where, to more rapidly share that information with local communities. Pest management and vector control specialists need more tools to respond and protect individuals, as well as better opportunities for community-wide surveillance and response. Support is needed to help communities purchase new technology to enable better mapping of disease locally, as well as for the research and development of new technologies.

**5. Support basic research to understand the underlying biology of these vectors.**
To develop new tools and strategies, we need to understand the underlying elements that drive vector species' behavior, reproduction, and utilization of their ecological niche, including identifying potential predators for invasive species. Research is also needed to identify established thresholds of populations so that pesticides can be deployed judiciously, using integrated pest management strategies to maximize vector management while minimizing environmental impact.

**6. Increase and sustain support for nationwide data modernization efforts through the CDC.**
A handful of data networks currently exist, but there is a great need for one efficient, integrated system that can track and share information on what diseases are being transmitted by bugs in specific locations in conjunction with data on considerations like weather patterns, geology, and pesticide use —ie., "one network to rule them all." This data integration would help enable more rapid and efficient research, dissemination, and workforce training.

*The Vector-Borne Disease Network (VBDN) is a stakeholder group of nearly three dozen nonprofit organizations, including membership and trade associations, vector control groups, and educational institutions such as the CDC regional Centers of Excellence on Vector-Borne Diseases. We advocate for vector-borne disease research and management funding, connect the community of vector professionals, and envision a world where human suffering from arthropod disease vectors is reduced. For more information, contact Erin Cadwalader, director of strategic initiatives at the Entomological Society of America, at ecadwalader@entsoc.org.*