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Testimony of  
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On  
**Fiscal Year 2019 Appropriations for the National Institutes of Health**  
**and Centers for Disease Control and Prevention**  
Submitted to the  
**Appropriations Subcommittee on Labor, Health and Human Services, Education, and**  
**Related Agencies**  
**United States Senate**

April 24, 2018

The Entomological Society of America (ESA) respectfully submits this statement for the official record in support of funding for arthropod-borne disease research at the U.S. Department of Health and Human Services (HHS).

**ESA requests \$39.3 billion in fiscal year (FY) 2019 for the National Institutes of Health (NIH). This should include increased support for arthropod-borne disease research at the National Institute of Allergy and Infectious Diseases (NIAID). The Society also supports increased investment in the core infectious diseases budget and the global health budget within the Centers for Disease Control and Prevention (CDC) to fund scientific activities related to vector-borne diseases for a total of \$8.445 billion in FY 2019.**

Cutting-edge research in the biological sciences, including the field of entomology, is essential for addressing societal needs related to environmental and human health. Many species of insects and arachnid (including ticks and mites) serve as vectors for an array of infectious diseases that threaten the health and well-being of people across the globe. This includes populations in every state and territory of the United States and U.S. military personnel serving at home and abroad. Vector-borne diseases can be particularly challenging to control; effective vaccines are not available for many of these diseases, and controlling the vectors is complicated by their mobility and their propensity for developing pesticide resistance.

The risk of emerging infectious diseases grows as global travel increases in speed and frequency and as environmental conditions conducive to vector population growth continue to expand globally. Entomological research aimed at understanding the relationships between arthropod vectors and the diseases they transmit is essential for reliable monitoring and prediction of outbreaks, effective prevention of disease transmission, and rapid diagnosis and treatment of diseases. The magnitude of the challenges presented by vector-borne diseases cannot be overstated. Mosquitoes alone are considered responsible for the deaths of more people than all other animal species combined, including humans.

**Given the enormous impact of arthropod vectors on human health, ESA urges the subcommittee to support vector-borne disease research programs that incorporate the entomological sciences as part of a comprehensive approach to addressing infectious diseases.**

NIH, the nation's premier medical research agency, advances human health by supporting research on basic human and pathogen biology and by developing prevention and treatment strategies. More than 80 percent of NIH funding is competitively awarded to scientists at approximately 2,500 universities, medical schools, and other research institutions across the nation. As one of NIH's 27 institutes and centers, NIAID conducts and supports fundamental and applied research related to the understanding, prevention, and treatment of infectious, immunologic, and allergic diseases.

The necessity of investments in basic and translational research in vector-borne diseases is exemplified by the dramatic spread of Zika virus, a disease transmitted by the *Aedes aegypti* mosquito, across the south western hemisphere starting in 2015. While scientists have been aware of Zika for more than 40 years, it previously posed minimal threat beyond contained regions. Epidemiologists identified the emergence of this threat, and scientists quickly began working on a vaccine, but validating safety and efficacy, once a potentially successful therapeutic is created, takes time. In 2017, NIH began an efficacy trial against Zika in North, Central, and South America. While the preliminary results are promising, it will take time to confirm how effective it is at eliciting an immune response and preventing transmission.<sup>1</sup> Furthermore, studies of the Zika pandemic continue not only because it hasn't fully disappeared from the U.S., but also because it can help us better respond to the next infectious disease outbreak transmitted by arthropods.<sup>2</sup>

NIAID has also funded research for a new model system, announced in August 2017, to study the relationship between ticks and a type of virus known as flaviviruses, which can be transmitted to humans. These types of viruses include dengue fever and West Nile virus, which are transmitted by mosquitoes, as well as Powassan virus disease and tick-borne encephalitis, which are spread by ticks. However, the mechanism by which these viruses infect the ticks is still poorly understood, and researchers hope that this system will create a better and more efficient way to support the development of countermeasures to tick-borne viruses.<sup>3</sup>

**To ensure funding for future groundbreaking projects of great utility for public health, ESA supports increased funding for NIAID and encourages the committee to support vector-borne disease research at NIH.**

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<sup>1</sup> M Gaudinski et al. Zika Virus DNA Vaccine Candidates are Safe and Immunogenic in Healthy Adults. The Lancet DOI: 10.1016/S0140-6736(17)33105-7 (2017).

<sup>2</sup> Morens, DM and Fauci, AS. Pandemic Zika: A formidable challenge to medicine and public health. The Journal of Infectious Diseases DOI: 10.1093/infdis/jix383 (2017).

<sup>3</sup> J Grabowski et al. Flavivirus infection of Ixodes scapularis (black-legged tick) ex vivo organotypic cultures and application for control. mBio DOI: 10.1128/mBio.01255-17 (2017).

CDC, serving as the nation's leading health protection agency, conducts scientific research and provides health information to prevent and respond to infectious diseases and other global health threats, irrespective of whether they arise naturally or via acts of bioterrorism. Within the core infectious diseases budget of CDC, the Division of Vector-Borne Diseases (DVBD) aims to protect the nation from the threat of viruses and bacteria transmitted primarily by mosquitoes, ticks, and fleas. DVBD's mission is carried out by a staff of experts in several scientific disciplines, including entomology.

CDC plays a critical role in surveillance systems for vector-borne diseases and identifying emerging threats. The growing incidence of the generally rare Bourbon virus, first discovered in Kansas in 2014 and transmitted by *Amblyomma americanum*, better known as Lone Star ticks, is being monitored in the Midwestern and southern states. However, very little is known about this disease and there are currently no medicines, so DVBD plays a central role in surveilling the threat and disseminating information about how people can reduce their potential exposure to ticks possibly carrying this disease.<sup>4</sup>

Another component of CDC's global health budget supports activities on malaria and other parasitic diseases, which include maintaining a global reference insectary that houses colonies of mosquitoes from around the world to be used by the agency for studies on malaria transmission.

**Given that the contributions of the CDC are vital for the health security of the nation, ESA requests that the committee provide robust support for CDC programs addressing vector-borne diseases.**

*ESA, headquartered in Annapolis, Maryland, is the largest organization in the world serving the professional and scientific needs of entomologists and individuals in related disciplines. As the largest and one of the oldest insect science organizations in the world, ESA has over 7,000 members affiliated with educational institutions, health agencies, private industry, and government. Members are researchers, teachers, extension service personnel, administrators, marketing representatives, research technicians, consultants, students, pest management professionals, and hobbyists.*

*Thank you for the opportunity to offer the Entomological Society of America's support for HHS research programs. For more information about the Entomological Society of America, please see <http://www.entsoc.org/>.*

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<sup>4</sup> <https://www.cdc.gov/ncezid/dvbd/bourbon/index.html>