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Statement of
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Introduction

Good morning Chairwoman Collins and members of the Special Committee on Aging. I am Dr. Lyle Petersen, Director of the Division of Vector-Borne Diseases in the National Center for Emerging and Zoonotic Infectious Diseases at the Centers for Disease Control and Prevention (CDC). Thank you for the opportunity to testify before you today on CDC's ongoing efforts to protect the U.S. from the growing threat of vector-borne diseases, and tickborne diseases in particular. CDC appreciates your continued commitment and support of our work in this area.

As the director for the Division for Vector-Borne Diseases for CDC, I lead our agency's efforts to research, prevent, and control viruses and bacteria spread by mosquitoes, ticks, and fleas. These vectors of disease transmit over 100 pathogens known to infect people, including those that cause mosquito-borne West Nile and Zika, tickborne Lyme disease and Rocky Mountain spotted fever (RMSF), and flea-borne plague. Together, vector-borne diseases account for 17 percent of the estimated global burden of all infectious diseases.

CDC recently examined trends in vector-borne diseases and what we found illustrates why these diseases are a major public health threat. We found that vector-borne disease cases reported by states to CDC tripled from 2004 to 2016, marked by numerous high-profile mosquito-borne outbreaks with a steady and concerning increase in tickborne diseases. Reports of tickborne diseases alone more than doubled during that same time period. We know that this is a small fraction of total vector-borne disease cases, as only about one-tenth of Lyme disease and one-twentieth of West Nile virus cases are reported each year by states. Despite this under-reporting, in 2017 state and local health departments reported a record number of tickborne disease cases to CDC for ***all*** nationally notifiable tickborne diseases, including Lyme disease, anaplasmosis and ehrlichiosis, spotted fever rickettsiosis (including Rocky Mountain spotted fever), babesiosis, tularemia, and Powassan virus disease.

In 2017, on a population basis, Maine had the ***highest incidence of Lyme disease in the nation***, with more than 1,800 cases of confirmed and probable cases of Lyme disease in just one year. On a population basis, Maine also had the ***second highest incidence of anaplasmosis***, second only to Vermont. Reported vector-borne disease cases have continued to rise steadily over time in Maine, with more than 2,600 cases of vector-borne disease reported in 2017, which is the last year for which we have complete data. In 2017, more than 98 percent of reported cases from Maine were for tickborne disease, including Lyme disease. These rates may be driven by geographic differences in risk, differences in local awareness, and state-to-state differences in practices for collecting and reporting such data.

Prevention of Vector-Borne Diseases

As you may already know, Lyme disease is caused by an infection from bacteria that is spread through tick bites. Using administrative claims data, CDC estimates that there are more than 300,000 cases of Lyme disease each year in the U.S. It is the most commonly occurring vector-borne disease and the sixth most commonly reported nationally notifiable infectious disease. CDC has a long-standing commitment to preventing Lyme disease and is on the forefront of prevention and control research. CDC scientists have been working together to understand the complicated interactions among ticks, animals, and people to find easy, effective, and affordable means for people to fight this disease. We are also strengthening our understanding of disease risk and burden through data collection and analysis; improving early and accurate diagnosis and treatment, and building collaborations with key prevention partners, including the regional university-based vector-borne disease Centers of Excellence.

We understand that the diagnosis of Lyme disease can be a scary and uncertain time for patients and their families. CDC is working to disseminate the best scientific information available to healthcare professionals and patients and working with state and local partners to ensure that current Lyme disease prevention tools and information are easily accessible, through either CDC or state and local resources. The increase in funding in 2019 for Lyme disease allowed for CDC to expand support for tick

surveillance within states at higher risk for tickborne disease and rapidly assess the public health risks and protective factors associated with the U.S. emergence of the Asian longhorned tick.

Trends in Vector-Borne Diseases

Three major factors contribute to increases in reports of vector-borne diseases. First, we know about more vector-borne germs than ever before and our outreach to physicians has increased. In the last 13 years alone, nine new vector-borne pathogens were identified in the U.S., including the first domestic outbreaks of the mosquito-borne chikungunya and Zika viruses and the discovery of seven new tickborne pathogens in the U.S.

Second, travel and trade are moving more pathogens around the world, as well as the mosquitoes and ticks that transmit them. Infected travelers can traverse the world in a single day and introduce vector-borne pathogens to new locations. There are more than 1.3 billion international tourist arrivals worldwide each year globally. Zika virus was an example of the impact that travel can have on the spread of disease. Zika was one of a number of obscure, mosquito-borne viruses that was rarely encountered or studied prior to the 2015-2017 outbreak in the region of the Americas. Due in part to international travel, Zika virus quickly spread throughout the Americas. The U.S. had over 5,000 reported cases in 2016, most of which were in travelers returning from affected areas.

Finally, existing mosquito and tick vectors continue to expand across the U.S. For example, the *Ixodes* ticks that transmit Lyme disease as well as several other tickborne diseases have now been found in more than 1,500 U.S. counties, covering 43 states. This marks a 45 percent increase in the number of counties that have recorded these ticks since 1998.

An example of the problems we are now facing in the U.S. is the introduction and emergence of the Asian longhorned tick. This tick, first discovered in New Jersey in 2017, has been identified now in 11 additional states ranging from Arkansas to New York and Pennsylvania. This marks the first time in

more than 50 years that an exotic tick was newly discovered and became established in the U.S. It causes massive infestations and transmits several vector-borne diseases throughout the world, including an Asian virus that is related to Heartland virus, which is found here in the U.S. Heartland virus, which is a rare but serious virus found in the U.S., has caused the hospitalization of almost all U.S. patients to date. Although this tick has not yet been associated with disease in the U.S., the high rate of pathogen transmission associated with this tick internationally makes it clear that the potential for health impact related to this tick in the U.S. is high. To date, this tick has not been found in Maine; however, ongoing state tick surveillance activities funded by CDC should allow for early detection should that change.

Addressing the Challenges

CDC is now working to determine which pathogens can be transmitted by this tick and what pesticides and repellents can be used to control them and prevent bites. While we conduct this research, we are also working with state partners to understand where this tick can be found in the U.S. We are also working with other federal agencies, including the U.S. Department of Agriculture, to closely monitor the situation and keep states informed of the risks to people and animals. The emergence and response to the Asian longhorned tick, an exotic tick, is a recent example of how CDC works with state and federal partners to assess the potential threat of new vectors and pathogens in the U.S. and determine how to protect people from vector-borne disease risks.

In addition, CDC works to protect America from vector-borne disease risks by supporting vector-borne disease prevention and control capacity within U.S. jurisdictions. CDC, in collaboration with the National Association of County and City Health Officials, assessed the vector control capacity of over 1,000 local vector control departments and districts. Results suggest that four out of five vector control organizations are missing at least one core vector control capacity, such as being able to conduct vector surveillance.

A valuable source of vector-borne disease prevention and control resources extend from CDC's five vector-borne disease Centers of Excellence (COEs). Through the Zika supplemental funding from Congress in 2016, CDC was able to establish five university-based regional Centers of Excellence in vector-borne diseases, to work towards enhancing prevention of and response to vector-borne diseases in their regions. These centers coordinate efforts with public health agencies and institutions to conduct operational research within their region, building partnerships across state lines.

With increased interest and support for vector-borne disease prevention and control activities, we have been able to expand support in all 64 jurisdictions eligible for the Epidemiology and Laboratory Capacity Cooperative Agreement, while providing enhanced support to nine states and one U.S. city at high risk for vector-borne disease. Each enhanced vector-borne disease program included increased state entomological expertise, as well as laboratory activities, case and outbreak investigations, and vector surveillance and management. For the first time, we were able to provide support to the U.S. territories and freely associated states in the Pacific. We were also able to support tick surveillance activities, which better equips states with the information that they need to assess tickborne disease risks and develop appropriate prevention programs that can prevent tick bites and reduce illness and death.

CDC has also been an active member of the *HHS Tick-borne Disease Working Group*, formed in 2016 to include a wide range of federal, patient, and partner organizations. This workgroup has focused on increasing coordination and examining research gaps and priorities. The first report of this workgroup was published in December of 2018 and included 28 recommendations for tick-borne diseases, including Lyme disease. CDC has appreciated the robust and deep conversations of this group and looks forward to continued participation and dialogue.

Conclusion

CDC is committed to reversing the upward trends in vector-borne disease by preventing future infections. However, it is clear that reversing these trends will not be easy. A major challenge is to discover better prevention methods for vector-borne diseases. There are no proven methods to sufficiently control the ticks that spread most tickborne diseases, so prevention relies on personal protection to prevent tick bites. There are also no vaccines available for humans for ***any*** of the vector-borne diseases endemic to the U.S. In addition, although guidelines and recommendations exist for West Nile virus, which is the most common mosquito-borne disease in the U.S., the ability of jurisdictions to implement and evaluate the efficacy of these recommendations varies. Further, no proven control methods exist for some important mosquito vectors, such as those that spread Zika. CDC is committed to making strategic investments in promising new vector-borne disease prevention strategies. We will also continue to support states and jurisdictions in their ability to assess risk through vector and disease surveillance, ensure lab capacity for rapid and accurate diagnosis of vector-borne disease, and support vector control capacity. Finally, we are committed to informing and supporting vaccine development as well as vaccine program implementation, as vaccines for vector-borne diseases become available.

Thank you again for the opportunity to appear before you today and for your support of our fight to protect the U.S. and its territories from the ongoing threat of vector-borne diseases. I appreciate your attention to this continuing threat.