Statement of Thomas Frieden, MD, MPH, Director, Centers for Disease Control and Prevention
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House Foreign Affairs Joint Subcommittee Hearing: The Global Zika Epidemic

Introduction

Good afternoon Chairman Smith, Ranking Member Bass, and members of the Subcommittee. Thank you for the opportunity to testify before you today and for your ongoing support for the Centers for Disease Control and Prevention's (CDC) work in global health. CDC works 24-7 to save lives and protect people against health threats. Today, I am here to discuss Zika virus in the Americas.

The Administration is taking every appropriate measure to protect the American people, and as you know on Monday announced that we are asking the Congress for more than $1.8 billion in emergency funding to enhance our ongoing efforts to prepare for and respond to the Zika virus, both domestically and internationally.

Zika is an emerging health threat and it is a rapidly changing situation involving many partners in this country and abroad. There are many things we don't yet know about Zika. We are figuring out more about Zika literally every day, and will share information – and adjust our guidelines and recommendations – as we learn more. That is the nature of a scientific response to an emerging health threat. The doctors, scientists, veterinarians, and others at CDC are working around the clock to protect Americans from this and other health threats. We already have made significant progress identifying the virus in brain tissue of affected infants, developing and distributing new diagnostic tests, issuing guidance, conducting epidemiological investigations along with affected countries, and improving monitoring and surveillance in the United States, including in the Commonwealth of Puerto Rico, the U.S. Virgin Islands, and American Samoa. Much of what we know about Zika and similar viruses today is based on the work done by CDC scientists who have dedicated their lives to working in this area. But

as hard as we work, there are still many things that we cannot know now, and cannot do now. We will continue to use the best of modern science to protect people as well as we can. I understand that Zika virus causes concern among people throughout the Americas, including people here in the United States. We are committed to ensuring that the American people have access to the most accurate, timely information about Zika virus and the current outbreak.

CDC is working in collaboration with other components of the Department of Health and Human Services (HHS), including the Office of the Assistant Secretary for Preparedness and Response (ASPR) and within that the Biomedical Advanced Research and Development Authority (BARDA), the National Institutes of Health, and the Food and Drug Administration, as well as with partners across the U.S. Government to communicate with health care providers and the general public; issue travel alerts and clinical guidance; and step up our efforts on research to better understand the Zika virus, and on the development of tests, treatments, and vaccines, as well as improved mosquito-control methods.

Zika and its History

Zika is a flavivirus, closely related to dengue, yellow fever, and West Nile viruses. Zika virus is primarily spread to people through the bite of certain infected *Aedes* species mosquitoes. These mosquitos also spread dengue, chikungunya, and other viruses. Mosquitoes become infected when they bite a person who is already infected with Zika virus. These infected mosquitoes can then spread the virus to other people through bites. Case reports of other modes of transmission include spread through sexual transmission and blood transfusion. Of great concern, Zika virus can also be passed from a mother to her developing baby during pregnancy.

Zika is not a new virus. It was first recognized in 1947, and it was recognized to cause occasional illness in Africa and Asia, but the first large outbreak we know of occurred in 2007 in the small Pacific island of Yap. Last May, the first local transmission of Zika in the Americas was reported in Brazil, and

by the end of 2015, Brazilian authorities estimated that the outbreak there involved perhaps a million suspected cases of Zika virus infection. In recent months, the virus has spread rapidly throughout Latin America and the Caribbean, as well as to parts of the Pacific. As of February 9, 2016, more than 30 countries and territories, including the Commonwealth of Puerto Rico as well as the U.S. Virgin Islands and American Samoa have reported local transmission of the Zika virus. On February 1, the World Health Organization (WHO) declared the recent cluster of microcephaly cases and Guillan-Barré, which has been temporally associated with Zika virus transmission, a public health emergency of international concern, a reflection of the seriousness of this unfolding health threat.

Symptoms and Adverse Outcomes

Most people who may be exposed to Zika virus will have only mild symptoms. In fact, about four out of five people infected with Zika appear not to have symptoms at all. Those who do become ill usually have mild symptoms such as fever, rash, joint pain, and red eyes or conjunctivitis. The symptoms last a couple days to up to a week, and it is very rare other than in utero, for Zika to cause serious illness or death.

Increasing evidence suggests that Zika virus infection may be associated with more serious health outcomes. In October 2015, Brazilian authorities recognized a concerning increase in microcephaly, which has occurred in close sequence to Brazil's outbreak of Zika virus. Microcephaly is a usually-rare, serious condition among newborns where a baby's head is smaller than expected when compared to babies of the same sex and age. Microcephaly is not a diagnosis in and of itself, but a sign that the brain did not develop as it should in the womb. Babies with microcephaly can have a range of problems, including seizures, developmental delay, feeding problems and hearing loss. In some cases, these problems can be life threatening.

Laboratory tests at CDC strongly suggest a link between Zika virus infection during pregnancy and microcephaly. We do not know whether this link is causal, or, if so, whether there are important

cofactors such as other infections, nutritional factors, or environmental toxins. We also do not know what, if any, other outcomes might be associated with Zika infection during pregnancy. Studies are in progress to learn more about the risks of Zika virus infection during pregnancy. Microcephaly in infants can be devastating to the affected families, and this ongoing outbreak is concerning to everyone, especially for pregnant women, and their families who may travel to or live in the infected areas. Zika virus spread in the Americas and its effect on pregnancy are new developments that we are working with partners to better understand.

Health authorities in Brazil and elsewhere have also reported an increase in suspected cases of Guillain-Barré syndrome, a rare neurologic disorder in which a person's own immune system damages nerve cells leading to nerve damage or paralysis that lasts for several weeks or several months. Most people fully recover, but it can take a few years to do so. Some people with Guillain-Barré syndrome have permanent damage and in rare cases, people have died. It is difficult to determine if any particular pathogen "caused" or "triggered" Guillain-Barré syndrome. Currently, we do not know if Zika virus infection causes Guillain-Barré syndrome. However, the development of Guillain-Barré syndrome is a recognized after-effect of many different infections, including infections with viruses similar to Zika. CDC is currently working with public health officials in Brazil to investigate whether there's any link between Zika infection and Guillain-Barré.

Preparedness and ResponseWe know that there will be many more Zika virus cases in affected areas in Latin America and the Caribbean. That is why the President's Zika emergency funding request includes support for CDC's efforts to enhance international capacity for virus surveillance, expand the Field Epidemiology Training program, laboratory testing, health care provider training, and vector surveillance and control in countries at highest risk of Zika virus outbreak.

While we have not yet seen transmission of the Zika virus by mosquitoes within the continental United States, we know that many returning travelers will have Zika infection – for comparison, there were 3,270 travelers in the United States diagnosed and reported with chikungunya infection in 2014 and 2015. So we expect that many travelers to the United States will be diagnosed with Zika infection, and the number of Zika cases among travelers visiting or returning to the United States will likely increase. Many areas of the United States have the type of mosquitoes that can become infected with and transmit Zika virus. Recent chikungunya and dengue outbreaks in the United States suggest that Zika outbreaks in the U.S. mainland may be relatively small and localized. Better housing construction, less crowding, regular use of air conditioning, use of window screens and door screens, and state and local mosquito-control efforts have helped to contain transmission of these mosquito-borne viruses. However, we understand that any local outbreaks will be of deep concern to the people living there. Furthermore, there is uncertainty surrounding the future, and it is important that we maintain and improve our ability to detect and respond to Zika and other mosquito-borne diseases. That is why the President's Zika emergency funding request includes support for Zika virus readiness and response capacity in States and territories with mosquito populations that are known to transmit Zika virus as well as to enhance mosquito control programs in these areas.For the Commonwealth of Puerto Rico as well as the U.S. Virgin Islands and American Samoa, the outlook is different. There have been case reports of local transmission in all three territories. Furthermore, recent outbreaks of dengue and chikungunya suggest that Zika virus may spread widely in those areas. Again, we appreciate the serious threat facing American citizens living in these territories and the emergency request would support targeted strategies to address these risks, and the entire Administration is committed to providing support to prepare and respond to this outbreak and to inform all Americans about how they may protect themselves from becoming infected with Zika virus.

Domestic Activities

CDC has a long history of assisting county, state, tribal and territorial public health partners to detect, prevent, and control diseases spread by mosquitos. Surveillance is essential to monitor and quickly identify areas with local transmission. We conduct multi-faceted surveillance for arboviruses, including Zika, through ArboNET, an integrated network which funds, through our Epidemiology and Laboratory Capacity cooperative agreements, staff in 49 states, Puerto Rico, and six large municipalities to conduct human case investigations, collect and test mosquitos, and perform laboratory analysis on arboviruses including Zika. Zika virus is now a nationally notifiable disease, meaning states report the virus to CDC, which will aid Zika surveillance efforts. CDC is also working with several states and Puerto Rico to determine a baseline prevalence of microcephaly so thatany an increase, should it occur, can be quickly and accurately identified.

With support from the President's emergency request, CDC will build on its current efforts to provide financial and technical resources to states and territories through cooperative agreements to strengthen their capacity to prepare for and respond to emerging threats such as Zika virus. These resources may be used to help health departments expand their capacity to prepare for cases of local Zika virus transmission in their areas and to implement community education and prevention programs to reduce human-mosquito contact and therefore reduce the risk of Zika transmission. Resources may also be used to implement vector control strategies to prevent further spread of Zika virus in areas where local transmission has been found.

It also is critical that states and territories are able to receive specimens and test for Zika virus in order to diagnose and report travel-related and locally acquired cases of Zika. CDC is providing, and under the emergency request will expand its efforts to assist public-health labs nationwide with the reagents necessary to test for Zika and the guidance on how to interpret test results. In addition, CDC is available to provide testing of any Zika samples upon request.

Building on experience applying advanced molecular detection technology to address the emergence of chikungunya virus, CDC scientists were able to develop, validate, and distribute a Zika test that could detect emerging strains for use in laboratories throughout the Western Hemisphere within three weeks of having received the first Zika virus sample. With older methods, this would have required three to four months. CDC also developed the IgM ELISA and Zika Virus Plaque reduction neutralization test in use at CDC to detect evidence of previous Zika infections. Currently, CDC scientists are also working to develop a faster, next-generation neutralization test that could detect prior Zika infection.

CDC experts are working intensively to learn more about the outbreak and provide people with the information they need to protect themselves. The same week the CDC laboratory identified Zika virus in samples from affected infants in Brazil, we issued a travel advisory indicating that pregnant women should consider postponing travel to Zika-affected areas. We issue travel alerts for the affected areas as confirmation of the virus is reported, and we'll keep you alert as the situation changes. Recognizing the potential for Zika virus transmission through blood transfusions, CDC is working with FDA to ensure the safety of the blood supply from Zika virus, particularly in regions experiencing local outbreaks. CDC also has provided guidance for doctors and other clinicians on evaluation, treatment and follow-up care of pregnant women and infants with possible exposure to Zika virus.

Our guidance has and will continue to be updated as our knowledge increases. As such, we have recently updated our guidance to provide recommendations for the clinical care and management of pregnant women living in areas where Zika transmission is widespread, with special consideration to the on-going risk of maternal Zika virus infection throughout pregnancy. These guidance documents were prepared in consultation with the American College of Obstetricians and Gynecologists, the Society for Maternal Fetal-Medicine, and the America Academy of Pediatrics. We issued a health advisory to help clinicians in recognizing, managing, and reporting Zika and recently held a clinician outreach call that

reached nearly 3,000 participants and more than 150 partner organizations. CDC will continue regular ongoing engagement of clinicians through direct outreach and partnerships with key medical societies

CDC also wants to ensure that the general public knows what they can do to protect themselves. Pregnant women should consider postponing travel to regions with ongoing Zika virus transmission. If they must travel, or if they live in affected areas, CDC recommends pregnant women talk to their doctors or other healthcare providers first and strictly follow steps to prevent mosquito bites. Reducing exposure to mosquitoes is important for anyone traveling to or residing in areas where the virus is circulating by wearing long sleeves, long pants, using EPA-registered repellents such as DEET and permethrin-treated clothing (both of which are safe to use in pregnancy), and using other protections such as air-conditioning to reduce exposure to daytime mosquitoes. For women living in areas with Zika virus outbreaks, CDC appreciates that the timing of pregnancy is a personal and complex decision for a woman to make in consultation with her doctor or other healthcare provider. Efforts to prevent unintended pregnancy, including assisting women and their partners in choosing appropriate and effective methods of birth control, are important conversations for women to have with their healthcare providers, regardless of the presence or absence of Zika virus. Given the potential for Zika virus to be spread through sex, if male partners have or are at risk for Zika virus infection, pregnant women and their male partners should consider abstaining from sexual intercourse or using condoms. This is a rapidly-changing situation and our understanding of the risks concerning Zika virus infection, including those surrounding transmission from mother to fetus and those concerning transmission between sexual partners, is incomplete and evolving. As we get new information, we will update our advice.

Global Activities

CDC is coordinating its response with the Pan-American Health Organization, the regional body of WHO, with other parts of WHO, and is collaborating with many international partners to learn more about this outbreak. We are working with the Brazilian Ministry of Health on research partnerships. Specifically, one partnership will be studying the link between Zika virus infection and microcephaly, while the other is examining the relationship between Zika virus and Guillain-Barré. Research teams from CDC are also in other countries to explore collaborations that will shed light on the risk of microcephaly with maternal Zika virus infection during pregnancy.

In addition, CDC has offered to all countries to test samples from microcephaly cases for serologic evidence of Zika virus infection and to help these countries establish in-country diagnostic capacity. To that end, we are currently providing training to laboratorians in South and Central America on diagnostic tests, including two recent workshops in Brazil and Nicaragua.

CDC's Global Disease Detection (GDD) program rapidly detects, accurately identifies and promptly responds to emerging infectious diseases such as Zika virus. The GDD Operations Center has been monitoring the spread of the epidemic from Brazil to other countries in the Americas since Brazil first reported Zika transmission in May of 2015. CDC's Central American office has facilitated the verification of Zika cases in several countries throughout Latin America, including Colombia, Venezuela, and Nicaragua. The GDD program has also been working to ensure that new information regarding Zika virus and its possible link to birth defects is communicated to U.S. Mission Health Unit staff throughout the Americas.

Research Activities

More research is critical to addressing several gaps in our ability to respond to Zika. We need a better understanding of the epidemiology of Zika and potential Zika-associated birth defects and other adverse

health outcomes. We need better diagnostic methods that can quickly and clearly differentiate between similar viruses to detect evidence of past Zika infection. Currently, a Reverse Transcription-Polymerase Chain Reaction (RT-PCR) test can provide a definitive diagnosis of Zika, but only if it is performed within about a week of symptom onset. The tests we have available for Zika in persons who are no longer ill may have cross-reactivity with similar flaviviruses, particularly dengue, which can lead to false-positive or inconclusive results. Diagnosis is particularly challenging with Zika virus since most people will not experience symptoms and therefore will not go to their healthcare provider in time for PCR-testing to be utilized.

Additional research is also needed to develop methods of mosquito control. Existing methods for mosquito control all have shortcomings, especially in areas where the population of *Aedes* vector mosquitoes is rampant. Vector control is particularly challenging with this specific type of mosquito because of its preference to live in and around houses, the fact that it bites during the day, and its ability to breed in very little water. More work and research is necessary to enhance and improve current vector control strategies and identify better options. Better mosquito surveillance is also vital to determine the location of mosquitoes and areas with mosquito resistance to insecticides which would inform the implementation of new mosquito control techniques.

Finally, a vaccine is needed to protect people at risk of Zika virus infections, particularly women of childbearing age. NIH, in collaboration with ASPR/BARDA, will address the possibility of developing such a vaccine based on vaccines for dengue and West Nile virus that have been in development. NIH also is exploring other vaccine development strategies. At CDC, our scientists developed both a West Nile virus vaccine which is currently in use for animal protection in the United States, and a dengue vaccine, which is currently in clinical trials.

Conclusion

Nature is a formidable adversary. To protect Americans, we need to invest in the laboratories, disease detectives, disease tracking systems, mosquito control, and investigations needed to continue to improve these essential tools. Investment in both the practice and research on new means of mosquito control is particularly important, as is work on a vaccine. As the Nation's health protection agency, CDC is focused on responding quickly to new and emerging health threats such as the Zika virus.

In addition, of the more than $1.8 billion in the President's emergency funding request to prepare for and respond to the Zika virus, $828 million is for activities at CDC. This includes funding to support prevention and response strategies through:

- Supporting Zika virus readiness and response capacity in states and territories with mosquito populations that are known to transmit Zika virus, with a priority focus on areas with ongoing Zika transmission;
- Enhancing mosquito control programs through enhanced laboratory, epidemiology and surveillance capacity in at-risk areas to reduce the opportunities for Zika transmission;
- Establishing rapid response teams to limit potential clusters of Zika virus in the United States;
- Improving laboratory capacity and infrastructure to test for Zika virus and other infectious diseases;
- Implementing surveillance efforts to track Zika virus in communities and in mosquitoes;
- Deploying targeted prevention and education strategies with key populations, including pregnant women, their partners, and health care professionals;
- Expanding the CDC Pregnancy Risk Assessment Monitoring System, improve Guillain-Barré syndrome tracking, and ensure the ability of birth defect registries across the country to detect risks related to Zika;
- Increasing research into the link between Zika virus infections and the birth defect microcephaly and measure changes in incidence rates over time;

- Enhancing international capacity for virus surveillance, expand the Field Epidemiology Training program, laboratory testing, health care provider training, and vector surveillance and control in countries at highest risk of Zika virus outbreaks; and
- Improving diagnostics for Zika virus, including advanced methods to refine tests, and support advanced developments for vector control.

We look forward to working with the Congress on the implementation of the President's emergency funding request.

CDC's current response to the Zika outbreak in the Americas again demonstrates our commitment to global health security and why implementation of the Global Health Security Agenda (GHSA) is needed. Global health security is a shared responsibility that cannot be achieved by a single actor or sector of government.

In partnership with other nations and international organizations, the CDC is committed to mounting a prompt, coordinated response to the emerging threat of Zika virus in order to protect the people both in the United States and around the world.

Thank you again for the opportunity to appear before you today. I appreciate your attention to this concerning outbreak and I look forward to answering your questions.