Written Testimony
House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations

Zika Virus Outbreak and Response

Statement of

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Good morning, Chairman Murphy, Ranking Member DeGette, and distinguished members of the House Energy and Commerce Subcommittee on Oversight and Investigations. I am Dr. Rick Bright, Director of the Biomedical Advanced Research and Development Authority (BARDA) and Deputy Assistant Secretary for Preparedness and Response in the Office of the Assistant Secretary for Preparedness and Response (ASPR). I appreciate the opportunity to speak with you today, the first opportunity I have had to testify since being named the BARDA director in November 2016. After spending a number of years developing influenza vaccines and therapeutics at the Centers for Disease Control and Prevention (CDC) and working in senior management positions in the biopharmaceutical industry, I joined BARDA in 2010. Before assuming the director role, I served in various roles in BARDA that focused on the development of vaccines, therapeutics, and diagnostics and as the director of the Division of Influenza and Emerging Infectious Diseases. My experience in medical countermeasure development in government, non-government organizations, and industry provide a firm foundation for my role as the BARDA director.

As a component of ASPR, BARDA was established in 2006 under the Pandemic and All-Hazards Preparedness Act (PAHPA). BARDA has a role in securing our nation from chemical, biological, radiological, nuclear, pandemic influenza and emerging infectious disease threats by supporting the transition of medical countermeasure candidates from early development across the "Valley of Death" and into advanced research and development towards an application for approval by the Food and Drug Administration (FDA). BARDA executes this mission by providing push and pull incentives to stimulate a robust pipeline of medical countermeasures for these threats and by forming public-private partnerships with industry to reduce risk, improve

efficiency and sustain a marketplace for development and procurement of these countermeasures. BARDA is comprised of a staff of highly skilled, technical experts, many of whom have decades of experience in the pharmaceutical industry. Since 2006, we have established partnerships with over 100 pharmaceutical and biotechnology companies and more than 25 academic and other institutions.

BARDA has established an array of specialized core services to support medical countermeasure advanced development efforts. These services facilitate access to experienced subject matter experts in a variety of disciplines germane to product development (such as clinical trial strategy and execution, regulatory sciences, quality control and quality assurance, production process engineering). BARDA also provides leadership by collaborating with HHS partners in animal model development and preclinical laboratories, by maintaining a clinical studies network (a network of companies to formulate and fill vaccines into final containers), and through BARDA's Centers for Innovation in Advanced Development and Manufacturing (CIADM). These national assets, known collectively as BARDA's National Medical Countermeasures Response Infrastructure, support BARDA's core mission of promoting biodefense product development and enhance BARDA's response capability. These capabilities are currently being leveraged for the Zika response in a similar way as they supported the response to Ebola and pandemic influenza.

BARDA collaborates strategically with its U.S. Government colleagues around medical countermeasure development through participation in the Public Health Emergency Medical Countermeasures Enterprise (PHEMCE). The PHEMCE, chaired by the ASPR, is a standing

virtual enterprise that coordinates the entire life cycle associated with the development and procurement of medical countermeasures for these emergency public health threats. It engages all of the key Federal departments and agencies that develop, procure, or distribute these important medical countermeasures and was created to improve coordination and collaboration within the Department and with our external stakeholders including nonprofits, other Federal departments, the private sector, and the international community.

Against this backdrop and overarching objectives for Zika response, BARDA established four strategic goals to address the medical countermeasure needs for the domestic and global Zika response. These are prevention of Zika virus infection through safe and effective vaccines; detection of acute and previous Zika virus infections through rapid diagnostics; ensuring a safe blood supply from Zika virus through screening and virus inactivation; and activation of our National Medical Countermeasure Response Infrastructure to assist in the development of medical countermeasures for Zika.

With funds provided from Congress in fiscal years 2016 and 2017, we have contributed to the overall HHS response to Zika by supporting the development of new Zika-specific vaccine candidates; vaccine platform technologies that will be able to address multiple emerging infectious diseases; development of rapid serological diagnostics to determine whether someone, including pregnant women and their male partners, has been infected recently with the Zika virus; tests to screen the blood supply for presence of Zika virus; and pathogen reduction technologies that will inactivate Zika virus and other pathogens in donated blood to reduce the risk of Zika virus transmission through blood transfusions.

In February 2016, BARDA participated, with its U.S. Government colleagues, in drafting aligned strategies for development of vaccines and diagnostics for Zika. For diagnostics, our goal was to stimulate and accelerate the development of diagnostic tests to speed the availability of results and inform people of their Zika virus exposure. We rapidly modified our Broad Agency Announcement to allow us to receive proposals to address this requirement. The response from industry was robust. Compiling funds received from repurposed Ebola appropriations with other sources of funding, BARDA awarded four contracts during the summer of 2016 for the development of Zika diagnostics that would determine whether people have had recent exposure to Zika. Industry partners currently supported by BARDA include InBios and DiaSorin to develop a laboratory-based serological test to detect IgM antibodies (indicating recent infection), and OraSure and Chembio to develop a point-of-care diagnostic test that would allow for rapid results for the clinician and patient. Two of these companies have received Emergency Use Authorizations from the FDA for their Zika test: InBios for their ZIKV Detect IgM Capture ELISA and DiaSorin for their LIAISON XL Zika Capture IgM Assay. In addition, BARDA, in close coordination with CDC, addressed a critical barrier for diagnostic developers by collecting blood specimens that contained Zika virus to create well-characterized panels for use in assessing how well the tests perform.

BARDA's role in addressing the blood supply shortage in Puerto Rico is another notable success story. On February 16, 2016, the FDA issued Zika-related blood donor guidance recommending, among other things, that areas with active Zika virus transmission, like Puerto Rico, obtain whole blood and blood components for transfusion from areas of the United States without active Zika virus transmission unless a blood donor screening test for Zika virus is used. Additionally,

the guidance recommended the deferral of individuals from donating blood if they have been to areas with active transmission such as Puerto Rico, potentially have been exposed to Zika, or have had a confirmed Zika virus infection. Because there were no blood donor screening tests available for Zika virus at that time, BARDA worked with CDC, FDA, and the Office of the Assistant Secretary of Health (OASH) to define requirements, conduct market research, obtain legal advice, and award a contract to transport blood products from the U.S. mainland to Puerto Rico to avoid a blood product shortage until a blood donor screening test became available. With BARDA's financial support, Roche Molecular Systems was able to test blood donations from Puerto Rico starting April 2016 under their FDA approved investigational ZIKV nucleic acid test. This entire process was completed in only six business days after being notified of the impending blood product shortage. This is just one of many examples of progress made possible thanks to our response-based programs and close collaboration with our colleagues across the Department.

BARDA has been working closely with our government and industry partners to identify and develop Zika vaccine candidates. BARDA hosts a carefully designed program, called TechWatch, that invites any individual or company to request a meeting with BARDA through our medicalcountermeasures.gov website. Our TechWatch program serves two primary functions: first to inform and communicate our medical countermeasure requirements to potential industry partners and second, to learn about medical countermeasure candidates that are in development. BARDA has hosted several TechWatch "marathons" to engage with companies that are developing Zika vaccine, therapeutic, and diagnostic candidates. BARDA is able to provide subject matter expertise, advice, and referrals at these engagements. Some of these

meetings lead to the submission of a white paper or proposal to BARDA to consider advanced development support of the specific candidate.

One essential function of BARDA is to work with industry partners to guide product candidates across advanced development towards an application for FDA approval. As it currently stands, many of the Zika vaccine candidates that are supported by BARDA are in the early stages of or making progress towards clinical development. Among these candidates, Sanofi Pasteur, Takeda, and the Instituto Butantan are working on whole virus inactivated vaccine candidates. This is a more traditional, conservative approach to development of a vaccine type that has shown to be successful for other flaviruses, such as the Japanese encephalitis vaccine. This vaccine approach has been used for many vaccines and has a proven track record for safety and immunogenicity. The vaccine being developed by Sanofi Pasteur is an extension of a collaboration that started with the Department of Defense's Walter Reed Army Institute of Research (WRAIR), the National Institute of Allergy and Infectious Diseases (NIAID) and BARDA. Sanofi Pasteur is in the process of licensing this technology from WRAIR. The initial vaccine, developed by WRAIR, is currently in several Phase 1 clinical trials in the United States that are being funded by NIAID and WRAIR. Takeda is also making good progress in the development and production of its Zika vaccine candidate and is planning to start its first Phase 1 clinical trial this fall. The Instituto Butantan, based in Sao Paulo Brazil, has received BARDA's support to develop a Zika vaccine for use in Brazil and other countries. This partnership builds on a past successful collaboration with Butantan on the development and production of influenza vaccines.

BARDA is also working with Moderna to develop a Zika vaccine based upon its novel messenger RNA (mRNA) platform. This is an exciting new vaccine platform that has the potential to rapidly develop and produce vaccines at a large scale—which is essential for response to emerging threats. Moderna recently published encouraging clinical data using this platform for an influenza vaccine candidate and, with BARDA's collaboration, it is currently conducting Phase 1/2 clinical trials that will assess the safety and immunogenicity of its vaccine candidate for Zika. Moderna is also expanding and optimizing its vaccine manufacturing scale to produce vaccine in preparation for later stage clinical studies.

Clinical efficacy trials for Zika vaccine candidates pose an added challenge. One objective of such trials is to collect data to support that a vaccine is safe and effective at preventing infection from Zika virus. However, at this point in time, the Zika virus has already spread through major urban centers in Brazil, throughout Puerto Rico, and other regions in Central America. This means that many people have already been exposed to the Zika virus and are likely already immune to reinfection. In order to conduct large-scale efficacy clinical trials for Zika vaccines, it is important to pre-position clinical sites where we assess that there may still be a significant population naïve to Zika but also where the virus is likely to appear. Thus, it can lead to a chase of the virus around the globe. Our BARDA modelers, in close coordination with CDC and NIH, are working to estimate where Zika may appear next. This work is informing our clinical and regulatory strategies and options to consider as we progress with vaccine development.

The funds that BARDA has received to date have been put to work to accelerate the development of Zika vaccines, diagnostics, and methods to ensure a safe blood supply. While these funds

were instrumental in pushing these candidates into initial clinical trials, additional funding is needed to support Phase 3 clinical trials for the most promising Zika vaccine candidates. At BARDA, we know the value of having multiple candidates in the pipeline to reduce the development risk and increase the chance of getting one or more vaccines to the finish line. With Zika virus, we continue to learn new things about the virus and the disease that it causes almost every week. Now is the time to keep the development pressure strong, to remove any barriers to rapid development and clinical evaluation of these vaccines, and to strive to have a vaccine that can be used to address any outbreak of Zika virus in the near future. Our ultimate goal is to have a vaccine available that will prevent anyone from getting infected with Zika virus. This could have a significant impact on preventing the outcomes we are now seeing from babies born to mothers who have been infected with Zika during pregnancy. BARDA and ASPR are committed to using innovative contractual methods, such as other transactional authorities, while exploring more flexible incentives and financial tools. A nimble and flexible approach is critical to address both the "Valley of Death" between basic research and advanced development, as well as the challenges that our development partners in industry may face when their products are licensed or cleared and enter the market.

The challenges ahead for Zika virus medical countermeasures include those inherent with flaviviruses, an unpredictable virus that could make both clinical development and sustaining an eventual market for countermeasures difficult. The creation of a Federal Emergency Response Fund could enable rapid response to public health outbreaks. Zika is once again a reminder of the challenges we seem to increasingly face in response to emerging diseases. Every day of delay in an emergency response can often be measured by lives lost or a negative impact on our

health or societal stability. Our efforts on Zika virus vaccines and diagnostics have shown once again that the BARDA model is very effective for a rapid medical countermeasure development response.

Mr. Chairman, ASPR and BARDA are working with our HHS and interagency colleagues and our private sector partners to prepare our nation for a range of public health threats. We are making efficient use of the resources Congress has provided and we are making investments and progress as transparent as possible considering proprietary and contractual obligations. This is a long and complicated process, but rest assured, we are up for the challenge. I look forward to working with members of this committee and your Congressional colleagues as HHS continues its response to Zika.