Written Testimony
Senate Health, Education, Labor, and Pensions Committee

Facing 21st Century Public Health Threats: Our Nation's Preparedness and Response Capabilities, Part 1

Statement of

RADM Stephen C. Redd, M.D.

Director, Office of Public Health Preparedness and Response
Centers for Disease Control and Prevention
Department of Health and Human Services

For Release upon Delivery
Expected at 10:00 a.m.
January 17, 2018

Chairman Alexander, Senator Murray, and other members of the Committee. I am Rear Admiral Stephen Redd, Director of the Office of Public Health Preparedness and Response at the Centers for Disease Control and Prevention (CDC). I appreciate the opportunity to be here today to discuss CDC's public health preparedness and response mission, and the agency's role in implementing the Pandemic and All-Hazards Preparedness Reauthorization Act of 2013 (PAHPRA).

CDC provides for the common defense of the country against public health threats. Through our dedication to science, surveillance, and service, CDC focuses on protecting the public health of the nation from threats such as emerging infectious diseases, natural disasters, and terrorism.

In carrying out the mission set forth under the Pandemic and All Hazards Preparedness Reauthorization Act, CDC draws on expertise from throughout the agency. CDC's expertise includes world-class laboratory testing, surveillance (for disease detection), epidemiology, guidance to healthcare providers, incident management, logistics, emergency risk communication, disease control programs, distribution of medical countermeasures, human and animal medicine, and responder health and well-being. Our multidisciplinary workforce enables an integrated national system that is nimble and prepared to detect and respond to any developing situation that could affect the health of people in the United States. In addition, CDC draws on its long-standing relationships and close collaboration with state and local partners to protect the health of communities across the country, and collaborates closely with the Assistant Secretary for Preparedness and Response (ASPR), the Food and Drug Administration (FDA) and other federal partners.

CDC experts lead and staff every activation of the agency's Emergency Operations Center (EOC), ensuring response activities are effective and efficient. HHS/CDC has an emergency management program accredited by the Emergency Management Accreditation Program. CDC activated its incident management system for 67 responses over the last 16 years, between September 2001 and December 2017. During a response, CDC's EOC

rapidly deploys scientific experts, coordinates the delivery of supplies and equipment to the incident site, monitors response activities, provides resources to state and local public health departments, and disseminates timely and accurate information within government, to health care providers, and to the public. During the agency's Zika and Ebola responses, CDC deployed over 1,700 and 3,700 staff, respectively. CDC also responds to public health events that do not require EOC support. In fiscal year 2017, CDC assisted state, local, and overseas public health authorities in 23 epidemiologic investigations of emerging infectious disease outbreaks as well as more than 20 environmental responses.

CDC Programs under the Pandemic and All Hazards Preparedness Reauthorization Act

The Pandemic and All Hazards Preparedness Reauthorization Act of 2013 (PAHPRA) reauthorized several public health preparedness programs. The discussion immediately below focuses on two of those programs: CDC's Public Health Emergency Preparedness cooperative agreement program (which includes the Cities Readiness Initiative (CRI)) and the Strategic National Stockpile (SNS). Later in the testimony I will discuss CDC's work related to a third PAHPRA program, biosurveillance.

Public Health Emergency Preparedness Cooperative Agreement (PHEP) Program: The PHEP cooperative agreement program is the largest CDC state program and provided approximately $600 million to state, local, and territorial public health departments in 2017. The program developed the first playbooks for public health preparedness and response, and has been instrumental in integrating state and local health departments into their jurisdictions' emergency response structures. PHEP currently supports 62 awardees – including all 50 states, eight territories and freely associated states, and directly funded cities (New York City; Washington, D.C.; Chicago; and Los Angeles). Funding is awarded according to a base-plus population formula prescribed by statute, which ensures a minimum amount of funding to each awardee. These funds support preparedness and response staff, enable exercises to test and validate capabilities, provide for timely training, and pay for laboratory and communications equipment essential to maintaining preparedness. In addition, CDC personnel

support PHEP awardees by helping to identify and address gaps in preparedness capabilities, providing planning resources to ensure the needs of at-risk individuals are incorporated into response strategies, and improving response capabilities from experience gleaned during public health responses, most recently to Ebola and Zika.

Strategic National Stockpile (SNS): The SNS is the largest federally-owned repository of vaccines, drugs, medical supplies, Federal Medical Stations, and medical equipment available for rapid delivery to support federal, state, and local response to health security threats. The SNS was created in 1999 to ensure the nation's readiness against public health emergencies by ensuring delivery of lifesaving medical countermeasures (MCMs) during deliberate or naturally-occurring outbreaks and other events that threaten public health. Since its inception, SNS products and staff have been deployed more than 100 times for events ranging from natural disasters to infectious disease outbreaks. CDC works with the HHS Assistant Secretary for Preparedness and Response and with other federal agencies through the Public Health Emergency Medical Countermeasures Enterprise (PHEMCE) to prioritize federal investments in medical countermeasures based on analysis of risk, benefits to the American people and sustainability of the MCM pipeline.

Management of the SNS and deployment of its assets are complex endeavors which rely on a broad range of scientific expertise, surveillance systems, public health communications systems, and state and local partners. The SNS ensures that the right medical countermeasures and supplies are available when, where, and in the quantity needed to stop or slow a public health emergency and save lives. And, scientific experts ensure that medicine and supplies expeditiously get to our public health partners at the state and local levels, who have had the necessary training, exercises, and clinical guidance to effectively and efficiently receive those assets from the SNS and get them to those who need them.

Cities Readiness Initiative (CRI): CRI, funded through the PHEP cooperative agreement, enhances preparedness in the nation's largest population centers, where nearly 60 percent of the population resides. The 72 cities (at

least one in every state) use CRI funds to develop, test, and maintain plans to quickly receive medical countermeasures from the SNS and distribute them to local communities. This program, through reliance on local boots on the ground, enables effective response to large-scale public health emergencies needing life-saving medications and medical supplies.

Public Health Preparedness through Science, Surveillance and Service

In carrying out its public health mission CDC's subject matter experts from across the agency collaborate to detect and respond to emerging threats that could affect Americans' health.

Science:

Exceptional and world-renowned scientific expertise and world-class laboratories ensure CDC is ready and able to respond to a broad range of threats, including highly hazardous and infectious diseases like Ebola, smallpox, and H7N9 influenza. For example, CDC's research on the smallpox virus helps find better drugs to treat the disease, stop the virus from spreading, make safer vaccines, and improve tests to detect the virus. Additionally, CDC's global influenza capacity-building efforts helped facilitate the rapid detection of the novel Asian linage influenza A (H7N9) virus in 2013. Most human infections resulted from exposure to infected poultry, but CDC assesses that the virus poses the greatest pandemic risk of all influenza viruses not yet circulating among humans, and is working with global health partners to monitor that virus and detect changes in it that could trigger a pandemic. CDC has developed two candidate vaccine viruses and shared them with vaccine manufacturers, for use in BARDA-supported vaccine production and in clinical trials by NIH's National Institute of Allergy and Infectious Disease. If the H7N9 virus develops the capacity to spread among humans, an effective vaccine would be key for preventing a pandemic.

CDC plays a critical role in discovering new and emerging infectious diseases, using advanced molecular detection techniques that combine next-generation genomic sequencing, high-performance computing, and epidemiology to identify pathogens faster and more accurately. Laboratories from all over the world send

specimens to CDC, often in cases where the cause of illness is unknown. Annually, CDC receives hundreds of thousands of specimens to examine and helps diagnose hundreds of cases of unexplained illness or death. Through advanced molecular detection investments, CDC is seeing improvements in faster detection of outbreaks (catching them when they are smaller) and in faster development of diagnostics, applying these technologies in dozens of areas such as foodborne disease, influenza, antimicrobial resistance, hepatitis, pneumonia, and meningitis. CDC shares genetic sequencing technologies with state and local health departments, and funds them to acquire new technology that helps them to respond quicker and more efficiently at a local level.

CDC is critical to preparing for the next influenza pandemic. In an influenza emergency, CDC's public health and infectious disease experts use advanced molecular detection techniques to identify disease strains that could cause a pandemic, release recommendations for the prevention, diagnosis, and treatment of disease, and provide communication to the nation about the pandemic. For example, each human case of infection with a new animal influenza virus represents the potential for a pandemic. CDC receives and studies viruses like these in its laboratories to better understand where and how they spread and the nature of illness they cause. This informs development of clinical and public health recommendations before and during emergency responses. In the event of an influenza pandemic, CDC's scientific experts use the best epidemiologic and laboratory data available to update or develop guidance to inform purchasing, distribution, and use of medical countermeasures including vaccines, antiviral drugs, respirators or masks, and ventilators. CDC also develops and evaluates solutions to lessen the impact of an influenza pandemic through non-pharmaceutical interventions or actions that people and communities can implement to help slow the spread of influenza, such as staying home when ill, coordinating school closures, and postponing mass gatherings.

CDC has longstanding collaboration with countries and institutions around the world. These strategic partnerships coupled with forward deployment of our scientists stationed in more than 60 countries enable CDC

to identify new pathogens, assess risks, and devise effective control measures. Our partnerships provide the platforms for timely sharing of laboratory specimens, innovations and distribution of diagnostic materials and technologies to prevent epidemics, and promptly respond to disease outbreaks before they cross international borders.

Vector-borne diseases present another preparedness challenge, as we saw in the Zika emergency. CDC is one of the nation's public health authorities on vector-borne diseases, like Zika, plague, and dengue. CDC scientists who specialize in vector-borne disease have deep expertise in entomology, microbiology, virology, veterinary medicine, zoology, and public health that does not exist elsewhere. These experts develop diagnostic tools and clinical guidance, as well as methods of treatment, prevention, and vector control, in order to slow the spread of these diseases. For example, CDC scientists have determined that a natural plant ingredient called nootkatone effectively repels and kills the mosquitoes and ticks that can spread disease. Nootkatone appears to work differently than available insecticides, and it could help fight mosquitoes that are resistant to existing insecticides.

CDC's scientific experts protect people from environmental health threats like contaminated water, radiation, and chemical emergencies. To do so, CDC identifies the environmental exposures that make people sick, investigates how those exposures are transmitted in the environment, and finds ways to eliminate the threat to people's health. For example, CDC's radiation guidelines help public health officials and clinicians prepare for, and respond to, radiation emergencies and treat exposures.

The list of CDC's scientific expertise is much longer than I have detailed, including myriad chronic diseases and also includes foundational scientific expertise critical to effective public health impact such as in the areas of workforce, laboratory systems, and data sciences.

Surveillance:

Public health surveillance – the collection, analysis, and use of data to target public health prevention and intervention activities – is the foundation of public health practice. CDC monitors health surveillance information around the clock to detect and track diseases and protect Americans. As one example, following 9/11, CDC made investments in enhancing syndromic surveillance—using health-related data based on patient symptoms that precede diagnosis—as an early warning system for bioterrorism. This system now allows officials to detect a much wider range of health threats—from opioid overdoses to chemical spills to disease outbreaks. Moreover, CDC collects, analyzes, and interprets human, animal, environmental, and food surveillance data, in order to identify and respond to potential health threats before they become emergencies. In aggregate, CDC's specialized surveillance systems provide prompt situational awareness and early warning for unknown or unexpected threats. CDC's surveillance activities directly support states in their primary responsibilities in protecting the public's health. Surveillance data, collected in collaboration with domestic and international partners, inform CDC's threat assessments and ensures response actions are at the right speed, scope, and scale to protect Americans.

CDC supports integrated disease surveillance activities at the state and local level through funding and provision of surveillance tools and services. The following are examples of the surveillance systems and support that CDC provides to state, local, and territorial public health departments to develop and strengthen their surveillance activities:

- National Notifiable Diseases Surveillance System (NNDSS): NNDSS is a nationwide system that enables all levels of public health—local, state, territorial, federal, and international—to collect and share data on approximately 100 diseases and conditions that are required to be reported in all 50 states, and keeps them under continuous surveillance. This system provides comprehensive, timely, and high-quality data for public health decision-making, enabling CDC programs to work with state partners to

better monitor disease occurrence, identify potential outbreaks, recognize emerging trends, track the impact of public health interventions, and respond.

- Influenza Surveillance: Influenza viruses are constantly changing, and, thus, require continued vigilance to protect the United States and the rest of the world from both seasonal and pandemic influenza threats. Influenza surveillance, both epidemiologic and virologic, is at the core of influenza preparedness. The surveillance platforms used year round to combat seasonal influenza threats serve as the foundation for pandemic influenza surveillance. CDC provides support to every state, and several major municipalities and territories, to conduct influenza surveillance and laboratory work. For many decades, CDC has served as an international leader in global influenza surveillance. We have partnered with more than fifty countries to establish, maintain, and expand influenza surveillance and laboratory capacity, in order to find influenza viruses where they emerge as quickly as possible to mitigate their potentially devastating impact on the United States. Domestic funding supports seasonal influenza surveillance through a network of interrelated systems that provide data on where influenza and influenza-like illnesses, hospitalizations, and deaths occur.

  National Syndromic Surveillance Program (NSSP): CDC, through state and local collaborations, collects de-identified health information on emergency room, urgent care, and hospital visits, as well as pharmacy and laboratory data. This investment has revolutionized public health surveillance to include this new type of data collection on top of traditional type and methods of data collection. States and local public health departments use the syndromic data to detect and characterize abnormal situations meriting further public health investigation. This strengthens local public health capacity to detect, respond to, and manage, outbreaks and other critical public health events. CDC has negotiated access to the data to enable situational awareness at regional and national levels. The series of three recent hurricanes presents a poignant example that demonstrates the usefulness and flexibility of this asset. Before the hurricanes, CDC and ASPR had begun establishing a mechanism to share National Disaster Medical Assistance Team (DMAT) data during mass gatherings. As the hurricanes hit, CDC and ASPR

established data flow mechanisms and rules, and in two days put in place a system to receive hourly data from DMATs, resulting in timely information that helped responders target communities at greatest need for public health interventions.

- Vector-Borne Surveillance: CDC operates systems that allow for national and state-based monitoring of specific vectors, such as ticks and mosquitoes, which carry diseases and pose risks for outbreaks. These systems monitor laboratory documented cases of disease, allowing for the early detection of outbreaks and helping decision-makers determine when and how to act in the interest of the public's health. State, territorial, city, and local health departments populate CDC's surveillance systems to inform vector control and management activities.
- Antibiotic Resistance Surveillance: Beginning in fiscal year 2016, Congress recognized the large and growing threat of antibiotic resistance and appropriated funding to CDC to detect and respond to resistant pathogens, prevent the spread of resistant infections, and collaborate with partners to encourage innovation for new prevention strategies. CDC has multiple surveillance systems that can detect and track resistant threats across healthcare, food, and the community. One important investment begun in 2016 is CDC's Antibiotic Resistance Laboratory Network (ARLN), which supports nationwide laboratory capacity to rapidly detect antibiotic resistance in healthcare, food, and the community, and inform local responses to prevent spread and protect people. The ARLN includes seven regional laboratories, the National Tuberculosis Molecular Surveillance Center, and laboratories in 50 states, five cities, and Puerto Rico. The ARLN is vital to detecting new and emerging resistant pathogens, including those that are untreatable, to trigger infection control response measures to prevent spread. The ARLN collects actionable data on threats including the "nightmare bacteria," carbapenem-resistant *Enterobacteriaceae* (CRE), *Candida auris*, and *Neisseria gonorrhoeae*; some strains of these pathogens have become resistant to all or nearly all available antibiotics. In addition, samples from the ARLN can be made available to researchers to support innovations in antibiotic and diagnostic development.

- Global Disease Detection: CDC's Global Disease Detection (GDD) Operations Center monitors outbreaks 24/7 across the globe, assesses their potential risk to the United States and communities around the world, and improves global public health surveillance. The GDD Operations Center monitors approximately 30-40 public health threats each day, including outbreaks, disasters, poisonings, and chemical, radiological, or nuclear events. Since 2007, CDC has tracked more than 170 unique diseases globally and identified outbreaks in more than 190 countries. This tracking provides the agency with critical early warning and response capabilities.
- Global Polio Surveillance: CDC, as part of the Global Polio Eradication Initiative, supports polio surveillance to track potential cases and circulating viruses and to effectively target polio immunization efforts. The goal of these efforts is polio elimination in every country and eventual worldwide eradication, and we are closer than we have ever been to achieving that monumental accomplishment. In 2017, the Global Polio Eradication Initiative identified just 20 wild poliovirus cases worldwide, down from 350,000 cases in 1988 when the global eradication initiative began. The global polio surveillance system, coupled with the CDC-supported Global Poliovirus Laboratory Network (comprised of 145 laboratories around the world), also detects and assists in the diagnosis of other epidemic prone diseases such as measles, rubella, and yellow fever.

Taken together, these surveillance systems provide an early warning alert, allowing CDC to protect the health of Americans through rapid, evidence-based action.

Providing Public Health Services:

State and local public health agencies are the cornerstones of preparedness and response. When states are prepared to respond, communities are better protected and more resilient in the face of threats. CDC has long-established relationships with state and local officials, and coordinates with them effectively and efficiently during public health emergency responses. CDC also collaborates with foreign ministries of health to protect

global health security that directly impacts United States health security. Examples of CDC's critical support of state, local, and foreign health agencies to ensure they are ready to respond to emergencies include:

- 24/7 public health consultation and disease expertise.
- Enabling a quality public health laboratory system while maintaining critical laboratory infrastructure and specimen testing support.
- Managing and delivering medical countermeasures.
- Public health workforce development that complements preparedness-specific provision of guidance, training, and exercises to ensure jurisdictions are ready to detect and respond to an emergency.

In the event of an outbreak, bioterrorist attack, or chemical or radiological release, laboratory capacity is essential to quickly detect, diagnose, and treat those who are impacted. CDC's Laboratory Response Network (LRN) maintains an integrated network of state and local public health, federal, and international laboratories that can respond to all types of public health threats. The linking of state and local public health laboratories, and veterinary, agriculture, and water- and food-testing laboratories is unprecedented and provides for training, rapid testing, timely notification, and secure messaging of laboratory results. With the LRN, CDC has developed and deployed tests to combat our country's most pressing infectious and non-infectious health issues, from Ebola to Zika to ricin toxin to nerve agents.

CDC ensures the nation is able to respond to influenza pandemics, vector-borne or vaccine-preventable disease outbreaks, other emerging infectious disease threats, and environmental health threats by supporting planning efforts among health departments, hospitals, and emergency responders. CDC tests its pandemic influenza response capabilities with federal, state, and local partners through virtual tabletop and functional exercises. CDC evaluates and improves its response plans based on lessons learned from previous responses and exercises. CDC supports state and local health departments directly during vector-borne and environmental health incidents by developing and evaluating novel repellents and other prevention tools; improving and deploying

diagnostic tools and tests; responding to toxic health threats; and providing unique expertise and training regarding radiation.

The existing public health system, its people, networks and resources, form the basis for response to health emergencies. For example, CDC's National Center for Immunization and Respiratory Diseases funds state infrastructure awards, manages vaccine shortages, prevents disease outbreaks and responds early and rapidly should they occur, and stands ready to respond quickly and comprehensively to other urgent emergencies requiring vaccination such as a pandemic or biologic attack. CDC also funds state and local public health agencies through the Epidemiology and Laboratory Capacity for Infectious Diseases cooperative agreement (ELC). This funding allows jurisdictions to strengthen their basic epidemiologic and laboratory capacity to address infectious disease threats. Multiple CDC programs use the ELC platform to protect the public health and safety of the American people by supporting health departments to effectively detect, respond to, prevent, and control a wide range of known and emerging (or re-emerging) infectious diseases. These CDC programs and others provide ongoing support to prevent, prepare for, and respond to public health emergencies.

An outbreak that starts in another country can hit our shores in a matter of hours. Strengthening global health security protects Americans' health. New diseases, like MERS and influenza H7N9, can emerge without warning and have the potential to cause widespread infection and fear. CDC works with 31 Global Health Security Agenda partner countries to help them build the core public health capacities necessary for identifying and containing outbreaks before they become epidemics that could affect us all. This work is focused on strengthening four critical areas: surveillance, laboratory, workforce development, and rapid response capability. In addition, CDC medical and public health officers staff United States Quarantine Stations that are located at 20 ports of entry and land-border crossings where the majority of international travelers arrive. These health officers are the first line of defense to prevent the introduction and spread of infectious diseases.

Conclusion

I want to leave the Committee with three primary points about CDC's role in public health emergency preparedness and response.

- CDC is the common defense of the country against threats to public health,
- CDC's preparedness work is built on a foundation of our broad and deep scientific, medical, and programmatic expertise, and
- CDC's longstanding partnerships with state and local public health authorities are essential to the health security of our country.

Through the three interconnected pillars of science, surveillance, and service, CDC plays a critical role in working to ensure that the United States is ready to respond to public health emergencies. CDC has over 70 years of experience in bringing top scientific expertise to health emergencies and remains a trusted partner in the United States and around the world. CDC stands ready to do its part to protect the health and well-being of the American public and save lives. We cannot necessarily predict the next disaster, but we know that being prepared protects health, saves lives, and prevents economic losses.

Thank you for the opportunity to testify.