



**Testimony before the
Subcommittees on Homeland Security
Committee on Appropriations
U.S. House of Representatives**

**Biosurveillance: Smart Investments for
Early Warning**

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Good afternoon, Chairman Price, Ranking Member Rogers, and distinguished members of the Subcommittee. I am Daniel Sosin, Acting Director of the Centers for Disease Control and Prevention's (CDC) Office of Public Health Preparedness and Response within the U.S. Department of Health and Human Services (HHS). Thank you for this opportunity to provide a broad perspective on the importance of biosurveillance and to explain public health's role in biosurveillance. I want to emphasize the critical role that collaborations between HHS and the Department of Homeland Security (DHS) play in supporting strong biosurveillance capabilities across government. My testimony outlines key elements of our national approach to biosurveillance, a brief description of CDC's approach to biosurveillance, and future directions for biosurveillance collaborations.

The United States is confronted today by an array of health threats with natural, accidental, and deliberate origins. The public health community, led by HHS, is responsible for addressing the human health consequences of all types of disasters - chemical, biological, radiological, nuclear, and environmental. HHS has lead responsibility for Emergency Support Function #8, and in that role leads federal public health to ensure integrated and focused national efforts to anticipate and respond to naturally occurring or man-made disasters and emerging biological and other threats to human health. Within HHS, CDC supports these efforts with scientific expertise, extensive experience working with state, local, and international departments of health in the core public health functions of surveillance, epidemiology and assessment sciences, laboratory science, as well as response infrastructure through incident management, risk communication, and medical countermeasure delivery and guidance. Biosurveillance is the information supply chain that supports decision-making in all these areas to ensure our response is appropriately matched to the public health event or emergency.

DHS is responsible for coordinating domestic federal operations to prepare for, respond to, and recover from biological weapons attacks. Biosurveillance for human health is an integral component of the DHS National Biosurveillance Integration System (NBIS). In accordance with the Homeland Security Presidential Directive-21 (HSPD-21), CDC has worked closely with DHS to assure that information from the human health component of biosurveillance is effectively shared with the broader response community to improve situational awareness and coordinated decision-making. These efforts also support multiple strategic objectives of the National Health Security Strategy that HHS provided to Congress in December 2009, which was developed working with Departments across government, including DHS.

Biosurveillance and Public Health Surveillance

Biosurveillance for human health includes three functional components, whose goals are to:

- 1) Detect unusual events (Baseline Disease Detection);
- 2) Validate or rule them out as potential threats (Investigation); and
- 3) Guide the response if a threat is confirmed (Response-Related Surveillance)

Investments in biosurveillance must be viewed with a wider lens than just early detection. Each of these three functions is vital to an informed and effective response and none alone is sufficient to achieve health security in the face of an emergency. Biosurveillance should build on existing, widely used systems and processes for efficient and timely response.

Baseline Disease Detection

The first function—early detection of unusual health events that might indicate that a new outbreak or attack is occurring—depends on the national public health and medical systems, which support infectious disease surveillance on a routine, day to day basis. Because we do not

know when or where a new public health threat may emerge, and because information obtained in the early stages of detecting a threat may not be specific enough to make clear the nature of the threat, a strong public health infrastructure with strong surveillance systems and what are known as “astute clinicians” trained to spot unusual events and routine ways to report them is critical. Therefore, early detection and timely characterization of biological threats arising anywhere in the world depend on strong global, national and regional disease surveillance systems and a robust public health workforce. Strengthening these systems serves our national interest and fulfills our responsibilities to the 2005 International Health Regulations. These regulations require World Health Organization (WHO) members to maintain or develop core capacities for disease surveillance, reporting, and response. Human clinical disease surveillance—case-reporting of notifiable diseases and unusual events—is the fundamental, multi-purpose, all-hazards layer of baseline disease detection. Public health and health care providers do this every day and, therefore, it is one of the most reliable systems during emergencies. It is multi-purpose in that it helps with detection, investigation, and response and takes into account when populations become sick from predictable or unanticipated health hazards. The importance of this primary layer of biosurveillance is acknowledged in the National Academy of Sciences report entitled *BioWatch and Public Health Surveillance: Evaluating Systems for the Early Detection of Biological Threats*.

Investigation

The second function—investigation—confirms whether the unusual event is actually something needing an elevated response. Investigation includes ongoing reporting of laboratory-confirmed cases of notifiable diseases (e.g, tularemia). Laboratories and healthcare providers send

surveillance information to state and local health departments, who report them to CDC, via the National Notifiable Disease Surveillance System (NNDSS). This includes suspect cases and unusual events reported by “astute clinicians” or even the public. A clinical case report of a reportable or unusual event is the most actionable type of surveillance data, prompting immediate investigation by local health departments, who may:

- Work with local healthcare partners to establish the cause and routes of transmission;
- Collect and analyze clinical specimens from the initial and any additional suspect cases;
- Heighten clinical surveillance for additional cases at hospitals, emergency departments, and physicians’ offices, using established mechanisms for setting and modifying reporting case definitions and notification requirements; and
- Heighten disease surveillance using additional methods of disease detection (e.g., analysis of other electronic clinical data and environmental data).

Disease surveillance based on health care encounters (clinical disease surveillance) is supplemented by several secondary surveillance layers, which include: environmental surveillance, (i.e., the DHS BioWatch Program, the DoD Guardian Program, and the USPS Biohazard Detection System), statistical analysis of electronic clinical data, mortality data, health behavior indicators, healthcare indicators, veterinary surveillance, intelligence sources, and electronic news and social media-based systems. Many non-traditional sources of information are not ideal for earliest detection of health emergencies due to the non-specific nature of the information. Rather, they demonstrate their greatest value in validation of incidents and supporting response. The National Biosurveillance Strategy for Human Health places priority on

improving the understanding and use of these secondary surveillance systems, including for the role in early detection.

Public health laboratories are key in the confirmation of diagnoses and identification of unusual disease agents and outbreaks of national and international concern. Maintaining a capable, robust, public health laboratory system that is linked with public health emergency response is a vital component of biosurveillance.

Response-Related Surveillance

- Once an outbreak of a dangerous pathogen is confirmed, the final function—response-related surveillance—is essential to track the event, understand its impact, determine whether countermeasures are needed, and provide public guidance on response to promote community resilience. Monitoring and characterizing an outbreak and its effects requires input from many sources, including laboratories, hospitals, doctors’ offices, and the public. It also requires integration of many streams of data, including medical information (mapping cases by geography, symptoms, severity, hospitalization, sex, medical history, and age) and molecular information on the pathogen itself. Response-related surveillance may include:
 - Conducting detailed case reviews and case-control studies to assess severity and identify risk factors and sources of exposure;
 - Monitoring the geographic spread of the outbreak;
 - Monitoring antigenic and genetic changes in the causative agent;
 - Tracking the use of hospital beds and medical equipment;

- Tracking distribution and use of drugs, vaccines, and other countermeasures (from manufacturers, stores, or stockpiles through dispensing);
- Monitoring adverse reactions in patients to the use of drugs, vaccines, or other countermeasures; and
- Understanding the information needs of the public, clinicians and other responders, and tailoring information and guidance to meet their needs.

Biosurveillance Priority Areas

To harness the potential of biosurveillance in the United States, President George W. Bush issued HSPD-21, *Public Health and Medical Preparedness* in October 2007. This directive identifies biosurveillance as one of four critical priorities for improving public health preparedness and response. Working with partners in federal, state, tribal, and territorial government, and private agencies and organizations, the National Biosurveillance Strategy for Human Health was developed to articulate a vision for enhanced biosurveillance in the 21st century. The Strategy proposes six priority areas to address critical gaps and suggest opportunities for improvement. They are as follows:

- Electronic Health Information Exchange;
- Electronic Laboratory Information Exchange;
- Unstructured Data;
- Integrated Biosurveillance Information;
- Global Disease Detection and Collaboration; and
- Workforce of the Future.

In addition to the recommendation to develop a broad national biosurveillance system for human health, HSPD-21 directed the establishment of a federal advisory committee to include “representatives from state and local government public health authorities and appropriate private sector health care entities.” To accomplish this, in May 2008, CDC established the National Biosurveillance Advisory Subcommittee (NBAS) to provide an independent perspective on enhancing our nation’s biosurveillance capacity. NBAS has helped shape the development of The Strategy with its report titled *Improving the Nation's Ability to Detect and Respond to 21st Century Urgent Health Threats*, which was published on October 16, 2009. The report makes a number of recommendations to improve biosurveillance by defining strategic goals and priorities, enabling detection of global health threats, investing in a skilled workforce to run biosurveillance programs, leveraging investments in electronic health records and electronic laboratory data to support biosurveillance and public health, and investing in new technologies to strengthen biosurveillance capabilities. CDC is working to address these recommendations.

CDC Focus on Biosurveillance

Surveillance is one of CDC Director Dr. Thomas Frieden’s top priorities. CDC has recently established a new Deputy Director for Surveillance, Epidemiology, and Laboratory Services to better enable us to maximize our current investments in biosurveillance programs across the agency. CDC will continue its current path to refine its public health surveillance systems to ensure systems are designed with end-users and stakeholders at the local, state and federal level in mind.

Significant changes are underway in health information technology, advanced through congressional health information technology investments made as part of the American Recovery and Reinvestment Act of 2009. These changes include accelerated adoption of electronic health records, expanded networks for exchange of health information, and state efforts to aggregate and evaluate clinical data from these networks for public health surveillance. CDC and our partners in public health are committed to helping advance these efforts, and to ensuring that we fully reap the population benefits of these developments.

Because disease can move rapidly around the world, training and supporting ongoing work of domestic and global health practitioners is especially critical for routine health protection and during emergencies. CDC's Global Disease Detection program supports ministries of health to build broad-based global public health workforce capacity (working with key partners such as the World Health Organization) to fill this critical need and link it with our national biosurveillance efforts.

Underlying all these activities is an effective and trained workforce. Advances in information technology are bringing in ever increasing amounts of new data. However, electronic systems cannot replace human interpretation and judgment in an evolving emergency situation. A strengthened public health workforce on the ground in state, local and international health departments will ensure that maximum benefit is derived from new technologies to coordinate information vertically and horizontally across all levels of government, jurisdictions, and among all health-related disciplines and is, in fact, an integral part of our national security infrastructure.

Early Detection and BioWatch

The first step in biosurveillance is to detect public health events of concern. Environmental surveillance and monitoring systems, including BioWatch, are important components within the multi-layered system that comprises biosurveillance. BioWatch is a targeted system designed to be one source of surveillance information for response in major metropolitan areas. CDC partners with the BioWatch program through verification of assays used in the analysis for biological agents and with technical analysis and subject matter expertise for biological detections. The National Academy of Sciences' (NAS) December 2009 report titled *BioWatch and Public Health Surveillance: Evaluating Systems for the Early Detection of Biological Threats* outlined important recommendations to improve BioWatch surveillance capabilities. We will continue to support DHS's further evaluation and refinement of the BioWatch system.

Moving Forward

Over the past two years, CDC has engaged a wide range of stakeholders in robust discussions that led to the National Biosurveillance Strategy for Human Health. This National Strategy and the NBAS report identified important opportunities to strengthen biosurveillance. The most recent NAS report reinforced these conclusions. These recommendations identified critical needs related to leadership, workforce capacity, and the judicious application of technology.

While the National Strategy, our broad biosurveillance principles, and the NAS report provide us with important direction, we will also draw on our recent experience with the 2009 H1N1 flu pandemic. This public health emergency put our surveillance tools and approaches to a real-world test and afforded an opportunity to explore new surveillance methods. We are

systematically exploring and critically evaluating this experience to inform our surveillance planning and implementation of future systems.

CDC will continue to collaborate with DHS to accelerate action on national biosurveillance efforts including the important contributions of BioWatch and NBIS. This collaboration is essential for maintaining a strong and vigilant national public health system.

Thank you for the opportunity to testify today. I am happy to answer any questions.