



Testimony
Before the Committee on Appropriations,
Subcommittee on Labor, HHS, Education and
Related Agencies
United States Senate

**Bioterrorism Preparedness:
CDC's Public Health
Response to the Threat of
Smallpox**

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Good morning, Mr. Chairman and Members of the Subcommittee. I am Dr. James LeDuc, Acting Director, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases (NCID), Centers for Disease Control and Prevention (CDC). Thank you for the invitation to update you on CDC's public health response to the threat of smallpox. I will address specific activities aimed at preparedness for a deliberate release of variola virus, the pathogen responsible for smallpox.

As you are aware, many facilities in communities around the country have received anthrax threat letters. Most were received as empty envelopes; some have contained powdery substances. However, in some cases, actual anthrax exposures have occurred. As of Wednesday, October 31, 10 cases of inhalational anthrax and 10 cases of cutaneous anthrax have been identified in Florida, New Jersey, New York, and Washington, DC. This is the first bioterrorism-related anthrax attack in the United States, and the public health ramifications of this attack continue to evolve. In collaboration with state and local health and law enforcement officials, CDC and the FBI are continuing to conduct investigations related to anthrax exposures. During this heightened surveillance, cases of illness that may reasonably resemble symptoms of anthrax will be thoroughly reviewed. The public health and medical communities continue to be on a heightened level of disease monitoring to ensure that any potential exposure is recognized and that appropriate medical evaluations are given. This is an example of the disease monitoring system in action, and that system is working.

Public Health Leadership

The Department of Health and Human Services' (DHHS) anti-bioterrorism efforts are focused on improving the nation's public health surveillance network to quickly detect and identify the biological agent that has been released; strengthening the capacities for medical response, especially at the local level; expanding the stockpile of pharmaceuticals for use when needed; expanding research on disease agents that might be released, rapid methods for identifying biological agents, and improved treatments and vaccines; and regulating the shipment of hazardous biological agents or toxins.

As the Nation's disease prevention and control agency, it is CDC's responsibility on behalf of DHHS to provide national leadership in the public health and medical communities in a concerted effort to detect, diagnose, respond to, and prevent illnesses, including those that occur as a result of a deliberate release of biological agents. This task is an integral part of CDC's overall mission to monitor and protect the health of the U.S. population.

In 1998, CDC issued *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century*, which describes CDC's plan for combating today's emerging diseases and preventing those of tomorrow. It focuses on four goals, each of which has direct relevance to preparedness for bioterrorism: disease surveillance and outbreak response; applied research to develop diagnostic tests, drugs, vaccines, and surveillance tools; infrastructure and training; and disease prevention and control. This plan was developed with input from state and local health departments, disease experts, and partner organizations such as the American Society for Microbiology, the Association of Public Health Laboratories, the Council of State and Territorial Epidemiologists, and the Infectious Disease Society of America. It emphasizes the need to be prepared for the unexpected – whether it is a naturally occurring influenza pandemic or the deliberate release of smallpox by a terrorist. It is within the context of these overall goals that CDC is preparing our Nation's public health infrastructure to respond to potential future acts of biological terrorism. Copies of this CDC plan have been provided previously to the Subcommittee. In addition, CDC presented in March a report to the Senate entitled "Public Health's Infrastructure: A Status Report." Recommendations in this report complement the strategies outlined for emerging infectious diseases and preparedness and response to bioterrorism. These recommendations include training of the public health workforce, strengthening of data and communications systems, and improving the public health systems at the state and local level.

CDC's Strategic Plan for Bioterrorism

On April 21, 2000, CDC issued a Morbidity and Mortality Weekly Report (MMWR), *Biological and*

Chemical Terrorism: Strategic Plan for Preparedness and Response - Recommendations of the CDC Strategic Planning Workgroup, which outlines steps for strengthening public health and healthcare capacity to protect the nation against these threats. This report reinforces the work CDC has been contributing to this effort since 1998 and lays a framework from which to enhance public health infrastructure. In keeping with the message of this report, five key focus areas have been identified which provide the foundation for local, state, and federal planning efforts: Preparedness and Prevention, Detection and Surveillance, Diagnosis and Characterization of Biological and Chemical Agents, Response, and Communication. These areas capture the goals of CDC's Bioterrorism Preparedness and Response Program for general bioterrorism preparedness, as well as the more specific goals targeted towards preparing for the potential intentional reintroduction of smallpox.

- ***Preparedness and Prevention***

CDC is working to ensure that all levels of the public health community – federal, state, and local – coordinate with the medical and emergency response communities to deal with the public health consequences of biological and chemical terrorism.

CDC is creating diagnostic and epidemiological performance standards for state and local health departments and will help states conduct drills and exercises to assess local readiness for bioterrorism. In addition, CDC, the National Institutes of Health (NIH), the Department of Defense (DOD), and other agencies are supporting and encouraging research to address scientific issues related to bioterrorism. In some cases, new vaccines, antitoxins, or innovative drug treatments need to be developed or stocked. Moreover, we need to learn more about the pathogenesis, epidemiology, and clinical features of the infectious diseases which do not affect the U.S. population currently. We have only limited knowledge about how artificial methods of dispersion may affect the infection rate, virulence, or impact of these biological agents.

In 1999, the Institute of Medicine released its *Assessment of Future Scientific Needs for Live Variola Virus*, which formed the basis for a phased research agenda to address several scientific issues related to smallpox. This research agenda is a collaboration between CDC, NIH, DOD, and international partners, and is being undertaken in the high-containment laboratory at CDC with the concurrence of WHO. The research addresses: 1) the use of modern serologic and molecular diagnostic techniques to improve diagnostic capabilities for smallpox, 2) the evaluation of antiviral compounds for activity against the smallpox virus, and 3) further study of the pathogenesis of smallpox by the development of an animal model that mimics human smallpox infection. To date, genetic material from 45 different strains of smallpox virus has been extracted and is being evaluated to determine the genetic diversity of different strains of the virus. The NIH, with CDC and DOD collaborators, has funded a Poxvirus Bioinformatics Resource Center (www.poxvirus.org) to facilitate the analysis of sequence data to aid the development of rapid and specific diagnostic assays, antiviral medicines and vaccines. A dedicated sequencing and bio-informatics laboratory has been developed at CDC to help further these efforts. This laboratory will also be used to help characterize other potential bioterrorism pathogens. A team of collaborating scientists has screened over 700 compounds for antiviral activity against isolates of variola (smallpox) virus and other related orthopoxviruses and have found several compounds which merit further evaluation in animal models. Over 20 of the most promising compounds will be further tested for antiviral activity in animal model systems. The identification of one currently licensed compound with in vitro and in vivo efficacy against the smallpox virus has led to the development of an Investigational New Drug (IND) application by NIH and CDC to the FDA for use of this drug, cidofovir, in an emergency situation for treating persons who are diagnosed with smallpox. In addition, CDC has included the use of cidofovir in an existing IND to allow the emergency use of this medication in the treatment of adverse reactions to smallpox vaccination. Researchers also have been funded by NIH to design new anti-smallpox medicines and to create human monoclonal antibodies to replace the limited supply of vaccinia immune globulin that is needed to treat vaccine complications that arise during immunization campaigns.

The Advisory Committee for Immunization Practices (ACIP) worked with CDC to develop updated guidelines for the use of smallpox vaccine. These guidelines were published in the *MMWR* in June 2001 and serve to educate the medical and state and local public health community regarding the recommended routine and emergency uses and medical aspects of the vaccine, as well as the medical aspects of smallpox itself. Several infection control and worker safety issues were also addressed by the ACIP within the updated guidelines.

We are pursuing the development of additional smallpox vaccine with multiple manufacturers in order to rapidly enhance our vaccine resource capabilities to respond to a smallpox outbreak. We are also working to ensure that the stores of vaccine that we have in the United States currently are ready for use, including protocols for emergency release and transportation of the vaccine. We have conducted potency testing to and have confirmed that all currently existing lots are still potent. On October 26, NIH began recruitment for a study to test Dryvax vaccine efficacy undiluted, at 1:5 dilution, and at 1:10 dilution. Depending on the results of this study, CDC will ensure availability of enough diluent to allow for the appropriate dilution of vaccine. One study has already been completed which found that undiluted vaccine was effective 95% of the time, 1:10 dilution was effective 70% of the time, and 1:100 was effective 20% of the time. CDC is in the process of contracting with additional manufacturers to produce a total of 300 million doses of vaccine by the end of next year. The President recently signed an Executive Order that allows HHS to provide indemnification for the smallpox manufacturers.

- ***Detection and Surveillance***

Because the initial detection of a biological terrorist attack will most likely occur at the local level, it is essential to educate and train members of the medical community – both public and private – who may be the first to examine and treat the victims. For example, the Florida physician's ability to recognize a suspected case of anthrax and his awareness of his role in reporting it to the local health department was critical to our initial recognition of the current bioterrorist events. It is also necessary to upgrade

the surveillance systems of state and local health departments, as well as within healthcare facilities such as hospitals, which will be relied upon to spot unusual patterns of disease occurrence and to identify any additional cases of illness.

CDC is enhancing its national surveillance system for hospital-acquired infections, dialysis surveillance, and healthcare worker safety surveillance into the National Healthcare Safety Network (NHSN). NHSN, is a web-based tool for collecting and communicating important clinical findings with healthcare facilities. Other partnerships with managed care and provider groups have proved invaluable for communicating recommendations during the recent bioterrorism response, and further activities to improve detection of potential bioterrorist attacks through these partners is planned.

CDC will provide terrorism-related training to epidemiologists and laboratorians, emergency responders, emergency department personnel and other front-line health-care providers, and health and safety personnel. CDC is working to provide educational materials regarding potential bioterrorism agents to the medical and public health communities on its bioterrorism website at www.bt.cdc.gov.

Preparing CDC, state, and other professionals to respond to a smallpox bioterrorist threat or incident will revolve primarily around training three groups:

- **CDC Response Teams.** CDC will begin conducting a 3-day course this month for personnel comprising teams that will be deployed to respond to an incident. Training will cover technical issues regarding the disease and the vaccine, operational issues such as isolation and quarantine, surveillance, and communications, and an introduction to CDC's response plan. A scenario-based exercise will be included.
- **State Health Representatives.** CDC is developing a 3-4 day training course for health representatives from U.S. states and territories who would be involved in

responding to a smallpox bioterrorist incident. The objective of this training is that each state/territory produce a Smallpox Response Plan that will be compatible with CDC's national plan. Approximately 150 representatives (up to 3 from each state/territory) will be trained.

- **Clinicians.** On December 13, CDC will conduct a live satellite broadcast titled *Smallpox: What Every Clinician Should Know*. This training session is targeted toward physicians, nurses, and others who may be called on to identify and handle smallpox cases and to deliver smallpox vaccine. It will cover topics such as smallpox epidemiology, diagnosis, laboratory confirmation, vaccination, and management of suspected cases. After the broadcast, the course will be converted to a web-based format and self-instructional videotapes.

Concurrent with the satellite broadcast, a "train the trainer" session will be held for infectious disease experts at academic institutions and staff at national provider organizations. The goal is to enable representatives from these groups to disseminate smallpox response training to their peers throughout the medical community. Followup sessions will be held through April/May 2002.

CDC is also producing a variety of educational materials to be used by clinicians who may be involved in smallpox identification, care, or vaccination. These materials include an interactive CD-ROM that will contain technical information and practice exercises, fact sheets, aids to smallpox diagnosis, and a smallpox Vaccine Information Statement.

- ***Diagnosis and Characterization of Biological and Chemical Agents***

To ensure that prevention and treatment measures can be implemented quickly in the event of a

biological or chemical terrorist attack, rapid diagnosis is critical. CDC has developed guidelines and quality assurance standards for the safe and secure collection, storage, transport, and processing of biologic and environmental samples. In collaboration with other federal and non-federal partners, CDC is co-sponsoring a series of training exercises for state public health laboratory personnel on requirements for the safe use, containment, and transport of dangerous biological agents and toxins. CDC, also in cooperation with the Association of Public Health Laboratories (APHL) and the National Laboratory Training Network (NLTN) have sponsored a “hands-on” laboratory course for public health microbiologists. In conjunction with the course, CDC produced two videos that were distributed to the participants as well as to members of the NLTN. The participants in this course are now using these videos and the other materials developed by CDC to train other laboratorians in their states. CDC is also enhancing its efforts to foster the safe design and operation of Biosafety Level 3 laboratories, which are required for handling many highly dangerous pathogens. Furthermore, CDC is developing a Rapid Toxic Screen to detect people’s exposure to 150 chemical agents using blood or urine samples.

- ***Response***

A decisive and timely response to a biological terrorist event involves a fully documented and well rehearsed plan of detection, epidemiologic investigation, and medical treatment for affected persons, and the initiation of disease prevention measures to minimize illness, injury and death. CDC is addressing this by (1) assisting state and local health agencies in developing their plans for investigating and responding to unusual events and unexplained illnesses and (2) bolstering CDC’s capacities within the overall federal bioterrorism response effort. CDC has formed and trained multiple outbreak response teams that are available for rapid deployment to assist state and local authorities deal with outbreaks due to any potential bioterrorism agent including smallpox. CDC is formalizing current draft plans for the notification and mobilization of personnel and laboratory resources in response to a bioterrorism emergency such as smallpox, as well as overall strategies for vaccination, and

development and implementation of other outbreak control measures such as isolation and quarantine measures. In addition, CDC is developing national standards to ensure that respirators used by first responders and by other healthcare providers responding to terrorist acts provide adequate protection against weapons of terrorism.

Hospitals are critical in the response to bioterrorist attacks. CDC is collaborating with various healthcare associations and infection control societies to better prepare for potential bioterrorist events. Various hospital-based syndromic surveillance activities in regions affected by anthrax exposures have provided critical information on possible cases. Through provider-based sentinel networks, CDC has been able to communicate with infectious disease clinicians, infection control professionals, and other key clinical participants in bioterrorism preparedness and response.

- ***Communication Systems***

Rapid and secure communications are crucial to ensure a prompt and coordinated response. Thus, strengthening communication among clinicians, emergency rooms, infection control practitioners, hospitals, pharmaceutical companies, and public health personnel is of paramount importance. To this end, CDC is making a significant investment in building the nation's public health communications infrastructure through the Health Alert Network (HAN). HAN is a nationwide program to establish the communications, information, distance-learning, and organizational infrastructure for a new level of defense against health threats, including bioterrorism. Currently, 13 states are connected to all of their local health jurisdictions; 50 states have begun connecting to local providers as well; and CDC is also directly connecting to groups, such as the American Medical Association, to cast a broad net of coverage. CDC has also established the Epidemic Information Exchange (Epi-X), a secure, Web-based communications system that provides information sharing capabilities to state and local health officials. CDC also provides timely satellite broadcast and web-broadcast training through the Public Health Training Network. For example, on October 18, CDC experts shared information on anthrax

with physicians, hospitals, and other healthcare providers across the country via a satellite broadcast, *Anthrax: What Every Clinician Should Know*. Part II of this program is scheduled for this week and will present an update on clinical guidelines and procedures for the early recognition, diagnosis, treatment, and reporting of anthrax exposure.

Accurate and up-to-date information helps calm public fears and limit collateral effects of the attack. CDC communicates with the public directly through its website on emergency preparedness and through a public inquiry telephone and email system, which, since the recent attacks, has responded to hundreds of questions daily. In addition, CDC communicates to the public by releasing daily updates to the news media, answering inquiries from the press and providing medical experts for interviews.

The National Pharmaceutical Stockpile

Another integral component of public health preparedness at CDC has been the development of a National Pharmaceutical Stockpile (NPS), which is mobilized in response to an episode caused by a biological or chemical agent. The role of the CDC's NPS program is to maintain a national repository of life-saving pharmaceuticals and medical material that can be delivered to the site or sites of a biological or chemical terrorism event in order to reduce morbidity and mortality in a civilian population. The NPS is a backup and means of support to state and local first responders, healthcare providers, and public health officials. The NPS program consists of a two-tier response: (1) 12-hour push packages, which are pre-assembled arrays of pharmaceuticals and medical supplies that can be delivered to the scene of a terrorism event within 12 hours of the federal decision to deploy the assets and that will make possible the treatment or prophylaxis of disease caused by a variety of threat agents; and (2) a Vendor-Managed Inventory (VMI) that can be tailored to a specific threat agent.

Components of the VMI will arrive at the scene 24 to 36 hours after activation. The NPS was mobilized for the first time on September 11, when a 12-hour push pack was deployed to New York City, delivering 50 tons of medical supplies to the site of the disaster in 7 hours. In addition, substantial

quantities of VMI were delivered to New York City within 24 hours. Components of the VMI were deployed to various locations along the East coast to provide adequate supplies of antibiotics as prophylaxis to individuals who were potentially exposed to anthrax. CDC has developed this program in collaboration with federal and private sector partners and with input from the states.

Challenges

As has been highlighted recently, increased vigilance and preparedness for unexplained illnesses and injuries are an essential part of the public health effort to protect the American people against bioterrorism. Prior to the September 11 attack on the United States, CDC was making substantial progress toward defining, developing, and implementing a nationwide public health response network to increase the capacity of public health officials at all levels-federal, state, and local-to prepare for and respond to deliberate attacks on the health of our citizens. The events of September 11 were a defining moment for all of us, and since then we have dramatically increased our levels of preparedness and are implementing plans to increase it even further.

CDC has been addressing issues of detection, epidemiologic investigation, diagnostics, and enhanced infrastructure and communications as part of its overall bioterrorism preparedness strategies. Based on federal, state, and local response in the weeks following the events of September 11, and on recent training experiences, such as the National TOPOFF event and the *Dark Winter* exercise--which simulated a terrorist release of smallpox virus, CDC has learned valuable lessons and identified gaps that exist in bioterrorism preparedness and response at federal, state, and local levels. CDC will continue to work with partners to address challenges such as improving coordination among other federal agencies during a response and understanding the necessary relationship needed between conducting a criminal investigation versus an epidemiologic case investigation. These issues, as well as overall preparedness planning at federal, state, and local levels, require additional action to ensure that

the nation is fully prepared to respond to acts of biological and chemical terrorism.

Disease experts at CDC are developing strategies to prevent the spread of disease during and after bioterrorist attacks. Specific components include (1) creating protocols for immunizing at-risk populations; (2) isolating large numbers of exposed individuals; (3) reducing occupational exposures; (4) assessing methods of safeguarding food and water from deliberate contamination; and (5) exploring ways to improve linkages between animal and human disease surveillance networks since threat agents that affect both humans and animals may first be detected in animals.

Conclusion

In conclusion, CDC is committed to working with other federal agencies and partners as well as state and local public health departments to ensure the health and medical care of our citizens. We have made substantial progress to date in enhancing the nation's capability to prepare for and respond to a bioterrorist event, but there is much more to be done. The best public health strategy to protect the health of civilians against biological terrorism is the development, organization, and enhancement of public health prevention systems and tools. Priorities include strengthened public health laboratory capacity, increased surveillance and outbreak investigation capacity, and health communications, education, and training at the federal, state, and local levels. Not only will this approach ensure that we are better prepared for deliberate bioterrorist threats, but it will also enable us to recognize and control naturally occurring new or re-emerging infectious diseases. A strong and flexible public health infrastructure is the best defense against any disease outbreak.

Thank you very much for your attention. I will be happy to answer any questions you may have.