

GAO

Report to the Honorable Bill Frist,
Majority Leader, U.S. Senate

October 2003

BIOTERRORISM

Public Health Response to Anthrax Incidents of 2001





Highlights of [GAO-04-152](#), a report to the Honorable Bill Frist, Majority Leader, U.S. Senate

Why GAO Did This Study

In the fall of 2001, letters containing anthrax spores were mailed to news media personnel and congressional officials, leading to the first cases of anthrax infection related to an intentional release of anthrax in the United States. Outbreaks of anthrax infection were concentrated in six locations, or epicenters, in the country. An examination of the public health response to the anthrax incidents provides an important opportunity to apply lessons learned from that experience to enhance the nation's preparedness for bioterrorism.

Because of your interest in bioterrorism preparedness, you asked GAO to review the public health response to the anthrax incidents. Specifically, GAO determined (1) what was learned from the experience that could help improve public health preparedness at the local and state levels and (2) what was learned that could help improve public health preparedness at the federal level and what steps have been taken to make those improvements.

www.gao.gov/cgi-bin/getrpt?GAO-04-152.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Janet Heinrich (202) 512-7119.

BIOTERRORISM

Public Health Response to Anthrax Incidents of 2001

What GAO Found

Local and state public health officials in the epicenters of the anthrax incidents identified strengths in their responses as well as areas for improvement. These officials said that although their preexisting planning efforts, exercises, and previous experience in responding to emergencies had helped promote a rapid and coordinated response, problems arose because they had not fully anticipated the extent of coordination needed among responders and they did not have all the necessary agreements in place to put the plans into operation rapidly. Officials also reported that communication among response agencies was generally effective but public health officials had difficulty reaching clinicians to provide them with guidance. In addition, local and state officials reported that the capacity of the public health workforce and clinical laboratories was strained and that their responses would have been difficult to sustain if the incidents had been more extensive. Officials identified three general lessons for public health preparedness: the benefits of planning and experience; the importance of effective communication, both among responders and with the general public; and the importance of a strong public health infrastructure to serve as the foundation for responses to bioterrorism or other public health emergencies.

The experience of responding to the anthrax incidents showed aspects of federal preparedness that could be improved. The Centers for Disease Control and Prevention (CDC) was challenged to both meet heavy resource demands from local and state officials and coordinate the federal public health response in the face of the rapidly unfolding incidents. CDC has said that it was effective in its more traditional capacity of supporting local response efforts but was not fully prepared to manage the federal public health response. CDC experienced difficulty in managing the voluminous amount of information coming into the agency and in communicating with public health officials, the media, and the public. In addition to straining CDC's resources, the anthrax incidents highlighted both shortcomings in the clinical tools available for responding to anthrax, such as vaccines and drugs, and a lack of training for clinicians in how to recognize and respond to anthrax. CDC has taken steps to implement some improvements. These include creating the Office of Terrorism Preparedness and Emergency Response within the Office of the Director, creating an emergency operations center, enhancing the agency's communication infrastructure, and developing databases of information and expertise on the biological agents considered likely to be used in a terrorist attack. CDC has also been working with other federal agencies and private organizations to develop better clinical tools and increase training for medical care professionals.

In commenting on a draft of this report, DOD stressed the critical role it played in the public health response, and HHS provided additional examples of actions taken to enhance national preparedness for bioterrorism and other public health emergencies.

Contents

| | | |
|-----------------------------|---|----|
| Letter | | 1 |
| | Results in Brief | 4 |
| | Background | 5 |
| | Local and State Public Health Officials Identified Strengths in Their Responses as Well as Areas for Improvement | 10 |
| | Experience Showed Aspects of Federal Preparedness That Could Be Improved | 21 |
| | Concluding Observations | 31 |
| | Agency Comments | 32 |
| Appendix I | Timeline of Selected Key Events in the Anthrax Incidents | 34 |
| Appendix II | Comments from the Department of Defense | 37 |
| Appendix III | Comments from the Department of Health and Human Services | 39 |
| Appendix IV | GAO Contact and Staff Acknowledgments | 41 |
| | GAO Contact | 41 |
| | Acknowledgments | 41 |
| Related GAO Products | | 42 |
| Table | | |
| | Table 1: People with Anthrax Infections, Letters Containing Anthrax Spores, and Facilities Contaminated with Anthrax Spores in the Six Epicenters | 10 |

Abbreviations

| | |
|-------------|---|
| AHRQ | Agency for Healthcare Research and Quality |
| AMI | American Media Inc. |
| CDC | Centers for Disease Control and Prevention |
| DOD | Department of Defense |
| EIS | Epidemic Intelligence Service |
| EOC | Emergency Operations Center |
| EPA | Environmental Protection Agency |
| Epi-X | Epidemic Information Exchange |
| FBI | Federal Bureau of Investigation |
| FDA | Food and Drug Administration |
| FEMA | Federal Emergency Management Agency |
| HAN | Health Alert Network |
| HHS | Department of Health and Human Services |
| <i>MMWR</i> | <i>Morbidity and Mortality Weekly Report</i> |
| NIH | National Institutes of Health |
| USAMRIID | United States Army Medical Research Institute of Infectious Diseases |

This is a work of the U.S. government and is not subject to copyright protection in the United States. It may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.



G A O

Accountability * Integrity * Reliability

United States General Accounting Office
Washington, DC 20548

October 15, 2003

The Honorable Bill Frist
Majority Leader
United States Senate

Dear Senator Frist:

In the fall of 2001, letters containing anthrax spores were mailed to news media personnel and congressional officials, leading to the first cases of anthrax infection related to an intentional release of anthrax in the United States.¹ Outbreaks of the disease were concentrated in six locations, or epicenters, in the country—Florida; New York; New Jersey; Capitol Hill in Washington, D.C.;² the Washington, D.C., regional area, which includes Maryland and Virginia; and Connecticut—where individuals came into contact with spores from the contaminated letters. The anthrax incidents caused illness in 22 people, 11 with the cutaneous (skin) form of the disease and 11 with the inhalational (respiratory) form. Five people died, all from inhalational anthrax. The anthrax incidents and the illness and deaths they caused also had an impact on the country beyond the six epicenters. Across the nation, even in areas far removed from the epicenters, residents brought samples of suspicious powders to officials for testing and worried about the safety of their daily mail.

The public health response to the anthrax incidents was complicated by several factors. The incidents occurred in the turbulent period following the terrorist attacks of September 11, 2001, when the focus of the nation was centered on response to those events. In addition, the anthrax

¹Anthrax is a serious disease caused by *Bacillus anthracis*, a bacterium that forms spores. A bacterium is a very small organism made up of one cell. A spore is a dormant bacterium cell that can be revived under certain conditions.

²In this report, we identify Capitol Hill, the complex of congressional office buildings centering on the U.S. Capitol, as an epicenter distinct from the Washington, D.C., regional area epicenter because Capitol Hill functions independently from the District of Columbia. The Office of the Attending Physician, U.S. Congress, which is an office of the U.S. Navy, serves as the local health department for Capitol Hill and is responsible for the health of about 30,000 public officials and staff, as well as tourists, on Capitol Hill.

incidents were unprecedented. The response was coordinated by the Department of Health and Human Services (HHS), primarily through its Centers for Disease Control and Prevention (CDC), and CDC had never responded simultaneously to multiple disease outbreaks caused by the intentional release of an infectious agent. Anthrax was virtually unknown in clinical practice, and many clinicians did not have a good understanding of how to diagnose and treat it. As a result, public health officials at the federal, state, and local levels were basing their actions and recommendations to government officials, other responders,³ and the public on information that was changing rapidly. The response to the incidents has been characterized by several public officials, academics, and other commentators as problematic and an indication that the country was unprepared for a bioterrorist event.

An examination of the response to the anthrax incidents provides an important opportunity to apply lessons learned from that experience to enhance the nation's preparedness for bioterrorism and other public health emergencies. Because of your interest in bioterrorism preparedness, you asked us to review the public health response to the anthrax incidents. Specifically, you asked us to determine (1) what was learned from the experience that could help improve public health preparedness for bioterrorism at the local and state levels and (2) what was learned that could help improve public health preparedness for bioterrorism at the federal level and what steps have been taken to make those improvements.

In studying the response of local and state public health departments, we interviewed officials from the six epicenters. For a previous report,⁴ we had conducted interviews about bioterrorism preparedness with officials from seven cities and their respective state capitals. These interviews were conducted from December 2001 through March 2002, and we used information from these interviews to examine the public health response

³In this report, the term responder refers to any organization or individual that would respond to a bioterrorist incident. These include physicians, nurses, hospitals, laboratories, public health departments, emergency medical services, emergency management agencies, fire departments, and law enforcement agencies.

⁴U.S. General Accounting Office, *Bioterrorism: Preparedness Varied across State and Local Jurisdictions*, [GAO-03-373](#) (Washington, D.C.: Apr. 7, 2003).

to the anthrax incidents in localities that were not epicenters. To study federal public health efforts, we interviewed officials from the Department

of Defense (DOD) and HHS. These officials included representatives from DOD's Armed Forces Institute of Pathology, Chemical Biological Incident Response Force, Naval Medical Research Center, and U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), and from HHS's Agency for Healthcare Research and Quality (AHRQ), CDC, Food and Drug Administration (FDA), National Institutes of Health (NIH), and Office of the Assistant Secretary for Public Health Emergency Preparedness. To determine the nature of the information provided by CDC during the incidents, we examined the materials that CDC disseminated during October 2001 through December 2001. For overall assessments of and information on the local, state, and federal public health response, we interviewed members of the academic community and officials of private organizations representing groups affected by the incidents or involved in the response, including the American Hospital Association, the American Medical Association, the American Nurses Association, the American Postal Workers Union, the American Public Health Association, and the District of Columbia Hospital Association. We also reviewed media reports of the incidents from television news services and newspapers, retrospective analyses of the response published after the incidents, relevant congressional hearings that were held between October 2001 and December 2001, and materials provided to us by local, state, and federal agencies and private organizations involved in responding to the attack. To understand the scientific community's analysis of the anthrax incidents, we searched the scientific literature using the National Library of Medicine's PubMed service and reviewed relevant articles. To determine what was learned from the experience that could help improve public health preparedness for bioterrorism, we analyzed these materials for common themes. We focused on what could be learned from the anthrax incidents that could help improve public health preparedness not specifically for anthrax or any particular locality but for bioterrorism in general. To determine what steps have been taken to make those improvements, we reviewed materials from relevant federal agencies through October 2003. Although efforts to decontaminate affected facilities are part of the public health response, they are outside the scope of this report, as is the criminal investigation associated with the

incidents.⁵ We conducted our work from May 2003 through October 2003 in accordance with generally accepted government auditing standards.

Results in Brief

Local and state public health officials identified strengths in their responses to the anthrax incidents of 2001 as well as areas for improvement. These officials said that their planning efforts had helped to promote a rapid and coordinated response, but they had not fully anticipated the extent of coordination that would be needed across both public and private entities involved in the response to the anthrax incidents. Even though many aspects of their existing response plans had been made operational, for example, by putting agreements into place, the aspects that had not been operationalized affected their ability to coordinate a rapid response to the anthrax incidents. Local and state officials said that their responses also benefited from previous experiences, whether gained through exercising their plans or by responding to emergencies of various kinds. These experiences had allowed them to build relationships and identify areas for improvement in their plans and thus to be better prepared to respond to the anthrax incidents. Local and state officials also stressed the importance of effective communication throughout the incidents. They reported that communication among response agencies was generally effective, but they had difficulty reaching clinicians to provide them with needed guidance. Local and state public health officials were concerned that the capacity of their workforce and clinical laboratories was strained and said that their responses would have been difficult to sustain if the incidents had been more extensive.

The experience of responding to the anthrax incidents also showed aspects of federal preparedness that could be improved. CDC was challenged to both meet heavy resource demands from local and state officials and coordinate the federal public health response in the face of

⁵For information on aspects of the response to the anthrax incidents that are outside the scope of this report, see our reports on those topics: U.S. General Accounting Office, *U.S. Postal Service: Better Guidance Is Needed to Improve Communication Should Anthrax Contamination Occur in the Future*, [GAO-03-316](#) (Washington, D.C.: Apr. 7, 2003); U.S. General Accounting Office, *Capitol Hill Anthrax Incident: EPA's Cleanup Was Successful; Opportunities Exist to Enhance Contract Oversight*, [GAO-03-686](#) (Washington, D.C.: June 4, 2003); and U.S. General Accounting Office, *U.S. Postal Service: Issues Associated with Anthrax Testing at the Wallingford Facility*, [GAO-03-787T](#) (Washington, D.C.: May 19, 2003). For a list of our other work related to bioterrorism preparedness, see the list of related products at the end of this report.

rapidly unfolding anthrax incidents. CDC has acknowledged that although it was effective in its more traditional capacity of supporting local response efforts, it was not fully prepared to manage the federal public health response. CDC served as the focal point for communicating critical information during the response to the anthrax incidents and experienced difficulty in managing the voluminous amount of information coming into the agency and in communicating with public health officials, the media, and the public. In addition to straining CDC's resources, the anthrax incidents highlighted both shortcomings in the clinical tools available for responding to anthrax, such as vaccines and drugs, and a lack of training for clinicians on how to recognize and respond to anthrax.

CDC has reviewed its performance during the anthrax incidents, identified areas for improvement, and taken steps to implement those improvements. These include restructuring the Office of the Director, building and staffing an emergency operations center, enhancing the agency's communication infrastructure, and developing and maintaining databases of information on and expertise in biological agents considered most likely to be used in a terrorist attack. CDC has also increased its collaborative efforts with others within and outside of HHS, for example, by creating a permanent position of CDC liaison to the Federal Bureau of Investigation (FBI). CDC has also been working with other federal agencies as well as private organizations to support the development of better clinical tools, including new vaccines and treatments for anthrax and other potential agents of bioterrorism, and increased training for medical care professionals.

In commenting on a draft of this report, DOD stressed the critical role it played in the public health response, and HHS provided additional examples of actions it has taken to enhance national preparedness for bioterrorism and other public health emergencies.

Background

Anthrax

Anthrax is an acute infectious disease caused by the spore-forming bacterium called *Bacillus anthracis*. The bacterium is commonly found in the soil, and its spores can remain dormant for many years. Although anthrax can infect humans, it occurs most commonly in plant-eating animals. Human anthrax infections have usually resulted from occupational exposure to infected animals or contaminated animal products, such as wool, hides, or hair. Both human and animal anthrax infections are rare in the United States.

Anthrax infection can take one of three forms: cutaneous, usually through a cut or an abrasion; gastrointestinal, usually by ingesting undercooked contaminated meat; or inhalational, by breathing airborne anthrax spores into the lungs. After the spores enter the body through any of these routes, they germinate into bacteria, which then multiply and secrete toxins that can produce local swelling and tissue death. The symptoms are different for each form and usually occur within 7 days of exposure. Depending on the extent of exposure and its form, a person can be exposed to *Bacillus anthracis* without developing an infection. There are several methods for detecting anthrax spores or the disease itself, for example, nasal swabs for exposure to spores, blood tests for infections, and wet swabs for environmental contamination. CDC does not recommend the use of the nasal swab test to determine whether an individual should be treated, primarily because a negative result (no spores detected) does not exclude the possibility of exposure. Confirmation of anthrax infection or the presence of anthrax spores can require more than one type of test. The disease can be treated with a variety of antimicrobial medications and is not contagious.⁶ With proper treatment, fatalities are rare for cutaneous anthrax. For gastrointestinal anthrax, between 25 and 60 percent of cases have resulted in death. For inhalational anthrax, the fatality rate before the 2001 incidents had been approximately 75 percent, even with appropriate antimicrobial medications. An anthrax vaccine is available, but it is indicated for use in individuals at high risk of exposure to anthrax spores, such as laboratory personnel who work with *Bacillus anthracis*.

Because so few instances of inhalational anthrax have occurred, scientific understanding about the number of spores needed to cause infection is still evolving. Before the 2001 incidents, it was estimated that a person would need to inhale thousands of spores to develop an infection. However, based on some of the cases that occurred during the anthrax incidents, experts now believe that the number of spores needed to cause inhalational anthrax could be fewer than that, depending on a person's health and the nature of the spores.

⁶An antimicrobial medication either kills or slows the growth of microbes.

Public Health Response to a Bioterrorist Attack

In the existing model for response to a public health emergency of any type, including a bioterrorist attack, the initial response is generally a local responsibility. This local response can involve multiple jurisdictions in a region, with states providing additional support as needed. Having the necessary resources immediately available at the local level to respond to an emergency can minimize the magnitude of the event and the cost of remediation. In the case of a covert release of a biological agent such as anthrax, it can be days before exposed people start exhibiting signs and symptoms of the disease. The model anticipates that exposed individuals would seek out local clinicians, such as private physicians or medical staff in hospital emergency departments or public clinics. Clinicians would report any illness patterns or diagnostic clues that might indicate an unusual infectious disease outbreak to their state or local health departments. Local and state health departments would collect and monitor data, such as reports from clinicians, for disease trends and evidence of an outbreak. Environmental and clinical samples would be collected for laboratorians⁷ to test for possible exposures and identification of illnesses. Epidemiologists⁸ in the health departments would use the disease surveillance systems⁹ to provide for the ongoing collection, analysis, and dissemination of data to identify unusual patterns of disease. Public health officials would provide needed information to the clinical community, other responders, and the public and would implement control measures to prevent additional cases from occurring. The federal government can also become involved, as requested, by providing assistance with testing of samples and epidemiologic investigations, providing advice on treatment protocols and other technical information, and coordinating a national response.

⁷A laboratorian is one who works in a laboratory; in the medical and allied health professions, a laboratorian examines or performs tests (or supervises such procedures) with various types of chemical and biologic materials, chiefly to aid in the diagnosis, treatment, and control of disease, or as a basis for health and sanitation practices.

⁸An epidemiologist is a specialist in the study of how disease is distributed in populations and the factors that influence or determine this distribution.

⁹Disease surveillance systems provide for the ongoing collection, analysis, and dissemination of health-related data to identify, prevent, and control disease.

CDC's Bioterrorism Response Planning Efforts

As early as 1998, CDC had begun its planning efforts to enhance its capacity to respond effectively to bioterrorism. CDC said it was responsible for providing national leadership in the public health and medical communities in a concerted effort to detect, diagnose, respond to, and prevent illnesses that occur as a result of bioterrorism. In its strategic preparedness and response plan, CDC anticipated that it would need to collaborate with local and state public health partners and other federal agencies in order to strengthen components of the public health infrastructure.¹⁰ As part of this collaboration, CDC initiated a cooperative agreement program in 1999 to enhance state and local bioterrorism preparedness. CDC's planning efforts identified the importance of coordination with the Department of Justice, including the FBI and the National Domestic Preparedness Office. In addition, CDC said that there was ongoing coordination with the Office of Emergency Preparedness within HHS, FDA, NIH, DOD, the Federal Emergency Management Agency (FEMA), and many other partners, including academic institutions and professional organizations. At the time of the anthrax incidents, some of these collaborative efforts were in the planning stage, some were in the form of working groups, and others were limited in scope to areas such as laboratory preparedness, training, or new vaccine research.

CDC was also working to make improvements in various aspects of preparedness and prevention, detection and surveillance, and communication and coordination. At the time of the anthrax incidents, CDC was working on creating diagnostic and epidemiologic performance standards for local and state health departments. In collaboration with NIH and DOD, CDC was encouraging research for the development of new vaccines, antitoxins, and innovative drugs. In addition, CDC had developed a repository of pharmaceuticals and other supplies through the Strategic National Stockpile.¹¹ CDC was developing educational materials and providing terrorism-related training to epidemiologists, laboratory workers, emergency responders, emergency department personnel, and other front-line health care providers and health and safety personnel.

¹⁰Public health infrastructure is the foundation that supports the planning, delivery, and evaluation of public health activities and is composed of a well-trained public health workforce, effective program and policy evaluation, sufficient epidemiology and surveillance capability to detect outbreaks and monitor incidence of diseases, appropriate response capacity for public health emergencies, effective laboratories, secure information systems, and advanced communication systems.

¹¹At the time of the anthrax incidents, the Strategic National Stockpile was known as the National Pharmaceutical Stockpile.

Through cooperative agreements, CDC was also working to upgrade the surveillance systems of the local and state health departments and investing in the Health Alert Network (HAN)¹² and Epidemic Information Exchange (Epi-X)¹³ communication systems.

Fall 2001 Anthrax Incidents

In October 2001, an employee of American Media Inc. (AMI) in Florida was diagnosed with inhalational anthrax, the first case in the United States in over two decades. By the end of November 2001, 21 more people had contracted the disease, and 5 people, including the original victim, had died as a result. Although the FBI confirmed the existence of only four letters containing anthrax spores, by December 2001 the Environmental Protection Agency (EPA) had confirmed that over 60 sites, about one third of which were U.S. postal facilities, had been contaminated with anthrax spores.

The cases of inhalational anthrax in Florida, the first epicenter, were thought to have resulted from proximity to opened letters containing anthrax spores, which were never found. (See table 1.) The initial cases of anthrax detected in New York, the second epicenter, were all cutaneous and were also thought to have been associated with opened anthrax letters. The cases detected initially in New Jersey, the third epicenter, were cutaneous and were in postal workers who presumably had not been exposed to opened anthrax letters. Unlike the incidents at other epicenters, which began when cases of anthrax were detected, the incident on Capitol Hill, the fourth epicenter, began with the opening of a letter containing anthrax spores and resulting exposure. The discovery of inhalational anthrax in a postal worker in the Washington, D.C., regional area, the fifth epicenter, revealed that even individuals who had been exposed only to sealed anthrax letters could contract the inhalational form of the disease. Subsequent inhalational cases in Washington, D.C., New Jersey, New York, and Connecticut, the sixth epicenter, underscored that

¹²HAN is a nationwide program designed to ensure communication capacity at all local and state health departments (including full Internet connectivity and training), ensure capacity to receive distance learning offerings from CDC and others, and ensure capacity to broadcast and receive health alerts at every level.

¹³Epi-X is a secure, Web-based communication system to enhance bioterrorism preparedness efforts by facilitating the sharing of preliminary information about disease outbreaks and other health events among public health officials across jurisdictions and provide experience in the use of secure communications.

finding. (For a list of key events in the history of the anthrax incidents and the public health response to the incidents, see app. I.)

Table 1: People with Anthrax Infections, Letters Containing Anthrax Spores, and Facilities Contaminated with Anthrax Spores in the Six Epicenters

| Epicenters | Number of infected people | | Letter recovered within epicenter | Contaminated facilities |
|---------------------------------|---------------------------|----------------------|-----------------------------------|-------------------------|
| | Cutaneous anthrax | Inhalational anthrax | | |
| Florida | 0 | 2 | No | Yes |
| New York | 7 | 1 | Yes | Yes |
| New Jersey | 4 | 2 | No ^a | Yes |
| Capitol Hill | 0 | 0 | Yes | Yes |
| Washington, D.C., regional area | 0 | 5 | No ^a | Yes |
| Connecticut | 0 | 1 | No | Yes |

Source: CDC.

^aAlthough no letters were recovered within the New Jersey and Washington, D.C., epicenters themselves, the letters found in the New York and Capitol Hill epicenters have been determined to be the source of the contamination in New Jersey and Washington, D.C.

Although the anthrax incidents were limited to six epicenters on the East Coast, the incidents had national implications. Because mail processed at contaminated postal facilities could be cross-contaminated and end up anywhere in the country, the localized incidents generated concern about white powders found in locations beyond the epicenters and created a demand throughout the nation for public health resources at the local, state, and federal levels.

Local and State Public Health Officials Identified Strengths in Their Responses as Well as Areas for Improvement

Local and state public health officials across the epicenters emphasized the benefits of their planning efforts for promoting a rapid and coordinated response, stressed the importance of effective communication throughout the incidents, and reported that their response capacity was strained and the response would have been difficult to sustain if the incidents had been more extensive.

Local and State Public Health Officials Relied on Plans for Coordinating with a Wide Range of Entities and Identified Areas for Improvement

Local and state public health officials were challenged to coordinate their responses to the anthrax incidents across a wide range of public and private entities, often across more than one local jurisdiction. Officials reported that anticipating local needs in emergency response plans, making those plans operational with formal contracts and agreements, and having experience with other public emergencies or large events improved their ability to mount a rapid and coordinated response. When pieces of this planning process were missing, had not been operationalized, or had not been tested by experience, coordination of the local response was often more difficult.

Epicenters Had Engaged in Some Response Planning but Had Not Anticipated the Full Extent of Coordination That Would Be Needed

Local and state public health officials reported that they had typically planned for coordination of their emergency response but had not fully anticipated the extent to which they would have to coordinate with a wide range of both public and private entities involved in the response to the anthrax incidents, both locally and in other jurisdictions. Among others, public health departments had to coordinate their responses with those of local and federal law enforcement, emergency responders, the postal community, environmental agencies, and clinicians.

Most response plans anticipated the need for public health officials to coordinate with law enforcement and emergency response officials, both within their community and across jurisdictions. In one epicenter, for example, a regional organization of local governments had developed planning guidance that outlined collaborative networks between the public health and emergency response communities needed to strengthen the region's response to an event such as the anthrax incidents.

In contrast, the need to link the public health response with the responses of other public entities affected by the anthrax incidents, such as environmental agencies, military response teams, and the U.S. Postal Service, was less likely to have been anticipated in local response plans. During the response, standard practices for clinical and environmental testing and use of proper protective clothing and equipment needed to be coordinated among public health officials, postal officials, police, firefighters, environmental specialists, and teams from DOD. However, officials reported that in some cases personnel from environmental and military groups were meeting with public health officials for the first time as the response unfolded. When the need for consistency in testing procedures and standards for protective clothing and equipment had not been anticipated, officials sometimes had difficulty agreeing on which procedures and standards to follow. In addition, some plans had not anticipated the need to forge quick relationships between public health

departments and local groups affected by the incidents but not expressly mentioned in the plans. During the anthrax incidents, the absence of such a measure proved to be a particular problem for postal officials and postal union representatives. In part due to this absence of proactive plans, coordination between public health and postal officials on many of the details of the response was problematic, and there were difficulties communicating critical information, such as decisions on how and when to provide prophylactic, or preventive, treatment to postal workers.

The need for coordination between public health and private groups affected by the emergency—such as the hospital community—was also not always fully anticipated in local response plans. Public health officials in several areas had to work with local hospitals and other facilities to set up screening and postexposure prophylaxis clinics rapidly, sometimes in less than 24 hours. In this time they had to identify an appropriate site location, design patient flow plans, outline staff needs and responsibilities (medical, pharmacy, counseling, administrative, and facilities operation components), and obtain medications (including dealing with the logistics of breaking down and repackaging bulk medications). Few locations had formally addressed all of these issues before the anthrax incidents, but those that had addressed at least some of them reported being able to respond more rapidly.

Some Aspects of Response Plans Had Been Made Operational and Increased Officials' Ability to Coordinate a Rapid Response

Officials relied on a variety of formal agreements, such as memoranda of understanding and legal contracts, to address the needs identified in their planning documents. These needs included coordination across disciplines and jurisdictions, access to scientific information, and human resources support. Local officials reported that putting agreements and contracts into place to address these needs strengthened their preparedness both by solidifying links with their public and private partners and by helping them identify weaknesses that could be addressed prior to an emergency. When systems had not been put into place to support plans, coordination of response efforts was more difficult.

Formal agreements had often been put into place to support coordination among officials within communities and across jurisdictions, but some aspects of plans that were important for coordinating the response had not yet been made operational. For example, one official reported having arranged to link surveillance and environmental health personnel with law enforcement officials during criminal investigations in the event of an anthrax attack. Another official had already established agreements with local counterparts to provide access to prophylaxis. Officials reported that when formal contacts between officials had not been established,

coordination with counterparts in their community and other jurisdictions during the incidents often relied on personal relationships.

While some public health departments reported having systems in place to ensure ready access to the scientific information needed to make decisions and provide information to the media and the public, many reported that they did not. Officials reported that planning ahead and then taking the necessary steps to compile available scientific information—including what was known about anthrax, procedures for testing exposure to anthrax, treatment protocols, and standards for the types of protective clothing and equipment that are appropriate for first responders—were important for responding rapidly and reducing confusion across the parties involved in the response.

Officials stated that during the response they relied on existing mutual aid agreements or contracts that gave them access to staff for screening and mass care clinics, allowed the state to pull local epidemiologists to support the state response, and addressed licensure issues for staff brought in from other states. However, these agreements were not always in place, or only partially covered the needs of the situation, and some officials had to spend time dealing with issues that could have been addressed before the event. For example, an official in one epicenter reported that because a state of emergency had not been declared in the jurisdiction, there was no system to pay for food for staff who were working 24-hour shifts in prophylaxis clinics. Several officials in other localities reported that systems had not been put into place to authorize payment for overtime work in both public health departments and laboratories. In addition, one health department received offers of volunteer help from many physicians, pharmacists, nurses, epidemiologists, and other concerned citizens. However, it could not use the volunteers because it did not have a volunteer management system to train providers and verify credentials.

Experience with Drills and Responding to Emergencies Allowed Officials to Identify Areas for Improvement in Their Plans

Experience with drills and responding to public health emergencies helped officials identify weaknesses in their plans. These officials stated that drills ranging from tabletop to full-scale exercises were useful for testing coordination and response capacities both locally and regionally. Public health officials also reported that their experience in dealing with hoax letters and false alarms proved useful, particularly in supporting coordination with the law enforcement community. In major metropolitan areas, experience with large events, such as political conventions, forced local public health departments to develop their emergency response plans and put the necessary agreements in place to support those plans. Experience with public health emergencies—including natural disasters

and outbreaks of infectious disease such as West Nile virus—also allowed officials to work on coordinating their responses across multiple sites, test their surveillance systems, and establish links with other public and private entities.

Where previous experience had not allowed officials to identify and address shortcomings of their plans, the anthrax incidents tended to uncover weaknesses. For example, one local public health official reported that although the agency had planned how to set up a prophylaxis clinic it had not actually exercised getting people through the testing and prophylaxis process. During the anthrax response, it took significantly longer than the agency had anticipated to obtain test results from overwhelmed laboratories. This official said that if the agency had known how long it was going to take to get laboratory results, it would have provided the first doses of prophylaxis for a longer duration to take into account the additional time required to obtain test results. Another official reported that the agency's experience with setting up a prophylaxis clinic during the anthrax response taught the agency how to select more appropriate sites for mass vaccination or prophylaxis clinics in emergency situations. Experience also revealed shortcomings in regional coordination. Several officials noted that although some plans for coordination across jurisdictions were in place, they had not been exercised, and so the relationships to support coordination had not been formed or tested.

Communicating Effectively during the Incidents Was Challenging

Local officials identified communication among responders and with the public during the anthrax incidents as a challenge, both in terms of having the necessary communication channels and in terms of making the necessary information available for distribution. Good communication can minimize an emergency, improve response, and reassure the public. Officials reported that although communication among local responders was generally effective, there were problems in communicating with some hospitals and physicians. They also reported that dealing with the media and communicating messages to the public were also challenging.

Communication among Response Agencies Was Generally Viewed as Effective

Communication among local and state response agencies was generally perceived to be effective and helped keep agency officials informed and the public health response coordinated. Channels of communication between public health agencies and other responders—including law enforcement and emergency management agencies, hazardous material units, and neighboring state public health agencies—were already in existence at the time of the anthrax incidents. Regular conference calls,

which were initiated during the incidents, were used to distribute information, raise issues, and answer questions.

In addition to telephone calls, local and state public health offices relied on fax machines and the Internet to send and receive information during the incidents. Most local health departments, however, noted that they did not have backup communication systems that could be used in case everyday systems became unavailable. In addition, public health workers did not generally have cell phones, pagers, or laptop computers, which could provide the means to keep working if it became necessary to vacate a building during a crisis. In one epicenter, when an agency had to evacuate its quarters during the incidents and workers could not be at their desks, many of its communication systems (in addition to the information stored in the office in electronic formats) became unavailable. Several local agencies that did not have backup systems available at the time of the anthrax incidents told us they have concluded that it is important to invest in such systems to be prepared for any future public health emergencies.

Local response agencies generally got the information they requested from other local agencies. For example, in one epicenter, police and fire departments were given specific protocols for handling suspicious samples and triaging them for the laboratory. However, there were instances in which they did not get needed information. For example, a local emergency response official stated that the local fire department did not know what protective equipment (such as masks and gloves) firefighters should wear when responding to a suspected anthrax incident. The fire department turned to the local health department for answers, but the health department took weeks to release the protocol.

Flow of Information to Clinicians Was Problematic

State and local officials reported difficulty providing needed information to some hospitals and physicians in a timely way, and members of the medical community expressed concern about the timeliness of the information they received. Physicians recognized that they lacked experience with anthrax and were particularly concerned about missing a diagnosis because of its high fatality rate. They expected to be given rapid and specific instructions from public health officials about how to recognize and treat people who had been exposed. They wanted guidelines, for example, on how to diagnose inhalational anthrax and how to advise individuals who worked in post offices. Hospitals in one epicenter reported receiving daily influxes of people with flulike symptoms. Because these hospitals were seeking guidance on how to distinguish between influenza and anthrax symptoms, the hospital

association in the area initiated daily conference calls with concerned clinicians. The purpose of these calls was to collect questions to ask other organizations, such as CDC, to coordinate consistent answers to questions from the public, and to share information about clinical approaches.

Some of the ways in which local public health agencies tried to communicate with hospitals and physicians were regarded as relatively effective by the agencies, but no method worked well for all targeted recipients. Health departments used various means to make relevant materials available to hospitals and physicians, including sending faxes or e-mail messages, posting relevant information on their Web sites, distributing CD-ROMs, and setting up hotlines. In one state, which had no confirmed anthrax infections but numerous false alarms, the state public health department faxed critical information to hospitals throughout the state. Officials in the department reported that while this system was useful in disseminating information it was insufficient because it did not provide a means of receiving information from the hospitals. E-mail worked well for institutions, but it was an ineffective way of communicating with physicians, especially those who did not have a hospital-based practice. Several local public health officials told us that many private physicians did not have e-mail or Web access. Because electronic messages were not a feasible way of communicating with many clinicians, there was no way to get timely information about anthrax to them. Some primary care physicians were difficult to reach by any mass communication method or even individually because public health officials sometimes did not have up-to-date rosters of their telephone numbers. Officials in one state said they realized during the incidents that they did not have a way to send information directly to dermatologists, a group of specialists who were especially important for detecting the cutaneous form of anthrax infection. Because localities were unable to reach all physicians directly, government agencies relied on physicians and associations who did receive the information to serve as conduits. However, government and association officials agreed that this method did not provide complete coverage of all physicians.

Criminal Investigation
Sometimes Hindered Flow of
Information to Officials and the
Public

Local officials reported that the criminal investigation of the anthrax incidents sometimes hindered their ability to obtain information they needed to conduct their public health response. For example, public health officials in one epicenter said that they were unable to get certain information from the FBI because the local public health officials lacked security clearances. They said that if they had received more detailed information earlier about the nature of the anthrax spores in the envelopes, it might have affected how their agencies were responding. In

addition, a laboratory director in one of the epicenters reported that the criminal investigation led to constraints on his ability to communicate laboratory results to clinicians.

Just as information was not provided to government agencies because of law enforcement considerations, officials stated that criminal aspects of the incidents complicated the distribution of information to the public. Officials expressed concern about the necessity of withholding some information from the public. One official reported that communication with the public was constrained when the situation became a criminal investigation. She was concerned that information the public needed to understand its risk was no longer being provided. Officials in one epicenter told us that they were concerned that constraints on the ability of local public health departments to communicate could lead to a loss of credibility. More generally, officials reported that fear in the community could have been reduced if they had been able to release more information to the media and the public.

Supplying Information to Meet Needs of Media and Local Public Was Challenging

Local and state officials reported that although they were generally successful in persuading people to seek treatment, they encountered difficulties in providing needed information to the media and local public during the anthrax incidents. Because the incidents were taking place in many locations, local communications were complicated by the public's exposure to information about other localities and from the national media.

Local and state officials realized that they needed to use the media to disseminate information to the public and that they needed to be responsive to the media so that the information the media were providing was accurate. Public health and other government officials in the epicenters held regular press conferences to keep the public informed about local developments, made officials available to respond to media requests, and developed informational materials so that the media and the public could be better informed. Several officials stated that the media helped in publicizing sources of information such as hotlines and specific information such as details about who should seek treatment and where to go for it. However, media analysts have also noted that the media were sometimes responsible for providing incorrect information. For example, one official said that when the media reported that nasal swabbing was the test for anthrax, individuals sought unnecessary nasal swab testing from emergency rooms, physicians, and the health department, and thereby diverted medical and laboratory resources from medical care that was required elsewhere.

Communication with the public was further complicated by the evolving nature of the incidents and the local public's exposure to information from other localities and the national media. Comparisons of actions taken by officials at different points in time and in different areas caused the public to question the consistency and fairness of actions taken in their locale. For example, the affected public in some epicenters wondered why they were being given doxycycline for prophylaxis instead of ciprofloxacin, which had been heralded in the media as the drug of choice for the prevention of inhalational anthrax and used earlier in other epicenters. CDC's initial recommendation for ciprofloxacin was made because ciprofloxacin was judged to be most likely to be effective against any naturally occurring strain of anthrax and had already been approved by FDA for use in postexposure prophylaxis for inhalational anthrax. However, when it was determined that doxycycline was equally effective against the strain of anthrax in the letters and following FDA's announcement that doxycycline was approved for inhalational anthrax, the recommendation was changed. This change was made because of doxycycline's lower risk for side effects and lower cost and because of concerns that strains of bacteria resistant to ciprofloxacin could emerge if tens of thousands of people were taking it. In epicenters where prophylaxis was initiated after the recommendation had changed, officials followed the new recommendation and gave doxycycline to affected people. Local officials were challenged to explain the switch and address concerns raised by affected groups about apparently differential treatment. One local official described the importance of explaining that the switch was also taking place even in locations that had started with ciprofloxacin.

Response Capacity Was Strained and Would Have Been Difficult to Sustain

Elements of the local and state public health response systems—including the public health department and laboratory workforce as well as laboratories—were strained by the anthrax incidents to an extent that many local and state officials told us that they might not have been able to manage if the crisis had lasted longer. The anthrax incidents required extended hours for many public health workers investigating the incidents, as well as the assignment of new tasks, including the staffing of hotlines, to some workers. Aside from problems of workforce capacity, some clinical laboratories were not prepared in terms of equipment, supplies, or available laboratory protocols to test for anthrax, and most of them were unprepared for and overwhelmed by the large number of environmental samples they received for testing. The systems experienced these stresses in spite of assistance from CDC and DOD, and temporary transfers of local, and in some cases regional, resources.

Public Health Workers Were Overwhelmed with Work

During the anthrax incidents, the workload increased greatly at local and state health departments and laboratories and across the country. The departments heightened their disease surveillance, investigated false alarms and hoaxes as well as potential threats, tested large numbers of samples, and performed other duties such as answering calls on telephone hotlines that were set up to respond to questions from the public. Health departments across the nation received thousands of such calls. For example, officials at one location told us that they received 25,000 calls over a 2-week period during the crisis. Nine states—Colorado, Connecticut, Louisiana, Maryland, Montana, North Dakota, Tennessee, Wisconsin, and Wyoming—reported to CDC that during the week of October 21 to 27, 2001, they received a total of 2,817 bioterrorism-related calls. These nine states also reported that during that week they conducted approximately 25 investigations per state and had from 8 to 30 state personnel engaged full-time in the responses in each state.

Some local and state health departments had to borrow workers from other parts of their agencies or from outside of their agencies, such as from CDC and DOD, to meet the greater demands for surveillance, investigation, laboratory testing, and other duties related to the incidents. Several agencies realized that they lacked staff in particular specialties, such as environmental epidemiology. Some state public health departments did not have enough epidemiologists to investigate the suspected cases in their localities and had to borrow staff from other programs. Health workers were pulled from other jobs to work in the field or to staff the telephone hotlines. Staff borrowed from other parts of the agency were sometimes unable to fulfill their traditional public health duties, such as working on prevention of sexually transmitted diseases, and some routine work was delayed. In spite of the borrowing, staff at some agencies worked long hours over a number of weeks. In some cases, state laboratories had to borrow staff from various parts of their health department because laboratory workers were overwhelmed and the laboratories required staffing for 24 hours a day, 7 days a week. In some locations, CDC provided epidemiologists and laboratorians to help fill gaps in staff.

Some borrowed workers had to be trained for their new duties while the incidents were ongoing. Some workers had to be trained or cross-trained in two fields, requiring additional time from other staff and resources from the department. Some borrowed staff had to be trained for the specific tasks required by the incidents. Finding sufficient numbers of people who were appropriately trained or could be efficiently trained to staff the telephone hotlines effectively was also a challenge. Local officials

reported that even if sufficient staff were found, calls were not always handled effectively, especially when the caller needed mental health services.

Many officials we interviewed were concerned about their ability to deal with demand on staff in future crises. Since the anthrax incidents, some states have sent members of their staff for additional training. Some officials emphasized that surge capacity should be flexible to ensure preparedness for various types of future bioterrorism incidents.

Laboratories Handled Huge Volumes of Samples, and Some Were Underequipped to Do So

In addition to overwhelming the laboratory workforce, the large influx of samples strained the physical capacity of the laboratories. Public health laboratories around the country tested thousands of white powders and other environmental samples as well as clinical samples. According to CDC, during the anthrax incidents, laboratories within the Laboratory Response Network¹⁴ tested more than 120,000 samples, the bulk of which were environmental samples. Officials from one state told us that its laboratories did not have the capacity to handle the volume of work they received. Some local and state public health laboratories could not analyze anthrax samples because of limitations of equipment, supplies, or laboratory protocols. For example, in some states there were a limited number of biological safety cabinets, which were needed to prevent inhalation of anthrax spores by laboratory workers during the testing of samples. Some laboratories did not have the chemicals needed to conduct the appropriate tests. In some states, none of the state laboratories could conduct an essential diagnostic test for anthrax, the polymerase chain reaction test. In another state, only one of three state laboratories could perform this test. Some state and local laboratories were not prepared to take the safety precautions required to test samples for anthrax. Local laboratories were even less capable of doing anthrax testing. Samples for confirmatory testing were sent to CDC or to DOD's USAMRIID. In addition to performing confirmatory testing, DOD also provided other laboratory support to state and local officials. For example, the samples from one epicenter were sent to DOD, and the department sent mobile laboratories to two other epicenters to assist with testing samples.

¹⁴The Laboratory Response Network was established in 1999 by CDC, DOD, and the Association of Public Health Laboratories to maintain state-of-the-art capabilities for biological agent identification and characterization. The network is a multilevel system designed to link local and state public health laboratories with advanced capacity clinical, military, veterinary, agricultural, water, and food-testing laboratories. About 100 laboratories participate in the network, with at least one network laboratory in each state.

Moreover, although some laboratories were relatively well prepared to test clinical samples, they were not expecting the hundreds of environmental samples they received and did not have protocols prepared for testing them. It was the volume of these environmental samples, rather than the volume of the clinical samples, that overwhelmed the laboratories. Among the environmental samples, there were white powder samples that arrived without any assessment by law enforcement as to the level of threat they posed. At least one state laboratory developed protocols so that law enforcement personnel could triage samples, thereby increasing the likelihood that only those samples with a relatively high threat level would be forwarded to the laboratory for further testing. Even where protocols for testing these samples were available, it was a time-consuming and unfamiliar task for the laboratory to label them, track their progress, and ensure that their results were reported to the appropriate authority.

Experience Showed Aspects of Federal Preparedness That Could Be Improved

CDC led the federal public health response to the anthrax incidents, and the experience showed aspects of federal preparedness that could be improved. During the anthrax incidents, CDC was designated to act on behalf of HHS in providing national leadership in the public health and medical communities. As the lead agency in the federal public health response, CDC had to not only provide public health expertise but also manage the public health response efforts across epicenters and among other federal agencies. While local and state officials reported that CDC's support of their responses to the rapidly unfolding anthrax incidents at the local and state levels was generally effective, CDC acknowledged that it was not fully prepared for the challenge of coordinating the public health response across the federal agencies. CDC experienced difficulty serving as the focal point for communicating critical information during the response. In addition to straining CDC's resources, the anthrax incidents highlighted shortcomings in the clinical tools available for responding to anthrax, such as vaccines and drugs, and a lack of training for clinicians on how to recognize and respond to anthrax.

CDC Provided Support to Meet Heavy Resource Demands from Local and State Officials

CDC effectively responded to heavy resource demands from state and local officials to support the local responses. CDC reported that its support activities included surveillance; clinical, epidemiologic, and environmental investigation; laboratory work; communications; coordination with law enforcement; medical management; administration of prophylaxis; monitoring of adverse events; and decontamination. As new epicenters became involved, CDC dispersed additional agency staff to assist local and state health departments and other groups playing a role in the response efforts, eventually deploying more than 350 employees to the

six epicenters. In addition, because even the perception of danger required a public health response, CDC also provided assistance as requested in localities beyond the epicenters. From October 8 to 31, 2001, CDC's emergency response center received 8,860 telephone inquiries from all 50 states, the District of Columbia, Puerto Rico, Guam, and 22 foreign countries. CDC's callers included health care workers, local and state health departments, the public, and police, fire, and emergency departments and included requests for information about anthrax vaccines, bioterrorism prevention, and the use of personal protective equipment. Thus CDC not only provided resources to the epicenters but also had to coordinate local efforts nationwide.

Local public health offices required varying levels of assistance from CDC. For example, in one epicenter local officials looked to CDC to lead the epidemiologic investigation and relied primarily on CDC staff. In contrast, local officials in another epicenter led the local disease outbreak investigation and control effort and CDC staff supplemented a large local team. In most of the epicenters, the team sent by CDC included Epidemic Intelligence Service (EIS) officers, who are specially trained epidemiologists, to help with the investigation. The team's epidemiologic investigation used the traditional two-pronged approach in which it completely investigated either the case or the circumstance of a confirmed exposure and conducted intensive surveillance to identify any other anthrax cases or exposures. Laboratory testing proved to be an important tool in the epidemiologic investigation, and the CDC team also included laboratorians, who assisted with laboratory testing. In one epicenter, CDC also sent one of its anthrax experts to provide guidance and assist the local and state officials.

CDC Reported It Was Not Fully Prepared to Coordinate the Federal Public Health Response

In addition to playing its traditional role of supporting local and state public health departments, CDC also was confronted with the challenge of coordinating the public health activities of multiple federal agencies involved in the response, a task for which it acknowledged it was not wholly prepared. CDC described having to create an ad hoc emergency response center in an auditorium from which to manage the federal public health response, which involved numerous agencies. These included FDA, which, among other activities, provided guidance on treatment and addressed drug and blood safety issues. In addition, NIH provided scientific expertise on anthrax. CDC also coordinated with federal agencies working on the environmental and law enforcement aspects of the response efforts. DOD was responsible for testing all of the anthrax letters that were recovered and was involved in the transportation and

testing of environmental samples as well as the cleanup of contaminated buildings. EPA was in charge of the cleanup of contaminated sites. FEMA assisted the President's Office of Homeland Security in establishing and supporting an emergency support team. The FBI led the criminal investigation.

Although CDC's planning efforts prior to the anthrax incidents had identified the importance of coordination with other federal agencies for an effective response to bioterrorism, and CDC had developed some working groups among federal agencies, CDC sometimes had to adjust its response as events unfolded to facilitate coordination of more practical issues such as conducting simultaneous investigations in the field. For example, CDC told us that in one epicenter both CDC and the FBI, which needed to collect samples for the forensic investigation, identified the need to gain a better understanding of one another's work. During the incidents, CDC provided a liaison to the FBI, and the agencies worked together to collect laboratory samples. Since the anthrax incidents, CDC has held joint training with the FBI to discuss what they learned from their experience that could facilitate working together in the future.

CDC has made several efforts to improve coordination since the anthrax incidents, including major structural changes within the agency, creation of a permanent emergency operations center (EOC), and increased collaborative efforts with others within and outside of HHS. Officials point to the creation of the Office of Terrorism Preparedness and Emergency Response, which is part of the Office of the Director, as a major change. The primary services of this office are to provide strategic direction for CDC to support terrorism preparedness and response efforts, secure and position resources to support activities, and ensure that systems are in place to monitor performance and manage accountability. The office manages the cooperative agreement program to enhance local and state preparedness and jointly manages the Strategic National Stockpile with the Department of Homeland Security. The office also manages the EOC, which was created to promote quicker and better-coordinated responses to public health emergencies across the country and around the globe. The EOC is staffed 24 hours a day, 7 days a week, and the staff includes officials from FEMA, DOD, and other agencies. CDC also created a permanent position of CDC liaison to the FBI to increase collaboration with that agency.

CDC Experienced Difficulty Serving as Focal Point for Communicating Critical Information during Response to Anthrax Incidents

CDC served as the focal point for information flow during the anthrax incidents, but experienced some difficulty in fulfilling that role. In addition to the varied responsibilities involved in leading the public health response, the agency concurrently had to collect and analyze the large amount of incoming information on the anthrax incidents, assemble and analyze the available scientific information on anthrax, and produce guidance and other information based on its analyses for dissemination to officials, other responders, the media, and the public. CDC officials reported that the agency had difficulty producing and disseminating this guidance rapidly as well as difficulty conveying information to the media and the public.

CDC Had Difficulty Managing the Influx of Information to Produce and Disseminate Guidance Rapidly

CDC officials acknowledged that the agency was not always able to produce guidance as quickly as it would have liked. When the incidents began, it did not have a nationwide list of outside experts on anthrax, and it had not compiled all of the relevant scientific literature on anthrax. Consequently, CDC had to do time-consuming research to gather background information to inform its decisions, which slowed the development of its guidance. CDC has since compiled background information and lists of experts not only for anthrax but also for the other biological agents identified as having the greatest potential for adverse public health impact with mass casualties in a terrorist attack, and it has made the background information available on its Web site.¹⁵

CDC officials reported that CDC also had difficulty compiling the information it received during the incidents. Although CDC's role as focal point for information was a familiar one, the magnitude of information it received was unusual. CDC received a tremendous amount of information via e-mail, phone, fax, and news media reports from such sources as the agencies and organizations in the epicenters of the incidents, public health departments not in the epicenters, other federal agencies, and international public health organizations. CDC also received information from its staff in the field, but encountered some problems in those communications. Agency officials have said there were communication problems between epidemiologic staff in the field and at headquarters, which CDC attempted to address by holding "mission briefings" through its emergency response center; however, these briefings were not conducted regularly. CDC's efforts to manage all of this incoming

¹⁵These agents, which are labeled Category A agents, are anthrax, botulism, plague, smallpox, tularemia, and viral hemorrhagic fevers.

information and associated internal communication problems were complicated by its concurrent responsibility for coordinating the day-to-day activities involved in the federal public health response to the unfolding incidents.

According to CDC, both clinical and environmental guidance was developed during the incidents by using working groups of six to eight employees who were subject matter experts. Keeping up with the influx of new information that was being acquired daily proved to be a challenge for these working groups. CDC officials told us that no group at CDC was responsible for collecting and analyzing all of the data that were coming in and that few people at CDC had time to read their e-mail messages during the incidents. Since the incidents, CDC has established teams of scientists from inside and outside CDC whose only role is to review and analyze information during a crisis; CDC does not intend for these teams to be involved in day-to-day response operations.

As the working groups incorporated new information into their analyses, the guidance they were producing changed accordingly. For example, as the epidemiologic investigation expanded, CDC had to revise its assessment of the risk of developing inhalational anthrax from letters containing anthrax spores. Early on, CDC was acting on the theory that there was little risk of contracting inhalational anthrax from sealed letters. The incidents in the Washington, D.C., regional area, the fifth epicenter, represented a turning point in the epidemiologic investigation. The discovery of inhalational anthrax in a postal worker who presumably had been in contact only with sealed anthrax letters required CDC to revise its assessment. From this point on, CDC presumed that any exposure would put an individual at risk and changed its recommendation regarding who should get prophylaxis accordingly. CDC began to recommend prophylaxis for all individuals who had been in contact with sealed as well as unsealed anthrax letters, whereas earlier the agency had not been recommending such treatment unless an individual had been exposed to an opened letter.

Initially, CDC relied on the HAN communication system and its *Morbidity and Mortality Weekly Report (MMWR)* publication to disseminate its guidance and other information; however, during the incidents there were difficulties with both of these methods. At the time of the incidents, all state health departments were connected to the HAN system. However, only 13 states were connected to all of their local health jurisdictions, and therefore HAN messages could not reach many local areas. Some states were satisfied with the information they received via HAN, but others

claimed they did not get much information from HAN and what they did get was incomplete. During the incidents, CDC expanded its list of HAN recipients to include additional organizations, including medical associations. *MMWR* is issued on a weekly basis, and so the information in the latest issue was not always completely up-to-date for incidents that were unfolding by the hour. For example, information published in *MMWR* on October 26, 2001, contained the notice that the information was current as of October 24, 2001. In addition to these structural barriers to getting information out quickly to those who needed it, CDC's internal process of clearing information before issuance through HAN or *MMWR* was time-consuming. CDC has since changed its clearing process so that information can get out faster. The agency also made a number of other changes during the incidents to address some of the difficulties it encountered in providing information to the public health departments and clinicians. These included bringing in professionals from other communication departments in CDC to help get information out quickly, issuing press releases twice a day, and holding telebriefings. Since the incidents, CDC has taken actions to expand its communication capacity, including developing an emergency communication plan, increasing the number of health experts on staff, and establishing a pressroom, in which the Director of CDC gives press briefings on public health efforts. In addition, it has developed, and posted to its Web site, information to assist local and state health officials in detecting and treating individuals infected with agents considered likely to be used in a bioterrorist attack.

CDC Had Difficulty Conveying Information to Media and Public

During the anthrax incidents, the media and the public looked to CDC as the source for health-related information, but CDC was not always able to successfully convey the information that it had. Media analysts and other commentators have asserted that although CDC officials were the most authoritative spokespersons they were not initially the most visible. In an October 2001 nationwide poll, respondents indicated that they considered the Director of CDC and the U.S. Surgeon General to be better sources of reliable information about the outbreak of disease caused by bioterrorism than other federal officials mentioned in the survey.

Another problem CDC encountered in its efforts to communicate messages to the public was difficulty in conveying the uncertainty associated with the messages, that is, the caveat that although the messages were based on the best available information, they were subject to change when new facts became known. As a bioterrorist event unfolds and new information is learned, recommendations about who is at risk and how people should be treated may change, and the public needs to be prepared that changes may occur. Local officials and academics have

criticized CDC's communication of uncertainty during the anthrax incidents. CDC officials have acknowledged that they were unsuccessful in clearly communicating their degree of uncertainty as knowledge was evolving during the incidents. For example, although there were internal disagreements at CDC over the appropriate length of prophylaxis, this uncertainty was not effectively conveyed to the public. Consequently, in December 2001, when many people were finishing the 60-day antimicrobial regimen called for in CDC's guidance, the public questioned CDC's announcement that patients might want to consider an additional 40 days of antimicrobials. Since the incidents, CDC officials have acknowledged the necessity of expressing uncertainty in terms the public can understand and appending appropriate caveats to the agency's statements.

Anthrax Incidents Strained Some Aspects of Federal Response Capacity

The anthrax incidents highlighted some of the strengths of the federal public health response capacity, while also reflecting some of its limitations. CDC's experience with epidemiologic investigations was drawn on extensively and effectively, and the Laboratory Response Network played an important role. Not all the clinical tools that were needed to identify, treat, and prevent anthrax infection were available, and those that were available had shortcomings. Although CDC's bioterrorism preparedness training program for clinicians had begun at the time of the incidents, most clinicians had not yet been trained to recognize and report anthrax infection.

CDC's Epidemiologic and Laboratory Resources Were Strained

CDC's skills in disease investigation were heavily relied on during the anthrax incidents. CDC teams worked with local and state public health departments and law enforcement to determine what happened with each case. CDC's EIS was an important component of the agency's response. The availability of trained epidemiologists enabled CDC to send numbers of them to each epicenter to provide temporary staff to help investigate the nature and extent of the local incident. CDC reported that because of the number of epicenters and calls for assistance from other localities, its staff, both at headquarters and in the field, were spread thin. The level of assistance provided by CDC depended on the needs of the local public health departments and therefore varied considerably by location. For example, while CDC epidemiologists augmented the staff of some local and state health departments who would have been severely overtaxed without CDC's help, the agency characterized its role in one epicenter as supplementary to that epicenter's team of epidemiologists.

The Laboratory Response Network proved to be an asset, and some state and local officials told us they were satisfied with the laboratory response during the anthrax incidents. At that time, CDC laboratories, like many of the laboratories in the network, were inundated with samples and operated 24 hours a day to help epidemiologists determine exposure and risk by testing samples to confirm cases. From October 2001 to December 2001, the network laboratories processed more than 120,000 samples for *Bacillus anthracis*. Public health laboratories other than those at CDC tested 69 percent of these samples, DOD laboratories tested 25 percent, and CDC laboratories tested 6 percent. In addition to testing samples at its laboratories, DOD also assisted the epicenters by providing personnel for laboratories in the epicenters and at CDC and operating portable laboratories to support local investigations. In addition to testing samples, CDC laboratories distributed chemicals needed for testing samples to network laboratories and developed a new testing method that permitted better diagnostics from biopsy samples. CDC used the network to send information to state bioterrorism response coordinators in local and state laboratories. State laboratories also communicated with each other and with CDC by using the network.

However, there were signs of strain in the Laboratory Response Network. USAMRIID officials told us that USAMRIID, as well as other military and civilian laboratories, is set up to process clinical samples and was unprepared to process the volume and types of environmental samples that it received. They noted that many of the procedures for obtaining environmental samples from objects, such as keyboards and telephones, had never been standardized. Officials reported that they spent a great deal of time developing and validating these procedures as the incidents unfolded. In addition, DOD laboratory officials told us that they had to process overflow samples from overwhelmed laboratories at CDC and in the epicenters. DOD officials expressed concern about dependence on DOD laboratory resources for civilian emergencies, noting that in wartime DOD's laboratories are needed to support military operations.

The Strategic National Stockpile was also an asset in CDC's response efforts. The anthrax incidents underscored the benefits of having a system in place to transport antimicrobials and vaccines quickly to areas that need them during emergencies. The Strategic National Stockpile program delivered antimicrobial medications for postexposure prophylaxis and provided for the transportation of anthrax vaccine, clinical and environmental samples, and CDC personnel, including epidemiologists, laboratory scientists, pathologists, and special teams of researchers.

Available Clinical Tools Had Shortcomings

Not all of the clinical tools that physicians needed to identify, treat, and prevent anthrax infection were available, and those that were had shortcomings. Clinicians did not suspect and had difficulty promptly diagnosing anthrax because of their inexperience with the disease and because of the nonspecific nature of its presenting symptoms. Cutaneous anthrax can be confused with cellulitis or a spider bite. Inhalational anthrax is difficult to distinguish from other respiratory illnesses, such as pneumonia or influenza. Routine laboratory and radiological testing did not always clearly signal anthrax infection, and, even after physicians did suspect it, the laboratory tests needed to confirm it were time-consuming, laborious, and required that samples be sent to specialized laboratories. Diagnostic tests that are more accurate and can yield results more quickly are in development.

Treatment for anthrax infection was available, but it was not effective in almost half of the inhalational cases. Both inhalational and cutaneous anthrax, once diagnosed, were treated with a combination of intravenous antimicrobial medications. All of the patients with cutaneous anthrax recovered, but 5 of the 11 patients with inhalational anthrax did not. The drugs worked by killing the bacteria that develop from anthrax spores following germination of those spores in the body. However, anthrax bacteria produce toxins, and no treatments were available that could destroy these toxins. For this reason, the antimicrobial drugs used to treat inhalational anthrax were ineffective in those patients in whom the bacteria had already produced too much toxin by the time treatment was initiated. CDC is working with other agencies within HHS, such as NIH, and other federal agencies, including DOD, to support the development of new treatments for anthrax and other potential agents of bioterrorism.

Methods of prophylaxis for people exposed to anthrax spores were available and apparently effective, but there were several difficulties with these methods. There was uncertainty about how to assess exposure to determine who should be given prophylaxis; initially only one drug had been approved for prophylaxis, and it was approved only for prophylaxis of inhalational anthrax; the optimal length of prophylaxis for those thought to have been exposed to anthrax spores was unknown; prophylactic drugs had to be taken for months and had side effects; and the anthrax vaccine requires more than one dose, had not been approved for postexposure prophylaxis, and was in short supply. Nasal swabs and blood tests were used early in the investigation to assess exposure, but these were not reliable methods. When there was uncertainty about who was exposed or how great their risk from exposure was, prophylaxis was sometimes recommended for all workers in a facility with some

contamination, regardless of how close to the contamination the workers had been. This prophylaxis often started with an initial supply of medication while test results were awaited. For example, some people were given a 10-day supply of drugs and asked to return within 10 days to learn whether they needed to continue taking the drugs. Initially, CDC, with advice from NIH, recommended prophylaxis for 60 days.¹⁶ The drugs had side effects, and the rate of compliance with the regimen was typically about 40 percent. Since the incidents, federal agencies have been developing and evaluating tools for detecting anthrax spores. Such tests could enable field workers to make better initial assessments of exposure at particular locations to determine who should get prophylaxis. CDC is working with other federal agencies to support the development of new methods of prophylaxis for anthrax and other potential agents of bioterrorism.

HHS reported that at the time of the anthrax incidents no system or data collection instruments existed for monitoring the nearly 10,000 people who were receiving prophylaxis and thus it did not have a way to collect information on the compliance with, adverse events from, or effectiveness of prophylaxis. CDC attempted to collect this information retrospectively, but acknowledged that this method is not optimal. To improve preparedness for future incidents, CDC and FDA have created a post-event surveillance working group that is responsible for developing a system capable of collecting this kind of data.

Few Clinicians Had Been Trained to Recognize Anthrax

During the anthrax incidents, it became apparent that few clinicians had been trained to recognize anthrax infections. In November 2000, CDC had created a national training plan for bioterrorism preparedness and response. The plan outlined training required to implement the agency's Bioterrorism Event Response Operational Plan and strategies for training public health and medical professionals in collaboration with partners (chiefly public health organizations and professional groups such as the American Medical Association). At the time of the anthrax incidents, CDC had been implementing the plan for less than a year, and relatively few people had been trained: CDC reports that by October 2001 about 12,000 physicians, nurses, and other medical professionals had completed the programs. However, CDC estimated that during the incidents more than

¹⁶Later, CDC recommended expanding prophylaxis for those already on it to include an additional 40 days of antimicrobial drugs, with or without three doses of the anthrax vaccine.

one million medical professionals participated in its anthrax-related training programs via satellite, Web, video, and phone. In addition to CDC's training programs, which continue to be available, CDC collaborates with professional organizations, such as the American Medical Association and the American Nurses Association, to provide training for their members, and other federal agencies present training programs on bioterrorism (for example, AHRQ) or fund training programs on bioterrorism (for example, the Health Resources and Services Administration).

Concluding Observations

The anthrax incidents of 2001 required an unprecedented public health response. The specific nature of the incidents and the nature of the response varied across the epicenters and other localities across the country. In each epicenter, local officials had to coordinate responses that were a combination of local, state, and federal efforts. In addition, local public health officials in the epicenters were challenged to mount an intensive response that included identifying and treating people already infected with anthrax as well as people who had been exposed and could become infected, identifying contaminated areas and preventing additional people from being exposed, processing thousands of samples suspected of containing anthrax, and responding to thousands of calls from concerned members of their communities.

The public health response to the anthrax incidents both demonstrated the benefit of public health preparedness measures already in place or under way at the local, state, and federal levels and emphasized the need to reinforce or expand on those measures. The specific strengths and weaknesses of the public health response identified by local and state public health officials varied. Nonetheless, public health officials from all locations identified general lessons learned for public health preparedness. The lessons identified fall into three general categories: the benefits of planning and experience; the importance of effective communication, both among those involved in the response efforts and with the general public; and the critical importance of a strong public health infrastructure to serve as the foundation from which response efforts can be mounted for bioterrorism or other public health emergencies.

CDC was instrumental in supporting local and state efforts throughout the anthrax incidents, for example, by sending epidemic investigators into the field and providing laboratory expertise. DOD resources and expertise were also required to support several epicenters. CDC was challenged with the unfamiliar task of coordinating the extensive federal public health response efforts. Before the incidents began, CDC officials had recognized that the agency was not fully prepared to coordinate a major public health response effort and indeed had identified areas that needed improvement in testimony before Congress on the day before it confirmed the first case of inhalational anthrax in Florida. CDC officials have acknowledged that the agency did not perform as well as it would have liked during the incidents. The agency has taken steps to improve future performance, including creating the Office of Terrorism Preparedness and Emergency Response within the Office of the Director, building and staffing an emergency operations center, enhancing the agency's communication infrastructure, and developing and maintaining databases of information and expertise on the biological agents the federal government considers most likely to be used in a terrorist attack.

Agency Comments

We obtained comments on our draft report from DOD and HHS. (See apps. II and III.) DOD highlighted that lessons learned from its support of the public health response could aid in the development of expanded capabilities within the civilian sector to improve the nation's public health preparedness. DOD emphasized its capabilities that were vital to the success of the public health response, including environmental assessment, transportation of contaminated articles, laboratory testing, and cleanup of contaminated locations. The environmental cleanup was beyond the scope of this report.

HHS found the report to be informative and provided additional examples of actions taken to enhance national preparedness for bioterrorism and other public health emergencies. These examples included the establishment of the Office of Public Health Emergency Preparedness; the accelerated acquisition of antimicrobial drugs for the Strategic National Stockpile; and the expansion of basic and targeted research and upgrading of research facilities focused on the pathogens most likely to be used as bioterrorism agents.

DOD and HHS also made technical comments, which we incorporated where appropriate.

We are sending copies of this report to the Secretary of DOD, the Secretary of HHS, and other interested officials. We will also provide copies to others upon request. In addition, the report will be available at no charge on GAO's Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please call me at (202) 512-7119. Another contact and key contributors are listed in appendix IV.

Sincerely yours,

A handwritten signature in black ink that reads "Janet Heinrich". The signature is written in a cursive style with a large initial "J".

Janet Heinrich
Director, Health Care—Public Health Issues

Appendix I: Timeline of Selected Key Events in the Anthrax Incidents

| Date | Events Occurring on That Date |
|---|--|
| | <i>Events Determined Retrospectively to Have Occurred on That Date (in italics)</i> |
| Tuesday, 9/11/01 | <ul style="list-style-type: none"> • Terrorist attack on World Trade Center and Pentagon prompts heightened epidemiologic surveillance activities in some areas. |
| Wednesday, 9/26/01 through Monday, 10/01/01 | <ul style="list-style-type: none"> • <i>In New York (NY), two NBC employees, a New York Post employee, and the child of an ABC employee and in New Jersey (NJ), two U.S. Postal Service (USPS) employees, one from the West Trenton postal facility and one from Hamilton postal facility, seek medical attention for skin conditions.</i> • <i>In Florida, an American Media Inc. (AMI) employee is admitted to the hospital with a respiratory condition.</i> |
| Tuesday, 10/02/01 | <ul style="list-style-type: none"> • The Centers for Disease Control and Prevention (CDC) issues a Health Alert Network (HAN) alert regarding preparedness for bioterrorism, acknowledging the public's concern about smallpox and anthrax and providing information about preventive measures. • <i>In Florida, a second AMI employee is admitted to the hospital, with a diagnosis of meningitis.</i> |
| Thursday, 10/04/01 | <ul style="list-style-type: none"> • CDC and the Florida Department of Health announce confirmation of a case of inhalational anthrax. The infected person is an AMI employee, and the cause of the infection is unknown. |
| Friday, 10/05/01 | <ul style="list-style-type: none"> • In Florida, an AMI employee becomes the first anthrax victim to die. |
| Sunday, 10/07/01 | <ul style="list-style-type: none"> • In Florida, the AMI building is closed after anthrax spores are found. |
| Monday, 10/08/01 | <ul style="list-style-type: none"> • In Florida, prophylaxis of AMI employees begins. |
| Wednesday, 10/10/01 | <ul style="list-style-type: none"> • Because the source of the AMI employee's anthrax exposure is believed to have been a letter, USPS begins nationwide employee education on signs of anthrax exposure and procedures for handling mail to avoid anthrax infection. |
| Friday, 10/12/01 | <ul style="list-style-type: none"> • In NY, the New York City Department of Health (NYCDOH) announces the confirmation of a case of cutaneous anthrax in an NBC employee. • USPS says that it will offer gloves and masks to all employees who handle mail. |
| Monday, 10/15/01 | <ul style="list-style-type: none"> • On Capitol Hill, an employee opens a letter addressed to Senator Daschle thought to contain anthrax spores. People thought to be in the vicinity of the letter when it was opened are treated with ciprofloxacin, at the time the only drug approved for postexposure prophylaxis for anthrax. • In Florida, CDC confirms a second case of inhalational anthrax in an AMI employee. • In NY, NYCDOH announces a second case of cutaneous anthrax, in a child of an ABC employee. |
| Thursday, 10/18/01 | <ul style="list-style-type: none"> • In the Washington, D.C., regional area (DC),^a USPS reports that although it believes that the Daschle letter, which was processed at the Brentwood postal facility, was extremely well sealed and that there was a minute chance that anthrax spores escaped into the facility, it is testing the facility for anthrax contamination; quick tests are negative, other tests are sent to the laboratory. • In NJ, laboratory testing confirms cutaneous anthrax in two USPS employees, one from the West Trenton postal facility and one from the Hamilton postal facility. • In NY, NYCDOH announces a third case of cutaneous anthrax, in a CBS employee. • In Florida, USPS closes two postal facilities contaminated with anthrax spores for cleaning. • In a telebriefing, the Director of CDC provides information about anthrax, including risk of exposure, availability of vaccines and antimicrobial medications, screening tests, symptoms, and what to do with suspicious mail and also explains CDC's role in the investigation. • CDC broadcasts part one of a live satellite and Web broadcast on anthrax for clinicians. • FDA announces that it has approved doxycycline for postexposure prophylaxis for anthrax. • <i>In DC, a USPS employee who works at the Brentwood postal facility seeks medical attention.</i> |

**Appendix I: Timeline of Selected Key Events
in the Anthrax Incidents**

| Date | Events Occurring on That Date <i>Events Determined Retrospectively to Have Occurred on That Date (in italics)</i> |
|---------------------|---|
| Friday, 10/19/01 | <ul style="list-style-type: none"> • In DC, a USPS employee who works at both the Brentwood postal facility and a Maryland postal facility is admitted to a hospital with suspected inhalational anthrax. • In NJ, the Hamilton and West Trenton postal facilities are closed, and the New Jersey Department of Health and Senior Services recommends that all USPS employees from both facilities receive prophylaxis. • In NJ, laboratory testing confirms cutaneous anthrax in a second USPS employee who works at the Hamilton postal facility. • In NY, NYCDOH announces a fourth case of cutaneous anthrax, in a <i>New York Post</i> employee. |
| Saturday, 10/20/01 | <ul style="list-style-type: none"> • <i>In DC, a third USPS employee who works at the Brentwood postal facility is admitted to a hospital with a respiratory condition.</i> |
| Sunday, 10/21/01 | <ul style="list-style-type: none"> • In DC, the USPS employee who worked at the Brentwood and Maryland postal facilities and was admitted to the hospital on 10/19/01 is confirmed to have inhalational anthrax. • In DC, the Brentwood and Maryland postal facilities, are closed. Evaluation and prophylaxis of employees begin. • In DC, a USPS employee who worked at the Brentwood postal facility and who initially sought medical attention on 10/18/01 is admitted to a hospital with suspected inhalational anthrax and becomes the second anthrax victim to die. • <i>In DC, a fourth USPS employee who worked at the Brentwood postal facility seeks medical attention at a hospital. His chest X-ray is initially determined to be normal, and he is discharged.</i> |
| Monday, 10/22/01 | <ul style="list-style-type: none"> • In DC, the USPS employee who worked at the Brentwood postal facility and who sought medical attention on 10/21/01 and was discharged is admitted to the hospital with suspected inhalational anthrax, and becomes the third anthrax victim to die. • In DC, the USPS employee who was admitted to the hospital on 10/20/01 is confirmed to have inhalational anthrax. • In DC, prophylaxis is expanded to include all employees and visitors to nonpublic areas at the Brentwood postal facility. • CDC rebroadcasts part one of the live satellite and Web broadcast on anthrax for clinicians. |
| Wednesday, 10/24/01 | <ul style="list-style-type: none"> • In NY, USPS begins giving prophylaxis to employees at six New York City postal facilities where contaminated letters may have been processed. |
| Thursday, 10/25/01 | <ul style="list-style-type: none"> • In DC, a State Department mail facility employee is called back to the hospital for admission; test taken the previous day is positive for inhalational anthrax. • In NY, NYCDOH announces a fifth case of cutaneous anthrax, in a second NBC employee. • CDC initiates daily telebriefings to provide updates on the anthrax incidents. |
| Saturday, 10/27/01 | <ul style="list-style-type: none"> • In NY, NYCDOH announces the sixth case of cutaneous anthrax, in a second <i>New York Post</i> employee. |
| Sunday, 10/28/01 | <ul style="list-style-type: none"> • In NJ, laboratory testing confirms inhalational anthrax in a USPS Hamilton employee who was admitted to a hospital with suspected inhalational anthrax on 10/19/01. |
| Monday, 10/29/01 | <ul style="list-style-type: none"> • In NY, preliminary tests indicate anthrax in a hospital employee who was admitted with suspected inhalational anthrax on 10/28/01. The hospital where she works is temporarily closed, and NYCDOH recommends prophylaxis for hospital employees and visitors. • In NJ, laboratory testing confirms cutaneous anthrax in a woman who receives mail directly from the Hamilton facility. The woman originally sought medical attention on 10/18/01 and was admitted to the hospital on 10/22/01 for a skin condition. • In NJ, laboratory testing confirms a second case of inhalational anthrax, in a USPS Hamilton employee who initially sought medical attention on 10/16/01 and was admitted to the hospital on 10/18/01 with a respiratory condition. |
| Wednesday, 10/31/01 | <ul style="list-style-type: none"> • In NY, the hospital employee becomes the fourth anthrax victim to die.^b |

**Appendix I: Timeline of Selected Key Events
in the Anthrax Incidents**

| Date | Events Occurring on That Date |
|---------------------|--|
| | <i>Events Determined Retrospectively to Have Occurred on That Date (in italics)</i> |
| Thursday, 11/01/01 | <ul style="list-style-type: none"> • CDC broadcasts part two of the live satellite and Web broadcast on anthrax for clinicians. |
| Friday, 11/2/01 | <ul style="list-style-type: none"> • In NY, NYCDOH announces the seventh case of cutaneous anthrax, in a third <i>New York Post</i> employee. |
| Wednesday, 11/21/01 | <ul style="list-style-type: none"> • In Connecticut, an elderly woman, who was admitted to the hospital for dehydration on 11/16/01, becomes the fifth anthrax victim to die.^b • The Connecticut Department of Public Health, in consultation with CDC, begins prophylaxis for USPS employees working in the Seymour and Wallingford postal facilities. |
| Friday, 12/21/01 | <ul style="list-style-type: none"> • CDC expands the options for those on prophylaxis to include extending the duration of drug therapy and adding the anthrax vaccine. |

Source: CDC, Connecticut Department of Public Health, District of Columbia Department of Health, FDA, Florida Department of Health, New Jersey Department of Health and Senior Services, NYCDOH, Office of the Attending Physician of the U.S. Congress, and USPS.

^aThe Washington, D.C., regional area includes Washington, D.C., Maryland, and Virginia.

^bAs of September 30, 2003, the source of exposure had not been confirmed.

Appendix II: Comments from the Department of Defense



ASSISTANT SECRETARY OF DEFENSE
2600 DEFENSE PENTAGON
WASHINGTON, DC 20301-2600

HOMELAND DEFENSE

14 OCT 2003

Ms. Janet Heinrich, Director
Health Care – Public Health Issues
U.S. General Accounting Office
Washington, DC 20548

Dear Ms. Heinrich:

This is the Department of Defense (DoD) response to the GAO final report, "Bioterrorism: Public Health Response to Anthrax Incidents of 2001" dated October 6, 2003 (Code 290288/ GAO-04-152).

DoD acknowledges receipt of the final report and notes it contains no specific recommendations for departmental action, however, we believe the report should be amended for two specific purposes. First, the report should highlight the significant role the Department played in supporting civilian public health response during this unprecedented biological attack on American soil. In addition, amending the report to reflect the lessons learned from DoD's support can aid the development of expanded capabilities within the civilian sector to help improve the nation's public health preparedness. Specific technical comments for your consideration are also attached.

During the period from October 2001 through January 2002, DoD supported civilian public health and law enforcement authorities by employing its unique weapons of mass destruction (WMD) response capabilities to perform environmental assessments, transportation of contaminated articles, laboratory confirmation testing and cleanup of locations suspected of anthrax contamination. These capabilities were vital to the success of the public health response.

Immediately following the Fall 2001 anthrax attacks, the United States Capitol Police contacted DoD and requested assistance to conduct environmental assessments, testing and evaluation of air and source samples for anthrax spores in the House and Senate office spaces. DoD responded by dispatching the Marines and sailors of the Chemical Biological Incident Response Force (CBIRF), 4th Marine Expeditionary Brigade (Anti-Terrorism) to address this threat. Subsequently, CBIRF was assigned in direct support of the Federal Bureau of Investigation - Hazardous Materials Response Unit at the United States Postal Service Mail P Street Facility to conduct biological-hazard reconnaissance and collection and over packing of congressional mail.

Additionally, the laboratories of the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) and the U.S. Navy Naval Medical Research Center (NMRC), were also pressed into service to support the Center of Disease Control to conduct confirmation testing of contaminated samples for the presence of anthrax.

These capabilities were unique to the DoD and resulted from the Department's past contingency planning for WMD response in an overseas warfighting environment. At the time of the attacks, no other Federal government agency then possessed the capability and requisite experience for addressing biological agent contamination across the full range of activities from

**Appendix II: Comments from the Department
of Defense**

assessment to confirmation testing and subsequent decontamination and cleanup. Accordingly, with this extensive biological defense experience, training and expertise, DoD is fully prepared to assist civilian public health officials in the future to expand their development of WMD response capabilities.

DoD appreciates the opportunity to provide this additional information on its role and we look forward to working with you on improving our nation's future bioterrorism preparedness.

Sincerely,



Paul McHale

Attachments
a/s

Appendix III: Comments from the Department of Health and Human Services



DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of Inspector General

Washington, D.C. 20201

OCT 10 2003

Ms. Janet Heinrich
Director, Health Care – Public Health Issues
United States General Accounting Office
Washington, D.C. 20548

Dear Ms. Heinrich:

Enclosed are the Department's comments on your draft report entitled, "Bioterrorism: Public Health Response to Anthrax Incidents of 2001." The comments represent the tentative position of the Department and are subject to reevaluation when the final version of this report is received.

The Department appreciates the opportunity to comment on this draft report before its publication.

Sincerely,

A handwritten signature in cursive script that reads "Dara Corrigan".

Dara Corrigan
Acting Principal Deputy Inspector General

The Office of Inspector General (OIG) is transmitting the Department's response to this draft report in our capacity as the Department's designated focal point and coordinator for General Accounting Office reports. OIG has not conducted an independent assessment of these comments and therefore expresses no opinion on them.

Comments of the Department of Health and Human Services on the General Accounting Office's Draft Report, "Bioterrorism: Public Health Response to Anthrax Incidents of 2001" (GAO-04-152)

The Department of Health and Human Services (HHS) appreciates the opportunity to comment on the above-referenced draft report. The report provides an informative account of a) the role of the Centers for Disease Control and Prevention (CDC) in responding to the public health emergency engendered by the anonymous, surreptitious, and malicious distribution of weaponized *Bacillus anthracis* (*B. anthracis*) through the U.S. mail system during October 2001; b) the lessons learned from that unique experience; and c) actions to enhance CDC's readiness for further bioterrorism incidents and other public health emergencies. The report should become a valuable reference document for policy makers, public health professionals, and members of the general public concerned with U. S. national preparedness in the ever-present threat of bioterrorism and its myriad potential manifestations.

The U.S. General Accounting Office could enhance the utility of the report by making explicit that the CDC role, invaluable as it was, is only part of the story. During the weeks following the appearance of the letters laced with *B. anthracis* spores, the Office of the Secretary of Health and Human Services maintained an ad hoc emergency operations center under the personal direction of the Deputy Secretary with a view toward ensuring appropriate direction and coordination of all HHS assets deployed during the crisis, including those of CDC. To cite but one example, HHS deployed 325 U. S. Public Health Service Commissioned Officers to help effect mass distribution of antibiotics, triaging, assessment, patient education, and counseling of 37,000 persons at risk of exposure to *B. anthracis*.

Moreover, in the wake of the anthrax incidents, HHS undertook a host of significant actions – including but going well beyond those CDC-based activities noted in the report – to enhance preparedness for bioterrorism and other public health emergencies. These other actions include a) the Secretary's creation of the Office of Public Health Preparedness (subsequently codified in statute and renamed the Office of Public Health Emergency Preparedness) and, through it, the establishment of the Secretary's Command Center and the Secretary's Emergency Response Teams; b) an unprecedented increase of support for public health departments, hospitals, other health care entities, and communities throughout the nation to enhance State and local preparedness for public health emergencies; c) accelerated acquisition of antibiotics for the National Pharmaceutical Stockpile (subsequently renamed in statute as the Strategic National Stockpile) to improve preparedness for further anthrax attacks or other bioterrorism incidents; d) accelerated acquisition of enough doses of smallpox vaccine to cover the entire U. S. population in the event of a terrorist-induced smallpox outbreak; e) significant expansion of basic and targeted research and upgrading of research facilities focused on the pathogens most likely to be used as bioterrorism agents; and f) in view of the potential for food to be a medium for terrorism, substantial augmentation of efforts to protect the security and safety of the U. S. food supply.

Technical and Other Comments

We have also provided technical and other comments on the draft for your consideration and use in finalizing the report; these comments are being submitted separately.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Michele Orza, (202) 512-6970

Acknowledgments

In addition to the contact named above, Robert Copeland, Charles Davenport, Donald Keller, Nkeruka Okonmah, and Roseanne Price made key contributions to this report.

Related GAO Products

Infectious Diseases: Gaps Remain in Surveillance Capabilities of State and Local Agencies. [GAO-03-1176T](#). Washington, D.C.: September 24, 2003.

Hospital Preparedness: Most Urban Hospitals Have Emergency Plans but Lack Certain Capacities for Bioterrorism Response. [GAO-03-924](#). Washington, D.C.: August 6, 2003.

Severe Acute Respiratory Syndrome: Established Infectious Disease Control Measures Helped Contain Spread, but a Large-Scale Resurgence May Pose Challenges. [GAO-03-1058T](#). Washington, D.C.: July 30, 2003.

Capitol Hill Anthrax Incident: EPA's Cleanup Was Successful; Opportunities Exist to Enhance Contract Oversight. [GAO-03-686](#). Washington, D.C.: June 4, 2003.

Bioterrorism: Information Technology Strategy Could Strengthen Federal Agencies' Abilities to Respond to Public Health Emergencies. [GAO-03-139](#). Washington, D.C.: May 30, 2003.

U.S. Postal Service: Issues Associated with Anthrax Testing at the Wallingford Facility. [GAO-03-787T](#). Washington, D.C.: May 19, 2003.

SARS Outbreak: Improvements to Public Health Capacity Are Needed for Responding to Bioterrorism and Emerging Infectious Diseases. [GAO-03-769T](#). Washington, D.C.: May 7, 2003.

Smallpox Vaccination: Implementation of National Program Faces Challenges. [GAO-03-578](#). Washington, D.C.: April 30, 2003.

Infectious Disease Outbreaks: Bioterrorism Preparedness Efforts Have Improved Public Health Response Capacity, but Gaps Remain. [GAO-03-654T](#). Washington, D.C.: April 9, 2003.

Bioterrorism: Preparedness Varied across State and Local Jurisdictions. [GAO-03-373](#). Washington, D.C.: April 7, 2003.

U.S. Postal Service: Better Guidance Is Needed to Improve Communication Should Anthrax Contamination Occur in the Future. [GAO-03-316](#). Washington, D.C.: April 7, 2003.

Hospital Emergency Departments: Crowded Conditions Vary among Hospitals and Communities. [GAO-03-460](#). Washington, D.C.: March 14, 2003.

Homeland Security: New Department Could Improve Coordination, but Transferring Control of Certain Public Health Programs Raises Concerns. [GAO-02-954T](#). Washington, D.C.: July 16, 2002.

Homeland Security: New Department Could Improve Biomedical R&D Coordination but May Disrupt Dual-Purpose Efforts. [GAO-02-924T](#). Washington, D.C.: July 9, 2002.

Homeland Security: New Department Could Improve Coordination but May Complicate Priority Setting. [GAO-02-893T](#). Washington, D.C.: June 28, 2002.

Homeland Security: New Department Could Improve Coordination but May Complicate Public Health Priority Setting. [GAO-02-883T](#). Washington, D.C.: June 25, 2002.

Bioterrorism: The Centers for Disease Control and Prevention's Role in Public Health Protection. [GAO-02-235T](#). Washington, D.C.: November 15, 2001.

Bioterrorism: Review of Public Health Preparedness Programs. [GAO-02-149T](#). Washington, D.C.: October 10, 2001.

Bioterrorism: Public Health and Medical Preparedness. [GAO-02-141T](#). Washington, D.C.: October 9, 2001.

Bioterrorism: Coordination and Preparedness. [GAO-02-129T](#). Washington, D.C.: October 5, 2001.

Bioterrorism: Federal Research and Preparedness Activities. [GAO-01-915](#). Washington, D.C.: September 28, 2001.

West Nile Virus Outbreak: Lessons for Public Health Preparedness. [GAO/HEHS-00-180](#). Washington, D.C.: September 11, 2000.

Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks. [GAO/NSIAD-99-163](#). Washington, D.C.: September 14, 1999.

Combating Terrorism: Observations on Biological Terrorism and Public Health Initiatives. [GAO/T-NSIAD-99-112](#). Washington, D.C.: March 16, 1999.

GAO's Mission

The General Accounting Office, the audit, evaluation and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through the Internet. GAO's Web site (www.gao.gov) contains abstracts and full-text files of current reports and testimony and an expanding archive of older products. The Web site features a search engine to help you locate documents using key words and phrases. You can print these documents in their entirety, including charts and other graphics.

Each day, GAO issues a list of newly released reports, testimony, and correspondence. GAO posts this list, known as "Today's Reports," on its Web site daily. The list contains links to the full-text document files. To have GAO e-mail this list to you every afternoon, go to www.gao.gov and select "Subscribe to e-mail alerts" under the "Order GAO Products" heading.

Order by Mail or Phone

The first copy of each printed report is free. Additional copies are \$2 each. A check or money order should be made out to the Superintendent of Documents. GAO also accepts VISA and Mastercard. Orders for 100 or more copies mailed to a single address are discounted 25 percent. Orders should be sent to:

U.S. General Accounting Office
441 G Street NW, Room LM
Washington, D.C. 20548

To order by Phone: Voice: (202) 512-6000
 TDD: (202) 512-2537
 Fax: (202) 512-6061

To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: www.gao.gov/fraudnet/fraudnet.htm

E-mail: fraudnet@gao.gov

Automated answering system: (800) 424-5454 or (202) 512-7470

Public Affairs

Jeff Nelligan, Managing Director, NelliganJ@gao.gov (202) 512-4800
U.S. General Accounting Office, 441 G Street NW, Room 7149
Washington, D.C. 20548