September 11th Attack and the Intentional Release of Anthrax

Q&A: CDC AND PUBLIC HEALTH RESPONDS — 10-YEAR ANNIVERSARY

A tragedy is often marked in the lives of those who have experienced it as “life before,” or “life after.” The Centers for Disease Control and Prevention does the same as it reflects on the decade after the terrorist attack of September 11 and the intentional release of anthrax that followed.

Before that September attack, CDC was busy with a multitude of concerns that embody the work of public health. The headlines before Sept. 11, 2001, tracked CDC’s work on potential health concerns from mosquitoes that stowed away on imported lucky bamboo to a Norwalk-like virus outbreak at two summer camps. The Task Force on Community Prevention Services had just issued a report on increasing physical activity. Internationally, CDC was answering immediate health questions during a refugee crisis in Guinea. It was doing what CDC does: work with state and local public health departments and partners across borders to find and tackle the problems that can plague individuals, communities and the world. And then disaster struck.

The following reflects portions of interviews with and reports by past and present CDC leaders and subject matter experts.

What was CDC’s immediate role in responding to the Sept. 11, 2001, attacks in the United States?

Our first thoughts were, “how can we help?”

Within hours of the morning attack, CDC sent a small cadre of its public health experts from different disciplines to New York City by private jet.

CDC had previously established a unique FAA-issued priority flight designation that allowed people and materiel to be flown to New York City despite the closure of airspace over the United States.

There were many unknowns that first day, but the team’s primary mission was to support the city health department. CDC expected to help in organizing for mass casualties and conducting immediate biological surveillance for infectious disease illnesses from the possible release of biologic agents.

The team arrived before nightfall and integrated with the New York City Health Department. Concerned about the possibility that hospitals could be overwhelmed with the injured, the NYC health director and CDC’s team-lead agreed that CDC should send up more than a dozen Epidemic Intelligence Service (EIS) officers. In addition, the first emergency mobilization of the National Pharmaceutical Stockpile, arrived that night in New York City.

At the request of the New York City Department of Health, CDC’s Strategic National Stockpile delivered a 50-ton push-package of pharmaceuticals and medical supplies to Ground Zero in New York City within seven hours of the federal decision to deploy. In addition, ventilators and their ancillary supplies and other critical medical supplies necessary for the treatment of burn and blast injuries were sent. Along with that, thousands of respirators and other personal protective equipment for response personnel were delivered to New York in the 24 hours after the attack.

EIS deployed to emergency departments

The additional EIS officers boarded a plane bound for New York. CDC sent epidemiologists, occupational health specialists, industrial hygienists and other professionals to support the city’s response. The EIS officers deployed to emergency departments in sentinel hospitals to identify unusual disease symptoms or outbreak clusters. Their job would be disease and injury surveillance to help identify the types and amount of medical resources needed.
The expectation was that large numbers of people had been injured by the crash and collapse of the buildings. When the sad realization was that hospitals would not be receiving injured survivors because most victims had perished, the CDC team’s attention was also directed to occupational health. Eye injuries and respiratory distress ranked high. Soon attention turned to environmental health concerns such as air quality, food and water safety, and rodent control. Days later, more EIS investigators were deployed both to New York City and to Washington, D.C. to help establish a disease surveillance system.

**What was CDC’s role in responding to the anthrax attacks?**

The nation as a whole was still reeling from the terrorist attack of September 11th when public health officials identified a case of inhalation anthrax in a Florida resident, the first such case since 1976 in the United States. As the Department of Health and Human Services’ lead agency for bioterrorism response, CDC had a much more central role for the federal government in the anthrax attack response compared to the terrorist attack on September 11th.

In 1998, CDC had begun to earnestly develop a strategic plan for addressing bioterrorism. Public health was the lead for increased vigilance and preparedness for unexplained illnesses and injuries. There were five components to the plan: preparedness and prevention, surveillance and early detection, diagnosis, response, and communication. These required integrated training and research.

CDC was making incremental progress to define, develop and implement a set of public health capacities at the local, state and federal level to respond to deliberate biologic or chemical attacks on the health of U.S. citizens. In 1999, the CDC had begun providing selected state and local public health jurisdictions with federal funds to develop their public health infrastructure and response capacity. The New York City Department of Health was one of the first city departments funded under this program. In addition, CDC began participating in terrorism response exercises with local, state and federal agencies. Internally, CDC had created the Bioterrorism Preparedness and Response Program. Importantly, CDC established a national repository of emergency drugs and medical equipment, which later became the Strategic National Stockpile.

**Public health leads**

Ready or not, the Florida anthrax event thrust public health and bioterrorism to the front of the line. A CDC-trained laboratorian in the Florida Health Department isolated *Bacillus anthracis* from a patient and alerted his health director and CDC according to protocol. The national Laboratory Response Network was created specifically to ensure the nation had sentinel experts who could correctly identify unusual bacteria from patient specimens and sound the alarm. It worked.

CDC and public health as a whole had limited science or past bioterrorism experience to draw upon beyond basic laboratory and epidemiologic understanding. There was great uncertainty about what the nation was dealing with and the magnitude of the event. The days and weeks that followed saw a quick escalation along the East Coast.

On October 4, anthrax was confirmed in the first patient and a second patient from the same media company reported being ill. Three days later, a Sunday, CDC confirmed *B. anthracis* from the office keyboard of the first patient — there was no doubt it was intentional because the organism would not naturally be found in an office setting.

In the weeks that followed, cases accumulated in New York, New Jersey, Washington, D.C. and Connecticut. CDC deployed teams of epidemiologists, occupational health experts, industrial hygienists and environmental health professionals in response. In addition, it gathered nearly a third of its workforce at the headquarters to aid in the response. The response was staged in an old auditorium at the Atlanta headquarters set up on metal tables marked by paper signs, according to their mission.

**Epidemiology and Surveillance Response**

Suspicious envelopes sent on September 18 were meant to reach media company AMI and NBC, ABC, CBS and the New York Post. Envelopes mailed on Oct. 9 were sent to Senator Daschle’s and Senator Leahy’s offices. Four days after the September 18 envelopes were mailed, the first cluster of nine cases began. The second cluster began five days after the September 18 envelopes were mailed.

Officers from CDC’s EIS were deployed to establish surveillance, track exposed individuals and collect epidemiological data to identify risk factors for exposure.

Public health uses specific tools to define the extent of an outbreak. The team at CDC headquarters responsible for characterizing the event created a line list of patients with case descriptions, a database of clinical and environmental specimens from field teams and multiple reports.
The team created an epidemic curve that showed the date of onset of illness for 22 cases of bioterrorism-related anthrax. Two distinct case clusters were noted, with a 13-day period between the clusters in which no cases were reported. A single case of inhalational anthrax was noted in Connecticut 20 days after the second cluster of cases. The epidemiology team mapped out the flow of mail in these areas and identified the positive environmental samples, confirmed anthrax cases, and suspected cases.

Soon, CDC epidemiologists created a field tool kit to guide investigations. The learning curve was steep and the urgent requests for support unrelenting. To capture what was being learned in real time about how public health should respond to an anthrax event, the team created a “tool kit.”

The tool kit included 250 items meant to reduce the learning curve for investigations that followed by health departments and CDC. This practical tool kit included patient handouts, diagnostic and treatment algorithms, prophylaxis clinical materials and guidance, consent forms, training materials, templates for logs, shipping and lab protocols, and helpful hints learned along the way.

Environmental Response
CDC collected nearly 10,000 environmental samples to test for the organism’s presence which aided in determining agent sources and exposure pathways. Environmental sampling helped determine the extent and degree of contamination necessary to create risk assessments and support medical treatment and clean-up decisions. Environmental sampling also helped to guide decisions about reoccupying locations.

Laboratory Response
In 1996, CDC had only basic microbiology expertise with anthrax. By 2000, CDC had a highly trained but small cadre of laboratorians who could isolate \( B. \text{anthracis} \) and do the molecular subtyping, which became critical in the criminal investigation. Fortunately, CDC had also developed and trained the Laboratory Response Network so others across the country could isolate and identify anthrax bacterium.

They could identify anthrax bacteria by simple tests such as susceptibility of the anthrax bacteria to lysys by the gamma phage, or by using a more sophisticated approach such as direct fluorescent-antibody staining. Their laboratory capacity also included finding evidence of the organism’s DNA by polymerase chain reaction (PCR) from specimens from a patient’s affected tissue or site.

The first night after samples arrived at CDC, its anthrax laboratory processed 300 clinical and environmental specimens. Molecular subtyping confirmed that this strain was identical to the Ames strain.

Thousands of clinical and environmental specimens were processed by the CDC anthrax lab without a single miss in diagnosis. Isolating the anthrax bacterium from clinical or environmental specimen is not simple. The culture plate used was non-selective and could grow thousands of other bacteria present in these samples, making finding the specific organism a challenging hunt. At CDC, \( B. \text{anthracis} \) isolates were found on the four suspect envelopes, in 17 clinical specimens and in 106 environmental samples.

Across the nation, the laboratory response network tested an estimated 350,000 environmental samples and clinical specimens over an extended period. The results were used in site characterization assessments, post decontamination clearance and forensic investigations.

Interventions
Through a combination of environmental sampling and case-cluster investigation, CDC recommended 10,300 peo-
ple receive antimicrobial prophylaxis for 60 days. An estimated 32,000 began antimicrobial prophylaxis. A small number of persons requested vaccination also. CDC’s Strategic National Stockpile supported hundreds of rapid shipments of antibiotics around the country.

As the investigation progressed, EIS officers helped administer antibiotics, performed logistics management, and helped with risk communication. More than 100 EIS officers were in the field during the anthrax investigations.

Educational materials and counseling was initiated in small groups and health fairs were held to encourage people to continue the full course of antibiotics. CDC monitored for adherence and found that those who perceived the risk to be higher were more likely to finish the course of antibiotics. Importantly, no case of anthrax developed among the more than 10,000 people who received a course of antibiotics as a precaution based on their exposure risk.

**Information Response and Partnership**

Information sharing in the response became as essential as oxygen is to life. The demand for news and guidance at all levels of government, media, and a concerned public was crushing. Between September 11 and the end of November 2001, CDC issued more than 175 updates on the response reaching an estimated 7 million health professionals and the public.

HHS and CDC worked extensively to reach out to various groups within the health delivery system to inform them of what they knew. In addition to updates in the *CDC MMWR*, CDC sent notifications through its Health Alert Network and Lab Alert Network to state and local health departments.

**How did CDC work with state and local health departments during the anthrax response?**

In 2001, CDC had more than half a century of experience collaborating with state and local health departments and it knew their value during any outbreak response. CDC is not a regulatory agency and is invited by states and local health departments to work with them. During an event of national importance CDC’s footprint may be larger, but the need to collaborate remains.

No one knows a community or population better that the public health officials who serve them. However, a strong, integrated national public health infrastructure is critical to protecting the public’s health during large events. In 2001, CDC was not yet there, although it had been working to increase local capacity in critical response areas. The work state and local health departments did with the limited resources they had was immense. Naturally, the chaos of an event of this magnitude strained capacities and relationships. Overall, CDC tried to share what it knew as quickly as it knew it with all of those involved. In reverse, CDC saw its local and state partners strive to do the same.

The anthrax cases in Florida provided a good example of how CDC worked with state and local officials. After the first case resulted in death, CDC moved quickly to confirm the case of the second victim early on the evening of October 7. The CDC, HHS, FBI, DOJ, Florida Governor’s Office, Florida Public Health Department, and a local public health department quickly formulated a plan that got the word out overnight to the affected employees that they needed to come to the clinic for medicine and testing that very next morning. CDC shipped medicine to Florida overnight so it was there when the people arrived in the morning. And CDC and Florida officials issued a joint release at 11 p.m. on October 7 notifying the media and public of the second case. It was a good example of local, state, and federal officials working together to get out a message, send medicine and mobilize people to come get treatment — literally overnight on a Sunday evening.

**How would CDC characterize the response efforts? What were the most difficult aspects to respond to?**

The response efforts were unprecedented. CDC, public health, and the nation faced a silent enemy with unknown capacity. Uncertainty permeated the environment in which local, state, and federal governments along with private medical-care systems and organizations bravely and incessantly went to work. Collectively, public health and medicine had very little science or past bioterrorism experience to draw on as well as an out-dated, weakened public health infrastructure just beginning to get its footing in bioterrorism preparedness.

We took every available public health tool and adapted it to this new situation. Public health was innovative, dedicated, and relentless in working to stop the threat from this intentional release. We did it alongside new federal partners and under intense scrutiny. We disseminated public health information promptly and delivered medicine to people who needed it. As a result, five people too many lost their lives and countless others were saved. Deaths in this outbreak were far below expectations in that the fatality rate for inhalation anthrax was thought to be around 80 percent. The fatality rate in these attacks was about 40 percent.

Nonetheless, the desire is always to do more, better.
What were the biggest challenges or gaps? How have these changed or been addressed during the past decade.

CDC was challenged by the magnitude of the event and the weight of demand for information and recommendations. Situational awareness became more and more difficult and people did resort to informal ways to find out what they needed.

Our local and state partners were frustrated by “watching the sausage get made” at CDC as information changed and guidance changed with it. Information never flowed fast enough and completely enough for all of the stakeholders involved, including the public.

CDC had not yet adopted the incident command system and had challenges in forming systems to move vital information in multiple directions.

There were gaps in knowledge or gaps in the number of people with needed knowledge. For example, the fact that the first cutaneous cases were unrecognized in clinical settings demonstrated the challenge when preparing to respond to unusual diseases.

There were gaps in laboratory protocols, regulatory requirements and procedures to alert local and state health departments.

CDC has had a decade of events on which to hone its preparedness skills. From anthrax it moved on to respond to SARS, monkeypox, Hurricane Katrina, H1N1, Haiti earthquake and cholera outbreak, the oil spill and recently the Japan disasters.

CDC has come a long way from attempting to respond to 9/11 at a few tables in a conference room. Today CDC applies the incident command system with modifications to allow us to collaborate and communicate more efficiently. CDC has created the Office of Public Health Preparedness and Response that includes a Division of Emergency Operations which stands ready to assemble the teams necessary and scale up as required for any public health emergency. These functions now operate in a state-of-the-art facility that serves as a 24/7 command center for monitoring and coordinating CDC’s emergency response to public threats across the nation and abroad.

CDC laboratories and the National Laboratory Response Network are more proficient in detecting a range of biological agents that could be used as a weapon. CDC also has greatly increased its oversight of the safety and security of dangerous biological agents (such as the agent that causes anthrax) and toxins. In addition, CDC experts have worked with states to develop their plans for receiving and distributing antibiotics and other medical assets from CDC’s Strategic National Stockpile during a public health emergency including a bioterrorist attack. All 50 states now have these plans in place.

During the anthrax response, CDC learned that the linkages forged between clinical and public health communities are strong and these linkages saved lives by detecting illness early. We learned how to shorten the time lag between acquiring new knowledge, communication and action. We confirmed that close collaboration of local, state, and federal public health personnel builds confidence in local response. We have modified recommendations, refocused investigations and are quicker to adapt new scientific information into our response.

If there were an anthrax attack today, do you think the response would be different? How?

That’s a natural question to ask on a milestone anniversary. The simplest answer is CDC has multi-disciplined experienced and trained professionals now supported by a emergency operation center that could provide the surge capacity and evolving support needed if another anthrax event were to occur. CDC’s scientists and public health professionals have done exhaustive follow-up research and published extensively what they learned during and after the anthrax response in 2001. As such, CDC’s approach for communicating to the public and partners in a crisis has changed. CDC has added laboratory protocols and operating procedures for sampling and shipping specimens. It has refined safety training and conducted joint exercises for biologic agents. CDC has developed an environmental microbiology framework to identify threat agents, determine the risk of infection, and evaluate methods to reduce risk. CDC has described the reasons people may reject public health recommendations and treatment and developed educational materials to address their concerns.

CDC plays a key role in preparing the nation for all types of public health threats, including natural, biological, chemical, radiological and nuclear incidents. When a disaster occurs, CDC is prepared to respond and support national, state and local partners to save lives and reduce suffering. CDC also helps these partners recover and restore public health functions after the initial response.

CDC’s Office of Public Health Preparedness and Response (OPPHR) provides strategic direction, support, and coordination for CDC’s preparedness and emergency response activities.

Protecting the public from health threats involves public health preparedness as well as medical preparedness. Both are essential for national health security and, hence, to the overall preparedness of the nation.

- **Public health preparedness** is the ability of the public health system, community, and individuals to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those in which scale, timing, or unpredictability threatens to overwhelm routine capabilities.

- **Medical preparedness** is the ability of the health care system to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose
scale, timing, or unpredictability threatens to overwhelm routine capabilities. Medical preparedness generally is the responsibility of agencies other than CDC.

Emergency preparedness requires attention not just to specific types of hazards but also to steps that increase preparedness for any type of hazard, including training and exercises. CDC developed an emergency preparedness exercise toolkit intended to guide local public health agency staff in developing, implementing, and evaluating emergency drills and exercises, and facilitating the public health aspects of larger, multiagency emergency exercise events. The toolkit provides essential guidance including templates, checklists and forms to assist with every stage of the exercise process. Emphasis is on identification of objectives during the planning phase, a critical step for ensuring a meaningful post-exercise evaluation.

The resources below reflect the increasingly robust resources available from CDC to support the public health response.

- **The Health Alert Network (HAN)** HAN is a strong national program that provides Health Alerts, Health Advisories, Updates and Info Service Messages to state and local health officers, public information officers, epidemiologists and HAN coordinators as well as clinician organizations.

- **SNAPS: Snap Shots of State Population Data** SNAPS provides local-level community profile information nationwide. It can be browsed by county and state and searched by zip code. SNAPS serves as a valuable tool when responding to public health emergency events at the state, tribal, and local levels.

- **Surveillance** CDC has multiple resources for case definitions, illness recognition and detection, planning and systems.

- **Training & Education** CDC offers support and best practices for risk communications, public health and clinical training, and laboratory training.

- **Clinician Outreach and Communication Activity (COCA)** CDC’s COCA establishes partnerships with national clinician organizations to communicate information about disease outbreaks and terrorism events.

- **Healthcare Facilities** CDC has specific resources for individuals at healthcare facilities tasked with ensuring that their facility is as prepared as possible for an emergency.

- **Labs** CDC provides guidance on testing, agent identification, biosafety, specimen collection and shipping.

Collectively these and thousands of other steps have made CDC better prepared. While outcomes can’t be promised, CDC can promise it has learned what did and did not work during the anthrax attack and has held itself accountable for being as prepared as possible for future known and unknown threats to public health.

To learn more about CDC preparedness for anthrax and other hazards, visit http://emergency.cdc.gov/cdc/

**What do you think are the biggest threats or challenges to bioterrorism preparedness today?**

A potential threat may be the misguided belief that preparedness is a thing, something you create once and simply take off the shelf when you need it. Being prepared is an ongoing process and a collective mindset among all public officials and citizenry to the degree they are willing to invest time, resources and attention.

Our society is interconnected and accessible from anywhere across the globe. New technology and ill purpose can wreak havoc without notice.

Preparedness means good public health with an ability to deal with day-to-day disease threats, including detecting and responding to unusual diseases, having the capacity to diagnose rare illnesses, the laboratory acumen to know what you have, and the insight to know what it means to our citizenry’s health. Collectively, these things and the means to respond swiftly are the foundation of preparedness against acts of bioterrorism.

Because of its unique abilities to respond to infectious, occupational, or environmental outbreaks and events, CDC plays a pivotal role in public health preparedness for catastrophic events. CDC focuses on strengthening response capabilities within the agency as well as externally by providing resources to help strengthen preparedness at state, local, tribal and territorial levels. Many preparedness activities occur on a daily basis, such as monitoring for real or potential public health emergency threats. These and other types of activities can be expanded to respond to emergency scenarios such as pandemic influenza.

National emergency preparedness requires a coordinated effort involving every level of government as well as the private sector, non-governmental organizations and individual citizens. CDC’s work in preparedness supports the Department of Homeland Security, which has overall authority for emergency response activities as laid out in the National Response Framework.

CDC is committed to working with other federal agencies and partners as well as state and local public health departments to ensure the health and medical care of our citizens. The best public health strategy to protect the health of civilians against biological terrorism is a strengthened public health system including public health laboratory capacity, increased surveillance and outbreak investigation capacity and education and training at the local, state and federal level.

CDC works 24/7 saving lives, protecting people from health threats and saving money through prevention resulting in a more secure nation. CDC puts science and prevention into action to make the healthy choice the easy choice. CDC helps people live longer and healthier to lead productive lives.

To learn more about CDC public health emergency preparedness and response, visit: www.cdc.gov/phpr.