The Anthrax Events In Florida

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In March 2000, I accepted the newly created position of Biological Defense Coordinator at the Florida Department of Health (DOH), Bureau of Laboratories (BOL) in Jacksonville. I had worked for the BOL for almost five years as a microbiologist in the virology, tuberculosis and molecular biology laboratories. In response to a growing concern for bioterrorism, the Centers for Disease Control and Prevention (CDC), the Federal Bureau of Investigation (FBI) and the Association of Public Health Laboratories established the Laboratory Response Network (LRN) in August 1999 with the mission to provide a robust laboratory infrastructure to detect agents of bioterrorism. In 2000, three of the five Bureau of Laboratories’ locations (Jacksonville, Miami and Tampa) became LRN reference laboratories. Pensacola was later added in the summer of 2005.

In October 2000, I participated in the first training course at CDC to identify agents of bioterrorism. The week-long course covered the organisms of greatest concern, including *Bacillus anthracis*, the causative organism of anthrax. Almost a year to the day we received a call late in the afternoon from a clinical laboratory in Fort Lauderdale, Integrated Regional Laboratories (IRL), that they were sending us a patient’s specimen that they could not rule out *B. anthracis*. In the previous months the BOL had trained clinical laboratories, including IRL, on the microbiological methods used to rule out bioterrorism threat agents and the referral procedures in the event that they could not rule out such an agent. I received that specimen around noon on October 3, 2001. I immediately started the analyses that I had been taught at CDC. At that time, LRN reference laboratories had the capability to confirm the identification of biothreat agents using only conventional microbiological techniques, which involve culturing and growing the organism. This can take up to 24 hours for *B. anthracis*. Rapid molecular methods, such as real-time PCR, that detect DNA specific to the organism were not available to us at that time. However, CDC had already performed a multi-center validation study for *B. anthracis* DNA detection and released the method to the public health LRN laboratories mid-October 2001, only then allowing detection of the organism in less than six hours.

Without the benefit of the rapid molecular methods, two key conventional microbiological methods were required to identify *B. anthracis*, one of which required overnight growth of the organism in culture. Throughout the afternoon and evening of October 3, I ran the one key test and obtained a positive result for *B. anthracis* a little after 10:00 p.m. that night. During this time, CDC arranged the transfer of the specimen to Atlanta for additional testing and characterization. I left the laboratory at 11:30 p.m. and returned the following morning to read the results of the second key test. At 8:30 a.m. on October 4, 2001, I confirmed the identification of *B. anthracis* in the index patient who had been admitted to JFK Medical Center in Atlantis, Florida, and whose specimen had been submitted by IRL. The sample was flown to CDC on October 4.

During my training as a Biological Defense Coordinator, I had learned that a typical bioterrorism scenario could involve an intentional release of an organism in a localized, highly populated area, such as a football stadium. In such an event, numerous patients would be expected from a small geographical area. Since this followed so closely the tragedy of September 11th, the Florida Department of Health sent an alert to all hospitals and physicians within the state requesting immediate notification of any patient exhibiting symptoms of anthrax. One additional
patient was identified that had been hospitalized since October 1. Because only one additional patient matched the criteria rather than hundreds, I was hopeful that these were naturally-acquired infections, not an act of terrorism. However, the fact that anthrax is not endemic in Florida was more than a little concerning.

In addition to surveillance for new cases of anthrax, the DOH Bureau of Epidemiology investigated both cases identified. They obtained samples from areas where the patients had been prior to hospitalization, including their workplace. These samples were sent to the BOL — Miami. A nasal swab of the second patient was also tested by the BOL. Both this nasal swab and a sample taken from the index patient’s computer workstation tested positive for B. anthracis. Since the second patient was a coworker of the index patient at American Media Inc. (AMI) and the index patient’s computer at AMI was contaminated with B. anthracis spores, it then appeared that this was an intentional release at the workplace. Further laboratory testing on samples collected by the Environmental Protection Agency (EPA) confirmed this.

Following a press release, on October 8, 1,114 people who worked in or had visited the AMI building during the previous 60 days presented at the Palm Beach County Health Department (CHD) for prophylactic ciprofloxacin. Palm Beach CHD collected 1,076 nasal swabs and submitted them for testing at the BOL — Miami. One additional AMI mail worker tested positive, but never developed symptoms of the disease.

The additional laboratory testing determined that the AMI mail room and company mail van were grossly contaminated so it was assumed that the source of the B. anthracis spores was possibly via the U.S. Postal Service. Once this was communicated through the media to the general public, people felt they were potential victims and started seeing mail and common spilled household white powders (flour, corn starch, etc.) as potentially spore-laden materials.

On October 10, 2001, we started to receive these suspicious materials at the BOL. The first such sample received was delivered by our FBI Weapons of Mass Destruction Coordinator. It was a Federal Express package of film slides and negatives sent to a Jacksonville business from the AMI photographic editing department. Thankfully, the presence of B. anthracis was able to be ruled out, to the relief to the business owner and the employees.

The following day saw a steady increase in the numbers of such samples received and it soon became obvious that help was needed. Fortunately, the BOL — Jacksonville laboratory is one of the largest tuberculosis testing laboratories in the United States. TB laboratories are high containment facilities, designated biosafety level 3 (BSL-3), with engineering controls and special microbiological practices, including the use of respirators, designed to ensure the safety of laboratory personnel and prevent release of organisms into the environment. BSL-3 laboratories are also required to safely handle and work with B. anthracis. With such facilities, including many biological safety cabinets and isolation rooms, and many staff trained to work in them we were able to manage the increased workload. Employees volunteered and were reassigned with everyone having a role to play. At BOL — Jacksonville, we had 18 microbiologists from the TB and General Bacteriology laboratories participating in the analyses of samples; Yvonne Sallinger, Microbiology Laboratory Administrator, organized staffing; Susanne Crowe, Virology/Serology Laboratory Administrator, managed the sample database; Dr. Dean Willis, Chief of Infectious Diseases and Clinical Services, facilitated laboratory operations and logistics and was media liaison; Dr. Ming Chan, Jacksonville Laboratory Director and Bureau Chief, coordinated the activities of all BOL sites and communicated essential information to the Florida Department of Health Secretary and Governor. In addition, a plethora of support personnel were involved in sample receipt, data entry, ordering and receiving supplies, financial management, information technology support and results reporting. At the height of the crisis, the laboratory operated 18 hours per day, seven days a week, with staff work hours staggered to optimize availability to manage the workload.

As the crisis escalated with additional anthrax victims identified in other states, the work volume remained high for several months. Between October 2001 and June 2002 the BOL — Jacksonville, Miami and Tampa LRN laboratories processed 10,690 samples for B. anthracis. This included both clinical patient specimens from our hospital sentinel laboratory partners as well as environmental samples, including many hoax threats. One of the more concerning of these was perpetrated by Clayton Lee Waagner. Waagner, at the time one of the FBI’s 10 most wanted fugitives, mailed letters and Federal Express packages to more than 250 abortion clinics nationwide. The packages contained powder laced with high concentrations of Bacillus thuringiensis spores. B. thuringiensis, an insect pathogen used as a biological insecticide, is genetically closely related to B. anthracis, but is not harmful to peo-
Between October 15 and 17, 2001, BOL — Jacksonville received and tested seven such letters mailed to Planned Parenthood Clinics in Florida and an additional seven Federal Express packages received November 8 through 10, 2001. These tested positive for *B. thuringiensis* and negative for *B. anthracis*.

The types of environmental samples received were variable to say the least. From the obvious bulk mail from post offices, suspicious mail from homeowners and powder samples (including powdered doughnuts), to the more obscure airline seat covers, dead birds, body bags, teddy bears, disposable underpants, a Marilyn Monroe effigy and residential mail boxes together with post and concrete anchor. It seemed nothing was too bizarre, but each presented a new challenge, not only to those of us in the laboratory attempting to safely handle and provide quality testing, but also to the first responders collecting and packaging such items for delivery to the laboratory.

The partnerships we had begun to develop with the first responders during the previous year were solidified. We worked so closely with a multitude of agencies, such as local, state and federal law enforcement officers, postal inspectors, fire department hazardous materials (HazMat) teams and police bomb squads, that we knew each other on a first name basis. The same can be said of our clinical partners in the hospital sentinel laboratories and county health departments. Over the past ten years these partnerships have continued to strengthen. With the direction of Associate Bureau Chief and BOL — Tampa Director, Dr. Phil Amuso, and the University of South Florida’s Center for Biological Defense, we provide environmental sample collection training to all HazMat and first responder personnel in Florida and sentinel laboratory biological defense training to all clinical microbiology laboratories.

Despite the increased workload and extended working hours, throughout the entire anthrax event, the BOL continued to deliver all daily public health services. Each day thousands of specimens were received and tested for tuberculosis, HIV, hepatitis viruses, sexually transmitted diseases, rabies, influenza, food borne illnesses, genetic disorders of newborns and many others.

Throughout the anthrax events the BOL LRN laboratories proved to be essential to both the public health investigation as well as the FBI’s criminal investigation. The laboratory confirmed *B. anthracis* as the cause of infection in the index patient; identified other exposed persons by isolating *B. anthracis* from the nasal swabs of the second patient and an asymptomatic AMI mail worker; ascertained a workplace exposure to spores; and together with the EPA determined the mechanism of dissemination of the agent via the U.S. Postal Service.

The foresight that went into the establishment of the LRN was phenomenal. Before the inception of the LRN, the majority of state public health laboratories were not able to quickly and definitively identify *B. anthracis*. Cultures would have to have been sent to CDC for identification. The decentralized LRN approach gave state and local public health laboratories the capability to identify many bioterrorism threat agents. A key part of the LRN is a CDC comprehensive training program for biological defense personnel such as me, on which I have been an instructor since 2005, as well as sentinel laboratory outreach performed by the public health LRN laboratories. Without the LRN, the 2001 anthrax events could have taken a very different path, likely delaying initial patient diagnosis and almost certainly lengthening the turnaround time for environmental sample testing due to the overwhelming number of samples to be tested at CDC. The major consequence in delaying diagnosis, particularly with organisms such as *B. anthracis*, which can be fatal if not recognized early in the course of infection, could have been a much higher incident of clinical cases and resulting mortality.

The lessons learned from the anthrax events of 2001 and the subsequent injection of additional state and federal funding has greatly increased Florida’s capability and capacity to respond to public health emergencies, whether due to terrorism, natural disasters, or outbreaks or emerging infectious diseases, such as SARS and 2009 H1N1 Influenza.