

Review of Fall 2001 Anthrax Bioattacks

(under construction)

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Summary:

From mid-September to November 2001, a number of anthrax-laced letters were mailed to news media offices on the U.S. east coast and to the U.S. Congress. A total of 22 individuals contracted either cutaneous anthrax (11 cases) or inhalational anthrax (11 cases), and 5 died (all from inhalational anthrax). Anthrax cases included individuals at targeted locations (9 cases), postal service employees (9 cases), individuals who handled cross-contaminated mail (2 cases), and individuals with unpinpointed exposures (2 cases). An additional case of cutaneous anthrax occurred in March 2002 due to laboratory exposure to collected samples.

The anthrax employed in the letters was a common genetic strain and had been treated to maximize its tendency to aerosolize. The genetic strain as well as the method of weaponization suggest the perpetrator(s) had access to U.S. bioweapons research facilities. The perpetrator (or perpetrators) remain unidentified, although the investigation came to focus on a domestic source.

Background:

Anthrax is a bacterial disease caused by *Bacillus anthracis*. Three forms of exposure exist--cutaneous (skin exposure), gastrointestinal (entering through the digestive system), and inhalation. Naturally-occurring anthrax is generally contracted from infected livestock. Most modern natural cases of anthrax are cutaneous. Inhalational anthrax has a higher case-fatality rate than the other two forms. Given the relatively low LD-50 and the persistence of anthrax in the environment in the form of inert spores, anthrax has been weaponized by several national bioweapons programs.

Most nations ceased offensive bioweapons research in accordance with the Biological Weapons Convention treaty. The United States ceased its programs in 1970, but continued research for defensive purposes. The Soviet Union continued a large-scale biowarfare program. In April 1979 an accidental leak from a Soviet bioweapons production facility in the city of Sverdlovsk, Russia, resulted in an anthrax outbreak which caused at 68 deaths (some reports suggest about 100 fatalities among 250 to 450 cases). In 1995 Iraq admitted to research and production of weaponized anthrax. Aum Shinrikyo, a group which conducted terrorist attacks using sarin nerve gas in Tokyo in 1995, had engaged in research and attempted use of anthrax but was apparently unsuccessful.

In the United States, anthrax is currently a rare disease. Prior to 2001, the last case of inhalational anthrax in the United States was in 1976.

Cases: (incomplete)

Cases are discussed in groups by known or presumed exposure site, followed by table 1 listing all cases.

- **Boca Raton, Florida:** Robert Stevens, 63, a photo editor at the AMI tabloid newspaper Sun, died

of inhalation anthrax. He was apparently exposed prior to departing on vacation 26 Sept. 2001 and fell ill 30 Sept. Stephens was brought to JFK Medical Center in Palm Beach at 0230 on 2 Oct.; four hours later he was comatose. Anthrax was suspected the same day by hospital staff and confirmed by the CDC on 4 Oct. Stevens died the afternoon of 5 Oct. Tests found anthrax at AMI offices at 5401 Broken Sound Blvd. in Boca Raton, FL; the building was subsequently quarantined. Unconfirmed reports suggest that the source was a letter received in late Sept. addressed to singer Jennifer Lopez. Two mailroom workers tested positive for exposure to anthrax. One of these workers, E. Blanco, 73, was hospitalized and subsequently diagnosed with inhalational anthrax 15 Oct.; he recovered and left the hospital about 24 Oct. Two hospitalized co-workers turned out to have pneumonia and recovered. On 13 Oct. five more employees were found to have been exposed to anthrax. Traces of anthrax were found in a Boca Raton post office on 15 Oct. and later in two additional post offices (in Boca Raton and Lake Worth). Two suspected terrorists in the 11 Sept. attacks rented an apartment in Delray Beach from the wife of the Sun's editor, although this is believed coincidental.

- **New York City, New York:** A letter addressed to NBC news anchor Tom Brokaw contained anthrax. E. O'Connor, the staff member who opened it (around 20 Sept.) contracted cutaneous anthrax, becoming symptomatic about 29 Sept. O'Connor saw a doctor on 1 Oct. who suspected anthrax; she subsequently recovered. The letter was postmarked 18 Sept. from Trenton, NJ, and contained a brown granular material. (Initial suspicion erroneously focused on a letter postmarked 20 Sept. from St. Petersburg, FL, accompanied by a white powder.) A police officer and two laboratory technicians who handled the letter were exposed to spores, it was announced 14 Oct. Anthrax was at one point suspected to have been spread to the Manhattan office of Governor Pataki, but later tests discounted this.
- **New York City, New York:** The 7-month old son of an ABC employee has tested positive for cutaneous anthrax, it was announced 15 Oct. The child recovered. It is suspected but not established that the child was exposed in a visit to ABC offices on West 66th St. in New York City on 28 Sept. The child was hospitalized shortly thereafter.
- **New York City, New York:** C. Fletcher, 27, a female staff member of CBS has developed cutaneous anthrax from an unknown source, presumed to be a letter, it was announced 18 Oct. The employee, an assistant to Dan Rather, has recovered. She is a British citizen.
- **New York City, New York:** J. Huden, 30, an employee of the New York Post, contracted cutaneous anthrax; the source is unknown but is presumably a letter. She first noticed symptoms on 22 Sept. and was prescribed antibiotics, but was not tested for anthrax until after Oct. 12. Two other New York Post employees also developed cutaneous anthrax. A letter was recovered at this location.
- **Washington, DC, area:** A letter addressed to Senate Majority Leader Tom Daschle tested positive for anthrax. The letter was opened in his office in the Hart building across from the Capitol in Washington, DC, on 15 Oct. About 40 staffers were in his office at the time; about 28 were found to have been exposed. The letter was postmarked 9 Oct. from Trenton, NJ, and contained a white powder. The House of Representatives recessed on 17 Oct. for several days to allow decontamination of office areas. During the period of recess contamination by anthrax was found in several locations, including sites in the Hart office building. From 25-27 Oct. anthrax contamination was found in the following sites: a CIA building; a building where White House mail is processed; and a Supreme Court site. A media employee present at the Senate office building when the original letter was opened was diagnosed with inhalation anthrax around 26 Oct., but later concluded not to have anthrax.

Two Washington postal workers died of inhalation anthrax on 22 Oct.: Joseph P. Curseen, 47, and Thomas L. Morris, Jr., 55: on 21 Oct. a postal worker from Washington's Brentwood postal facility went to the emergency room of an area hospital and was sent home diagnosed with the flu; on 22 Oct. he was brought back by ambulance. Both this individual and another Brentwood postal worker hospitalized the morning of 22 Oct. died later that day. Two other workers are confirmed by 23 Oct. to have inhalation anthrax (one 35-year old male who handles mail and one 41-year old female postal union official), with 9 others showing possible symptoms.

- **Trenton area, New Jersey:** On 18 Oct. two postal workers in New Jersey were reported to have cutaneous anthrax. One was a female letter carrier at the West Trenton post office in Ewing, NJ, who developed symptoms on 27 Sept. The other was a 35-year old man who is a letter sorter in Hamilton, NJ. These exposures presumably represent contact with letters mailed from this location. On 23 Oct. a female postal worker from Trenton is reported to have inhalation anthrax.
- **Virginia:** One employee of the State Department, a mail handler, developed anthrax.
- **New York City, New York:** Kathy Nguyen, a hospital supply worker, developed anthrax and died 31 Oct. 2001. The source of her exposure was never identified. The subway system in New York City was tested extensively following identification of her case but with negative results.
- **Oxford, Connecticut:** Otilie Lundgren, a retired 94-year-old woman, died of inhalation anthrax on 21 Nov. 2001. Investigation eventually indicated that she was exposed through cross-contamination of mail. One of the anthrax letters mailed to Congress passed through a postal sorting machine 20 seconds before a letter addressed to a location 6 km from Lundgren's residence. This letter was presumably the letter mailed 9 Oct. to Senator Leahy which was misdirected and was discovered 16 Nov. in isolated mail. The local post office handling Lundgren's mail was found contaminated by anthrax.
- **Houston(?), Texas:** An unnamed laboratory worker developed cutaneous anthrax in March 2002. The lab was among a large number of labs enlisted to process anthrax samples in conjunction with response to the bioattacks. The worker handled anthrax samples without gloves, causing infection through a cut.

Table 1: Cases of anthrax associated with fall 2001 bioterrorism

CDC case #	name *	onset	lab diagnosis	age	sex	race	type	exposure site	letter	statu
1	J. Huden	9/22/01	10/19/01	31	F	white	C	NY Post, New York City, NY	5	
2	E. O'Conner	9/25/01	10/12/01	38	F	white	C	NBC, New York City, NY	2	
3	R. Morgano	9/26/01	10/18/01	39	M	white	C	? (USPS, Hamilton, New Jersey)	?	

4	E. Blanco	9/28/01	10/15/01	73	M	hispanic	I	AMI, West Palm Beach, FL	1	
5	T. Heller	9/28/01	10/18/01	45	F	white	C	USPS, Hamilton, NJ	1/5-C	
6	C. Chamberlain	9/28/01	10/12/01	23	F	white	C	NBC, New York City, NY	2	
7	anonymous	9/29/01	10/15/01	0.6	M	white	C	ABC, New York City, NY	3	
8	Robert Stevens	9/30/01	10/4/01	63	M	white	I	AMI, West Palm Beach, FL	1	died 10/5/0
9	C. Fletcher	10/1/01	10/18/01	27	F	white	C	CBS, New York City, NY	4	
10	P. O'Donnell	10/14/01	10/19/01	35	M	white	C	USPS, Hamilton, NJ	6/7-C	
11	N. Wallace	10/14/01	10/28/01	56	F	black	I	USPS, Hamilton, NJ	6/7-C	
12	J. Patel	10/15/01	10/29/01	43	F	Asian	I	USPS, Hamilton, NJ	6/7-C	
13	L. Richmond	10/16/01	10/21/01	56	M	black	I	USPS Brentwood, Washington, DC	6-C	
14	Thomas Morris, Jr.	10/16/01	10/23/01	55	M	black	I	USPS Brentwood, Washington, DC	6-C	died 10/22/
15	Joseph Curseen	10/16/01	10/26/01	47	M	black	I	USPS Brentwood, Washington, DC	6-C	died 10/22/
								USPS		

16	anonymous	10/16/01	10/22/01	56	M	black	I	Brentwood, Washington, DC	6-C	
17	L. Burch	10/17/01	10/29/01	51	F	white	C	? (New Jersey)	?	
18	anonymous	10/19/01	10/22/01	34	M	hispanic	C	NY Post, New York City, NY	5	
19	D. Hose	10/22/01	10/25/01	59	M	white	I	State Dept., Alexandria, VA	6-C	
20	M. Cunningham	10/23/01	10/28/01	38	M	white	C	NY Post, New York City, NY	5	
21	Kathy Nguyen	10/25/01	10/30/01	61	F	Asian	I	? (New York City, NY)	?	died 10/31/
22	Ottilie Lundgren	11/14/01	11/21/01	94	F	white	I	(residence, Oxford, CT)	7-C	died 11/21/
23	anonymous	3/1/02	3/5/02	?	M	?	C	laboratory (UTHSC?), Houston?, TX	1/7-L	

* Notes to table: several survivors have chosen not to be publically identified; those survivors that have chosen to be publically identified are listed here only by first initial and last name. Type of anthrax case is cutaneous (C) or inhalation (I). Number of letter of known or presumed exposure is identified in table 2; "-C" indicated cross-contamination, not direct exposure, from that letter. This table is based principally on Jernigan et al. (2001) (excepting names of individuals).

Source letters: (incomplete)

Only four letters used for the anthrax attacks were recovered by investigators. At least three additional letters are presumed based on sites where cases developed. Two known letters (and the three presumed letters) were mailed on 18 Sept. to news media offices in Florida (1) and New York City (4). Two known letters were mailed on 9 Oct. to the Washington, DC, offices of Senators Daschle and Leahy (the Leahy letter never reached its destination). The anthrax in the 9 Oct. letters was more readily aerosolized, with the result of multiple anthrax cases (some fatal) among postal employees.

Table 2: Known and presumed anthrax letters

letter	date mailed	date recovered	target	resulting cases (by CDC #)
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1	9/18/01	no	AMI, FL	4, 8	5
2	9/18/01	(9/20/01)	NBC, NY	2, 6	
3	9/18/01	no	ABC, NY	7	
4	9/18/01	no	CBS, NY	9	
5	9/18/01	(9/22/01)	NY Post, NY	1, 18, 20	
6	10/9/01	10/15/01	Daschle, DC	13, 14, 15, 16	10, 11, 12
7	10/9/01	11/16/01	Leahy, DC	19, 22	
unknown				3, 17, 21	

Anthrax origin: (incomplete)

Perpetrator: (incomplete)

Other reports:

A letter to a doctor in a foreign country tested positive for anthrax. CDC genetic typing found that this anthrax was a different strain from those used in the domestic attacks. The CDC report only identifies the country as "Country B". This is probably the letter received by a doctor in Chile, carrying a Florida return address but postmarked from Switzerland. Based on the genetic typing this is not related to the U.S. attacks.

On 19 Oct. 2001 authorities had reported that a travel brochure received by a family in Buenos Aires, Argentina, tested positive for anthrax. The letter was mailed from Miami, FL. This may have later been proven false.

A number of additional letters were initially reported to contain anthrax, but were found not to contain anthrax after further testing. This includes: a letter to a Microsoft facility in Reno, NV, mailed from Malaysia; one to the New York Times building in New York City; one to a New York Times office in Brasilia, Brazil; one to a doctor in Nairobi, Kenya, mailed from Atlanta, GA.

Response: (incomplete)

The total cost of the anthrax bioattacks was certainly over \$1 billion. Decontamination of the Senate office building, conducted by the EPA, cost \$23 million. Decontamination of the Brentwood postal facility cost \$130 million. Decontamination of the Hamilton postal facility was not completed until March 2005. Through 2002, the U.S. Postal Service had received \$700 million in funding for decontamination of facilities, health care, and procurement of irradiation equipment for irradiating mail. Additional uncounted costs at local levels include cleanup and response to false alarms over "white powder" of household origin, and lost productivity associated with resultant work stoppages.

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