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Florida Anthrax Case Triggers Prompt, Professional Response from Public Health Agencies

On October 4, 2001, the Florida Department of Health and the US Department of Health and Human Services announced that a 63-year-old male hospitalized in Florida was diagnosed with meningeal anthrax. His exposure had occurred at his worksite, the American Media Inc (AMI) building. This report provides an overview of meningeal anthrax, describes the public health response to the Florida situation, and supplements information in previous Disease Prevention News (DPN) articles on anthrax. It also gives references, including clickable Internet links to other current, applicable information.

In addition to evidence of central nervous system involvement in the Florida man's case of meningeal anthrax, mediastinal widening was noted on his chest x-ray. The man subsequently died. The diagnosis was confirmed by the Centers for Disease Control and Prevention (CDC) using several different laboratory methodologies including polymerase chain reaction testing of blood and cerebrospinal fluid. An epidemiological investigation was implemented over the course of the next week. As part of this ongoing investigation, *Bacillis anthracis* was identified in nasal samples from at least 2 additional workers at AMI. No other workers are known to have illness consistent with anthrax. The ongoing investigation has also detected *B. anthracis* in the AMI building. Final results on the other environmental samples will not be available for several days. In the meantime, public health officials, in cooperation with the company, have secured the building and are contacting workers and visitors to the building.

General Anthrax Information

Information on diagnosis and treatment of both pulmonary and cutaneous anthrax can be found at the following Websites:

www.tdh.state.tx.us/bioterrorism
www.tdh.state.tx.us/phpep/dpn/dpnissue.htm (Vol.61 No.17)

Additional information on anthrax and other BT agents can be found at the CDC site:

www.bt.cdc.gov

The Journal of the American Medical Association has an excellent article online that addresses anthrax treatment issues:

www.jama.ama-assn.org/issues/v281n18/ffull/jst80027.html (Vol.281 No.18)

Meningeal Anthrax

Meningeal anthrax is exceedingly rare, even in countries or during times in which endemic anthrax is common. A 1952 review described 95 cases that had appeared in the medical literature from the mid-1870s through the early 1950s.[1] Significant pertinent data were available for only 70, which were further summarized: 37 (53%) of the 70 had obvious primary cutaneous anthrax lesions; 16 (23%), primary pulmonary lesions; 6 (8%), intestinal lesions; and one each, a combination of cutaneous and pulmonary lesions or of cutaneous and intestinal lesions. One of the remaining 9 cases occurred in a newborn whose mother had anthrax, and 8 (11%) had no obvious primary focus. Almost all (98%) of the patients with meningeal involvement died.

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The number of nonmeningeal anthrax cases for the same time period cannot be estimated but would likely have been many thousand. At the time of the report (1950s), 60 to 80 (mostly industrial) anthrax cases per year were reported for the US alone, and at least one 30-year series describes 2,400 industrial cases. The rarity of meningeal forms of anthrax is further illustrated by more recent data (1970-1980) from Zimbabwe.[2] Only a handful of meningeal cases[2,3] were associated with the large epidemic that accompanied the rampant epizootic that occurred in Zimbabwe during this time; overall, more than 9,500 human cases were recorded during this outbreak.

In the above-mentioned 1952 review of meningeal anthrax, patients' symptoms included initially high temperatures that often dropped to abnormally low levels later in the illness; the typical duration of illness was 2 to 4 days (range 1-6).[1] Peripheral leukocytosis was the rule.

> Frequently, there was a sudden onset with malaise, intense headache, dizziness, chilliness or frank chills, myalgia, nausea and vomiting, and general restlessness. The occasional presence of a petechial rash made the differential diagnosis from meningococcemia important.[1]

The cerebrospinal fluid is almost always xanthochromic, and differentiation from spontaneous subarachnoid hemorrhage may be difficult. 8 cases are summarized in Table 1: 5 patients were from Zimbabwe,[3] 1 from Greece,[4] and 2 from the US.[1] Missing information for individual cases was unavailable.

In contrast to the extreme rarity of meningeal anthrax in the industrial or endemic/enzootic setting, meningeal findings were very common in the Sverdlovsk industrial anthrax accident in Russia in 1979,[5] an accidental release of spores from a bio-weapons plant. Twenty-one (50%) of the 42 primary inhalational anthrax case-patients for whom autopsy data were available also had evidence of meningeal involvement. A reanalysis of the tabular data presented in this report shows that the duration of illness varied for patients who had meningeal involvement compared with those who did not. For the patients for whom illness duration can be calculated, the mean duration of illness for 14 patients with meningeal signs was 2.8 days compared with 5.8 days for those without ($p = 0.02$).

Clinical information is generally unavailable for this case series. However, anecdotal information suggests the

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Table 1. Summary of 8 Meningeal Anthrax Cases

Demog		Signs & Symptoms				Cerebrospinal Fluid						Blood
Age	Sex	T(C)	Seizure	LOC	Cutaneous Lesion	WBC/mm³	RBCs/mm³	Glucose	Protein	G(+)	Cult	Cult
56	F	39.6	Y	Y	Y	4,000	3.600	5	1,400	Y	Y	Y
40	M	-	Y	-	Y	-	-	-	-	-	Y	-
57	M	-	-	Y	Y	10,000	60	130	265	Y	Y	-
58	M	35.0	-	Y	Y	-	-	-	-	-	Y	Y
9	F	39.5	Y	Y	Y	6,300	1,100	11	2,035	Y	Y	Y
13	F	↑	Y	Y	Y	2,200	-	10	2,800	Y	Y	-
61	M	40.5	Y	Y	Y	2,790	xantho	57	211	Y	Y	-
29	F	40.5	Y	Y	N	3,000	400	56	400	Y	Y	Y

- Information unavailable

patients were often initially diagnosed with pneumonia, presumably because of shortness of breath and fever, but that myocardial infarction was also considered in the differential because of accompanying severe chest pain.

In summary, patients with meningeal anthrax present with signs of meningeal irritation, and their work-up should be similar to that of other meningitis patients and should include a spinal tap. The spinal fluid is often cloudy and pink; Gram (+) bacilli can usually be identified quickly.

Other Lesions Associated with Primary Inhalational Anthrax

A few other facts from the Russian inhalational autopsy series[5] are particularly noteworthy. Unlike pulmonary anthrax secondary to hematogenous spread from primary cutaneous anthrax, the pulmonary lesions in primary inhalational anthrax include severe local effects at the primary site, thoracic hemorrhagic necrotizing lymphadenitis, and hemorrhagic necrotizing mediastinitis. A single primary lesion similar to a Ghon focus was observed in 11 (46%). Gastrointestinal lesions were observed in 39 (93%) of the 42 cases. Unlike primary gastrointestinal anthrax, in which lesions tend to be solitary and involve the terminal ileum or cecum, these gastrointestinal lesions were numerous and involved many regions of the gastrointestinal tract, including the stomach and jejunum; they appeared to be of hematogenous origin.

Possible Exposures: Florida AMI Building Workers and Visitors

A few Texas residents visited the AMI building after August 1, 2001. As a precautionary measure, persons known to have been in the AMI building since August 1, 2001, will be contacted and told to see a doctor. As part of their evaluation, these persons need to have
1) nasopharyngeal swabs and
2) serum for anthrax serology obtained and transported in a tiger-top tube.
They should also be given antibiotic chemoprophylaxis in consultation with the Texas Department of Health (TDH) (512/458-7676). Health professionals should report any patients matching the above profile to their local health departments. The information will, in turn, be relayed to TDH and the CDC/ Palm Beach County Health Department.

Nonexposures and Noncases

Secondary transmission of anthrax, i.e. person-to-person or fomite-to-person, does not occur. In other words, a household contact of a fulltime worker at the AMI building is at **NO** increased risk over the general public. Likewise, persons who purchase newspapers published in the AMI building are **NOT** at increased risk over the general public.

Neither antibiotic chemoprophylaxis nor anthrax vaccine is warranted for patients without known anthrax exposure. The Texas anthrax epizootic from earlier this year is finished. To date the only known possible anthrax exposures in Texas are among the few individuals who visited the AMI building after August 1, 2001. Inappropriate or unwarranted antibiotic treatment will lead to resistance and decrease the useful future efficiency of the antibiotics used. For more information on this subject, visit the Infectious Disease Society of America Website:

www.idsociety.org

Patients must be reassured that normal daily activities should be continued.

Physicians should keep in mind that early symptoms of anthrax are described as "flu-like." Texas has already identified positive influenza isolates and will soon be entering the official

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"flu season." In addition to appropriately vaccinating at- risk populations against influenza, physicians are encouraged to perform viral cultures on patients with flu-like illnesses who present early in the season. Viral cultures may be submitted to the TDH Bureau of Laboratories at 1100 West 49th Street, Austin, TX 78756.

Further laboratory submission information is available at the TDH Website:

www.tdh.state.tx.us/lab
under Manual of Reference Services.

Rapid influenza tests may also be useful. Hospitals and clinics are encouraged to have kits on hand.

Prepared by Kate Hendricks, MD, MPH&TM, Director, and Michael McElwain, MPH, TDH Infectious Disease Epidemiology and Surveillance Division.

References

1. Haight TH. Anthrax meningitis: review of literature and report of two cases with autopsies. *Am J Med Sci.* 1952; 224:57-68.

2. Davies JCA. A major epidemic of anthrax in Zimbabwe: the spread of the epidemic in Metabeleland, Midlands and Mashonaland Provinces during the period November 1978 to October 1980. *Central African J Med.* 1982 Dec;28(12): 291-298.

3. Levy LM, Baker N, Meyer M, Crosland P, Hampton J. Anthrax meningitis in Zimbabwe. *Central African J Med.* 1981 Jun;27(6):101-104.

4. Manios S, Kavaliotis J. Anthrax in children: a long forgotten potentially fatal infection. Scand *J Infect Dis.* 1979; 11:203-206.

5. Abramova FA, Grinberg LM, Yampolskaya OV, Walker DH. Pathology of inhalational anthrax in 42 cases from the Sverdlovsk outbreak of 1979. *Proc Natl Acad Sci USA.* 1993;90:2291-2294.

Information useful to a clinical lab regarding threat agent identification is available at www.tdh.state.tx.us/bioterrorism).

Physicians with questions not answered in the reference sources noted in this report may contact Kate Hendricks at 512/458-7677, kate.hendricks@tdh.state.tx.us, *or Julie Rawlings*, MPH, IDEAS, at 512/458-7228, julie.rawlings@tdh.state.tx.us.

As always, report unusual clusters or presentations of illness to the local health department by calling this number: 800/705-8868

Influenza Prevention and Control: 2001-2002

Vaccine Supply

More influenza vaccine is expected to be available during the 2001-2002 season than in previous years. Some delays in distribution are projected, but they are not expected to be as significant as those in the 2000-2001 season.

Manufacturers project that 79.1 million doses of influenza vaccine will be produced and distributed for 2001. This is more than the amount of vaccine produced in 2000 and comparable with production in 1999. Approximately 56 percent of the total supply should be distributed by the end of October. An additional 31 percent of the total influenza vaccine supply will be delivered in November and the final 13 percent is expected in early December. Officials at the FDA and the CDC stress that these projections from manufacturers could change as the season progresses.

When to Receive Influenza Vaccine

In the United States, influenza usually occurs from November through March or April. The optimal period for immunization is October through the end of November before there is significant influenza activity. It takes about 2 weeks after vaccination for antibody against influenza to develop and provide protection. Although many persons at high risk of influenza-related complications remain unvaccinated by the end of November, vaccination in December and later can still be beneficial. During the last 19 years in the United States, influenza peaked in December during 4 seasons and January or later in 15 seasons.

Composition of the 2001-2002 Vaccine

The trivalent influenza vaccine prepared for the 2001-2002 season will include A/New Caledonia/20/99 (H1N1), A/Moscow/10/99-like (H3N2), and B/Sichuan/379/99-like antigens. For the A/Moscow/10/99-like (H3N2) antigen, U.S. manufacturers will use the antigentically equivalent A/Panama/2007/99 (H3N2) virus. For the B/Sichuan /379/99-like antigen, they will use one of the antigenically equivalent viruses B/Johannesburg/05/99, B/Victoria/504/2000, or B/Guangdong/120/2000. These viruses will be used in manufacturing because of their growth properties and because they are representative of currently circulating influenza A (H3N2) and B viruses.

State Vaccine Supply Contacts

If you are a provider of influenza vaccine services (eg., private physician, nursing home, hospital, or community/migrant health center) who has been unable to place an order for influenza vaccine, or has more vaccine than you need, please call or email your Texas Department of Health (TDH) immunization contact person. You will learn what, if any, efforts are being undertaken in your area to reallocate vaccine early in the season to ensure that all providers have some vaccine to begin vaccinating high-risk patients. These contact persons also may be able to help you obtain vaccine or reallocate any excess supply you may have.

The state influenza vaccine supply contacts for Texas are Lisa Davis and John Haynes, who can be reached at **800/252-9152** *or by email at* flu.vaccine@tdh.state.tx.us.

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Target Groups for Vaccination

Vaccination is recommended for the following groups of persons who are at increased risk for complications from influenza:

- Persons aged 65 years or older
- Residents of nursing homes and other chronic-care facilities that house persons of any age who have chronic medical conditions
- Adults and children who have chronic disorders of the pulmonary and cardiovascular systems, including asthma
- Adults and children who have required regular medical follow up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies, or immunosuppression (including immunosuppression caused by medications)
- Children and teenagers (aged 6 months to 18 years) who are receiving long-term aspirin therapy and therefore might be at risk for Reye's syndrome after influenza
- Women who will be in the second or third trimester of pregnancy during the influenza season.

Vaccination is also recommended for health care providers.

Advisory Committee on Immunization Practices (ACIP) Supplemental Recommendations

Due to the 2001-2002 influenza season vaccine delay and the large number of doses projected for distribution in November and December, the ACIP has developed supplemental recommendations. The goals of these recommendations are 1) to prioritize and phase vaccination efforts for the 2001-2002 influenza season to ensure that persons at greatest risk for severe influenza and its complications and health care providers receive vaccine early in the influenza season, and 2) to increase overall protection of those at greatest risk for severe influenza and its complications as targeted in Healthy People 2010 objectives. To meet these objectives the ACIP has made these supplemental recommendations:

- Providers should target vaccine available in September and October to persons at increased risk for influenza complications as well as to health-care workers.
- Beginning in November, providers should offer vaccine to contacts of high-risk persons, healthy persons aged 50 to 64 years, and any other persons wanting to reduce their risk for influenza.
- Providers should continue vaccinating patients, especially those at high risk and in other target groups in December and should continue as long as there is influenza activity and vaccine is available.
- Distribution of vaccine to worksites, where campaigns primarily vaccinate healthy workers should be delayed until November.
- All providers who have placed orders should receive some early season vaccine.
- Manufacturers, distributors, and vendors should inform providers of the amount of vaccine they will be receiving and the date of shipment.

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- Organizers of mass vaccination campaigns not in workplaces should plan campaigns for late October or November or when they are assured of vaccine supply and make special efforts to vaccinate elderly persons and those at high risk for influenza complications.
- Influenza vaccine service providers should develop contingency plans for possible delays in vaccine distribution.

Prepared by: Dwayne R. Haught, MSN, RN, Baylor College of Medicine and TDH Infectious Disease Epidemiology& Surveillance Division (IDEAS).

Adapted fromthe following CDC sources:

1. Delayed Supply of Influenza Vaccine Availability for 2001-2002 Season and Supplemental Recommendations of the Advisory Committee on Immunization Practices, MMWR 2001; 50(27): 582-585

2. Update: Influenza Activity—United States and Worldwide, 2000-2001 Season and Composition of the 2001-2002 Influenza Vaccine, MMWR 2001;50(22):466-470.

Both MMWR reports and other comprehensive information on influenza and the ACIP recommendations can be accessed at CDC's influenza website: www.cdc.gov/ncidod/disases/flu/fluvirus.htm.

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Guidelines for Submitting Manuscripts for Publication in *DPN*.

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