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## **Inhalation Anthrax Case in Pennsylvania**

On February 16, a 44 year old male presented to a hospital in Pennsylvania with respiratory symptoms including dry cough, shortness of breath and general malaise. Laboratory Response Network (LRN) and Polymerase Chain Reaction (PCR) on 2/21 and gamma phage lysis on 2/22 from blood culture isolate were positive for *Bacillus anthracis*.

Patient resides in New York City and makes drums from unprocessed domestic and imported (Africa) animal hides (cow and goat). Patient reports frequent travel to Africa (most recent travel 12/4/05 - 12/21/05). Patient reports last work with animal hides on 2/15. Process includes cleaning and removal of hair from hides without chemical fixatives. While traveling to Pennsylvania on 2/16, the patient collapsed with rigors and was transported and admitted to a small local hospital.

Patient transferred to a tertiary care center on 2/18. Patient is reported to be stable on antibiotic therapy in the ICU without mechanical ventilation. No signs of cutaneous or pharyngeal anthrax lesions. Preliminary clinical impression suggests anthrax sepsis secondary to inhalation route of exposure due to spores from contaminated animal hides.

Ongoing investigation by PA and NYC departments of health in coordination with law enforcement includes environmental assessment of patient's storage/work facility and home, and identification of individuals who may have had contact with unprocessed hides.

### *Anthrax causes and transmission*

Anthrax is caused by exposure to *B. anthracis* an encapsulated, aerobic, gram-positive, spore-forming, rod-shaped bacterium. Depending on the route of infection, human anthrax can occur in three clinical forms: cutaneous, inhalational, and gastrointestinal. Direct skin contact with contaminated animal products can result in cutaneous anthrax. Inhalation of aerosolized spores, such as through industrial processing of contaminated wool, hair, or hides, can result in inhalational anthrax. Hemorrhagic meningitis can result from hematogenous spread of the organism following any form of the disease.

The incubation period for anthrax is generally <2 weeks. However, due to spore dormancy and slow clearance from the lungs, the incubation period for inhalational anthrax may be prolonged. This phenomenon of delayed onset of disease is not recognized to occur with cutaneous or gastrointestinal exposures.

### *Skin/cutaneous anthrax*

Skin or cutaneous anthrax is the most common type of naturally-acquired infection. Infection begins as a pruritic papule or vesicle that enlarges and erodes (1-2 days) leaving a necrotic ulcer with subsequent formation of a central black eschar (Images at <http://www.bt.cdc.gov/Agent/cutaneous.asp>.) The lesion is usually painless with surrounding edema, hyperemia, and regional lymphadenopathy. Patients may have associated fever, malaise and headache. Historically, the case-fatality rate for cutaneous anthrax has been <1% with antibiotic treatment and 20% without antibiotic treatment. There are rare case reports of person-to-person transmission of cutaneous disease.

See <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5042a1.htm#tab2> for specific treatment of cutaneous anthrax.

### *Inhalational anthrax*

Inhalational anthrax is rare but is the most lethal form of the disease. Disease may initially involve a prodrome of fever, chills, nonproductive cough, chest pain, headache, myalgias, and malaise. However, more distinctive clinical hallmarks include hemorrhagic mediastinal lymphadenitis, hemorrhagic pleural effusions, bacteremia and toxemia resulting in severe dyspnea, hypoxia and septic shock. Widened mediastinum is the classic finding on imaging of the chest, but may initially be subtle (Images at <http://www.bt.cdc.gov/Agent/inhalational.asp> and in the appendices). Case-fatality rates for inhalational anthrax are high, even with appropriate antibiotics, and supportive care. Following the bioterrorist attack in fall 2001, the case-fatality rate among patients with inhalational disease was 45% (5/11). Person-to person spread of inhalational anthrax has not been documented.

For case definitions, treatment guidelines, laboratory testing procedures, etc, see Anthrax Information for Health Care Providers

<http://www.bt.cdc.gov/agent/anthrax/anthrax-hcp-factsheet.asp>

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**DEPARTMENT OF HEALTH AND HUMAN SERVICES**