Los Alamos
NATIONAL LABORATORY
Occupational Medicine (ESH -2)

ANTHRAX

What is anthrax?

Anthrax is a disease caused by one of the largest bacteria, Bacillus anthracis. In it's spore (encapsulated) form the bacillus can survive for many years in soil, the hair of animals or anywhere that it can hide from ultraviolet (UV) light, high heat or disinfectants (such as Clorox© solution). Anthrax is mainly a disease of hooved animals, but it occasionally occurs in humans who are exposed to infected animals, infected meat, or animal hides or wool containing anthrax spores. Humans can also be intentionally infected when anthrax is used as an agent of bioterrorism.

How is anthrax transmitted to humans?

The anthrax spores can enter a cut or abrasion in the skin when handling contaminated materials. This is the most common means of infection and produces cutaneous anthrax, an infection of the skin.

Aerosolized release of anthrax spores, or of a powder prepared from anthrax spores and carrier material, allows the spores to be inhaled and deposited within the lung. Infection occurs if more than 2,500 to 55,000 spores are inhaled, resulting in the relatively rare cases of inhalation anthrax.

Infection of the throat or the gastrointestinal tract can occur after eating undercooked meat from an infected animal; this is called gastrointestinal anthrax.

How is anthrax recognized?

Cutaneous anthrax appears on areas of exposed skin such as arms, hands, face and neck up to 12 days after exposure. An itching bump enlarges into a round skin ulcer by the second day. Blisters appear and may drain a clear or slightly bloody fluid. A black, painless, depressed scab will form and dry up and fall off within 1 to 2 weeks, usually without leaving a scar. In some cases, infection spreads to lymph nodes and the blood stream producing painful swollen lymph nodes, fever and chills.

Inhalation anthrax can occur as early as 2 days or as late as 60 days after exposure. The average is 7 days after exposure. The illness presents in two stages. The ***first stage*** appears with fever, chills, shortness of breath, cough, headache, vomiting, weakness, abdominal pain and chest pain. Some patients appear to temporarily improve while others progress directly to the second stage. This first stage of illness lasts from hours to a few days.

The ***second stage*** develops abruptly with a sudden onset of high fever, difficultly with breathing, sweating, shock and collapse. Up to half of the patients develop meningitis with stiff neck, delirium and eventually coma. Death can occur within hours.

Gastrointestinal anthrax can occur 3 to 7 days after eating meat from infected animals. The disease can present ***either*** as nausea, vomiting, body aches, bloody diarrhea, abdominal pain and fever and chills ***or*** sore throat, difficulty swallowing, fever, swollen lymph nodes in the neck, fever and chills.

How is anthrax diagnosed?

Bacillius anthracis in environmental samples can be detected by a test strip, if available, and is confirmed by a bacterial culture of an environmental sample on a sheep blood agar plate or the use of polymerase chain reaction (PCR) technique and genetic identification. The test strip is immediate; the culture or PCR identification requires 6 to 24 hours in the lab.

Diagnosis of anthrax can be suspected by the clinical findings and confirmed by bacterial culture of blood or fluid from the skin lesions or by rapid serologic tests, such as enzyme-linked immunosorbent assay. In some cases, the bacteria can be seen under the microscope in stained specimens of the patient's blood.

Nasal swabs are used **ONLY** for epidemiological investigation of a **KNOWN EXPOSURE** to Bacillus anthracis. Nasal swabs are **NOT** used to detect exposure, to diagnosis anthrax or to make treatment decisions. The New Mexico State Department of Health has told New Mexico Clinical Laboratories: ***"Do not collect nasal swabs to look for anthrax. They are used only when checking those associated with a proven case."***

Can anthrax be treated?

Yes, several antibiotics are effective against anthrax, including ciprofloxacin (Cipro), doxycycline (Vibramycin), and amoxicillin. If an individual has had a known potential exposure to Bacillus anthracis, prophylactic (preventive) treatment with ciprofloxacin (Cipro) or doxycycline (Vibramycin) will be started. Once cultures of the bacteria indicate what antibiotics the bacteria are sensitive to, a full course of the most appropriate, effective antibiotic will be prescribed.

Q&A CONTINUES ON REVERSE SIDE–PLEASE TURN PAGE OVER

What can be done to prevent infection?

Vaccines: The anthrax vaccine is not available for widespread use. Currently, the limited supply of vaccine is reserved for military personnel, lab workers, veterinarians and wool sorters. Laboratory workers who work with Bacillus anthracis as a part of their job assignment are offered immunization against anthrax.

Prevention and early detection: Early detection of exposure is most important. LANL workers need to follow guidance in the Safeguards and Security Bulletin, Volume 1, Number 15, dated October 15, 2001:

Suspicious Packages

*What constitutes a suspicious letter or package? Examples include an unexpected letter or package from a stranger or foreign country; items that do not have a return address or have one that cannot be verified as legitimate; items that are oddly shaped or stained; items that have a strange odor; and items that are marked with restrictive endorsements, such as "Personal" or "Confidential." For more guidance on identifying suspicious packages, see the FBI advisory at http://www.fbi.gov/pressrel/pressrel01/poster101201b.pdf or contact Mike Barnes, EM&R, at **665-5875**.*

Responding to a Suspicious Package

The key to controlling a situation involving a suspicious package is to remain calm and to limit the area and persons exposed to the potential threat.

Attempt to contact the sender and verify the contents of the suspicious letter or package. Do not physically examine the item.

If you are unable to verify the contents, call 911 (use for both work and home situations). Do not use a cellular phone within 50 feet of the item.

Notify your supervisor and initiate an evacuation of the facility. Do NOT use any fire pull stations to initiate an evacuation. Ensure that personnel evacuating the facility are not routed directly past the suspicious item location.

If you have opened a suspicious item you believe may contain biological material, immediately set the item down and prevent coworkers from handling it.

Instruct another worker to call 911, to notify your supervisor, and to initiate a facility evacuation.

Keep your hands away from your face and do not touch your eyes, nose or mouth. Wash your hands vigorously, use soap and warm water if available.

Proceed to the muster area and identify yourself to emergency responders

Contact the Security Help Desk (665-2002 or security@lanl.gov) for non-emergency questions and concerns related to security.

All of the Security bulletins can be accessed from the Security Website. http://int.lanl.gov/orgs/s/sec-con_update.shtml

LANL workers who have been exposed to a suspicious package or envelope at work should follow the 911 instructions above and then come to the Occupational Medicine Clinic to report the exposure. The clinic staff will report the event to the New Mexico State Department of Health who will track the results of the investigation and notify the Occupational Medicine Clinic if Bacillus anthracis is identified. The Occupational Medicine clinic, in coordination with the New Mexico State Department of Health, will provide prophylactic antibiotic therapy to all workers with potential exposure to Bacillus anthracis.

LANL workers should practice good personal hygiene in their daily routine. Frequent hand washing, especially before eating, is recommended to prevent transmission of any infectious disease.

Immunization against influenza reduces the incidence and severity of this viral illness, which commonly occurs from October through March each year and might be confused with other illness.