

# Anthrax

*Bacillus Anthracis*  
(Also Known as Woolsorter Disease)

## IMMEDIATELY REPORTABLE DISEASE

Per N.J.A.C. 8:57, healthcare providers and administrators shall immediately report **by telephone** confirmed and suspected cases of anthrax to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. The health officer (or designee) **must immediately institute the control measures listed below in section 6, "Controlling Further Spread,"** regardless of weekend, holiday, or evening schedules. A directory of local health departments in New Jersey is available at <http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



# **1 THE DISEASE AND ITS EPIDEMIOLOGY**

## **A. Etiologic Agent**

Anthrax is a disease caused by the bacterium *Bacillus anthracis*. It is primarily a disease of wild and domestic animals.

## **B. Clinical Description**

Anthrax is an acute bacterial disease, which usually involves the skin, but may involve the upper throat, lower respiratory tract, chest cavity, or intestinal tract. Toxins produced by the bacteria cause tissue and organ damage.

In anthrax affecting the skin (cutaneous anthrax), usually itching of an exposed skin surface occurs first. Itching is followed by a small red lesion that progresses to a blister and, ultimately, a scabbed ulcer (eschar) with extensive local edema. Roughly 5% to 20% of people with untreated cutaneous anthrax die, although prompt treatment with effective antibiotics can reduce the risk to less than 1%.

Initial symptoms of anthrax of the lower respiratory tract (inhalation anthrax) are usually mild, resembling an upper respiratory infection. Severe symptoms follow within three to five days, and include respiratory distress, fever, and shock, with death following shortly. Chest x-ray examination usually shows multiple abnormalities, including mediastinal widening, paratracheal fullness, pleural effusions, and parenchymal infiltrates. Hemorrhagic mediastinitis and/or meningitis are frequent severe complications. Treatment rarely prevents death once the severe symptoms begin. Prior to Fall 2001, the case-fatality rate for inhalation anthrax was reported to be 85% to 100%. However, in the bioterrorism-associated outbreak in October 2001, the case-fatality rate was 45.5% (five of 11 inhalation patients died).

Oropharyngeal and gastrointestinal anthrax are rare forms of disease resulting from the ingestion of infected meat that has not been sufficiently cooked. After an incubation period of two to five days, patients with oropharyngeal disease present with severe sore throat or local oral or tonsillar ulcers, usually associated with fever, toxicity, and cervical or submandibular lymphadenitis. Gastrointestinal anthrax begins with nonspecific symptoms of nausea, vomiting, and fever; these are followed in most cases by a severe abdominal pain. Mortality in both forms may be as high as 50%.

Laboratory confirmation is based on identification of *B. anthracis* in blood, skin lesion, or discharge by direct-stained smears, culture, or inoculation of laboratory animals. Rapid identification of the organism is also possible using immunodiagnostic testing, enzyme-linked immunoassay (ELISA), or polymerase chain reaction (PCR). Serological testing is generally of use in making a retrospective diagnosis: anthrax electrophoretic immunotransblot (EITB) reaction to the protective antigen and/or lethal factor bands.

### **C. Reservoirs**

Wild and domestic hoofed herbivores (plant-eating animals), including livestock, are the reservoir of vegetative organisms. When exposed to the environment, the organisms produce spores. Spores, which are very resistant to disinfection and adverse environmental conditions, are capable of surviving in soil for decades. Skins and hides of infected animals may harbor the spores for years. Worldwide spread of anthrax occurs primarily through dissemination of contaminated skins and hides.

### **D. Modes of Transmission**

Cutaneous infection occurs through (1) contact with contaminated skins, wool or hides, or products made from these; (2) contact with tissues of animals that are clinically ill or dead from anthrax; or (3) contact with soil contaminated with spores or contaminated bone meal used in gardening. Inhalational anthrax occurs through inhalation of spores, particularly in environments related to processing of animal hides and wool. It may also occur in association with accidental or intentional aerosolization of spores, as may occur with a laboratory accident or bioterrorist event. Intestinal and oropharyngeal anthrax occur through ingestion of undercooked contaminated meat.

### **E. Incubation Period**

The incubation period for anthrax is usually one to seven days, and most cases occur within two days of exposure. However, incubation periods of up to 60 days have been reported.

### **F. Period of Communicability or Infectious Period**

Person-to-person transmission has not been documented. However, products and soil contaminated with spores may remain infectious for decades.

### **G. Epidemiology**

Anthrax is primarily a disease of wild and domestic herbivorous (plant-eating) animals. Unaffected herds of livestock may be exposed through feed containing contaminated bone meal. Anthrax is an infrequent and sporadic cause of human disease in the United States and in most industrialized countries. Only 18 cases of inhalational anthrax were reported in the United States from 1900 to 1978, with the majority occurring in special risk groups, including two that were laboratory-associated. Prior to October 2001, the last reported case of inhalational anthrax occurred in 1976. In the United States, 224 cases of cutaneous anthrax were reported between 1944 and 1994. Anthrax in animals is common in Central and South America, southern and Eastern Europe, Africa, and Asia. Persons at greatest risk of

contracting anthrax are those whose occupations may expose them to contaminated meat, hides, wool, or cultures of the bacteria. Veterinarians and others who handle and treat infected animals are also at risk.

## **H. Bioterrorist Potential**

*B. anthracis* has been used as a bioterrorist agent. The most recent occurrence in the United States was in Fall 2001 when 22 cases (11 inhalational cases and 11 cutaneous cases) from seven states along the East Coast were related to contaminated letters sent through the US Postal Service.

The dissemination of *B. anthracis* causes a serious public health challenge in terms of limiting the numbers of casualties, decontamination, and dissemination of accurate and appropriate information to diverse populations.

# **2 CASE DEFINITION**

## **A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition**

The New Jersey Department of Health and Senior Services (NJDHSS) case definition and the Centers for Disease Control and Prevention (CDC) case definition are the same.

## **B. Case Definition**

### **CONFIRMED**

A clinically compatible case, AND

Isolation of *B. anthracis* from a clinical specimen, OR

Anthrax EITB reaction to the protective antigen, OR

Lethal factor bands obtained after onset of symptoms, OR

Demonstration of *B. anthracis* in a clinical specimen by immunofluorescence.

### **PROBABLE**

A clinically compatible case that is epidemiologically linked to a confirmed case as determined by NJDHSS.

### **POSSIBLE**

Initially reported case based on clinical diagnosis until confirmation is obtained. All cases require confirmation; no possible case classifications are retained within the database of NJDHSS.

- C.** Isolates of *B. anthracis* must be submitted within the three working days to:  
New Jersey Department of Health and Senior Services  
Public Health and Environmental Laboratories  
367 South Warren St.  
Trenton, NJ 08625  
ATT: Nelson Delgado, BioThreat Response Laboratory Coordinator, 609.292.9532.

### **3 LABORATORY TESTING AVAILABLE**

- A.** *B. anthracis* is easily isolated in a clinical microbiology laboratory. Therefore, all clinical laboratories are expected to perform initial culture of suspected cases of *B. anthracis*.
- B.** According to level A laboratory protocol, the level A laboratory is to rule out *B. anthracis* and if this is not possible to forward the isolate to NJDHSS Public Health and Environmental Laboratories (PHEL) for identification. Laboratories must contact the NJDHSS Infectious and Zoonotic Diseases Program (IZDP) at 609.826.5964 or 609.392.2020 (nights and weekends) prior to submitting suspected isolates of *B. anthracis* to PHEL.
- C.** PHEL provides confirmatory testing services for all referred isolates of suspected *B. anthracis* from blood, tissue biopsies, discharge fluid, vesicle fluid, etc.
- D.** PHEL provides testing services for environmental samples suspected of contamination with *B. anthracis*.
- E.** In addition, PHEL requests that all laboratories submit all isolates of *B. anthracis* cultured for further identification to aid in the public health surveillance necessary for this illness.
- F.** For more information on submitting samples, contact PHEL at 609.292.9532 or 609.292.7879.

# 4 PURPOSE OF SURVEILLANCE AND REPORTING AND REPORTING REQUIREMENTS

## A. Purpose of Surveillance and Reporting

1. To identify cases and clusters of human illness that may be associated with a bioterrorist event.
2. To identify human and animal cases as early as possible to prevent transmission to other persons or animals, either through direct contact (unlikely) or through spores that form in carcasses of dead animals.
3. To identify potential sources of transmission in the United States (e.g., imported wool, livestock, or soil), and to stop transmission from such sources.
4. To identify sources of transmission and geographical areas of risk outside the United States and to stop transmission from such sources.

## B. Laboratory and Healthcare Reporting Requirements

Because of the rarity, potential severity, and possibility of bioterrorism involvement, NJDHSS requests that laboratories and healthcare providers **immediately report** any suspected case of anthrax to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located. If this is not possible, call NJDHSS IZDP at 609.826.5964 during business hours or 609.392.2020 after business hours and on weekends and holidays. Such telephone reports are to be followed by electronic data entry in the Communicable Disease Reporting and Surveillance System (CDRSS) within 24 hours of the initial report.

## C. Local Departments of Health Responsibilities

The New Jersey Administrative Code (NJAC 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of anthrax, as defined by the reporting criteria in section 2. Current requirements are that the cases be **reported immediately** to NJDHSS IZDP at 609.826.5964 during normal business hours or 609.392.2020 after business hours and on weekends and holidays.

# 5 CASE INVESTIGATION

**A. The most important step a local health officer can take on learning of a suspect or confirmed case of anthrax, or potential exposure to anthrax, is to call NJDHSS Communicable Disease Service immediately, during the day at 609.826.5964 or 609.392.2020 on nights and weekends.**

1. NJDHSS Communicable Disease Service will oversee and direct the case investigation of anthrax in New Jersey residents in conjunction with CDC. If a bioterrorist event is suspected, NJDHSS and other response authorities will work closely with health officers (the regional epidemiologist and infection control professionals) and provide instructions and information on how to proceed.
2. Following immediate notification to NJDHSS, the health officer may be asked to assist in investigating cases within their communities, including gathering the information necessary to complete data entry in CDRSS.

## B. CDRSS

The mandatory fields in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of *Bacillus anthracis* cases. The “CDRSS Screen” column includes the tabs which appear along the top of the CDRSS screen. The “Required Information” column provides detailed explanations of what data should be entered.

CDRSS Screen	Required Information
<b>Patient Info</b>	Enter the disease name (“ANTHRAX”), patient demographic information, illness onset date, and the date the case was reported to the local health department (LHD). Select the appropriate subgroup from the drop down options: “PENDING,” “CUTANEOUS,” “INHALATION,” “INTESTINAL,” or “OROPHARYNGEAL.”
<b>Addresses</b>	Enter any alternate address (e.g., work address). Use the <span style="border: 1px solid black; padding: 2px;">Comments</span> section in this screen to record any pertinent information about the alternate address (e.g., the hours worked). Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
<b>Clinical Status</b>	Enter any treatment that the patient received and record the names of the medical facilities and physician(s) involved in the patient’s care. If the patient received care from two or more hospitals, be sure that all

CDRSS Screen	Required Information
	are entered so the case can be accessed by all infection control professionals (ICPs) covering these facilities. If the patient is alive, select “NO” under the <b>Mortality</b> section. If the patient died, select “YES” and enter the date of death under the <b>Mortality</b> section.
<b>Signs/Symptoms</b>	Check appropriate boxes for signs and symptoms and indicate their onset. Make every effort to get complete information by interviewing the physician, the case-patient, family members, ICP, or others who might have knowledge of the patient’s illness. Also, information regarding the resolution of signs and symptoms should be entered.
<b>Risk Factors</b>	Enter complete information about known risk factors, if any.
<b>Laboratory Eval</b>	Select “BACILLUS ANTHRACIS IDENTIFIED” if culture was performed. Specimen type, specimen collection date, test result, and, if applicable, test value should also be recorded. Other pertinent testing information should be documented in the <b>Comments</b> section.
<b>Contact Tracing</b>	Information regarding contacts is not required for this disease.
<b>Case Comments</b>	Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the <b>Comments</b> section. <b>NOTE:</b> Select pieces of information entered in the <b>Comments</b> section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.
<b>Epidemiology</b>	Information regarding contacts is not required for sporadic cases of this disease. However, extensive investigation will surround all cases to rule out a bioterrorism event.
<b>Case Classification Report Status</b>	<p>Case status options are: “REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”</p> <ul style="list-style-type: none"> <li>• All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).”</li> <li>• Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).”</li> </ul>



CDRSS Screen	Required Information
	<ul style="list-style-type: none"> <li>• Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. “CONFIRMED” and “NOT A CASE” are the only appropriate options for classifying a case of <i>Bacillus anthracis</i> (see section 2A).</li> </ul> <p>Report status options are: “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.”</p> <ul style="list-style-type: none"> <li>• Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of “PENDING.”</li> <li>• Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.”</li> <li>• The “LHD REVIEW” option can be used if the LHD has a person who reviews the case before it is closed (e.g., health officer or director of nursing).</li> <li>• Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to “LHD CLOSED.”</li> <li>• “LHD CLOSED” cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to “REOPENED” and the LHD will be notified by e-mail. Cases that are “DHSS APPROVED” cannot be edited by LHD staff (see Section C below).</li> </ul> <p>If a case is inappropriately entered (e.g., an “UNKNOWN” case of disease was erroneously entered as a case of anthrax) the case should be assigned a report status of “DELETE.” A report status of “DELETE” should NOT be used if a reported case of anthrax simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.</p>

## 6 CONTROLLING FURTHER SPREAD

### A. Isolation and Quarantine Requirements (NJAC 8:57-1.10)

#### 1. Minimum Period of Isolation of Patient

Until lesions are healed or free of anthrax bacilli, or patient is on antibiotics.

**2. Minimum Period of Quarantine of Contacts**

This will be determined by NJDHSS after consultation with CDC.

**B. Protection of Contacts of a Case**

There is no immunization or prophylaxis for contacts of cases (see section 6E for more information on prophylaxis). Standard precautions and aseptic technique are recommended.

**C. Managing Special Situations**

1. If any cases of anthrax occur in individuals in a city or town in New Jersey, investigate to determine the source of infection and mode of transmission. Contact NJDHSS IZDP immediately at 609.826.5964 during business hours or at 609.392.2020 during any other time.
2. Program staff can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several jurisdictions and, therefore, be difficult to identify at a local level.
3. For a potential bioterrorist event, NJDHSS and other response authorities will work closely with local health officers and provide instructions and information on how to proceed.

**D. Preventive Measures**

**1. Environmental Measures**

- a. In the event that a food item is epidemiologically implicated in the transmission of disease, implicated food items must be removed from the environment.
- b. A decision about culturing implicated food items must be made in consultation with NJDHSS IZDP staff. Coordination for pickup and testing of food samples is the responsibility of the local health department.
- c. If a commercial product is suspected, report this to NJDHSS Food and Drug Safety Program at 609.826.4935, which will coordinate follow-up with relevant outside agencies.

**2. Personal Preventive Measures and Education**—To avoid cases of anthrax, NJDHSS recommends the following:

- a. Individuals at significant, continuing risk of acquiring anthrax (e.g., laboratory workers) should be vaccinated.
- b. Employees who work with hides of potentially infected animals should be educated about anthrax and how to minimize exposures.
- c. Employees who work in environments involved in outbreaks elsewhere will be handled on an individual basis.

## E. Indications for Prophylaxis

1. The need for prophylaxis is determined by public health officials on the basis of an epidemiologic investigation. Prophylaxis is indicated for persons exposed to an airspace contaminated with *B. anthracis*.
2. Prophylaxis is not indicated for healthcare and mortuary workers who care for patients or attend to corpses using standard precautions, for persons who handle or open mail in the absence of a credible threat, or for prevention of cutaneous anthrax.
3. Successful implementation of mass prophylaxis requires clarity of public health intent and communication, as well as coordination and collaboration. Issues for the point of prophylaxis distribution include layout and managing of traffic flow; security; availability of medical and office supplies, antibiotic and disease fact sheets, multilingual staff, and mental health counselors; legal needs (e.g., for a physician to write orders); and plans for follow-up, including assessment of adherence, illness, and possible drug adverse effects. Collaboration among health departments, healthcare delivery organizations, and clinicians is important.
4. Ciprofloxacin, doxycycline, and penicillin G procaine have been approved by the Food and Drug Administration (FDA) for prophylaxis of inhalational *B. anthracis* infection. Amoxicillin (in three daily doses) is an option for children and pregnant or lactating women exposed to strains susceptible to penicillin to avoid potential toxicity of quinolones and tetracyclines. Amoxicillin is not widely recommended as a first-line prophylactic agent, however, because of lack of FDA approval, lack of data regarding efficacy, and uncertainty about the drug's ability to achieve adequate therapeutic levels at standard doses.
5. The optimal duration of prophylaxis is uncertain; however, 60 days was recommended in 2001, primarily on the basis of animal studies of anthrax deaths and spore clearance after exposure.

## Additional Information

An Anthrax Fact Sheet is available at the NJDHSS Web site at [www.state.nj.us/health](http://www.state.nj.us/health). Technical information about anthrax is available from CDC at <http://www.bt.cdc.gov/agent/anthrax/>.

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