

HEALTH CARE PROVIDER FACT SHEET

ANTHRAX

Information for Health Care Providers

Physicians • Nurses • Laboratory Personnel • Infection Control Practitioners

Anthrax

- Caused by *Bacillus anthracis*, a large, encapsulated, gram-positive, aerobic, non-motile, spore-forming bacillus
- Transmission to humans usually occurs through occupational contact with infected animals or animal products
- Naturally acquired anthrax in humans most commonly involves the skin (cutaneous anthrax); inhalation anthrax and gastrointestinal (GI) anthrax are rare
- **Inhalation anthrax, caused by inhaling aerosolized spores, will be the most likely outcome of an intentional (bioterrorist) exposure**

Any confirmed or suspected case of anthrax (*Bacillus anthracis*) must be reported IMMEDIATELY to the Clark County Health District at 383-1378 Alert your laboratory personnel.

Inhalation Anthrax

Incubation: 1-5 days (may be as long as 60 days with low inoculum exposures)

Sign and Symptoms: Typically a bi-phasic illness:

- **Initial Phase:** Characterized by flu-like symptoms: Low grade fever, non-productive cough, malaise, fatigue, myalgias, mild chest discomfort. Rhonchi may be present, otherwise normal exam.
- **Acute Phase:** Develops 1-5 days after initial symptoms. May be preceded by up to 3 days of improvement. Characterized by abrupt development of severe respiratory distress with dyspnea, stridor, cyanosis, and high fever. Shock and death usually follow within 24-36 hours after onset of respiratory distress. The average interval between onset of acute phase and death is 3 days.

CXR: Mediastinal widening, often with pleural effusion, but usually no infiltrates

- **Autopsy Clues:** Hemorrhagic necrotizing mediastinitis and thoracic hemorrhagic necrotizing lymphadenitis. Hemorrhagic meningitis may also be present.

Treatment of Inhalation Anthrax (Table 1)

- Early (during the initial phase) antibiotic treatment is essential. Mortality may still be high (~90%) after the onset of symptoms even with treatment
- Natural strains of anthrax are resistant to extended-spectrum cephalosporins, sulfamethoxizol, and trimethoprim: these should not be used for treating (or prophylaxing for) anthrax
- Physicians may be asked to get an informed consent signed for administration of certain medications supplied by the Strategic National Stockpile (SNS)

CLARK COUNTY HEALTH DISTRICT OFFICE OF EPIDEMIOLOGY

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TABLE 1. Inhalational anthrax treatment protocol^{*,†} for cases associated with bioterrorism attack (MMWR 2001/Vol.50/No.42)

Category	Initial therapy (intravenous) §,¶	Duration
Adults	Ciprofloxacin 400 mg every 12 hrs* or Doxycycline 100 mg every 12 hrs †† and One or two additional antimicrobials ¶	IV treatment initially**. Switch to oral antimicrobial therapy when clinically appropriate: Ciprofloxacin 500 mg po BID or Doxycycline 100 mg po BID Continue for 60 days (IV and po combined) §§
Children	Ciprofloxacin 10–15 mg/kg every 12hrs ¶¶, *** or Doxycycline: †††,†† >8 yrs and >45 kg: 100 mg every 12 hrs >8 yrs and <45 kg: 2.2 mg/kg every 12 hrs ≤8 yrs: 2.2 mg/kg every 12 hrs and One or two additional antimicrobials ¶	IV treatment initially**. Switch to oral antimicrobial therapy when clinically appropriate: Ciprofloxacin 10–15 mg/kg po every 12 hrs*** or Doxycycline: ††† >8 yrs and >45 kg: 100 mg po BID >8 yrs and <45 kg: 2.2 mg/kg po BID <8 yrs: 2.2 mg/kg po BID Continue for 60 days (IV and po combined) §§
Pregnant Women §§§	Same for nonpregnant adults (the high death rate from the infection outweighs the risk posed by the antimicrobial agent)	IV treatment initially. Switch to oral antimicrobial therapy when clinically appropriate. † Oral therapy regimens same for nonpregnant adults
Immunocompromised persons	Same for nonimmunocompromised persons and children	Same for nonimmunocompromised persons and children

* For gastrointestinal and oropharyngeal anthrax, use regimens recommended for inhalational anthrax.
 † Ciprofloxacin or doxycycline should be considered an essential part of first-line therapy for inhalational anthrax.
 § Steroids may be considered as an adjunct therapy for patients with severe edema and for meningitis based on experience with bacterial meningitis of other etiologies.
 ¶ Other agents with in vitro activity include rifampin, vancomycin, penicillin, ampicillin, chloramphenicol, imipenem, clindamycin, and clarithromycin. Because of concerns of constitutive and inducible beta-lactamases in *Bacillus anthracis*, penicillin and ampicillin should not be used alone. Consultation with an infectious disease specialist is advised.
 ** Initial therapy may be altered based on clinical course of the patient; one or two antimicrobial agents (e.g., ciprofloxacin or doxycycline) may be adequate as the patient improves.
 †† If meningitis is suspected, doxycycline may be less optimal because of poor central nervous system penetration.
 §§ Because of the potential persistence of spores after an aerosol exposure, antimicrobial therapy should be continued for 60 days.
 ¶¶ If intravenous ciprofloxacin is not available, oral ciprofloxacin may be acceptable because it is rapidly and well absorbed from the gastrointestinal tract with no substantial loss by first-pass metabolism. Maximum serum concentrations are attained 1–2 hours after oral dosing but may not be achieved if vomiting or ileus are present.
 *** In children, ciprofloxacin dosage should not exceed 1 g/day.
 ††† The American Academy of Pediatrics recommends treatment of young children with tetracyclines for serious infections (e.g., Rocky Mountain spotted fever).
 §§§ Although tetracyclines are not recommended during pregnancy, their use may be indicated for life-threatening illness. Adverse effects on developing teeth and bones are dose related; therefore, doxycycline might be used for a short time (7–14 days) before 6 months of gestation.

Cutaneous Anthrax (a possible outcome of a terrorist release of *B. anthracis*)

- Local skin involvement after direct contact with spores or bacilli
- Commonly seen on exposed areas: face, neck, forearms, hands
- Localized itching, followed by a papular lesion that turns vesicular, followed by development of a black eschar within 7-10 days of onset of the initial lesion
- Usually non-fatal if treated with appropriate antibiotics for 7-10 days (Table 2)
- Wound or wound drainage may be contagious (direct contact): follow standard wound precautions

TABLE 2. Cutaneous anthrax treatment protocol* for cases associated with bioterrorism attack (MMWR 2001/Vol.50/No.42)

Category	Initial therapy (oral) †	Duration
Adults*	Ciprofloxacin 500 mg BID or Doxycycline 100 mg BID	60 days §
Children*	Ciprofloxacin 10–15 mg/kg every 12 hrs (not to exceed 1 g/day) † or Doxycycline: ¶ >8 yrs and >45 kg: 100 mg every 12 hrs >8 yrs and <45 kg: 2.2 mg/kg every 12 hrs ≤8 yrs: 2.2 mg/kg every 12 hrs	60 days §
Pregnant women*, **	Ciprofloxacin 500 mg BID or Doxycycline 100 mg BID	60 days §
Immunocompromised	Same for nonimmunocompromised persons* and children	60 days §

* Cutaneous anthrax with signs of systemic involvement, extensive edema, or lesions on the head or neck require intravenous therapy, and a multidrug approach is recommended. Table 1.

† Ciprofloxacin or doxycycline should be considered first-line therapy. Amoxicillin 500 mg po TID for adults or 80mg/kg/day divided every 8 hours for children is an option for completion of therapy after clinical improvement. Oral amoxicillin dose is based on the need to achieve appropriate minimum inhibitory concentration levels.

§ Previous guidelines have suggested treating cutaneous anthrax for 7–10 days, but 60 days is recommended in the setting of this attack, given the likelihood of exposure to aerosolized *B. anthracis* (6).

¶ The American Academy of Pediatrics recommends treatment of young children with tetracyclines for serious infections (e.g., Rocky Mountain spotted fever).

** Although tetracyclines or ciprofloxacin are not recommended during pregnancy, their use may be indicated for life-threatening illness. Adverse effects on developing teeth and bones are dose related; therefore, doxycycline might be used for a short time (7–14 days) before 6 months of gestation.

Gastrointestinal Anthrax (very unlikely outcome of a terrorist release of *B. anthracis*)

- Abdominal pain, nausea, vomiting, and fever following ingestion of contaminated food, usually meat
- Bloody diarrhea, hematemesis
- Gram-positive bacilli on blood or stool culture, usually after 2-3 days of illness
- Usually fatal after progression to septicemia

Post-Exposure Prophylaxis

- Antibiotic prophylaxis should be initiated when exposure to aerosolized anthrax spores is suspected
- Initiation of prophylaxis should be coordinated with the Clark County Health District
- Prophylaxis should continue for at least 60 days if the exposure is confirmed
- Physicians may be asked to get an informed consent signed for administration of certain medications supplied by the Strategic National Stockpile (SNS)

Post-Exposure Prophylaxis Protocol (MMWR 2001/Vol.50/No.41:889-97)

(**indicates medications which will be supplied as part of the SNS maintained at the CDC)

	Initial therapy	Duration
Adults , including pregnant women ^{1,2} and Immuno-compromised	**Ciprofloxacin 500 mg po BID OR	60 days
	**Doxycycline 100 mg po BID	
Children ^{1,3}	**Ciprofloxacin 10-15 mg/kg po Q12 hrs ⁴ OR	60 days
	**Doxycycline ⁵ : > 8 yrs and > 45 kg: 100 mg po BID > 8 yrs and ≤ 45 kg: 2.2 mg/kg po BID ≤ 8 yrs: (same as > 8 yrs and ≤ 45 kg)	

1. If susceptibility testing allows, therapy should be changed to oral amoxicillin for post-exposure prophylaxis to continue therapy out to 60 days.
2. Although tetracyclines are not recommended during pregnancy, its use may be indicated for life-threatening illness. Adverse affects on developing teeth and bones are dose related, therefore, doxycycline might be used for a short course of therapy (7-14 days) prior to the 6th month of gestation. Please consult a pharmacist after the 6th month of gestation for recommendations.
3. Use of tetracyclines and fluoroquinolones in children has well-known adverse effects; these risks must be weighed carefully against the risk for developing life-threatening disease. If a release of *B. anthracis* is confirmed, children should be treated initially with ciprofloxacin or doxycycline as prophylaxis but therapy should be changed to oral amoxicillin 40 mg per kg of body mass per day divided every 8 hours (not to exceed 500 mg three times daily) as soon as penicillin susceptibility of the organism has been confirmed.
4. Ciprofloxacin dose should not exceed 1gram/day in children.
5. In 1991, the American Academy of Pediatrics amended their recommendation to allow treatment of young children with tetracyclines for serious infections, such as, Rocky Mountain Spotted Fever, for which doxycycline may be indicated. Doxycycline is preferred for its twice-a-day dosing low incidence of gastrointestinal side effects.

Anthrax Vaccine

- An inactivated cell-free vaccine that is used primarily by the military and those at occupational risk
- Is only licensed for use in healthy adults aged 18-65
- Anthrax vaccine should be administered at 0, 2 and 4 weeks following exposure. Supplies are very limited, however, and it is unlikely that the vaccine will be available for the general public in the future
- If vaccine is not available, antibiotic treatment should be continued for 60 days

Infection Control

- **Person-to-person transmission does NOT occur with inhalation or GI anthrax**
- Standard (Universal) Precautions for care and transport of patients and during post-mortem care
- Wound precautions for patients with cutaneous anthrax
- Isolation of patients is NOT necessary; however, the following extra precautions are advised:
 - After an invasive procedure, instruments used should be autoclaved
 - Contaminated clothing/bedding should be placed in labeled, plastic bags for later incineration or steam sterilization
 - Spills of potentially infected body fluid or tissue:
 - Gently cover, then liberally apply 0.5% hypochlorite (a 1:10 dilution of household bleach)
 - Let sit for at least 20 minutes before cleaning up (work from perimeter to center)
 - Any materials used in the clean-up must be autoclaved or incinerated
 - Rinse off the concentrated bleach to avoid its caustic effects
 - Contamination of personnel
 - Remove outer clothing carefully where spill occurred and place in a labeled, plastic bag
 - Remove rest of clothing in the locker room and place in a labeled, plastic bag
 - Shower thoroughly with soap and water
- If exposure to contaminated sharps occurs:
 - Follow standard reporting procedures for sharps exposures
 - Thoroughly irrigate site with soap and water and apply a disinfectant solution such as hypochlorite solution. DO NOT SCRUB AREA.
 - Promptly begin therapy for cutaneous anthrax
 - Recommended treatment for cutaneous exposure: prophylaxis with Ciprofloxacin 500 mg Po BID x 7-10 days
 - Notify the Clark County Health District Office of Epidemiology at (702) 383-1378
- Decontamination of environment
 - Use a decontamination solution of 0.5% hypochlorite (a 1:10 dilution of household bleach) for surfaces
 - Let sit for at least 20 minutes before cleaning up (work from perimeter to center)
 - Routinely clean non-sterilizable equipment with a sterilizing solution
- Cremation should be considered due to potential risks associated with embalming

Managing Anthrax Threats

Letters containing *B. anthracis* spores have been sent to persons in NYC, DC and found in the U.S. mail system. Prompt identification of a threat and institution of appropriate measures may prevent inhalational anthrax. To prevent exposure to *B. anthracis* and subsequent infection, suspicious letters or packages should be recognized and appropriate protective steps taken.

Characteristics of suspicious packages and letters include inappropriate or unusual labeling, strange return address or no return address, postmarks from a city or state different from the return address, excessive packaging material, and others. If a package appears suspicious, it should not be opened. The package should be handled as little as possible. The room should be vacated and secured promptly and appropriate security or law enforcement agencies promptly notified. (Box 1).

Box 1. Handling of Suspicious Packages or Envelopes

- Do not shake or empty the contents of a suspicious package or envelope.
- Do not carry the package or envelope, show it to others, or allow others to examine it.
- Put the package or envelope on a stable surface.
- Do not sniff, touch, taste, or look closely at it or any contents that may have spilled.
- Alert others in the area about the suspicious package or envelope.
- Leave the area, close any doors, and take actions to prevent others from entering the area.
- If possible, shut off the ventilation system.
- Wash hands with soap and water to prevent spreading potentially infectious material to face or skin.
- Seek additional instructions for exposed or potentially exposed persons.
- If at work, notify a supervisor, a security officer, or a law enforcement official. If at home, contact the local law enforcement agency.
- If possible, create a list of persons who were in the room or area when this suspicious letter or package was recognized and a list of persons who also may have handled this package or letter. Give the list to both the local public health authorities and law enforcement officials.

ANTHRAX THREATS

Clark County Health District
24-hour number: 385-1291

Metro Police Dispatch Office
24-hour number: 311

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**When You See Unusual,
Think Outbreak!**