



# ANTHRAX

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Anthrax (also known as wool sorters disease, malignant pustules, milzbrand, charbon and splenic fever) is one of the oldest and most destructive diseases of livestock. It is found worldwide, and severe outbreaks have been recorded since Medieval times. Anthrax kills both animals and humans.

Anthrax has great economic importance to the livestock industry. It is most common in food animals, but can affect many warm-blooded animals. Anthrax is caused by the bacterium *Bacillus anthracis*. The bacterium forms spores (the dormant stage) that are extremely resistant to temperature, sunlight, drying and chemical disinfectants. These spores can live in the environment for years, especially in alkaline soils containing lots of nitrogen and organic matter. When the spores enter an animal (by ingestion or other means), they change to the disease-causing form, multiply and release potent toxins.

Secondary outbreaks can occur when animals and people come in contact with contaminated animal hides, milk, meat, wool, or feed or fertilizer that contain animal products.

## Disease in Livestock and Deer

Anthrax outbreaks occur most often in low-lying areas where the soil is alkaline (pH is greater than 6), when the low temperature is higher than 60 °F, and after there has been a flood or a drought.

Animals usually become infected by ingesting spores in the soil while grazing. (Flies and other biting insects can transmit anthrax from one animal to another, but this is much less common.) There is usually a history of previous outbreaks in the area, although several years may go by between outbreaks. Symptoms usually appear 3 to 7 days after an animal is infected. The disease can be peracute (extremely sudden and severe), acute or chronic.

In cattle, sheep, goats and deer anthrax may be peracute; an animal that appeared normal only a few hours earlier may be found dead.

In the acute form animals rapidly develop fever (up to 107.6 °F). They may stagger, tremble, and have signs of abdominal pain and respiratory distress. There may be blood-tinged diarrhea, blood in the urine and milk, and hemorrhaging from the mouth and nose. Pregnant animals may abort. Animals may die within 24 hours, with convulsions in the terminal stage of the disease. The acute form is more common in cattle, sheep, horses and deer.

In swine, the disease tends to be chronic. Swelling in the head and neck often interferes with breathing and swallowing and the animal may die from asphyxia. There may be blood-tinged mucous discharge from the mouth and nose. The chronic form is also seen in horses and dogs. Chronic cases of anthrax are more responsive to antibiotic treatment.

Anthrax can resemble other conditions that cause sudden death. In cattle and sheep, this includes clostridial infections, bloat, lightning strike, acute leptospirosis, bacillary hemoglobinuria, anaplasmosis, babesiosis, and acute poisoning by bracken fern, sweet clover, lead, or blue-green algae. In horses, acute equine infectious anemia, colic, lightning strike, lead poisoning, and blue-green algae poisoning may resemble anthrax. In swine, classical swine fever (hog cholera), African swine fever, and pharyngeal malignant edema symptoms are similar to anthrax. Poisoning and non-fatal vehicle collisions could mimic anthrax in deer.

The carcass of an animal killed by anthrax usually shows little or no rigor mortis, and there is usually dark blood oozing from the mouth, nose and anus (the blood does not clot). The body will be bloated and will decompose rapidly. **If you find a suspicious carcass, do not cut into it!** Opening the carcass will release anthrax spores into the environment and spread the disease. Instead, call a veterinarian at once. He or she will know how to safely take blood samples for laboratory analysis and advise you on carcass burning.

Anthrax can be treated with several antibiotics. Penicillin and oxytetracycline are very effective. The recommended daily dose of penicillin for swine, goats and sheep is 22,000 units/kg (10,000 units/pound); the daily dose for cattle is 5 to 10 million units. Your veterinarian will instruct you to continue therapy for at least 5 days and to administer the daily dose in two equal parts at 12-hour intervals for at least the first 2 days. If potassium penicillin or sodium penicillin is available, it should be given by IV as the initial dose in severely ill animals.

The daily oxytetracycline dose is 4.5 mg/kg (2 to 2.1 mg/pound) for all species. The dose should be given in two equal parts every 12 hours for the first 2 days. It may be given as an IM injection or by IV (slowly) for at least 5 days.

Carefully follow label instructions for withdrawal times for approved over-the-counter antibiotics or follow instructions for the use and withdrawal times of extra-label antibiotics recommended by a veterinarian.

## Disease in People

There are three forms of anthrax in people—cutaneous, pulmonary and gastrointestinal. Rare cases of anthrax meningitis also have been documented.

The cutaneous form accounts for more than 90 percent of the cases in humans. It occurs when an anthrax spore enters through a wound in the skin. Symptoms appear in 2 to 5 days. The first symptom is a red, raised lesion that may be mistaken for an insect bite. This develops into a blister. The area becomes swollen and the swelling may spread to other areas. A lesion on the head or neck may cause the throat to swell so much that a tracheal tube must be inserted so that the victim can breathe. If treated quickly, the death rate from cutaneous anthrax is low. In untreated cases the death rate may be as high as 20 percent.

The pulmonary form is caused by inhaling anthrax spores. Symptoms appear 1 to 5 days later. It begins like many common respiratory infections with fever, malaise, muscle pain and cough. In the second phase, 3 to 5 days later, the patient suddenly develops respiratory distress, sweating, cyanosis and shock. Victims die within 24 hours. This form of anthrax is almost always fatal, if untreated.

People also can get anthrax by eating contaminated meat. Symptoms will appear within 12 hours to 5 days. The patient develops fever, vomiting, bloody diarrhea and malaise. If untreated, the death rate can be as high as 50 percent.

Penicillin is the preferred antibiotic for treating anthrax in people. Tetracycline and erythromycin also are effective if used early and are used in patients with penicillin allergy.

## Prevention and Control

Animals in areas where anthrax has previously occurred should be vaccinated against the disease. Vaccine should be given at least 2 to 4 weeks before the normal seasonal outbreak. In areas where anthrax often occurs, a veterinarian may recommend giving a booster shot in 2 to 4 weeks. Normally an annual booster is adequate.

Vaccinated animals may develop some swelling and fever that lasts several days. Dairy cattle may produce less milk and pregnant sows may abort after vaccination. Milk from cows with fever should be properly destroyed. Food animals should not be vaccinated within 60 days of slaughter.

Healthy animals should not be given any antibiotics for at least 7 days after vaccination against anthrax because antibiotics can make the vaccine ineffective.

There is a human vaccine for anthrax. Veterinarians, people who handle raw materials (meat, hides or wool) that might be contaminated, and others who are at risk should be vaccinated. For information on human vaccination contact the Texas Department of Health (<http://www.tdh.state.tx.us/>) or see the Centers for Disease Control Web site (<http://www.cdc.gov/>).

The best way to control an anthrax outbreak is to keep from releasing more spores into the environment. Carcasses, bedding, and other contaminated materials and soil should be burned as soon as possible. Burn carcasses where they lie. If you must move them, use a sled so that you do not spread anthrax by dragging the carcass across the ground. Alert the appropriate local authorities that you will be burning a carcass. In dry years you may be expected to use special fire containment procedures. **Remember, do not open the carcass.** The disease-causing form of the bacteria that is in the carcass is usually destroyed when the carcass is burned. But if the carcass is opened and the bacteria are exposed to air, they transform into the resistant spores that will spread infection. Note that thorough burning kills spores.

Keep predators, pets and all other animals away from the carcass until after it is completely burned. Even the bones of infected animals can spread anthrax. To protect yourself, wear long sleeves and disposable gloves when handling a carcass if anthrax is suspected; also wear protective clothing when working or vaccinating animals.

Follow general sanitation procedures after handling livestock and disinfect any equipment used with livestock that may be contaminated. Ordinary disinfectants will not work for anthrax spores. Use a freshly prepared 5 percent solution of sodium hydroxide (lye) to kill anthrax spores. Lye is a caustic and dangerous chemical, and should be used under professional supervision. Personal protection gear is necessary when it is used. Follow all label precautions when using this disinfectant.

Veterinarians are required to report all diagnosed cases of anthrax to the Texas Animal Health Commission (800-550-8242) and Texas Department of Health (512-458-7255). After a case has been diag-

nosed in the field, it is usual for an area TAHC veterinarian to issue a temporary restriction on the movement of animals on or off the affected premise. Sick animals on the premise should be isolated from healthy animals, but no animals should be moved off the premise. If anthrax is confirmed, the premise will be quarantined until at least 10 days after all livestock are vaccinated, and after proper disposal of all carcasses.

Anthrax outbreaks usually have subsided by the start of deer season and cool weather. Nevertheless, hunters should shoot, field dress and consume only game that appears healthy.

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