



# **Guidelines for Prevention and Control of Anthrax**

Developed with joint collaboration of  
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## Guidelines for Prevention of Anthrax

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## What is anthrax?

Anthrax is a serious infectious disease caused by gram-positive, rod-shaped bacteria known as *Bacillus anthracis*. Anthrax can be found naturally in soil and commonly affects domestic and wild animals around the world. Although it is rare, people can get sick with anthrax if they come in contact with infected animals or contaminated animal products.

Contact with anthrax can cause severe illness in both humans and animals. Anthrax is not contagious, which means you can't catch it like the cold or flu.

## How do animals get infected with anthrax?

Domestic and wild animals such as cattle, sheep, goats, antelope, and deer can become infected when they breathe in or ingest spores in contaminated soil, plants, or water. In areas where domestic animals have had anthrax in the past, routine vaccination can help prevent outbreaks.

## How do people get infected with anthrax?

People get infected with anthrax when spores get into the body. When anthrax spores get inside the body, they can be "activated." When they become active, the bacteria can multiply, spread out in the body, produce toxins (poisons), and cause severe illness.

This can happen when people breathe in spores, eat food or drink water that is contaminated with spores, or get spores in a cut or scrape in the skin. It is very uncommon for people in the United States to get infected with anthrax.

## Where is anthrax found?

Anthrax is most common in agricultural regions of Central and South America, sub-Saharan Africa, central and southwestern Asia, southern and eastern Europe, and the Caribbean.

Anthrax is rare in Pakistan, but sporadic outbreaks do occur in wild and domestic grazing animals such as cattle or deer. Anthrax is more common in developing countries and countries that do not have veterinary public health programs that routinely vaccinate animals against anthrax.

## Types of Anthrax:

The type of illness a person develops depends on how anthrax enters the body. Typically, anthrax gets into the body through the skin, lungs, or gastrointestinal system. All types of anthrax can eventually spread throughout the body and cause death if they are not treated with antibiotics

### **1. Cutaneous Anthrax:**

When anthrax spores get into the skin, usually through a cut or scrape, a person can develop cutaneous anthrax. This can happen when a person handles infected animals or contaminated animal products like wool, hides, or hair. Cutaneous anthrax is most common on the head, neck, forearms, and hands. It affects the skin and tissue around the site of infection.

Cutaneous anthrax is the most common form of anthrax infection, and it is also considered to be the least dangerous. Infection usually develops from 1 to 7 days after exposure. Without treatment, up to 20% of people with cutaneous anthrax may die. However, with proper treatment, almost all patients with cutaneous anthrax survive

## **2. Inhalation Anthrax**

When a person breathes in anthrax spores, they can develop inhalation anthrax. People who work in places such as wool mills, slaughterhouses, and tanneries may breathe in the spores when working with infected animals or contaminated animal products from infected animals. Inhalation anthrax starts primarily in the lymph nodes in the chest before spreading throughout the rest of the body, ultimately causing severe breathing problems and shock.

Inhalation anthrax is considered to be the most deadly form of anthrax. Infection usually develops within a week after exposure, but it can take up to 2 months. Without treatment, only about 10 - 15% of patients with inhalation anthrax survive. However, with aggressive treatment, about 55% of patients survive.

## **3. Gastrointestinal Anthrax**

When a person eats raw or undercooked meat from an animal infected with anthrax, they can develop gastrointestinal anthrax. Once ingested, anthrax spores can affect the upper gastrointestinal tract (throat and esophagus), stomach, and intestines.

Gastrointestinal anthrax has rarely been reported in the United States. Infection usually develops from 1 to 7 days after exposure. Without treatment, more than half of patients with gastrointestinal anthrax die. However, with proper treatment, 60% of patients survive.

## **4. Injection Anthrax**

Recently, another type of anthrax infection has been identified in heroin-injecting drug users in northern Europe.

Symptoms may be similar to those of cutaneous anthrax, but there may be infection deep under the skin or in the muscle where the drug was injected. Injection anthrax can spread throughout the body faster and be harder to recognize and treat. Lots of other more common bacteria can cause skin and injection site infections, so a skin or injection site infection in a drug user does not necessarily mean the person has anthrax.

## **How People Are Infected**

People get infected with anthrax when spores get into the body. When this happens, the spores can be activated and become anthrax bacteria. Then the bacteria can multiply, spread out in the body, produce toxins (poisons), and cause severe illness. This can happen when people breathe in spores, eat food or drink water that is contaminated with spores, or get spores in a cut or scrape in the skin. Certain activities (described below) can increase a person's chances of getting infected.

## Working with infected animals or animal products

Most people who get sick from anthrax are exposed while working with infected animals or animal products such as wool, hides, or hair.

- Inhalation anthrax can occur when a person inhales spores that are in the air (aerosolized) during the industrial processing of contaminated materials, such as wool, hides, or hair.
- Cutaneous anthrax can occur when workers who handle contaminated animal products get spores in a cut or scrape on their skin.

## Eating raw or undercooked meat from infected animals

People who eat raw or undercooked meat from infected animals may get sick with gastrointestinal anthrax. This usually occurs in countries where livestock are not routinely vaccinated against anthrax and food animals are not inspected prior to slaughter.

In the United States, gastrointestinal anthrax has rarely been reported. This is because yearly vaccination of livestock is recommended in areas of the United States where animals have had anthrax in the past, and because of the examination of all food animals, which ensures that they are healthy at the time of slaughter.

## Injecting heroin

A newly discovered type of anthrax is injection anthrax. This type of anthrax has been seen in northern Europe in people injecting heroin. So far, no cases of injection anthrax have been reported in the United States.

## Is Anthrax Contagious?

No. You cannot catch anthrax from another person the way you might catch a cold or the flu. In rare cases, person-to-person transmission has been reported with cutaneous anthrax, where discharges from skin lesions might be infectious.

## Symptoms:

The symptoms of anthrax depend on the type of infection and can take anywhere from 1 day to more than 2 months to appear. All types of anthrax have the potential, if untreated, to spread throughout the body and cause severe illness and even death.

**Cutaneous anthrax** symptoms can include

- A group of small blisters or bumps that may itch
- A painless skin sore (ulcer) with a black center that appears after the small blisters or bumps
  - Most often the sore will be on the face, neck, arms, or hands
  - Swelling can occur around the sore

**Inhalation anthrax** symptoms can include

- Fever and chills
- Chest discomfort
- Shortness of breath
- Confusion or dizziness

- Cough
- Nausea, vomiting, or stomach pains
- Headache
- Sweats (often drenching)
- Extreme tiredness
- Body aches

**Gastrointestinal anthrax** symptoms can include

- Fever and chills
- Swelling of neck or neck glands
- Sore throat
- Painful swallowing
- Hoarseness
- Nausea and vomiting, especially bloody vomiting
- Diarrhea or bloody diarrhea
- Headache
- Flushing (red face) and red eyes
- Stomach pain
- Fainting
- Swelling of abdomen (stomach)

**Injection anthrax** symptoms can include

- Fever and chills
- A group of small blisters or bumps that may itch, appearing where the drug was injected
- A painless skin sore with a black center that appears after the blisters or bumps
- Swelling around the sore
- Abscesses deep under the skin or in the muscle where the drug was injected
- Keep in mind
  - Symptoms are similar to those of cutaneous anthrax, but injection anthrax can spread throughout the body faster and be harder to recognize and treat than cutaneous anthrax.
  - Skin and injection site infections associated with injection drug use are common and do not necessarily mean the person has anthrax.

## Diagnosis:

diagnose anthrax, take patient histories to determine how exposure may have occurred, and order necessary diagnostic tests.

If inhalation anthrax is suspected, chest X-rays or CT scans can confirm if the patient has mediastinal widening or pleural effusion, which are X-ray findings typically seen in patients with inhalation anthrax.

The only way to confirm a diagnosis of anthrax is to either

- Test directly for *Bacillus anthracis* in a sample (blood, skin lesion swab, spinal fluid, or respiratory secretions) or
- Measure antibodies or toxin in blood.

Samples must be taken before the patient begins taking antibiotics

## Who Is At Risk

Anyone who has come in contact with anthrax spores could be at risk of getting sick. Most people will never be exposed to anthrax. However, there are activities that can put some people at greater risk of exposure than others.

## Medical Care:

All types of anthrax can be prevented and treated with antibiotics. There is a vaccine licensed to prevent anthrax, but it is only recommended for routine use in certain groups of at-risk adults. If someone has symptoms of anthrax, it's important to get medical care as quickly as possible to have the best chances of a full recovery.

## Prevention:

### Antibiotics

Antibiotics can prevent anthrax from developing in people who have been exposed but have not developed symptoms. Ciprofloxacin and doxycycline are two of the antibiotics that could be used to prevent anthrax.

Each of these antibiotics offers the same protection against anthrax. Anthrax spores typically take 1 to 6 days to be activated, but some spores can remain inside the body and take up to 60 days or more before they are activated. Activated spores release toxins—or poisons—that attack the body, causing the person to become sick. That's why people who have been exposed to anthrax must take antibiotics for 60 days. This will protect them from any anthrax spores in their body when the spores are activated.

### Vaccine:

While there is a vaccine licensed to prevent anthrax, it is not typically available for the general public. Anthrax Vaccine Adsorbed (AVA) protects against cutaneous and inhalation anthrax, according to limited but well researched evidence. The vaccine is approved by the Food and Drug Administration (FDA) for at-risk adults **before** exposure to anthrax. The vaccine does **not** contain any anthrax bacteria and **cannot** give people anthrax.

Currently, FDA has not approved the vaccine for use **after** exposure for anyone. However, if there were ever an anthrax emergency, people who are exposed might be given anthrax vaccine to help prevent disease. This would be allowed under a special protocol for use of the vaccine in emergencies.

### Routine Use (Before Exposure):

Anthrax vaccine is routinely used in three groups of adults 18 to 65 years of age who may be at risk of coming in contact with anthrax because of their job:

- Certain laboratory workers who work with anthrax
- Some people who handle animals or animal products, such as some veterinarians
- Some members of the United States military

To build up protection against anthrax, these groups should get **5 shots** of anthrax vaccine over 18 months. To stay protected, they should get annual boosters. The shots are injected into the muscle (intramuscular).

### Who Should Not Get the Vaccine?

Certain people shouldn't get the anthrax vaccine in routine situations.

- Anyone who has had a serious allergic reaction to a previous dose of anthrax vaccine should not get another dose.
- Anyone who has a severe allergy to any component of the anthrax vaccine should not get a dose. Anyone with severe allergies, including allergy to latex, should tell their doctor.
- For anyone with a moderate or severe illness, their doctor might ask them to wait until they recover to get the vaccine. People with mild illness can usually be vaccinated.
- Pregnant women should not get the vaccine.

### **Emergency Use (After Exposure)**

In certain situations, such as a bioterrorist attack involving anthrax, anthrax vaccine might be recommended to prevent anthrax in people after they have been exposed.

If this were to happen, people who were exposed would get **3 shots** of anthrax vaccine over 4 weeks plus a 60-day course of antibiotics to prevent disease.

**During an emergency, the only people who should not get the vaccine after exposure are those who have had a serious allergic reaction to a previous dose of anthrax vaccine.**

**\*Source. CDC**