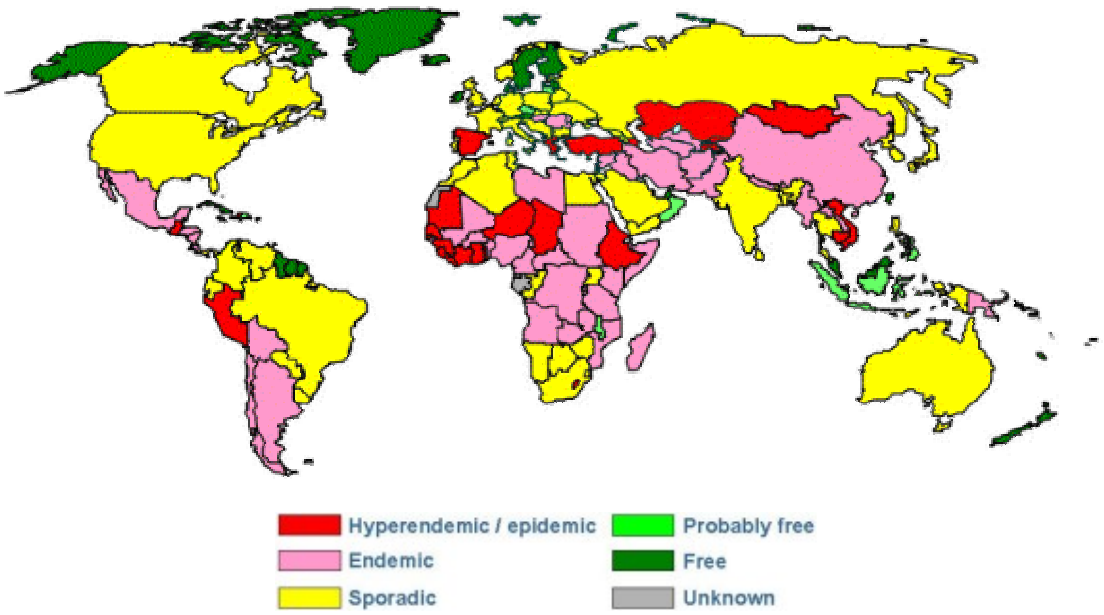
ANTHRAX

Bacillus Anthracis

Anthrax is a contagious disease affecting mainly herbivorous animals, such as cattle, sheep, horses, goats etc. It is caused by the bacterium bacillus anthracis. Anthrax occurs in agricultural regions, such as South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East. It is one of the oldest known diseases, and was once 'epidemic'. It was the first disease to have its 'causative organism' isolated (by C. J. Davaine in 1863).

Anthrax Occurrences around the World



Transmission

Animals are infected with anthrax by drinking water from an area of contaminated soil (where the organism can survive for years), or by eating infected carcasses or foodstuffs; or from the bites of bloodsucking insects. Humans are usually infected by anthrax through occupational exposure, normally with the flesh, bones, skins, hair and excrement of infected animals.

In humans anthrax is very rare; the chance of infection is about 1 in 100,000.

Infection

Anthrax infections come in three forms:

1) **Cutaneous Anthrax**. The most common form of Anthrax (about 95% of cases) is usually transmitted via injured skin or mucus membranes. Usually the victim is infected by handling contaminated wool, hides, leather or hair. The bacterium enters through cuts on the skin. A skin infection then begins as a raised and itchy bump (a gelatinous edema), which is often mistaken for an insect bite, and then develops into a 'vesicle', then a malignant pastule, and finally an ulcer. The ulcer is usually about 1-3cm across with a characteristic black necrotic ('dying') area in the middle. Nearby lymph glands often also become swollen. The infection may spread from this ulcer and lead to septicaemia. In the most severe cases, the blood stream may be invaded and the victim may die. However, only about 20% of untreated victims of this form of anthrax die.

2) **Inhalation Anthrax**. Also known as 'woolsorters' disease' usually occurs when the victim inhales spore-containing dust from animal hair or hides. The disease begins quickly with a high fever and a chest pain. It quickly progresses to a systemic hemorrhagic pathology. This form of the disease is often fatal if the treatment cannot stop the infection at the site of invasion.

3) **Gastrointestinal Anthrax**. Is similar to cutaneous anthrax but occurs on the intestinal mucosa. It is often caused by consuming infected meat. It is characterised by an acute inflammation of the intestinal tract, and its symptoms include nausea, loss of appetite, vo miting, fever, which are followed by abdominal pain, coughing up of blood and severe diarrhoea. Although this form of the disease is rare in developed countries, it has a high mortality rate.

♦Meningitis due to bacillus anthracis is a very rare occurrence that is caused by another primary infection.

Immunity

The only known effective defence against anthrax infection is the anthrax vaccine. This vaccine was developed from an attenuated strain of bacillus anthracis. The vaccine has an efficiency rate of 93%, and is known as AVA (Anthrax Vaccine Adsorbed). It is recommended for people who are likely to come into contact with the disease, such as farm workers, or scientists, and now, certain sections of the US Military.

The immunisation against anthrax consists of three subcutaneous injections given two weeks apart followed by three additional subcutaneous injections given after 6, 12 and 18 months. Annual 'booster' injections are also recommended to maintain a high level of immunity.

Treatment

People who have been exposed to anthrax but do not yet have the infection are put on a 60 -day course of antibiotics. Both penicillin, and tetracycline and fluoroquinolones are effective if they are given before the start of septicaemia or the spreading of the infection to the lymph nodes (which takes about 24 hours).

However, scientists have found evidence of strains engineered to resist these drugs.

Anthrax and Biological Warfare

Iraq, Russia, North Korea and perhaps 10 countries are capable of loading anthrax spores into weapons. Domestic terrorists may also be able to disperse the spores via mass attacks. In this case a cloud of anthrax spores would be released, probably by a crop-duster or similar aircraft. If the local animal population were to be infected, humans might then contract the disease from infected skin, carcass or meat. Anthrax spores can be made a stored in a dry form and still be lethal after decades in storage.

However, many people have pointed out that Anthrax is the least of the bioterrori sm worries. A determined terrorist could infect himself with a deadly disease, such as ebola and then come into contact with as many victims as possible, starting a chain reaction and possibly and an epidemic.

♦The *Times History of War* rates the potential death count of an anthrax attack at 30,000 to 100,000, based on 30kg being used at a rate of 0.1mg-min/m^3. This is similar to the 23,000 to 80,000 death count from a Hiroshima-sized atomic bomb.