**FACT SHEET ~ ANTHRAX..................**

**What is anthrax?**
Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic lower vertebrates (cattle, sheep, goats, camels, antelopes, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissue from infected animals.

**Why has anthrax become a current issue?**
Because anthrax is considered to be a potential agent for use in biological warfare, the Department of Defense (DoD) has begun mandatory vaccination of all active duty military personnel who might be involved in conflict.

**How common is anthrax and who can get it?**
Anthrax is most common in agricultural regions where it occurs in animals. These include South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East. When anthrax affects humans, it is usually due to an occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products from other countries where anthrax is more common may become infected with *B. anthracis* (industrial anthrax). Anthrax in wild livestock has occurred in the United States.

**How is anthrax transmitted?**
Anthrax infection can occur in three forms: cutaneous (skin), inhalation, and gastrointestinal. *B. anthracis* spores can live in the soil for many years, and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. It is rare to find infected animals in the United States.

**What are the symptoms of anthrax?**
Symptoms of disease vary depending on how the disease was contracted, but symptoms usually occur within 7 days.

**Cutaneous:** Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

**Inhalation:** Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

**Intestinal:** The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

**Where is anthrax usually found?**
Anthrax can be found globally. It is more common in developing countries or countries without veterinary public health programs. Certain regions of the world (South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East) report more anthrax in animals than others.
Can anthrax be spread from person-to-person?
Direct person-to-person spread of anthrax is extremely unlikely to occur. Communicability is not a concern in managing or visiting with patients with inhalational anthrax.

Is there a way to prevent infection?
In countries where anthrax is common and vaccination levels of animal herds are low, humans should avoid contact with livestock and animal products and avoid eating meat that has not been properly slaughtered and cooked. Also, an anthrax vaccine has been licensed for use in humans. The vaccine is reported to be 93% effective in protecting against anthrax.

What is the anthrax vaccine?
The anthrax vaccine is manufactured and distributed by BioPort, Corporation, Lansing, Michigan. The vaccine is a cell-free filtrate vaccine, which means it contains no dead or live bacteria in the preparation. The final product contains no more than 2.4 mg of aluminum hydroxide as adjuvant. Anthrax vaccines intended for animals should not be used in humans.

Who should get vaccinated against anthrax?
The Advisory Committee on Immunization Practices has recommend anthrax vaccination for the following groups:

- Persons who work directly with the organism in the laboratory
- Persons who work with imported animal hides or furs in areas where standards are insufficient to prevent exposure to anthrax spores.
- Persons who handle potentially infected animal products in high-incidence areas. (Incidence is low in the United States, but veterinarians who travel to work in other countries where incidence is higher should consider being vaccinated.)
- Military personnel deployed to areas with high risk for exposure to the organism (as when it is used as a biological warfare weapon).

Pregnant women should be vaccinated only if absolutely necessary.

What is the protocol for anthrax vaccination?
The immunization consists of three subcutaneous injections given 2 weeks apart followed by three additional subcutaneous injections given at 6, 12, and 18 months. Annual booster injections of the vaccine are recommended thereafter.

Are there adverse reactions to the anthrax vaccine?
Mild local reactions occur in 30% of recipients and consist of slight tenderness and redness at the injection site. Severe local reactions are infrequent and consist of extensive swelling of the forearm in addition to the local reaction. Systemic reactions occur in fewer than 0.2% of recipients.

How is anthrax diagnosed?
Anthrax is diagnosed by isolating B. anthracis from the blood, skin lesions, or respiratory secretions or by measuring specific antibodies in the blood of persons with suspected cases.

Is there a treatment for anthrax?
Doctors can prescribe effective antibiotics. To be effective, treatment should be initiated early. If left untreated, the disease can be fatal.
FACT SHEET BOTULISM

What is botulism?
Botulism is a rare but serious paralytic illness caused by a nerve toxin that is produced by the bacterium *Clostridium botulinum*. There are three main kinds of botulism. Foodborne botulism is caused by eating foods that contain the botulism toxin. Wound botulism is caused by toxin produced from a wound infected with *Clostridium botulinum*. Infant botulism is caused by consuming the spores of the botulinum bacteria, which then grow in the intestines and release toxin. All forms of botulism can be fatal and are considered medical emergencies. Foodborne botulism can be especially dangerous because many people can be poisoned by eating a contaminated food.

What kind of germ is *Clostridium botulinum*?
*Clostridium botulinum* is the name of a group of bacteria commonly found in soil. These rod-shaped organisms grow best in low oxygen conditions. The bacteria form spores which allow them to survive in a dormant state until exposed to conditions that can support their growth. There are seven types of botulism toxin designated by the letters A through G; only types A, B, E and F cause illness in humans.

How common is botulism?
In the United States an average of 110 cases of botulism are reported each year. Of these, approximately 25% are foodborne, 72% are infant botulism, and the rest are wound botulism. Outbreaks of foodborne botulism involving two or more persons occur most years and usually caused by eating contaminated home-canned foods. The number of cases of foodborne and infant botulism has changed little in recent years, but wound botulism has increased because of the use of black-tar heroin, especially in California.

What are the symptoms of botulism?
The classic symptoms of botulism include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and muscle weakness. Infants with botulism appear lethargic, feed poorly, are constipated, and have a weak cry and poor muscle tone. These are all symptoms of the muscle paralysis caused by the bacterial toxin. If untreated, these symptoms may progress to cause paralysis of the arms, legs, trunk and respiratory muscles. In foodborne botulism, symptoms generally begin 18 to 36 hours after eating a contaminated food, but they can occur as early as 6 hours or as late as 10 days.

How is botulism diagnosed?
Physicians may consider the diagnosis if the patient's history and physical examination suggest botulism. However, these clues are usually not enough to allow a diagnosis of botulism. Other diseases such as Guillain-Barré syndrome, stroke, and myasthenia gravis can appear similar to botulism, and special tests may be needed to exclude these other conditions. These tests may include a brain scan, spinal fluid examination, nerve conduction test (electromyography, or EMG), and a tension test for myasthenia gravis. The most direct way to confirm the diagnosis is to demonstrate the botulinum toxin in the patient's serum or stool by injecting serum or stool into mice and looking for signs of botulism. The bacteria can also be isolated from the stool of persons with foodborne and infant botulism. These tests can be performed at some state health department laboratories and at CDC.

How can botulism be treated?
The respiratory failure and paralysis that occur with severe botulism may require a patient to be on a breathing machine (ventilator) for weeks, plus intensive medical and nursing care. After several weeks, the paralysis slowly improves. If diagnosed early, foodborne and wound botulism can be treated with an antitoxin which blocks the action of toxin circulating in the blood. This can prevent patients from worsening, but recovery still takes many weeks. Physicians may try to remove contaminated food still in the gut by inducing vomiting or by using enemas. Wounds
should be treated, usually surgically, to remove the source of the toxin-producing bacteria. Good supportive care in a hospital is the mainstay of therapy for all forms of botulism. Currently, antitoxin is not routinely given for treatment of infant botulism.

**Are there complications from botulism?**

Botulism can result in death due to respiratory failure. However, in the past 50 years the proportion of patients with botulism who die has fallen from about 50% to 8%. A patient with severe botulism may require a breathing machine as well as intensive medical and nursing care for several months. Patients who survive an episode of botulism poisoning may have fatigue and shortness of breath for years and long-term therapy may be needed to aid recovery.

**How can botulism be prevented?**

Botulism can be prevented. Foodborne botulism has often been from home-canned foods with low acid content, such as asparagus, green beans, beets and corn. However, outbreaks of botulism from more unusual sources such as chopped garlic in oil, chile peppers, tomatoes, improperly handled baked potatoes wrapped in aluminum foil, and home-canned or fermented fish. Persons who do home canning should follow strict hygienic procedures to reduce contamination of foods. Oils infused with garlic or herbs should be refrigerated. Potatoes which have been baked while wrapped in aluminum foil should be kept hot until served or refrigerated. Because the botulism toxin is destroyed by high temperatures, persons who eat home-canned foods should consider boiling the food for 10 minutes before eating it to ensure safety. Instructions on safe home canning can be obtained from county extension services or from the US Department of Agriculture. Because honey can contain spores of *Clostridium botulinum* and this has been a source of infection for infants, children less than 12 months old should not be fed honey. Honey is safe for persons 1 year of age and older. Wound botulism can be prevented by promptly seeking medical care for infected wounds and by not using injectable street drugs.

**PLAGUE ~ General Information.............**

Male *Xenopsylla cheopis* (oriental rat flea) engorged with blood. This flea is the primary vector of plague in most large plague epidemics in Asia, Africa, and South America. Both male and female fleas can transmit the infection.

**Introduction:** Plague is an infectious disease of animals and humans caused by a bacterium named *Yersinia pestis*.

People usually get plague from being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Millions of people in Europe died from plague in the Middle Ages, when human homes and places of work were inhabited by flea-infested rats. Today, modern antibiotics are effective against plague, but if an infected person is not treated promptly, the disease is likely to cause illness or death.

**Risk:** Wild rodents in certain areas around the world are infected with plague. Outbreaks in people still occur in rural communities or in cities. They are usually associated with infected rats and rat fleas that live in the home. In the United States, the last urban plague epidemic occurred in Los Angeles in 1924-25. Since then, human plague in the United States has occurred as mostly scattered cases in rural areas (an average of 10 to 15 persons each year). Globally, the World Health Organization reports 1,000 to 3,000 cases of plague every year. In North America, plague is found in certain animals and their fleas from the Pacific Coast to the Great Plains, and from southwestern Canada to Mexico. Most human cases in the United States occur in two regions: 1) northern New Mexico, northern Arizona, and southern Colorado; and 2) California, southern Oregon, and far western Nevada. Plague also exists in Africa, Asia, and South America (see map).
Smallpox

*Health Information for International Travel, 2001–2002*

In May 1980, the World Health Organization (WHO) declared the global eradication of smallpox. Currently, there is no evidence of smallpox transmission anywhere in the world. The last reported case of endemic smallpox occurred in Somalia in October 1977, and the last reported case of laboratory-acquired smallpox occurred in the United Kingdom in 1978. WHO amended the International Health Regulations on January 1, 1982, deleting smallpox from the diseases subject to the regulations.

**Smallpox vaccination should not be given for international travel.** The risk from smallpox vaccination, although very small, now exceeds the risk of smallpox; consequently, smallpox vaccination of civilians is indicated only for laboratory workers directly involved with smallpox or closely related orthopox viruses (for example, monkeypox, vaccinia, and others). Health care workers whose contact with these viruses is limited to contaminated materials (for example, dressings) are at a lower risk of inadvertent infection than laboratory workers, but may be considered for vaccination.

**Misuse of Smallpox Vaccine**

Smallpox vaccine should never be used therapeutically. There is no evidence that vaccination has therapeutic value in the treatment of recurrent herpes simplex infection, warts, or any other disease.