ISSUE ★ BRIEF

PREPARED BY: NORTH CAROLINA ASSOCIATION FOR BIOMEDICAL RESEARCH

BIOTERRORISM

★ AT A GLANCE ★

★ OVERVIEW OF BIOTERRORISM ★

What is Bioterrorism?

Bioterrorism involves the deliberate release of viruses, bacteria or other agents used to cause illness or death in people, animals or plants. These agents typically are found in nature, but it is possible that they could be changed to increase their ability to cause disease, to be resistant to current medicines or to be spread into the environment. Biological agents can be spread through the air, through water or in food. Terrorists may use biological agents because they can be extremely difficult to detect and do not cause illness for several hours to several days. Some bioterrorism agents, such as the smallpox virus, can be spread from person to person, while others, such as anthrax, cannot.

A Long History

Early forms of bioterrorism date back to the 14th and 15th centuries, when corpses were used as ammunition and as biological weapons. While little was known about how germs cause disease, the stench of rotting bodies was known to transmit infections, according to medieval medical lore. Then, in the late 18th century during the American Revolution, smallpox was used by the British military as a weapon. Using smallpox as a weapon was not unprecedented for the British military, however, as they targeted Native Americans with smallpox attacks earlier in the century.

By World War I, the germ theory of disease was well established, and German scientists and military officials applied this knowledge during the war in a widespread campaign of biological sabotage. Their target

was livestock being shipped from neutral countries to the American and European Allies. The diseases the Germans cultivated as weapons were glanders and anthrax.

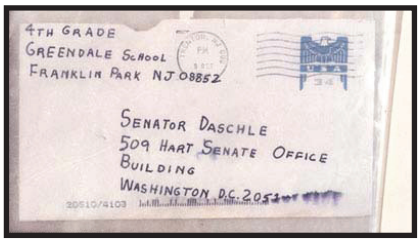
During World War II, the Japanese military practiced biowarfare on a mass scale. Directed against the Chinese, Japanese scientists used scores of human subjects to test the lethality of various disease agents, including anthrax, cholera, typhoid and plague. As many as 10,000 people were killed. The Japanese also dropped paper bags filled with plague-infested fleas over cities, contaminated wells and distributed poisoned foods.

Sparked by World War II, bioweapons programs in the Soviet Union and the United States reached new heights in the anxious climate of the Cold War. Both nations explored the use of hundreds of different bacteria, viruses and biological toxins, and each nation devised sophisticated ways to disperse those agents in fine-mist aerosols, to package them in bombs and to launch them on missiles.

At the end of 1969, President Richard Nixon terminated the offensive biological warfare program and ordered all stockpiled weapons destroyed. From this point on, U.S. researchers switched their focus to defensive measures. In 1972, the United States and more than 100 nations signed the Biological and Toxin Weapons Convention, which bars possession of deadly biological agents except for defensive research. But despite the treaty, the Soviet Union fired up its offensive program, which involved genetically altered "superplague," antibiotic-resistant anthrax and long-range missiles designed to spread disease.

Around 1985, Iraq launched its own bioweapons program, which included weaponized anthrax, botulinum toxin and aflatoxin. No evidence exists that the Iraqi state ever has used its biological arsenal.

During the mid-1980s and 1990s, followers of two different cults launched bioterrorist attacks — one on American soil and the other in a Tokyo subway. And soon after 9/11 in the fall of 2001, an anthrax attack was launched using the U.S. postal system. The attack killed a small number of people and caused significant panic throughout the American public.



The anthrax-containing envelope sent to Senator Tom Daschle from a fake address that killed two postal workers in October 2001.

★ APPLICATIONS OF BIOTERRORISM ★

Bioterrorism Agents

Bioterrorism agents include bacteria, viruses, fungi and other microorganisms, as well as biotoxins produced by microorganisms, plants and animals, that can kill or incapacitate. Because they can reproduce, biological agents have the unique potential to make an environment more dangerous over time. If used for hostile purposes, any disease-causing microorganism could be considered a weapon. For the purposes of warfare, specific characteristics of certain agents make them more likely to be used than others.

Some potential warfare agents can make their victims very sick without necessarily killing them. Examples include the microorganisms that cause tularemia, Q fever and yellow fever. After suffering debilitating illness, victims of these diseases often recover, though not always. Other agents are more likely to be lethal. The bacteria that cause bubonic plague and the virus that causes smallpox can kill large numbers of untreated people. Early antibiotic treatment usually cures plague victims, and smallpox vaccinations before exposure to the virus can prevent the disease.

The Centers for Disease Control (CDC) separates bioterrorism agents into three categories, depending on how easily they can be spread and the severity of illness or death they cause:

- Category A agents are organisms or biotoxins and are considered the highest risk to the public and

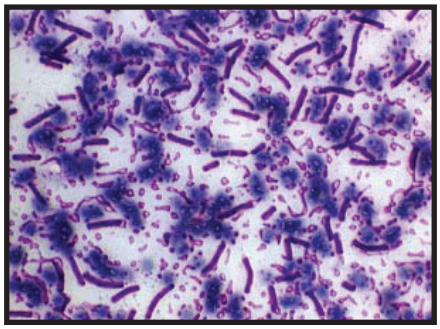
national security because they easily can be spread or transmitted from person to person, they result in high death rates and have the potential for major public health impact, they might cause public panic and social disruption and they require special action for public health preparedness. Diseases caused by such agents include anthrax, botulism, plague, smallpox, tularemia and viral hemorrhagic fevers.

- Category B agents are moderately easy to spread and result in moderate illness rates and low death rates. Example agents in this category include *Burkholderia mallei* (a bacterium that causes glanders), ricin toxin (a poison made from castor beans) and *Escherichia coli* (a bacterium that in some forms can cause disease, though it normally lives in the intestines of humans and other animals).
- Category C is made up of emerging infectious diseases such as the Nipah virus and the hantavirus.

The following are the most dangerous bioterrorist agents:

Anthrax

Anthrax is a serious disease caused by *Bacillus anthracis*, a bacterium that forms spores. There are three types of anthrax: skin (cutaneous), lung (inhalation) and digestive (gastrointestinal). Anthrax is not known to spread from one person to another. Humans can become infected with anthrax by handling products from infected animals or by breathing in anthrax spores from infected animal products (wool, for example). People can become infected with gastrointestinal anthrax by eating undercooked meat from infected animals. Anthrax also can be used as a weapon, as happened in the United States in 2001.



COURTESY ABERDEEN UNIVERSITY CHEMISTRY DEPARTMENT
Anthrax spores seen through a microscope.

Botulism

Botulism is a muscle-paralyzing disease caused by a toxin made by the bacterium *Clostridium botulinum*. The three main kinds are foodborne botulism, which occurs when a person ingests preformed toxin that leads to illness within a few hours to days; infant botulism, which occurs in a small number of susceptible infants each year who harbor *C. botulinum* in their intestinal tract; and wound botulism, which occurs when wounds are infected with *C. botulinum* that secretes the toxin. Although all forms of botulism can be fatal and are considered medical emergencies, foodborne botulism especially is dangerous because many people can be poisoned by eating contaminated food.

Plague

Plague is a disease caused by *Yersinia pestis*, a bacterium found in rodents and their fleas in many areas around the world. Pneumonic plague occurs when *Y. pestis* infects the lungs. Transmission can take place if someone breathes in *Y. pestis* particles, which could happen in an aerosol release during a bioterrorism attack. Pneumonic plague also is transmitted by breathing in *Y. pestis* suspended in respiratory droplets from a person or animal with pneumonic plague. Becoming infected in this way usually requires direct and close (within six feet) contact with the ill person or animal. Pneumonic plague also may occur if a person with bubonic or septicemic plague is untreated and the bacteria spread to the lungs.

Smallpox

Smallpox is a serious, contagious and sometimes fatal infectious disease. There is no specific treatment for smallpox disease, and the only prevention is vaccination. The term *smallpox* is derived from the Latin word for *spotted* and refers to the raised bumps that appear on the face and body of an infected person. Smallpox is caused by the variola virus that emerged in human populations thousands of years ago. Except for laboratory stockpiles, the variola virus has been eliminated. However, in the aftermath of the events of September and October of 2001, there is heightened concern that the variola virus might be used as an agent of bioterrorism.

Tularemia
Tularemia is a potentially serious illness that occurs naturally in the United States. It is caused by the bacterium *Francisella tularensis* found in animals (especially rodents, rabbits and hares). People can get tularemia in various ways, including being bitten by an infected tick, deerfly or other insect; handling infected animal carcasses; eating or drinking contaminated food or water; or breathing in *F. tularensis*. Tularemia is not known to be spread from person to person.

Viral Hemorrhagic Fevers
Viral hemorrhagic fevers are a group of illnesses characterized by bleeding and caused by several distinct families of viruses. In general, the term is used to describe a severe multisystem syndrome, which means that multiple organ systems in the body are affected. Characteristically, the overall vascular system is damaged and the body's ability to regulate itself is impaired. While some types of hemorrhagic fever viruses can cause relatively mild illnesses, many of these viruses, such as Ebola and Marburg, cause severe, life-threatening disease.

Attack Methods

A biological attack is most effective when agents are dispersed into the air, which is the typical method of dissemination. It can be done in various ways, such as firing artillery shells that burst in midair or using airplanes to spray the agents over an area. If released outdoors, these types of weapons can be affected by weather conditions. Rain would reduce the effectiveness of the agents, and wind might spread them in unexpected directions.

Some fragile microorganisms might not survive an explosion, but several, like anthrax spores, can remain potent after an explosive release. In any case, U.S. Army tests have shown that biological agents can be dispersed broadly in a variety of nonexplosive ways. In the 1950s and '60s, the Army released bacteria in hundreds of tests in populated areas throughout the United States. Agents were sprayed in San Francisco from a boat offshore, dispensed from slow-moving cars in Minneapolis and St. Louis and released from light bulbs dropped in the New York City subway system. The bacteria in the tests were not as dangerous as actual warfare agents, though they posed some risks to the exposed populations. The tests demonstrated that an enemy or terrorist could expose millions of people to disease-causing organisms by using a variety of simple techniques.

★ RELATED ISSUES ★

Fighting Bioterrorism

The 1972 Biological Weapons Convention is the most recent international agreement prohibiting the use of biological weapons. Prior to it, the 1925 Geneva Protocol prohibited the use of poison gas and bacteriological weapons in war.

The 1972 Biological Weapons Convention bans the use, development, production and stockpiling of biological and toxin weapons. It was the first international agreement to ban an entire category of weapons and was established three years after a unilateral decision in 1969 by the United States to eliminate its own biological arsenal. Most major powers, including the former Soviet Union and the United States, became parties to the biological treaty when it went into effect in 1975. Later, more countries joined in the agreement, and the world appeared about to be rid of germ weapons. However, the Soviet Union secretly continued to develop biological weapons, and many analysts contend that following the Iran-Iraq War in the 1980s, more countries began to develop biological weapons secretly, making the potential for their use increase.

Compliance is the major challenge to the success of the convention. Inspectors need unrestricted access to ensure compliance and to maintain hope that verification can be implemented elsewhere. Without that access, other nations may continue their biological warfare programs.

Domestically, Congress passed the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (the Bioterrorism Act), which President George W. Bush signed into law June 12, 2002. The act is separated into five titles: *National Preparedness for Bioterrorism and Other Public Health Emergencies*, *Enhancing Controls on Dangerous Biological Agents and Toxins*, *Protecting Safety and Security of Food and Drug Supply*, *Drinking Water Security and Safety* and *Additional Provisions*.

Several U.S. government agencies work together to enforce the Bioterrorism Act and to prevent future biological attacks from occurring. Those agencies include the CDC, the Department of Health and Human Services (DHHS), the Food and Drug Administration and the Department of Homeland Security, among others.

Preparedness and Response

Total protection from a bioterrorism attack is difficult, but steps can be taken to reduce the effects of an attack. Four approaches to protection include early detection of biological agents, physical shelter from the agents, decontamination of exposed materials and clothing and appropriate medical treatments.

COURTESY NATIONAL RENEWABLE ENERGY LABORATORY
Government agents wear special protective "hazmat" suits while inspecting a possible bioterror threat.

Since many biological agents are colorless, odorless and tasteless, an attack could take place without the victims realizing it. Even if a biological attack were known to be occurring, quick identification of the offending organism could be problematic. The U.S. military has developed a field apparatus that can test an air sample for the presence of specific biological agents. Called a Biological Integrated Detection System, it can confirm the presence of a handful of microorganisms, including anthrax and plague bacteria. However, there are scores of possible biological agents that cannot be detected easily. Several efforts are being made to develop a generic detector of dangerous organisms, using techniques such as laser technology, but despite such efforts, the ability to rapidly identify all possible agents remains elusive.

Once biological agents are detected, a sealed, ventilated shelter can provide protection. Gas masks can prevent agents from entering the lungs, and protective outer garments keep toxic agents from touching bare skin. From a military standpoint, each of these methods has drawbacks. Remaining in an enclosure constrains a soldier's fighting ability, cumbersome outerwear restricts mobility and a mask limits vision.

Quick decontamination of exposed surfaces is possible for most biological agents. Bleach, special powders or just soap and water can neutralize most biological agents. A few agents, such as anthrax spores, may not be destroyed easily if they are located in inaccessible places.

Medical or drug treatment can help some victims of biological weapons. For example, bleaching powder can lessen skin injuries from mustard gas exposure if applied soon after contact. Atropine and other antidotes can neutralize the effects of nerve agents if injected almost immediately after exposure. Vaccinations can protect against some biological agents, such as anthrax, and other agents are susceptible to antibiotics.

Because an act of bioterrorism or a large-scale natural disaster targeting the U.S. civilian population would require rapid access to large quantities of pharmaceuticals and medical supplies, special stockpiles are

being created by the federal government. No one can anticipate exactly where a terrorist will strike, and few state or local governments have the resources to create sufficient stockpiles on their own. Therefore, a national stockpile has been created as a resource for all. In 1999, Congress charged the DHHS and the CDC with the establishment of the National Pharmaceutical Stockpile, now known as the Strategic National Stockpile. Its mission is to provide a resupply of large quantities of essential medical material to states and communities during an emergency within 12 hours of a federal decision to deploy.

COURTESY CDC

The Strategic National Stockpile has accumulated enough medicine to protect several large cities at the same time in the event of a bioterrorist attack.

These four approaches to bioterrorism preparedness rely on a foundation of bioterrorism research; the ability to detect and counter bioterrorism danger depends on having reliable, up-to-date knowledge. The main government entity carrying out that research is the National Institute of Allergy and Infectious Diseases (NIAID), which seeks to understand, prevent and treat infectious and immunologic human diseases. Infectious diseases include those caused by new, emerging and re-emerging infectious agents, such as infections that are introduced intentionally as an act of bioterrorism.

The NIAID, a component of the National Institutes of Health, spent approximately $47 million on bioterrorism research in 2001. For 2006, however, Bush proposed a budget of $4.4 billion for the institute, a huge increase from previous years' spending. The NIAID uses that money to fund new research initiatives, including research investigating high-priority, Category A biological diseases (anthrax, botulism, plague, smallpox, tularemia and viral hemorrhagic fevers). Many of its research endeavors include work with government partners as well as with the business world and academia. And in addition to new research initiatives, the NIAID supports an extensive portfolio of existing bioterrorism-related research.

★ EDUCATIONAL ACTIVITY ★

Thinking Critically

The following educational activity is intended for high school students studying bioterrorism:

1. Ask students to investigate media reports about 21st-century bioterrorism. Organize students into five groups to take notes on:
   - Bioweapons development in the former Soviet Union
   - Bioweapons development in the United States
   - Obstacles to developing bioweapons
   - Obstacles to delivering bioweapons
   - Facts about anthrax and smallpox

2. Once students are done taking notes, have each group report on what it found. Then, provide the same groups with five other recent media sources and ask them to research how each media source reported on the five categories. How do the reports compare? Which sources gave the most facts? Which sources gave the least? What might account for any factual differences? What emotional tone, if any, did the reports convey? Ask students to report these findings to the class.

★ ADDITIONAL RESOURCES ★

A Glossary of Terms

Agent: A factor, such as a microorganism, a chemical substance or a form of radiation, that causes a disease or medical condition.

Anthrax: A noncontagious, potentially fatal disease caused by breathing, eating or absorbing through cuts in the skin the *Bacillus anthracis* bacteria.

Antidote: A substance that can counteract a form of poisoning. Sometimes, the antidote for a particular toxin is manufactured by injecting the toxin into an animal in small doses and the resulting antibodies are extracted from the animals' blood. However, some toxins have no known antidote. For example, the poison ricin, which is produced from the waste byproduct of castor oil manufacture, has no antidote, and as a result is often fatal if it enters the human body in sufficient quantities.

Atropine: A drug used as an antidote for nerve agent poisoning. Troops who are likely to be attacked with chemical weapons often carry autoinjectors with atropine that can be injected quickly into the thigh.

***Bacillus*:** A large family of bacteria that have a rodlike shape. They include the bacteria that cause food to spoil as well as those responsible for some types of diseases. Helpful members of the *Bacillus* family are used to make antibiotics or to colonize the human intestinal tract and aid with digestion.

Bacteria: Single-celled microorganisms that can exist either as independent (free-living) organisms or as parasites (dependent upon another organism for life).

Biological attack: The deliberate release of germs or other biological substances that can make people sick.

Bioterrorism: Terrorism using biologic agents. Biological diseases and the agents that might be used for terrorism have been listed by the Centers for Disease Control and Prevention, and the list includes a sizable number of select agents — potential weapons whose transfer in the scientific and medical communities are regulated to keep them out of unfriendly hands.

Botulism: An uncommon but potentially very serious illness, it is a type of food poisoning that produces paralysis of muscles via the nerve toxin botulinum (botox), which in turn is manufactured by the bacteria *Clostridium botulinum*.

Brucellosis: An infectious disease caused by the bacteria *Brucella* that results in rising and falling (undulant) fevers, sweats, malaise, weakness, anorexia , headache, myalgia (muscle pain) and back pain.

***Clostridium*:** A group of anaerobic bacteria that thrive in the absence of oxygen. It includes species that cause the diseases botulism, gas gangrene and tetanus.

***Clostridium perfringens*:** A type of bacteria that is the most common agent of gas gangrene and that also can cause food poisoning and a fulminant form of bowel disease called necrotizing colitis.

Dirty bomb: The use of common explosives to spread radioactive materials over a targeted area. Also known as a *radiation attack*, a dirty bomb is not a nuclear blast, but rather an explosion with localized radioactive contamination.

Disease: Illness or sickness often characterized by typical patient problems and physical findings.

Disease surveillance: The ongoing systematic collection and analysis of data and the provision of information, which leads to action being taken to prevent and control a disease, usually one of an infectious nature.

Ebola virus: A notoriously deadly virus that causes fearsome symptoms, the most prominent being high fever and massive internal bleeding. The Ebola virus kills as many as 90 percent of the people it infects and is one of the viruses that is capable of causing hemorrhagic (bloody) fever.

Encephalitis: Inflammation of the brain. It occurs, for example, in 1 in 1,000 cases of measles and can start after onset of the measles rash and result in a high fever, convulsions and/or a coma. It usually runs a short course with full recovery within a week, though it can result in central nervous system impairment or death.

Fulminant: Any event or process that occurs suddenly, quickly and is intense and severe to the point of lethality.

Glanders: A disease caused by infection with the bacterium *Burkholderia mallei*, usually by ingestion of contaminated food or water. Symptoms include the formation of nodular lesions in the lungs and ulceration of the mucous membranes in the upper respiratory tract. The acute form results in coughing, fever and the release of infectious nasal discharge, followed by septicaemia and death within days. In the chronic form, nasal and subcutaneous nodules develop, eventually ulcerating. Death can occur within months, while survivors act as carriers.

Hantavirus: A group of viruses that cause hemorrhagic fever and pneumonia. It is carried by several mouse and rat species and is spread to humans when virus-containing particles from rodent urine, droppings or saliva are stirred into the air.

Incubation period: The time elapsed between exposure to a pathogenic organism and when symptoms and signs are first apparent. Depending on the disease, the person may or may not be able to give the disease to others during the incubation period.

Marburg virus: The virus that causes Marburg hemorrhagic fever, a disease that affects both humans and nonhuman primates. Caused by a genetically unique, animalborne RNA virus of the filovirus family, its recognition led to the creation of this virus family. The four species of Ebola virus are the only other known members of the filovirus family.

Necrotize: To undergo the process of necrosis, which is the death of tissue in the body.

Nipah virus: A virus that infects pigs and people, in whom it can cause a sometimes-fatal form of viral encephalitis. Nipah virus caused a severe outbreak of viral encephalitis in Malaysia in 1998.

Panic: A sudden strong feeling of fear that prevents reasonable thought or action.

Plague: An infectious disease caused by the bacterium *Yersinia pestis*.

Public health: The approach to medicine that is concerned with the health of the community as a whole.

Q fever: An acute febrile illness caused by *Coxiella burnetii*, a species of bacteria. Q fever is a zoonotic disease, which means it is contracted from animals. Besides the sudden onset of fever, it causes headaches, malaise and pneumonia, but not a rash.

Ricin: A potent protein toxin made from the leftover waste after processing castor beans to make castor oil.

Septicemic plague: A form of plague that occurs when the bacteria multiply in the blood. It usually is contracted through a flea or rodent bite, and its symptoms include fever, chills, weakness, abdominal pain, shock and bleeding underneath the skin or other organs.

Smallpox: Also known as *variola*, smallpox is a highly contagious and frequently fatal viral disease characterized by a biphasic, or two-phased, fever and a distinctive skin rash that leaves pock marks. Because of its high case-fatality rates and transmissibility, smallpox now represents a serious bioterrorist threat. It is caused by the variola virus, the incubation period is about 12 days following exposure and initial symptoms include high fever, fatigue and head and back aches. A characteristic rash, most prominent on the face, arms and legs, follows in two to three days. The rash starts with flat, red lesions that evolve at the same rate. Lesions become pus-filled and begin to crust early in the second week. Scabs develop and then separate and fall off after about three to four weeks.

***Staphylococcus*:** A group of bacteria that cause a multitude of diseases. Under a microscope, *Staphylococcus* bacteria are round and bunched together. They can cause illness directly by infection or indirectly through products they make, such as the toxins responsible for food poisoning and toxic shock syndrome. *Staphylococcus* are the main culprit in hospital-acquired infections and cause thousands of deaths every year.

Toxic shock syndrome: A serious but uncommon bacterial infection whose symptoms include sudden high fever, a faint feeling, watery diarrhea, headache and muscle aches.

Toxin: A poisonous substance produced by living cells or organisms. Toxins almost always are proteins that are capable of causing disease on contact or absorption with body tissues by interacting with biological macromolecules such as enzymes or cellular receptors. Toxins vary greatly in their severity, ranging from usually minor and acute (as in a bee sting) to almost immediately deadly (as in botulinum toxin).

Tuberculosis: A highly contagious infection caused by the bacterium *Mycobacterium tuberculosis*. Tubercles (tiny lumps) are a characteristic finding in TB. Most patients with tuberculosis do not need to be quarantined, though it is necessary sometimes.

Tularemia: A bacterial disease caused by infection with the bacterium *Francisella tularensis* that usually occurs in wild and domestic animals, most often rabbits. Tularemia can be transmitted to humans by contact with animal tissues or ticks and fleas and also is known as *rabbit fever* and *deerfly fever*.

Undulant fever: An infectious disease caused by the bacteria *Brucella* that characteristically causes rising and falling fevers, sweats, malaise, weakness, anorexia , headache, myalgia (muscle pain) and back pain.

Vascular system: The organ system that moves substances to and from cells in the body. It also can help stabilize body temperature and pH levels.

Virus: A microorganism smaller than a bacterium that cannot grow or reproduce apart from a living cell. A virus invades living cells and uses their chemical machinery to keep itself alive and to replicate itself. It can reproduce with fidelity or with errors (mutations). The ability to mutate is responsible for the ability of some viruses to change slightly in each infected person, which makes treatment more difficult.

Yellow fever: An acute, systemic (bodywide) illness caused by a flavivirus virus. In severe cases, the viral infection causes a high fever, bleeding into the skin and death of cells in the kidney and liver. The damage done to the liver from the virus results in severe jaundice, which yellows the skin.

***Yersinia*:** A group of bacteria that appear rodlike under a microscope and include *Yersinia pestis* (the cause of the bubonic and pneumonic plague). Infection with *Yersinia* bacteria can be treated with antibiotics.

Relevant Links

http://www.ama-assn.org
The American Medical Association helps doctors help patients by uniting physicians nationwide to work on the most important professional and public health issues. Its site contains a detailed FAQ section on bioterrorism.

http://www.cdc.gov/index.htm
The Centers for Disease Control and Prevention (CDC) is one of the 13 major operating components of the Department of Health and Human Services, which is the principal agency in the U.S. government for protecting the health and safety of all Americans and for providing essential human services, especially for people who are least able to help themselves. The CDC Web site contains multiple pages dedicated to bioterrorism, including general information, agent-specific information and information related to preparation and planning for an attack.

http://www.fda.gov
The Food and Drug Administration is responsible for protecting the public health by assuring the safety, efficacy and security of human and veterinary drugs, biological products, medical devices, our nation's food supply, cosmetics and products that emit radiation. Search for "bioterrorism" on the site for food safety and security information as it relates to the subject.

http://www.pbs.org
PBS is a nonprofit media enterprise owned and operated by the nation's 348 public television stations. The NOVA documentary program housed on its site contains a wealth of information on bioterrorism, including a detailed history, interviews with bioterrorist experts, video clips on the subject and educational resources.