

Article from SIRS Discoverer Database; (ProQuest) Lexile: 990L Biothreats-What You Should Know

CURRENT HEALTH 2
Feb. 2004, pp. 20+

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Biothreats--What You Should Know

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• *Although your risk of coming in contact with dangerous biological agents is low, you need to keep informed.*

In late 2001, several Americans became sick and some died from anthrax spores on letters. The scare shut down congressional offices for several days. People in the United States became aware and anxious about the dangers of **bioterrorism**, or germ warfare.

[\(See picture, "Kimball, Shana During Anthrax Scare in 2001."\)](#)

The threat of **bioterrorism** is a serious public health concern. How do you make sure you and your family are protected? Your first step is to arm yourself with information.

What Are the Threats?

Anthrax is one of several pathogens--germs--that infectious disease experts say could cause widespread harm if deliberately used as a weapon.

A pathogen is an agent, especially a living microorganism such as a bacterium, virus, or fungus, which causes disease. The greatest threat comes from those that are deadly, infectious, hard to prevent and treat, and can be spread easily over a wide area, says Charles Schable, M.D., the director of the **Bioterrorism Preparedness** and Response Program at the Centers for Disease Control and Prevention (CDC). You may already be familiar with some of the other diseases, in addition to anthrax, that pose the greatest threat if used for terrorism: smallpox, plague, botulism, and tularemia.

Specific bacteria cause plague, botulism, and tularemia. (See *A Closer Look at Biothreats*.) A few cases of each of these diseases occur in humans or animals every year somewhere in the world that are not caused by terrorist acts. (Smallpox is caused by a virus and has been eradicated worldwide. The last case was in Somalia in 1977.) Not everyone who is exposed to these diseases becomes infected or dies. Local health authorities can administer antibiotics or antidotes that are often effective if the disease is diagnosed early. Except for plague, each has a vaccine. But some vaccines are experimental and others are not widely available. Health officials recommend against large-scale immunization, because the chance of catching the disease is small. In some cases, the vaccine itself may cause problems.



How could these serious diseases become widespread as acts of **bioterrorism**? Some can be made in a lab or stolen from existing stocks. They could be mixed with a powder and distributed in the mail, as happened with anthrax. Or they could be spread through contaminated air, food, or water supplies. Biological agents may be more effective as threats against small groups than as actual weapons against large populations. Officials are investigating whether known groups have access to these bacteria and the technology and equipment to use them. Controlled release can be tricky and risky for the makers too.

The First Lines of Defense

Hospitals and local health departments are the first lines of defense against **bioterrorism**. They have received billions of federal dollars since 2001 to improve their response capabilities if a serious outbreak occurs. State labs and the CDC have been set up to give important backup. Federal and state law enforcement agencies are trained to get involved too.

Most hospitals have developed biosafety plans. Planning reduces the risk of panic in case of an attack. Practice helps too. Simulations test how personnel are supposed to respond. False alarms sometimes occur as well. "We react to every one of those as if it were the real thing," says Dr. Schable, "and from each one we learn." Communications are crucial. Did the right people get needed information as quickly as possible?

Being prepared helps no matter what threat arises. "The techniques that we had in place to work on **bioterrorism** served us very well for both SARS and monkeypox," notes Dr. Schable. Outbreaks of those diseases in 2003 were not terrorist-related.

In the Works

Meanwhile, the CDC and other researchers are developing ways to diagnose each disease more quickly. The sooner a diagnosis is made, the sooner lifesaving treatments can be started.

Improved nationwide surveillance can help spot serious problems. Suppose cold remedies start flying off drugstore shelves and it's not cold season? Or suppose patients on the East Coast start getting ailments usually seen only in the Southwest? Either situation might signal something dangerously out of the ordinary.

Prevention and treatment research have become more active. The government now stores medicines at strategic locations so it can quickly send supplies anywhere they're needed. But some bacteria strains may already be drug-resistant. Also, more research may be needed to develop enough vaccine with minimal side effects to control a major outbreak.

What You Can Do

"Being informed is important," stresses Dr. Schable. The National Institutes of Health and CDC Web sites have lots of material. The more you know, the better you can understand events and information.

In case of any attack, keep calm. Panic doesn't help anyone. Report any suspicious activity, substance, or mail to local authorities. Don't touch questionable items. Leave the area and close it off. Remove any clothing you think may be contaminated, and wash your hands with soap and water. If you think you may have become infected, contact your doctor or local health authorities immediately.

Meanwhile, keep things in perspective. "**Bioterrorism** is not something you can take lightly," says Dr. Schable. But Americans cope successfully with many other health risks. Flu, for example, claims about 36,000 lives each year in the United States. Information and a level head are your best defenses against **bioterrorism** concerns.

Don't Be Duped

Can oregano oil or colloidal silver save you from biological threats? No way, says the Federal Trade Commission (FTC). Gas masks, protective suits, and biohazard test kits may not work either.

Since 2001, the FTC has issued warnings to dozens of companies making deceptive or misleading claims. But government can't stop all con artists. You have to be a skeptical consumer. Anything that seems too good to be true probably is.

Watch out for ads that feed on fears. Fraudulent businesses often sound like legitimate groups. Check with consumer protection agencies. Don't trust your health to some huckster on the Internet or late night TV.

A Closer Look at Biothreats

Bacteria or virus: Anthrax (*Bacillus anthracis* bacteria)

Where normally occurs: Spores in the soil; can infect humans and animals

How spread: Enters a cut; consuming meat of infected animal; breathing spores into lungs

Treatment: Antibiotics

Vaccine: Available for livestock

Bacteria or virus: Botulism (*Clostridium botulinum* bacteria)

Where normally occurs: May occur naturally in fish, improperly canned foods, as spores in contaminated soil (rare)

How spread: Usually by eating contaminated food

Treatment: Antidote; ventilator; antibiotics

Vaccine: Experimental

Bacteria or virus: Plague (*Yersinia pestis* bacteria)

Where normally occurs: Rodents such as rats, squirrels, and prairie dogs

How spread: Fleabites; eating contaminated food

Treatment: Antibiotics

Vaccine: None

Bacteria or virus: Smallpox (*Variola virus*)

Where normally occurs: Humans

How spread: Direct contact with respiratory secretions, body fluids, bedding, or clothing of infected person; airborne (rare)

Treatment: None proven

Vaccine: Available

Bacteria or virus: Tularemia (*Francisella tularensis* bacteria)

Where normally occurs: Wild animals such as rabbits and squirrels

How spread: Touching body fluids of infected animals; fly or tick bite carrying blood of infected animal

Treatment: Intravenous antibiotics

Vaccine: Experimental; available for high-risk activities

Review/Discuss

• What has the federal government done to help to prepare Americans for the possibility of a **bioterrorism** attack? (*Billions of dollars have been given to hospitals and local health departments to improve their ability to diagnose and treat a **bioterrorism** attack, should one occur. State laboratories*)

for each state's department of health, local and federal law enforcement agencies, and the Centers for Disease Control and Prevention would also assist. All across the country, these agencies have developed plans for addressing a **bioterrorism** attack, and many hold practice simulations to test and improve their readiness.)

- Summarize some key findings of the work that has been done to help us become better prepared to handle a **bioterrorism** attack. (*Communications are crucial to the efforts to prevent or contain a **bioterrorism** attack. Many of the simulations so far have pointed to the idea that everyone involved needs to act in a timely and appropriate manner in response to an attack. A better understanding of unexpected crisis behavior and how to manage it would help us be better prepared.*)

- What are some of the areas of improvement that are in the works for the future? (*faster, better diagnostics for disease agents; improved surveillance networks to spot problems earlier; new medicines that could help us to resist or survive an attack; and better distribution of medical resources*)

Activity

Investigate where and when the most recent simulation for a catastrophic event--or even specifically, a **bioterrorism** attack--was held in your state or local area. What were the findings? Perhaps local police, fire, or rescue personnel were involved and might be willing to speak to the students about the event. Be sure to inquire what the role of the school community might be in a real or threatened attack.

Teacher Resources

Key Web sites for this topic include the Centers for Disease Control and Prevention (CDC), www.cdc.gov; the National Library of Medicine, National Institutes of Health, MedLine Plus Health Information site, www.nlm.nih.gov/medlineplus/healthtopics.html; and the Johns Hopkins Bloomberg School of Public Health biodefense site, www.jhsph.edu/Biodefense/tularemia.htm. (Search under "Biological Agents").