



ENVIRONMENTAL HEALTH SERIES

Biological and Chemical Terrorism

OVERVIEW

Although there have been attempts to use biological weapons as instruments of terrorism in the United States since the 1970s, the mailing of letters containing anthrax in October 2001 and the ensuing hysteria raised questions about protecting U.S. citizens from biological and chemical terrorism. In response, both federal and state lawmakers have passed or are considering passing legislation to assess and strengthen the nation's preparedness and response capabilities.

TERRORISM IN THE UNITED STATES AND OTHER COUNTRIES

As early as the 1970s, terrorist groups within the United States were suspected of planning to use biological weapons. Biological weapons fascinate these groups because they are easy to conceal and very small amounts can harm a large population, particularly if the agent is contagious. In 1972, members of a cult called the Order of the Rising Sun were arrested for possession of 40 kilograms of typhoid bacteria, which they were planning to put into the water supply in certain U.S. cities. The first known successful use of bioterrorism occurred in 1984, when followers of the U.S.-based Rajneeshee cult tried to influence a local election in Oregon by contaminating salad bars with salmonella; more than 750 people were infected.

When Thomas Lavy was arrested along the Alaskan-Canadian border in 1993, he was carrying 130 grams of ricin (one gram is enough to poison over 1000 people). No connection was found to terrorist groups, possibly since Mr. Lavy committed suicide soon after he was taken into custody.

In Japan, the Aum Shinrikyo doomsday cult, which killed at least 12 people and sick-

ened hundreds by releasing deadly sarin gas in Tokyo subway stations in 1995, also tried on various occasions to use or get access to anthrax, botulinum toxin, and ebola virus as agents of terror.¹

CHARACTERIZING THE RISKS

Since the anthrax attacks of October 2001, government officials have been forced to reassess the risk of biological and chemical terrorism, conceding that the threat may be more serious than they once thought. Assessing these risks is far from precise, however: it depends heavily on intelligence gathering and consideration of an incredibly large number of possible scenarios. Many experts agree that certain types of mass casualty events are unlikely, and the more catastrophic an event becomes, the less likely it is that terrorists could carry out the attack.² Preparations for such events may be prudent, nonetheless, given the enormity of their effects and potential consequences.

Before the October 2001 anthrax assault, many thought the risk of an attack to be very low, given the advanced equipment and degree of knowledge needed to create such biological and chemical weapons. These views

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were reinforced by the failure of the Japanese Shinrikyo cult, which, even with huge amounts of money and advanced biological knowledge at its disposal, failed numerous times to effectively deliver chemical and biological weapons.

The largest risk was thought to be posed by state-financed operations of so-called “rogue nations,” that could potentially have access to the knowledge and resources necessary to create biological and chemical weapons. This fear was fueled in part by information presented by Russian scientist Ken Alibek, author of *Biohazard*, who worked within the massive Soviet bioweapons research, development and production program. The Russian program, an open violation of the Biological Weapons Convention of 1972, consisted of 47 laboratories and employed 50,000 scientists, technicians and support staff.³ Dr. Alibek reported that some of the scientists who were employed by the program went on to work on bioweapons programs in

SHORT HISTORY OF BIOLOGICAL AND CHEMICAL WEAPONS

The first documented use of a biological or chemical agent occurred in the 6th century B.C., when Assyrians poisoned their enemies’ wells with a toxic fungus. During World War I, the use of biological and chemical agents such as mustard and chlorine gas caused concern about the unpredictability, lack of control, and morality of these new weapons of war. In 1925, the Geneva Protocol was signed, which banned the use of poisonous or asphyxiating gases and bacteriological agents. Nonetheless, some nations—including the Soviet Union and the United States—continued to pursue biological and chemical weapons programs throughout much of the 20th century.⁴

Fear of these weapons increased as the Cold War continued and stores of sophisticated chemical and biological weapons grew. In 1969, President Nixon signed an executive order to stop all offensive biological and toxin weapon research and production. Three years later, all stockpiles of biological agents and munitions from the U.S. program had been destroyed. In 1975, President Ford signed the 1972 Biological Weapons Convention, which also was signed by 102 other countries to prohibit the development, production, and stockpiling of bacteriological and toxin weapons.

Despite the convention, research and stockpiling of such weapons continued. In 1992, Boris Yeltsin admitted that the 1979 anthrax outbreak that killed at least 64 people in the Soviet city of Sverdlovsk (now called Ekaterinburg) was caused by an accidental release from a biological warfare research facility.

other countries, such as Iran, Iraq and North Korea.

One of the greatest fears is that smallpox specimens may have been smuggled out of the Russian facilities and could be in the hands of countries or organizations that work with terrorists. A 1999 report by the General Accounting Office concluded that use of smallpox as weapon of terrorism was unlikely due to difficulty acquiring the virus. Nonetheless, in January 2002, the World Health Organization recommended that the remaining stocks of smallpox be retained in order to give researchers more time to develop vaccines and treatments against the deadly virus. This action reverses a policy adopted in 1999 to eradicate the last remaining stores of smallpox virus.

President Bush responded to the perceived threat of a smallpox attack with a plan to vaccinate up to 10.5 million people, including military personnel, first responders and health care workers. The plan is controversial, since it would be costly and the vaccine carries a known risk of death and disability. Also, the risk of a smallpox attack is very small.

Since the anthrax attack, experts and governmental agencies are taking a serious look at previous assumptions. Some experts, such as D.A. Henderson, former director of the World Health Organization’s Smallpox Eradication Campaign, have warned that the threat of use of bioweapons is both plausible and serious, and that methods of producing and using them are available from many sources. In fact, many laboratories around the world sell anthrax, plague, typhoid, and the bacteria that produce the botulinum toxin. In addition, advances in science and biotechnology are likely to bring the tools for creating such weapons within the reach of a greater number of people.

Of the biological agents likely to be used in a terrorist attack, the Centers for Disease Control and Prevention (CDC), which Congress designated as the lead agency for overall public health and emergency response planning in 1999, lists six biological agents in the highest priority category:

- Anthrax,
- Botulinum toxin,
- Smallpox,
- Plague,
- Tularemia, and
- Viral Hemorrhagic Fever.

CDC lists 12 other agents in the second and third highest priority categories.

Sarin, mustard agent and chlorine are among the many chemical agents in the CDC chemical agents listing. Some officials fear that terrorists could cause the release of hazardous chemicals not only from canisters or bombs, but also from the facilities that store these chemicals for industrial use.

A bioterror attack causes great concern because of the silent nature with which such an attack could begin. Until the sick begin to arrive in emergency and health care clinics days or weeks after the attack, there may be no sign that anything has taken place, while a major epidemic could already be under way. Moreover, those who see the first cases may not be prepared to identify symptoms of some of the more exotic diseases that could result from a bioterrorist attack. A major bioterrorist event or threat has the potential to put incredible stresses on the nation's public health and health care systems, possibly pushing them beyond their capacity.

A chemical attack, on the other hand, would likely be more obvious because symptoms are likely appear immediately, initiating emergency response from police, fire and special emergency personnel.

WATER AND FOOD SAFETY

The U.S. Environmental Protection Agency (EPA), the American Waterworks Association, and the Federal Bureau of Investigation state that the risk of the water supply being successfully contaminated is low. Systems that already are in place to treat drinking water remove biological and chemical contaminants, and testing done at plants is likely to detect those that are present in high quantities after treatment. In addition, in order to contaminate the large reservoirs of water present at treatment facilities, enormous quantities of the contaminant would be required, making delivery extremely difficult.

Still, unintentional contamination of drinking water has occurred; one of the worst cases was in Milwaukee, Wisconsin, in 1994. Excessive rainfall washed scores of cryptosporidium, a parasite, into rivers, where it eventually contaminated the source of the city's drinking water and caused an estimated 400,000 illnesses.

To ensure that the nation's water supply remains safe from terrorism, the EPA has set up a special task force and is working with other government agencies and the states. EPA is providing local water utilities with technical training, vulnerability assessments and is helping to enhance emergency response.

Food is also a potential target. The Centers for Disease Control and Prevention and the U.S. Food and Drug Administration (FDA) have expressed concern about the intentional contamination of the food supply, citing an accidental contamination of chicken in Belgium with the cancer-causing chemical dioxin. The contamination was not discovered until months later, after many people were exposed.

The FDA is working with food safety agencies at federal, state and local levels to strengthen the nation's food safety system. It is focusing on more effective prevention

programs, new surveillance systems, and faster foodborne illness outbreak response capabilities.

PREPAREDNESS AND RESPONSE

In April 2000, the CDC Strategic Planning Working Group reported that "early detection of and response to biological or chemical terrorism is crucial." Its report stated that, without adequate preparedness, a large-scale chemical or biological attack could overwhelm the local—and even national—public health infrastructure.⁵

A report by the National Academy of Sciences, released in November 2002, supports the working group's contention, stating the nation's public health system is troubled by an "insufficient and inadequately trained" work force, "antiquated" laboratory capacity, a lack of real-time surveillance systems, an "ineffective and fragmented communications network," and incomplete work in the area of emergency preparedness and response.

One of the few large-scale preparedness exercises, the "Topoff" exercise, was conducted by the Department of Justice in May 2000 in Denver, Colorado. The simulation began with an aerosol of plague bacteria being released covertly at the Denver Performing Arts Center. By the final day of the exercise—seven days after the simulated release—there were difficulties getting antibiotics to the facilities that needed them, more than 3,000 U.S. and international patients had pneumonic plague, 795 had died, and medical care facilities had begun to shut down.

Analysis of the exercise revealed breakdowns in decision making, communications, leadership and coordination. Public health resources were soon exhausted, and staff were overwhelmed. Hospitals quickly became overburdened and were depleted of beds, staff and antibiotics. The state also was ill-prepared to quarantine people, and the disease spread quickly to other states and countries.⁶

Preparing the nation for response will be a major challenge to state and federal governments, as well as to public health and health care systems. One key to effectively dealing with an attack is early detection so that containment and proper treatment can begin. To achieve this goal, an effective disease surveillance system needs to be in place, and those who are likely to be first responders—local doctors and medical workers—need to be properly trained.

FEDERAL ACTION

In 1999, Congress designated CDC as the lead agency for overall public health planning for bioterrorism preparedness. A bioterrorism office was created within the agency to target areas for preparedness activities.

After researching and assessing the issue, the CDC

MODEL STATE EMERGENCY HEALTH POWERS ACT

Professors Larry Gostin and James Hodge of the Center for Law and the Public's Health, in cooperation with CDC, designed the act so that states would have access to model legislation that coherently addresses the legal ramifications of public health emergency response. The act provides language that states, territories and other U.S. jurisdictions can draw upon to supplement their current laws on emergency public health response.

NCSL created a "Checklist of Issues" handbook for the act at the request of legislators and staff who reviewed the model legislation. The checklist helps policymakers determine whether their jurisdiction's legal framework is adequate to respond in public health emergencies.

Strategic Planning Workgroup identified five major outcomes needed to be prepared for biological and chemical events:

- A well-trained, well-staffed, and fully prepared public health work force;
- Laboratory equipped and staffed to produce timely and accurate results for diagnosis and investigation;
- Epidemiology and surveillance programs, which will provide rapid detection of health threats;
- Information systems that enable rapid communication and analysis of health data; and
- Preparedness and response capabilities, which include response plans, exercises and the ability to maintain a high level of preparedness.

The federal government has responded with a number of grants and technical assistance.

In January 2002, Health and Human Services (HHS) Secretary Thompson said that each state would share \$1.1 billion in federal funds to prepare for public health emergencies. Because of the large amount of planning involved in implementing state preparedness plans, only a small percentage of this money has been utilized by the states.

The first portion of the funds has gone to fight bioterrorism and infectious disease and is being distributed through the CDC. A second portion went to the Health Resources and Services Administration to set up regional hospital plans to respond to potential terrorist attacks and will be distributed to states in a manner similar to the CDC money. The third portion has been provided by the HHS Office of Emergency Preparedness to support the Metropolitan Medical Response System. The response system is designed to increase local jurisdictions' ability to respond to release of a chemical or biological agent and to improve mass casualty incident preparedness.

Additional state funding at similar or higher levels is likely in the future; the president's 2003 budget includes an additional \$4.3 billion to HHS, funneled through the National Institutes of Health, the CDC and the Food and Drug Administration for vaccines, food safety, increased security and laboratory upgrades.

STATE ACTIVITY

Thought should be given to communications, delegation of responsibilities, training and other issues that must be addressed before a disaster occurs.

Successful response relies on the cooperation of various local and federal departments such as the departments of health, state laboratories, security forces and fire departments. Relationships must be tested and in place before an emergency occurs.

Among the questions that committees, state legislatures and public health departments must address are:

- Are people clear on legal authority?
- Who declares a public health emergency?
- What powers are given to whom? Can people be quarantined?
- Who are the around-the-clock contacts?
- Health care workers must be freed of time-consuming paperwork.
- Medical liability must be addressed.
- Do quarantine laws allow people to be forcibly held or vaccinated?

States have been very active in introducing bills to prepare for and respond to chemical and biological terrorist attacks. Legislation addressing a wide range of issues—including quarantine, security, increased criminal penalties, pharmaceutical stockpiles and others—have been introduced. Following are a few examples of enacted legislation:

Colorado

H.B. 1077, 2000

This act defines bioterrorism and created the Governor's Expert Emergency Epidemic Response Committee to address emergency needs of the state in case of an epidemic. The act required the committee to supplement the state disaster plan with suggested procedures for handling an emergency epidemic by July 1, 2001, and to provide expert advice to the governor for emergency epidemics or threats.

Georgia

S.B. 385, 2002

Addresses reporting requirements, disease surveillance, compulsory vaccination, isolation and segregation, report-

ing and identification of deceased people and coordination in public health emergencies.

Indiana

S.B. 180, 2001

Requires the state Emergency Medical Services Commission to conduct training and establish standards for the administration of antidotes, vaccines and antibiotics in situations related to a terrorist or military attack. The state Department of Health is directed to monitor communicable diseases and outbreaks of diseases that could be used as biological weapons. The department also is to develop capabilities and procedures to identify unknown biological substances that could be used as weapons. The statute defines terrorism and weapons of mass destruction and provides penalties for terrorism and the false reporting of a weapon of mass destruction. The penalty was enhanced for computer tampering to aid terrorism.

Minnesota

H.B. 3031, 2002

Establishes the Emergency Health Powers Act. Relates to declaring national security and peacetime health emergencies. Requires the reporting of certain health conditions, provides criminal penalties for bioterrorism, appropriates money, and provides for the quarantine of people.

New Hampshire

H.B. 1478, 2002

The Public Health Emergency Preparation and Response Act addresses investigation and examination authority, isolation and quarantine procedures, authority for access to and disclosure of patient records, authority to control pharmaceutical agents, and reporting requirements.

Utah

H.B. 231, 2002

Modifies the Health Code to create the Detection of Public Health Emergencies Act. Requires health care providers to report to the Department of Health when the health care provider suspects that an individual has been exposed to or harbors an illness or condition resulting from bioterrorism, an epidemic or pandemic disease, or other highly fatal infectious agent.

NOTES

1. Brigadier General Russ Zajtchuk, ed., *Medical Aspects of Chemical and Biological Warfare* (United States of America, Office of The Surgeon General Department of the Army, 1997), 75.
2. *Bioterrorism in the United States: Threat, Preparedness, and Response* (Washington, D.C.: Chemical and Biological Arms Control Institute (CBACI), 2000), 6.
3. Ken Alibek, *Biohazard* (New York: Random House Inc., 1999).
4. Brigadier General Russ Zajtchuk, ed., *Medical Aspects of Chemical and Biological Warfare* (United States of America, Office of The Surgeon General Department of the Army, 1997), 12-25.
5. Centers for Disease Control and Prevention, "Biological and Chemical Terrorism: Strategic Plan for Preparedness and Response; Recommendations of the CDC Strategic Planning Workgroup," *Morbidity and Mortality Weekly Report* 49, RR-4 (2000), 6
6. Thomas V. Inglesby, Rita Grossman, and Tara O'Toole, "A Plague on Your City: Observation from TOPOFF," *Clinical Infectious Diseases* 32 (2001), 436-445.

RESOURCES

- Garret, L. *Betrayal of Trust: The Collapse of Global Public Health*. New York: Hyperion, 2000.
- Lathrop, Peggy, and Linda M. Mann. "Preparing for Bioterrorism." Presented at the pathology fall symposium, "Disaster and Emergency Management: Knowledge Gained, Experience Applied," Baylor University Medical Center, Dallas, Texas, November 2, 2000.

Osterholm, Michael, and John Schwartz. *Living Terrors*. New York: Delacorte Press, 2000.

LINKS

Center for Disease Control and Prevention Center for Public Health Emergency Preparedness and Response.

www.bt.cdc.gov

Center for Civilian Biodefense Strategies at the Johns Hopkins Bloomberg School of Public Health and the School of Medicine.

www.hopkins-biodefense.org

NCSL Web site on state activities in public health preparedness.

www.ncsl.org/programs/press/2001/freedom/stateaction.htm

NCSL Web site on general public health preparedness

www.ncsl.org/programs/health/health-menu.htm

For more information about this topic, including details on state legislation and available funding and technical assistance, please visit the NCSL Web site at www.ncsl.org, **Protecting Democracy** section.

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