

# Confronting Biological Terrorism

## *Global Epidemiological Monitoring*

**It is difficult for policy-makers to assess the likelihood of a mass-casualty terrorist attack on their nations, but the consequences of such a possibility demand that governments pay serious attention to this issue. Several developments in the 1990s have increased public concern about the prospect that terrorists might employ weapons of mass destruction (WMD), especially nonnuclear ones.**

The collapse of the Soviet Union was an especially ominous event in terms of the possibilities for terrorism: it left hundreds of tons of nuclear material potentially vulnerable to theft, and reports surfaced about former Soviet weapons experts sharing their knowledge with states known to sponsor terrorism. There have been indications that the unconventional arsenals of several states involved in carrying out terrorist attacks have also been significantly improved. Iraq, in particular, was discovered to have produced a wide variety of lethal biological agents, and the Soviet Union was discovered to have developed antibiotic-resistant pathogens for use as weapons. Perhaps most troubling were revelations that the Soviet Union had produced several tons of smallpox and indications that the virus may have been acquired by both Iraq and North Korea.

Several highly publicized incidents have made clear that terrorists are interested in acquiring and using unconventional WMD. The most significant of these was a Japanese cult's chemical attack on a Tokyo subway in 1995, which

killed 12 and sent thousands to hospitals. It was later learned that the cult had also attempted, unsuccessfully, to acquire nuclear and biological weapons. Also troubling is the US government's claim that terrorist interest in WMD is growing. Osama bin Laden, the purported mastermind of a series of high-casualty terrorist attacks, is reportedly attempting to acquire nuclear, chemical, and biological agents. The US Central Intelligence Agency (CIA) reports that bin Laden's operatives have also been trained "to conduct attacks with toxic chemicals or biological toxins" and that Hamas is also "pursuing a capability to conduct attacks with toxic chemicals." Iraq, a sponsor of terrorism, reportedly threatened to smuggle anthrax and other WMD into Britain, in one instance threatening to put anthrax in duty-free bottles of alcohol, cosmetics, cigarette lighters, and perfume sprays. In other cases, several antigovernment individuals and groups were found to have acquired biological agents, revealing gaps in existing regulations regarding the sale or possession of lethal or incapacitating biological agents. Still, despite clear indications of eroding constraints, most terrorist attacks involving unconventional weapons thus far have involved crude agents and rudimentary equipment, resulting in relatively few casualties.

Partly in response to these threats, US government agencies have been holding exercises to test their preparedness to respond to WMD attacks. The exercises revealed that hospitals were likely to quickly exhaust their supply of antidotes and vaccines; "first responders" (police and firemen) were inadequately trained and likely to succumb themselves; and coordination among

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state, local, and federal officials was almost nonexistent. The public-health infrastructure is still unprepared for a timely response to outbreaks, and a number of public-health officials complain that there is too much focus on chemical attacks and too little on biological ones. Systems for ensuring that medication and personnel are disseminated appropriately are underdeveloped. And the lack of a global infectious-disease surveillance system will make it difficult to pinpoint the origin of a disease and to determine if it was introduced deliberately by terrorists. Analysts generally agree that although nuclear terrorism will remain a significant danger for the indefinite future, chemical, biological, and radiological (CBR) weapons are far easier and cheaper to produce, and CBR terrorism is therefore significantly more likely to occur.

Of these different types, terrorism with biological agents is the most serious threat. Despite their relative ease of manufacture, biological weapons are potentially as deadly as thermonuclear weapons. One US government study concluded that 100 kilograms of anthrax could kill from one to three million people if dispersed under optimal conditions. In comparison, a hydrogen bomb with a yield of one million tons of TNT could kill 600,000 to two million people.

Because the magnitude of the catastrophic threat presented by CBR terrorism is so difficult to calculate, it makes sense to focus on "dual-use" remedies. These include pursuing medical countermeasures that will improve human health regardless of whether major bio-

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logical attacks ever occur; improving epidemiological surveillance for human, animal, and plant diseases; and increasing compliance with Centers for Disease Control and Prevention (CDC) regulations regarding "reportable" diseases. All of these policies fall under the broad rubric of what might be called Global Epidemiological Monitoring (GEM).

Improving global disease surveillance for human and animal pathogens is critical for addressing the threat of bioterrorism. The West Nile virus outbreak shows why. When West Nile encephalitis was first diagnosed in New York state in the summer of 1999, CIA officials speculated that the virus, which had never before been seen in the western hemisphere, might have been deliberately introduced. Ultimately, the CDC concluded that the outbreak was not intentional. But the difficulty of identifying the virus and its origin—which was exacerbated by the lack of communication between public-health officials and the veterinary community—illustrates the complexity of distinguishing a biological-weapons incident from a natural outbreak of disease. This difficulty will only grow as urbanization, crowding, poverty, and misuse of antibiotics continue to increase the incidence of infectious diseases once thought to be under control.

On the rare occasions that biological weapons actually have been used or accidentally released, scientists and government officials often first assumed that the epidemics were natural outbreaks. For instance, many US security experts initially believed that a 1979 outbreak of anthrax in the Soviet Union, which killed at least 68 people, was caused by contaminated meat, as the Kremlin had claimed. But in 1992, after

Communism collapsed, Boris Yeltsin admitted that the anthrax came from an illegal biological weapons plant. And when 751 people in Oregon became infected with salmonella in 1984, public-health authorities suspected a natural outbreak, not biological terrorism. A year later, a former cult member confessed at an unrelated trial that the salmonella had been deliberately spread by the Rajneeshee cult.

Inadequate surveillance is of increasing concern, not only because of the biological terrorism threat, but also because of the growth of emerging, re-emerging, and antibiotic-resistant disease threats. Population shifts, global warming, and international travel and trade are facilitating the movement of microbes to new areas and, sometimes, new hosts, further complicating the task of identifying the source of infectious disease. A recent example is the Nipah virus, which killed over 100 people in Malaysia between 1998 and 1999. This is a zoonotic disease similar to Hendra, a disease found almost exclusively in pigs; scientists were surprised when it jumped from pigs to humans.

When an unusual outbreak occurs somewhere in the world, the World Health Organization (WHO) and the CDC may or may not learn about it. The WHO recently reported that 71 percent of the time, it first learns about epidemic disease outbreaks from informal or unofficial sources, such as medical reports. Most reports are verified within a few days, and important events within 48 hours; however, the median time delay between the onset of an outbreak and the receipt of the first report by the WHO or the CDC is 18 days, and the delay can range from one to 215 days. Delays in recognizing and responding to an out-

break could make the difference between successfully containing a local outbreak and failing to anticipate a global epidemic.

Elements of a global surveillance system exist, but the system needs to be substantially strengthened and expanded, and the various components must be linked electronically. Laboratories should be built in the field; an improved system for transporting samples needs to be developed; and more robust communication links among laboratories, WHO Collaborating Centers, national health ministries, hospitals, animal-health authorities, and private voluntary organizations need to be established. Methods of disease surveillance and control should take advantage of the revolution in communications technologies. It should be noted that governments are not the only actors who can make a difference in this arena. Philanthropists and private organizations also have the capacity to fund and organize such efforts and could play a significant role, especially if governments remain unable or unwilling to take action. The same policies that help us prepare for biological terrorism can also help us detect and respond to a natural-disease outbreak that spreads rapidly around the world. The essential components of GEM need to be implemented, by whomsoever has the will and the ability to do so; it would be an important and meaningful step forward in the effort to safeguard the world against biological terrorism. Such a system would also address the more immediate threat of emerging, reemerging, and antibiotic-resistant diseases. ■