

Editorial

Toward Biosecurity

“ . . . for many years to come Americans will become increasingly less secure, and much less secure than they believe themselves to be. . . . While conventional conflicts will still be possible, the most serious threat to our security may consist of unannounced attacks on American cities by sub-national groups using genetically engineered pathogens.”

—The United States Commission on National Security in the 21st Century¹

ON THE THRESHOLD

ONE OF THE MOST important characteristics of our era is the prospect that powerful destructive technologies will be wielded by terrorist groups who wish to kill as many people as possible. While such prospects are becoming increasingly likely, they are not inevitable. To prevent such catastrophes, we must be able to imagine the tragic possibilities before us with the vividness and analytical precision necessary to establish coherent priorities and a course of action. We must begin with acknowledgement of some deeply disturbing realities.

Of the various plausible forms of terrorist attack against civilian populations, only attacks with nuclear or biological weapons have the capacity to cause mass casualties—potentially tens of thousands of deaths—in a single blow.^{2,3} Nuclear weapons are widely recognized as strategic threats to nations and civilizations, but the strategic danger posed by biological weapons is not as widely understood. Moreover, the actions needed to reduce the threat of biological weapons have only recently received concerted attention. Although chemical weapons can cause great suffering and terror and require specific preparation and response protocols, they are not capable of inflicting massive lethality and do not pose strategic threats to national survival. The convention of lumping nuclear, chemical, radiological (“dirty bomb”), and biological weapons together as “weapons of mass destruction” is misleading and hinders prevention of and preparation for these different threats.

Biological weapons can be manufactured with materials and know-how that are openly available, dispersed around the planet, and hard to track. There are no theoretical limits to the amounts of bioweapons agents that

can be manufactured or the number of targets that could be attacked. Best estimates are that about a dozen states now have active bioweapons programs,⁴ though it is exceedingly difficult to detect bioweapons production efforts or to distinguish legitimate biotechnological enterprises from weapons production. Some effort has been made to secure the enormous bioweapons enterprise operated by the former Soviet Union, but thousands of former bioweapons scientists remain unemployed, and Russia has yet to allow independent inspectors into some facilities that functioned as bioweapons plants during the Cold War.

Bioweapons will become increasingly diverse and potent as a result of discoveries being made in the life sciences—discoveries that are essential to progress in medicine, agriculture, and environmental stewardship. Governments will be greatly tempted to declare some segments of bioscience “off limits” or to sequester certain kinds of knowledge behind a shroud of secrecy. Such tactics in the quest for biosecurity are likely to bring only partial and temporary respite—at best—and could wreak tremendous damage upon science, the world economy, and public trust.

Bioweapons can be made without the technological resources of an industrialized state. Such weapons may be particularly attractive to terrorists seeking to inflict devastating harm on nations whose military might makes conventional attacks impractical. As has been shown by the search for those who mailed *B. anthracis*-laden letters to government officials and media outlets in 2001, it is (and will remain) difficult to assign attribution for covert bioattacks. If a bioattack leaves no return address or it is committed by a terrorist group without a country to defend, traditional deterrence strategies—“If you hurt

us, we will destroy what you most value”—will be ineffective.

Finally, covert delivery of a biological or nuclear weapon is far more likely than an attack using missiles. Catastrophic terrorist attacks do not require high-performance, superpower-quality weapons delivery systems. Simply transporting a nuclear weapon or a bioweapon to the place where it is to be detonated or dispersed can assure mass casualties.

LESSENING THE DANGER

The collective human reaction to the danger presented by bioterrorism and bioweapons proliferation has thus far been strangely subdued. In the U.S., the federal government has begun to address the national capacity to cope with the deliberate epidemics that would follow bioweapons attacks. Incremental progress has occurred in some areas. For example, state health departments received federal funds in FY 2002 to improve bioterrorism preparedness; in FY 2003, NIH will receive \$1.7 billion for biodefense-related research and development, a significant increase from the \$151 million appropriated for this purpose in FY 2002; production of a U.S. smallpox vaccine stockpile is underway, and plans for vaccinating against smallpox are being formulated at federal and local levels. Thus far, the individual initiatives begun to improve bioterrorism preparedness do not add up to a coherent strategy, on either the national or international level, for dealing with the problems of bioweapons, nor do the actions underway accurately reflect the urgency or magnitude of the perils that confront us.

Much can be done to prevent the development and use of bioweapons and to lessen the suffering, death, and disruption that could result from bioterrorist attacks. Governments alone cannot meet the challenges posed by bioterrorism, however. To achieve biosecurity—a security that is grounded in liberty, intellectual freedom, and respect for human life—it will be necessary to enlist the genius of innovative individuals and to engage institutions, professional communities, and industries. The problems posed by mass lethality bioweapons are global; ultimately, the solutions must be as well.

Biodefense research and development

Substantial scientific and technological progress will remain fundamental to improving national and international biodefense capacity. In the near term, we should seek to create effective diagnostic tests, medicine, and vaccines to counter attacks involving the most likely bioagents. In the longer term, we should use our technical prowess to shift the advantage from the offense to the defense, so that even attacks using sophisticated, bioengineered weapons will fail to cause large numbers of fatal-

ities. Such a response capacity will compel us to delve deeply into the science of human immune function, the mechanisms of pathogenesis, and other aspects of the science of infectious disease, and it will require that we establish the capacity to rapidly produce and distribute large quantities of appropriate vaccines and medicines.

Upgrade medical and public health capacities to manage large epidemics

A robust biodefense strategy will require significant preparation and organizational innovation within health care institutions and the public health community. Not within living memory has America been called upon to cope with mass casualty disasters, nor have we had to manage large-scale, fast-moving epidemics. The infrastructures now available to handle these threats are insufficient to the task. Preparing for bioterrorism, without harming the peacetime missions of medicine and public health—missions that are themselves crucial to a healthy society—will require substantial and sustained investments of talent and money.

Prevent bioweapons development and use

The most desirable and most effective solution to the bioterrorism problem is prevention. We must, over time, develop the intelligence capacities and technologies needed to detect bioweapons development and to interdict bioterrorist attacks before they take place. We will need to devise legal frameworks that provide assurance that nations and groups are not establishing bioweapons arsenals or pursuing bioterrorism. But treaties, laws, and regulations will not be sufficient to prevent bioterrorism. There is an intimate and indissoluble linkage between legitimate, critically important bioscientific research and potential malignant applications of such knowledge. It will not be possible to prevent bioweapons development and use without the active and willing participation of the scientific community.

WHY THIS JOURNAL?

The purpose of this journal is, first, to foster a deepening understanding of the threat posed by biological weapons and to broaden the spectrum of people who are knowledgeable in these realms. Second, it is our hope and ambition that this journal will provide a platform for the ideas, analyses, research, and reviews that might usefully influence the maturation of biodefense strategy, science, and practice. We intend that many different communities of thinkers and practitioners use the journal to exchange ideas about how to prevent bioweapons development and how best to mitigate the consequences of bioterrorist attacks.

The Journal's intended audience includes policy-makers, government officials, national security experts, biologists and managers of biotech enterprises, clinical and public health professionals, and civic leaders with biodefense responsibilities.

The Editorial Board of *Biosecurity and Bioterrorism* encompasses a tremendous scope of experience, expertise, and political perspective. The diverse backgrounds of the Board indicate our commitment to publishing a broad range of analysis and opinion. We are grateful that so many distinguished persons agreed to serve in this capacity.

Approach to handling sensitive information

It is imperative that there be an informed, vigorous, and wide-ranging public discussion about the bioweapons threat and what to do about it. If society is to make the commitments of talent and treasure needed to meet this threat, we must understand what is at stake. We recognize that some may regard information presented in this journal as better left unpublished. We have established a process (noted in the Instructions for Authors) for reviewing submitted articles for content that might aid terrorist aims and for carefully examining any such concerns raised by authors or peer reviewers. When in the judgment of the editors an article contains information that should not be published, we will pursue a graded response that seeks to impose the minimum constraints consistent with appropriate security concerns.

THE CHALLENGE

The dangers and challenges posed by the bioterrorist threat are daunting—and the threat is growing. The United States and the collective international community can eliminate bioweapons as agents of mass lethality. To accomplish this, the nature of the threat must be understood in greater detail by a wide range of leaders and by the public. We must take the steps needed to improve the ability of key institutions to respond effectively to deliberate epi-

demics. We must muster the technical expertise and scientific and managerial talent needed to create an arsenal of drugs and vaccines essential to saving the lives of victims of bioterrorist attacks. We must create a coherent system of social contracts, including professional standards and legal strictures, so that legitimate bioscience research can proceed without fueling a bioweapons arms race. Many are already laboring mightily, in both government and civilian sectors, to diminish and blunt the possible dangers of bioweapons. We hope this journal will become a useful tool to these communities in the furtherance of these aims. Together, we must muster the will and the wisdom to ensure the responsible use of biological knowledge and the technologies it makes possible.

*“May your strength give us strength
May your faith give us faith
May your hope give us hope
May your love give us love.”*

—Bruce Springsteen, *Into the Fire*, from *The Rising*

REFERENCES

1. The U.S. Commission on National Security in the 21st Century. *New World Coming: American Security in the 21st Century*. September 15, 1999.
2. Office of Technology Assessment, US Congress. *Proliferation of Weapons of Mass Destruction*. Washington, DC: U.S. Government Printing Office; 1993:53–55. Publication OTA-ISC-559.
3. World Health Organization. *Health Aspects of Chemical and Biological Weapons*. Geneva, Switzerland: World Health Organization; 1970:98–99.
4. Monterey Institute for International Studies chemical and biological weapons resource page. *Chemical and Biological Weapons*. Monterey, Calif: Monterey Institute for International Studies; 2002. Available at: cns.miiis.edu/research/cbw/possess.htm

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