

<<chap hd>>9. Assessing the Threat of Bioterrorism

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Various forms of cancer kill roughly 565,000 Americans per year; tobacco kills around 440,000, and obesity causes perhaps 400,000 or more deaths.² Approximately 1.7 million patients develop infections annually while undergoing treatment in U.S. hospitals, resulting in an estimated 99,000 deaths.³ These four causes account for roughly 1.5 million U.S. deaths per year, every year. A single organism, *Clostridium difficile*, causes some 350,000 infections and 15,000–20,000 deaths per year.⁴ In 1990, the Institute of Medicine at the U.S. National Academy of Sciences estimated that microbial resistance, largely caused by the use of antibiotics in food supplements for cattle and chickens, cost the U.S. health care system approximately \$5 billion per year.⁵ In 2008, that cost was estimated at \$20 billion per year.⁶ Bioterrorism killed no U.S. citizens in the 20th century and five to date in the 21st century.

Since the anthrax scare of October and November 2001—in which 22 people were sickened, of whom 5 died—the U.S. government has appropriated \$64 billion for biological weapons prevention and defense. The proposed current rate of annual appropriation for this purpose is \$7 billion, which will likely continue in the future.⁷

Placing the two brief paragraphs above alongside each other presents the crux of the issues examined in this chapter. Can we present a reasonable estimate of the threat of bioterrorism to the United States? How has the subject been treated in the political domain? What are the consequences of some of the U.S. government's responses to the problem since 2001? Five policy questions will be reviewed. The first and most basic is the assessment of the bioterrorist threat to the United States. Under this rubric, the nature of the political discussion

surrounding the issue of bioterrorism in the United States in recent years is examined. The second issue is how the U.S. government's response since 2001 has increased the proliferation potential of biological weapons (BW) and damaged national security. The third is the diversion of resources within the U.S. public health sector. The fourth issue is the misdirection of public health efforts in developing nations. The final policy issue to be examined is that of oversight and regulation of the burgeoning U.S. biodefense program.

<<ahd>>Assessment of the Current Threat of Bioterrorism to the United States

The problem of assessing the threat of bioterrorism can be separated into four considerations: the status of state offensive biological weapons programs; evidence of proliferation from state BW programs; evidence of state assistance to nonstate actors to develop or produce biological agents or weapons; and efforts to develop biological agents or weapons by nonstate actors that are true international terrorist groups.

Official U.S. government statements in the late 1980s claimed that four nations possessed offensive BW programs when the Biological Weapons Convention was signed in 1972 and that this number increased to 10 by 1989.⁸ In November 1997, U.S. government officials raised the estimate to 12—9 of which the United States identified by name in the intervening years. In 2001, the estimate was 13. Since then, the U.S. government has removed Libya, Iraq, and Cuba from the list (it had removed South Africa in 1995, without public notice when that government terminated both its biological and chemical weapons programs)—a reduction of essentially one-third. But strikingly, as early as 2003, official U.S. intelligence assessments became markedly more qualified about which countries were definitively developing BWs.⁹ Defense Intelligence Agency Director Michael Maples's threat assessment presentation on January 11, 2007, accentu-

ated the lack of specifics on the number and status of offensive state BW programs:

- “North Korea’s resources include a biotechnical infrastructure that could support the production of various biological warfare agents.”
- “Iran has a growing biotechnology industry, significant pharmaceutical experience and the overall infrastructure that could be used to support a biological warfare program. DIA believes Iran is pursuing development of biological weapons.”
- “China possesses a sufficiently advanced biotechnology infrastructure to allow it to develop and produce biological agents.”
- “We judge Russia also continues research and development that could support its chemical and biological warfare programs.”
- “India and Pakistan ... both ... have the infrastructure to support biological and some aspects of the chemical warfare programs.”
- “Syria’s biotechnical infrastructure is capable of supporting limited biological agent development. DIA assesses Syria has a program to develop select biological agents.”¹⁰

Only the statements on Iran and Syria refer explicitly to offensive BW programs; the other statements fail to support the suggestion that these particular countries possess an offensive BW program. These latter statements could apply to the United States and most European countries. These more muted and limited descriptions suggest that not as many countries possessed offensive BW programs as previously believed. In fact, these evolving assessments—and the Maples testimony in particular—raise serious questions about what basis in reality existed for the estimates of national BW programs in the 1970s and 1980s, excluding the Soviet Union, South Africa, Iraq, and perhaps Iran.

Because these recent estimates are so uncertain but have the benefit of accumulated intelligence, past estimates are likely to have been more questionable, as they were presumably generated on less intelligence. It now seems likely that the number of countries thought to have offensive BW programs in the early 1970s through 1989 might more accurately be estimated at four or five. In recent years, then, official U.S. estimates of the number of such programs have declined by at least one-third, leaving roughly a half dozen at most.¹¹ And the U.S. intelligence community has qualified its assessments of those remaining programs to such a significant degree that it is difficult to judge what degree of an “offensive” nature—the development, testing, production, or stockpiling of biological agents or weapons—exists in those programs.

Statements by innumerable U.S. government officials, academic analysts, and journalists between 1989 and 2003 nearly uniformly described the proliferation of state-run BW programs as a constantly increasing trend.¹² It now seems clear that as not the case. In fact, the number of state BW programs was probably more or less flat.

Available evidence indicates that proliferation from state-run offensive BW programs has been minimal. The former South African and Iraqi BW programs resulted in no known proliferation. As for the Soviet Union, only about 10 scientists are known to have immigrated to any country of BW proliferation concern in the post-Soviet period. Some were recruited by Iran, but most of this group worked in institutes belonging to the former Soviet Academy of Sciences, not in research institutes primarily serving the former Soviet BW program. Several immigrated to Israel.¹³ The United States never included Israel on its lists of BW-proliferated states, although Israel almost certainly maintained an offensive BW program for many years and may still do so.

One can be even more definitive regarding assistance from state-run BW programs to terrorist organizations seeking to develop or to produce biological agents or weapons: there is no

evidence whatsoever of any such activity. U.S. intelligence agencies have always considered the likelihood of such assistance to be extremely low, and they expect the same to remain the case in the future.¹⁴

Finally, the history of attempts by nonstate actors to develop or use biological agents has been remarkably limited. The significant episodes are all well known. The first was the use of salmonella, bacteria that cause diarrhea, in 1984 by the Rajneesh cult, in a failed attempt to influence a local election in Oregon. The second was Aum Shinrikyo's 1990–1993 failed effort to obtain and culture strains of *Clostridium botulinum* and *Bacillus anthracis* and disperse the resulting products. The group never succeeded in obtaining a pathogenic strain of either organism. Its culturing and dispersal efforts also came to naught. A third case was al Qaeda's effort in Afghanistan between 1997 and 2001 to obtain a pathogenic culture of *B. anthracis* and to initiate work with the organism. Once again, the effort failed, as the organization was unable to obtain a pathogenic strain of *B. anthracis*. Al Qaeda's work was extremely incompetent. It had barely begun preparations when a joint allied military team raided and occupied its facilities in December 2001.¹⁵ The most recent significant episode took place in the United States in September and October 2001—the so-called Amerithrax incidents.¹⁶ These were the dispersal of a purified, dry-powder preparation of *B. anthracis* sent through the U.S. postal system to multiple addressees, killing five people.

The al Qaeda and the Amerithrax events are the most significant but for opposite reasons. The barely initiated, rudimentary, and failed attempt by al Qaeda is important because of the nature of the group—an international terrorist organization with a wide organizational structure, demonstrated initiative, and a record of successful, albeit conventional, attacks. The Amerithrax attacks are significant because of the nature of the material prepared and the perpetrator; the

mailings demonstrate what a professional is capable of, but identifying the perpetrator was essential to explaining who could make such a product and under what conditions. In other words, identification would provide critical insight into both the likelihood of international terrorist organizations' developing similar capabilities and how quickly such a threat could emerge. Since the interruption of the al Qaeda BW project in December 2001, there are no indications that the group has resumed those efforts. Accounts of al Qaeda offshoot groups in the United Kingdom, France, or Iraq producing ricin, a far simpler task, are all spurious. There have also been no publicly identified indications that any other international terrorist group has initiated the development of BW agents in the intervening years.¹⁷

Although al Qaeda's efforts to develop a biological weapon failed, the group's efforts were provoked by the severely overheated discussion in the United States about the imminent dangers of bioterrorism. A message from al Qaeda's second-in-command, Ayman al-Zawahri, to his deputy, Muhammad Atef, on April 15, 1999, noted, "We only became aware of them [BWs] when the enemy drew our attention to them by repeatedly expressing concerns that they can be produced simply with easily available materials."¹⁸ In a similar vein, terrorism expert Brian Jenkins of the RAND Corporation has been at pains to point out, "We invented nuclear terror."¹⁹ If in the coming decades we do see a successful attempt by a terrorist organization to use BWs, blame for it can be in large part pinned on the incessant scaremongering about bioterrorism in the United States, which has emphasized and reinforced its desirability to terrorist organizations.

In terms of bioterrorism perpetrated by a terrorist organization, the Amerithrax events are an outlier. They were almost certainly carried out by a U.S. scientist, fully trained, with access to pathogenic strains and optimum working conditions, as discussed later in this chapter. A terrorist

group has never carried out a mass-casualty bioterrorist event. Yet thanks to the steady stream of prognostications that essentially explain to terrorists why BWs would be of great utility to them, such an event may well happen. Unfortunately, those interested in keeping the level of government funding for biodefense high will likely continue to make remarks of the same sort.

In the late 1990s and early 2000s, several General Accounting Office reports noted that the government had not performed a comprehensive bioterrorism threat assessment. Even after the initiation of greatly increased biodefense expenditures beginning in fiscal year 2002, such a threat assessment was not performed. Homeland Security Presidential Directive 10 states, “The United States requires a continuous, formal process for conducting routine capabilities assessments to guide prioritization of our on-going investments in biodefense-related research, development, planning, and preparedness.”²⁰ A DHS bioterrorism risk assessment model was used to generate the DHS threat assessment in 2006. A critique of the DHS model written by Alan Pearson, director of the Biological and Chemical Weapons Program at the Center for Arms Control and Non-Proliferation, notes:

The first “Bioterrorism Risk Assessment,” prepared by the DHS National Biodefense Analysis and Countermeasures Center (NBACC) using a methodology developed by Battelle Memorial Institute, was completed on January 31, 2006, and a report on the assessment was published on October 1, 2006. The assessment used threat scenarios and consequence modeling to rank 28 biological agents . . . according to their relative risk. For this purpose, the estimated likelihood of agent use in a range of different scenarios (“the probability that an adversary acquires, produces, and disseminates a biological weapon,” based on intelligence community input and the judgment of subject

matter experts) was multiplied by the projected consequences resulting from each scenario (using data vetted by the Department of Health and Human Services).

The risk calculation was weighted towards high-consequence events.²¹

The computer model produced a massive compilation of more than one million different combinations of variables, many of which were run in hundreds of iterations. In September 2008, a review committee established by the U.S. National Academy of Sciences released an extensive critique of the Battelle/DHS assessment model. The NAS review group noted that the DHS model

ranks each pathogen according to its level of risk, based on subjective event probabilities and their consequences. The subjective event probabilities were elicited from dozens of biological weapons experts.²²

The DHS model claimed that frequency of initiation and “estimated likelihood of agent use” were at least in part “based on intelligence community input.” However, it seems likely that there was little or no information of that nature available to the intelligence community, particularly if there were very few or no terrorist groups in the field actively operating BW development programs. The “intelligence input” was to include expression of interest, which are commonly jihadist rhetorical exhortations, and these almost never include reference to particular pathogens. The statement that the model depended on “subjective event probabilities ... elicited from ... experts” again suggests a lack of actual intelligence concerning all 27 agents.²³ It follows that the model was a theoretical exercise not based on actual intelligence; it is vulnerability assessment, not threat assessment.

Ostensibly to compensate for the lack of verified intelligence input, the NAS committee urged that the model should evaluate the choices of an “intelligent,” or “adaptive,” adversary.

This would only further compound the abstract quality of the model. The actual record of known terrorist groups indicates that not one has yet mastered the most elementary aspects of microbiology. (Ricin extraction from crushed seed pulp is a chemical process that requires no culturing of organisms.) To suggest that for purposes of “research, development, planning and preparedness” the U.S. government should now assume an “intelligent” and “adaptive” enemy posits capabilities that no terrorist group currently has or is likely to have for years to come. The “intelligent” and “adaptive” adversary was the perpetrator of the Amerithrax events.

<<ahd>> Discourse on Bioterrorism in Washington

The history of exaggerating the bioterrorist threat is a long one. It began in 1986 with an attack on the validity of the Biological Weapons Convention by Douglas Feith, then an assistant to Richard Perle in President Ronald Reagan’s Defense Department and until August 2005 undersecretary of defense for policy. Feith introduced the idea, now widely adopted, that advances in the microbiological sciences and the global diffusion of the relevant technology heighten the threat of BW use. Though molecular genetics and globalization have advanced drastically since 1986, it does not necessarily follow that the BW threat has grown. As noted, the number of states that maintain offensive BW programs has decreased. And despite the global diffusion of knowledge and technology, the incidence of terrorist networks’ creating BWs has remained very low over the entire period.

But alarmism continues. In 2005, Tara O’Toole, then chief executive officer and director of the Center for Biosecurity at the University of Pittsburgh Medical Center, said: “This is not science fiction. The age of Bioterror is now.”²⁴ The office of Vice President Cheney was the driving force behind the Bush administration’s emphasis on

bioterrorism.²⁵ Cheney was influenced by the highly unrealistic “Dark Winter” scenario developed by Dr. O’Toole, which one author has noted was “intended to put a real scare into government policy makers and members of Congress.”²⁶ Cheney was apparently greatly alarmed about the potential use of BWs by terrorists and reportedly believed he might soon become a victim.²⁷

Homeland Security Presidential Directive 10, “Biodefense for the 21st Century,” states, “Biological weapons in the possession of hostile states or terrorists pose unique and grave threats to the safety and security of the United States and our allies.” A recent panel established by the National Academy of Sciences went further: “The threat posed by biological agents employed in a terrorist attack on the United States is arguably the most important homeland security challenge of our era.”²⁸ In 2005, then Senator William Frist (R-TN), who coauthored the legislation that initiated these expenditures, said, “The greatest existential threat we have in the world today is biological . . . an inevitable bio-terror attack [would come] at some time in the next 10 years.”²⁹ In 2008, an academic author based a book on “the realization that no other problem facing humanity is so potentially cataclysmic and has been so inadequately addressed.”³⁰ According to many U.S. political figures and experts, the \$64 billion is therefore money well spent fighting a dangerous threat.

For two decades, we have been told that bioterrorism would be perpetrated by terrorist groups with an international presence and international political objectives. As noted, however, these groups have little or no scientific competence, little or no knowledge of microbiology, and no known access to pathogen strains or laboratory facilities. The most recent U.S. National Intelligence Council terrorist assessment makes no reference to any such capabilities.³¹ The report of the Commission on the Prevention of Weapons of Mass Destruction Proliferation and

Terrorism, released in December 2008, stated, “We accept the validity of intelligence estimates about the current rudimentary nature of terrorist capabilities in the area of biological weapons.”³²

Nevertheless, during congressional testimony in July 2008, Jeffrey Runge, an assistant secretary of the Department of Homeland Security, claimed: “The risk of a large-scale biological attack on the nation is significant. We know that our terrorist enemies have sought to use biological agents as instruments of warfare, and we believe that capability is within their reach.”³³ Runge said that what keeps him up at night “is a possibility of a large-scale biological attack on our homeland” and that he would describe “the current biological threat environment as illustrated by the effect a biological attack might have in a city like Providence,” Rhode Island. But such a scenario of BW use created by modelers does not at all represent “the current biological threat environment.” It is instead a classic vulnerability assessment, without any reference to a specific validated threat. Even with a validated threat, one cannot know in advance what the outcome of any particular attempted attack would be. This fact is illustrated by two prominent events: the use of the chemical agent sarin by the Japanese cult Aum Shinrikyo in Tokyo in 1995 and the anthrax dispersion in the United States in 2001. These attacks (for different reasons) resulted in only a small fraction of the casualties that might have occurred.

Joint testimony by a triumvirate of Runge’s DHS colleagues echoed the idea that a serious BW threat to the United States exists:

The Nation continues to face the risk of a major biological event that could cause catastrophic loss of human life, severe economic damages and significant harm to our Nation’s critical infrastructures and key resources.... The threat of bioterrorism has not subsided, and the impact of a large-scale bioterrorism event, such as the widespread dissemination of an aerosolized form of anthrax or other

deadly biological pathogen, would have a serious effect on the health and security of the Nation.³⁴

These lines, intermingled with some others containing a fair amount of distorted and misleading information regarding the simplicity of preparation and even weaponization of pathogens, are typical. Pages could be filled with examples of ignorance or disinformation on the subject. Numerous authors beat a tocsin of the bioterrorist threat, though not the U.S. intelligence community as indicated in testimony in 2006 and 2009 in addition to the WMD Commission quote noted earlier.

Other examples of the general tenor include reports and special commissions emphasizing the supposed threat of bioterrorism that were released during the fall of 2008. In September 2008, the congressionally mandated Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism previewed its report that was designed to “deepen both our assessment of the threat today and what we can do about it.”³⁵ The commission’s cochair, former senator Robert Graham (D-FL), stated, “My own assessment at this point is the more likely form of attack is going to be in a biological weapon.”³⁶

In contrast to this alarmist attitude, a proposed presidential platform statement submitted in August 2008 by the Federation of American Societies for Experimental Biology, an organization composed of 21 biomedical research societies and the largest life sciences group in the United States, did not refer to “bioterrorism” at all.³⁷

That same month, the Federal Bureau of Investigation announced that Bruce E. Ivins, a staff scientist at the U.S. Army Medical Research Institute for Infectious Diseases, was responsible for the 2001 anthrax attacks. Ivins had worked at USAMRIID for 27 years, including 20 years of work with anthrax. This disclosure that a longtime insider, not a nonstate terrorist

group, was responsible for a deadly BW attack on U.S. soil changed the entire construct of where the primary risks of bioterrorism lay and of what degree of competence a serious perpetrator would have. In 2002, Steven Block of Stanford University commented:

The fundamental question here is are we victims of our own anthrax, or our own expertise, or is this a further fallout from Al Qaeda? It's a critical question. This is the first biological warfare of the 21st century, and our proper response to it—morally, politically and in every other way—depends on our understanding which it is.³⁸

Dr. O'Toole, however, had quickly been convinced on the most tenuous of suppositions that the anthrax attacks had been carried out by al Qaeda. She prepared a memorandum making that argument, which was sent to the FBI and to CIA Director George Tenet and was “circulated among top government officials.”³⁹

In October 2009, the blue-ribbon Graham-Talent Commission produced a “Progress Report,” a clear effort to further boost government spending. The report's Executive Summary stated:

In recent years, the United States has received strategic warnings of biological weapons use from dozens of government reports and expert panels. The consequences of ignoring these warnings could be dire. For example, one recent study from the intelligence community projected that a one- to two-kilogram release of anthrax spores from a crop duster plane could kill more Americans than died in World War II.⁴⁰

As already noted, the “strategic warnings” are the highly exaggerated generic claims. As for the scenario suggested, no matter who conceived it, the outcome claimed is inconceivable.

Over 450,000 Americans died in World War II. Modeling scenarios depends on a wide variety of variables: strain selection, culturing and growth conditions, harvesting and preservation, and another set of environmental variables on release. Mortality might vary from zero to some calculated number. One to two kilograms (2.2 to 4.4 pounds) of anthrax spores would more likely produce mortality in the hundreds in an open-air release, not over 450,000.⁴¹ Moreover, no known terrorist group has the ability to produce a dry-powder preparation of anthrax, making the entire scenario implausible.

In a recent book written by former national security advisers Brent Scowcroft and Zbigniew Brzezinski, Scowcroft refers to the propagation of an “environment of fear” in the United States, which Brzezinski adds has made us “more susceptible to demagogy” that “distorts your sense of reality” and “channels your resources into areas which perhaps are not of first importance.” Brzezinski continues:

We have succumbed to a fearful paranoia that the outside world is conspiring through its massive terrorist forces to destroy us. Is that a real picture of the world, or is it a classic paranoia that’s become rampant and has been officially abetted? If I fault our high officials for anything, it is for the deliberate propagation of fear.⁴²

Warnings regarding the bioterrorist threat are one of the major components in producing that “environment of fear.” A few very determined and very vocal nongovernment purveyors of the bioterrorism threat, backed by one or two private foundations, have significantly contributed to producing that atmosphere. The Sloan Foundation funded at least 14 conferences in the United States and overseas, 4 of which were held by Interpol and 3 by the Department of Homeland Security.⁴³ Building on the fear emerging from the 9/11 and the Amerithrax attacks, this

movement helped generate the \$64 billion to date in federal expenditure, a large federal bureaucracy, strong congressional advocates, multiple research institutes and journals, and a thriving contractor industry—the same “stakeholders” who now call for the continuation of efforts to fight and prevent bioterrorism.

Bruce Hoffman, a terrorism expert, explained the situation after 2001 in a scathing comment:

[Bioterrorism] was where the funding was, and people were sticking their hands in the pot. It was the sexiest of all the terrorism threats and it was becoming a cash cow. So the threat of bioterrorism became a kind of self-fulfilling prophecy. It was archetypical Washington politics in the sense that you generate an issue and it takes on a life of its own.⁴⁴

This depiction is valid. What is needed, however, is more substantive detail regarding “the politics of bioterrorism,” for example, the instrumental role of Vice President Dick Cheney noted earlier.

In October 2008, David Koplow, professor of law at Georgetown University Law Center and a former deputy legal counsel in the Department of Defense, wrote:

Bioterrorism is a serious, important danger, one that deserves serious, focused attention. But empowering a bioterrorism-industrial complex, and fostering a needless climate of fear, paranoia, and helplessness cannot lead to fashioning reliable, long-term solutions. Rational policy requires a genuine, level-headed risk assessment, and a sustained, balanced approach, not a knee-jerk public relations drama.⁴⁵

<<ahd>> Reduction of U.S. Security by Increasing BW Proliferation Potential

The hyping of the bioterrorism threat has been accompanied by various policies that actually heighten the odds that the United States will experience another biological weapons attack. Ironically, most of these policies are part of U.S. biodefense efforts. The subject will be dealt with only cursorily here. It can be seen as a composite of several elements, some of which are extensively described in other publications and others of which are touched on in other sections of this chapter. Seven examples are provided here.

As indicated earlier, the role of exaggerated threat pronouncements can *stimulate* interest in BWs among nonstate actors. If for 10 to 15 years terrorist groups are told that a biological weapon is fantastically powerful, easy to acquire and produce, and will kill millions of people, they are going to become curious about it, even if they are ignorant about microbiology. And once it has been trumpeted worldwide for years, the false message is difficult to withdraw.

Disinformation and misinformation about the biological weapons threat encourage disastrous and costly policy decisions.⁴⁶ The leading example, of course, is the spurious “determination” that Iraq had produced mobile vehicles to make BW agents. This charge, presented to the entire world, was used as one of the major public justifications by the Bush administration for invading Iraq in 2003.⁴⁷ The concocted “Dark Winter” scenario did much to influence Vice President Cheney and the subsequent drive by the Bush administration for a national smallpox vaccination program.⁴⁸

Another problem is the way government officials communicate about the aftermath of a BW attack or any attack. If officials constantly tell the public that the greatest damage following the use of a BW agent will be *panic* (contradicting to a large degree the claim of mass-casualty effects), there *will* be panic if and when such an event occurs. This message too is difficult to withdraw after officials and experts have mistakenly propagated it for decades. If instead

officials drop inflated predictions and the public is told that the government is doing the best it can to prepare protections and defenses, that the nation will survive and recover, and that there is *no* need for panic, panic can be avoided. That is the lesson from every civil defense experience worldwide to date, in wartime and in peacetime.

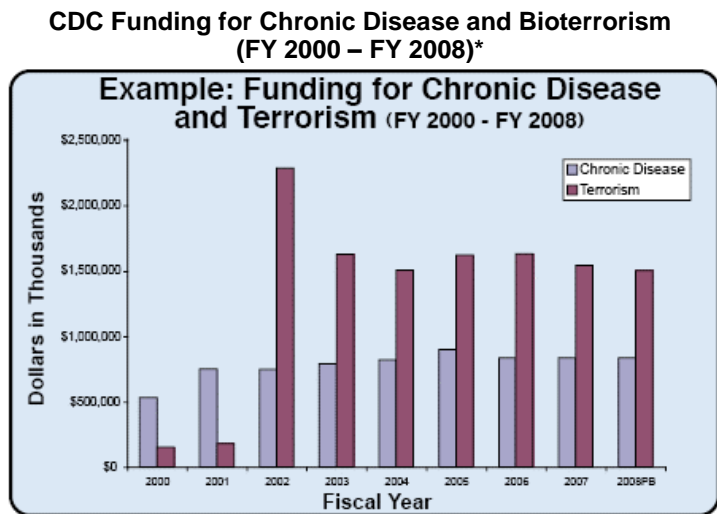
The massive increase in the number of scientists and laboratories working with select agents—those pathogens of interest to biodefense programs—heightens the risk of a deadly accident. Before 2001, there were perhaps several hundred scientists working on what are now select agents, in approximately several dozen laboratories at most. As of August 2008, there were 399 institutions and 14,797 scientists authorized to work with select agents.⁴⁹ As of October 2007, there were no fewer than 4,000–5,000 BSL-3 level laboratories in the United States, of which 1,356 were authorized to work with select agents.⁵⁰ As is universally the case for both infrastructure and humans, accidents occur more or less in direct proportion to the number of individuals involved and the number of transactions or events that take place. The more dangerous laboratories there are, the greater will be the incidence of accidents. Together with the release of a Government Accountability Office report in September 2009, a GAO official testified to Congress that the “increase in the number of researchers working with hazardous pathogens would ‘inevitably’ lead to an amplified risk of bioterrorist attack perpetrated by a scientist working at a biocontainment facility.”⁵¹

The dramatic increase in the size and the nature of biodefense experimentation will likely stimulate biodefense programs in other states. That increase elsewhere is already manifest. In 1993, there were reportedly 13 national biodefense programs. In 2007, that number had doubled, to 25 national programs.⁵² There is no way to predict how these programs will develop in the coming decades.

The publication of biodefense-related research may prove useful to those developing bioweapons. To see what information might be used for “biological weapons development utility,” presumably by unauthorized entities, the Department of Defense commissioned a study in 2003 to investigate journals such as *Scientific American*, *Science*, and *Molecular Microbiology*.⁵³ Five years later, a team from the Centers for Disease Control and the U.S. Army’s Dugway Proving Ground published a peer-reviewed paper describing the methodology for production and aerosol dispersion of weaponized, dry-powder *B. anthracis*.⁵⁴ This information was almost certainly not previously publicly available, and its publication makes a mockery of the oft-repeated claim that “recipes” for BWs are readily available on jihadi websites, where the information is practically useless. More importantly, the research and publication also violate the spirit and possibly the words of Article I of the Biological Weapons Convention. Had such a document been unearthed in Iraq before 2002, it probably would have been considered proof of an offensive Iraqi BW program.

Another danger is the export of “dual-purpose” equipment used in the production of biological agents. Between 1999 and 2003, the U.S. Department of Defense was responsible for the massive export to purchasers in Gulf States of such equipment.⁵⁵ It is extremely likely that the great majority of this equipment was resold to Iran at the same time that the U.S. government was for years attempting to curtail shipments of such equipment to Iran. <<Typesetter: please add “Figure 6.1.” before figure title and remove title from inside box; in footnote, please unbold and italicize “only”>>

<<ahd>> **Diversion of Resources from Other U.S. Public Health Needs**



* Terrorism refers **only** to bioterrorism.

A faulty threat assessment will lead to faulty national priorities and misallocated resources by successive administrations and Congress. If avoiding deaths in the order of medical magnitude were the criterion used to guide the national allocation of resources, they would go overwhelmingly toward fighting

smoking, obesity, antibiotic-resistant infections, and the other leading sources of mortality enumerated in the opening paragraph of this chapter rather than toward preparing to counter the “select agents” of interest to biodefense.⁵⁶

Even as the United States appropriated since 2001 \$64 billion to defend against select agents, U.S. life expectancy stood at 42nd in the world, and child mortality ranked 29th—despite the fact that the United States spends more on health care per person than any other country.⁵⁷

However, if we look at the Centers for Disease Control’s budget over the past eight years, we see something strikingly different: essentially flat funding for chronic disease and a large increase in spending on select agents and bioterrorism (see **Figure 6.1**).⁵⁸ Certainly, an

expenditure of \$57 billion has served to increase U.S. preparedness against the use of biological agents, but a very large portion of that sum does not serve dual-purpose utilities, that is, benefiting general U.S. public health needs as well.⁵⁹ The distribution of grants from the National Institute of Allergy and Infectious Diseases follows a similar pattern. Far more grants went to research on *B. anthracis* than to research dealing with organisms that kill thousands of people annually.⁶⁰ In addition, the National Institutes of Health has on average distributed only around \$220 million per year since FY07 for research on antibiotic resistance, with a substantial portion of that going to antibiotic resistance in select agents, and therefore oriented primarily toward biodefense rather than general public health.⁶¹

<<ahd>>Misdirection of Public Health Efforts in Low-Income Countries

The problem of misdirecting public health efforts in low-income countries, which is clearly akin to the diversion of public health resources in the United States, is a recent one. It is the consequence of proselytizing efforts by U.S. officials and private analysts active in propagating the conception of a bioterrorism threat. Early in the post-2001 U.S. biodefense buildup, U.S. government representatives tried to convince their European counterparts, particularly in member states of the North Atlantic Treaty Organization, to follow suit. The government officials in those countries who composed the audience for the U.S. urgings most often did not share the alarmed U.S. view of the imminence of a bioterrorist attack. The same held for the scientific cohort in those countries. Nevertheless, with time, U.S. efforts have had some success.

In addition, a series of international conferences sponsored by Interpol and funded by the Sloan Foundation in different geographic regions sought to convince law enforcement agencies

that they should turn increased attention and resources toward measures and programs related to bioterrorism. That was followed by a conference for senior-level public health authorities in African countries also funded by the Sloan Foundation. The conference urged the relevant officials in those countries to provide more resources and consideration to issues that relate to bioterrorism, in fact, to make the subject one of their primary concerns.⁶² Of greater importance was a March 2009 report produced by the U.S. National Academy of Sciences, which again urged public health officials in these countries to take up the problem of bioterrorism.⁶³ Experts from the U.S. Centers for Disease Control testifying to the NAS study group offered the following recommendations:

- Ensure the program is consistent with local priorities.
- Avoid taking personnel from other important local programs.
- Ensure local buy-in of activity.
- Ensure program compatibility and integration with existing local activities, structures, methods and equipment.⁶⁴

Though the NAS report ultimately repeated the last admonition, it would be impossible to induce the recommendations basic to the report without subverting public health programs in the selected developing nations based on their own needs, that is, the pattern of disease incidence in those countries that causes major mortality.

Nearly all these countries have drastically underfunded their public health sectors and have been faced with enormous disease burdens for decades. The number of trained public health professionals in these countries is always a small fraction of those needed to deal with existing public health problems, which in many of these countries, due to HIV infection, is nothing short of catastrophic. As a single example, at a minimum, between 700,000 and 2.7 million people die

yearly of malaria. Over 75 percent of them are African children.⁶⁵

Global priorities are clear. Global mortalities per year are poverty, 7.3 million; HIV/tuberculosis/malaria, 6 million; diarrheal disease, 3.5 million; smoking, 5 million; measles, 0.5–1 million; warfare, 1 million: a total of approximately 24 million people, year in-year out.⁶⁶ Bioterrorism mortality is zero. A World Health Organization report noted, “Disproportionate investment in a limited number of disease programmes considered as global priorities in countries that are dependent on external support has diverted the limited energies of ministries of health away from their primary role.”⁶⁷ Attempting to convince ministries of health in African countries to make bioterrorism a primary concern can only divert them further from their primary role.⁶⁸

<<ahd>>Regulation of a Dramatically Increased National Biodefense Program

A few weeks after the events of September 11, 2001, a professionally prepared dry-powder anthrax preparation was distributed through the U.S. postal system. Two envelopes that were sent to the U.S. Senate offices of Patrick Leahy and Tom Daschle were of particular importance due to the technical quality of the preparation. The response of the Congress and the administration was twofold. One was the massive increase in funding for biodefense, which comprised enhancing preparedness; purchase of drugs, vaccines, and detectors; and research, including the construction of a sizable number of new dedicated research facilities.⁶⁹ The other was the passage of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, the so-called select agent legislation. Under its provisions, the CDC and the Department of Agriculture specified a list of “select agents” of particular biodefense concern, and new requirements were established concerning the facilities and scientists that worked with such

agents. Research institutions that possessed any of the select agents were required to register with the CDC, the exchange and transfer of samples of the agents between scientists had to be approved by the CDC, a requirement for security and inventory management was established, and some personal reliability oversight was established for those working with the agents.

The regulations were needed. In his catalog of illicit uses of biological agents in the 20th century, Seth Carus found that laboratories and culture collections were the preferred source of pathogens and toxins for terrorists and criminals and that thefts were primarily conducted by insiders. There is no evidence that any terrorist or criminal group has ever successfully acquired a pathogenic microorganism from nature.⁷⁰ In addition, laboratory accidents inevitably happen. In the past few years, several have occurred in the most specialized and supposedly highly controlled facilities in Boston and Texas, built with post-2002 funding.

Other dangers arise via routine operations, neither accidents nor intended malice, that turn up problems of an unforeseen nature. For example, an effort to catalog select agent culture collections in Department of Defense facilities in 2008 led to unanticipated and astonishing problems. After months of investigation, USAMRIID reported in June 2009 that no fewer than 9,202 uncataloged microbial culture vials had been found in 335 freezers and refrigerators at the laboratory.⁷¹ Since the official database had listed 66,000 items, the “missing” increment represented about 13 percent of the total. There were two lessons from this incident. First, a CDC investigation of USAMRIID in September 2008 did not discover the problem of unlisted samples. Second, neither USAMRIID nor other U.S. Army biodefense laboratories had previously made complete inventories despite legislation in force since 2002 requiring them to do so.⁷² A U.S. Government Accountability Office report released in August 2009 indicated that several major high-containment facilities had been slow to upgrade their facilities in the preceding 12

months.⁷³

Another danger requiring regulation is the production and dissemination of knowledge by the U.S. biodefense program that could benefit both potential BW proliferators and nonstate actors. A report prepared by a committee of the U.S. National Academy of Sciences in 2004 identified seven classes of experiments, which illustrated the types of research that should require review and discussion by informed members of the scientific and medical community before they were undertaken or, if carried out, before they were published in full detail.⁷⁴ As a result of a recommendation in that report, a year later the president established the National Science Advisory Board for Biosecurity, with the mandate “to provide advice, guidance and leadership regarding biosecurity oversight of dual-use research.” In 2007, after two years of deliberations, the NSABB arrived at an ineffective recommendation that the oversight task be assigned to individual institutional biosafety committees (IBCs) at laboratories in universities, government contractor facilities, and other facilities across the country. The IBCs were established in the late 1970s because of concerns about molecular genetic (recombinant DNA) research. Their assigned function was to review proposed research projects in their own institutions. A report published in 2004 had demonstrated that the IBCs were, in most locations, nonfunctional in carrying out their existing, far simpler task.⁷⁵ In many institutions, the IBCs did not even exist, and where they did exist on paper, they did not follow supposedly mandatory guidelines for all institutions receiving federal funding. It was inconceivable that they could also perform the role that the NAS report suggested.

The greatest danger is deliberate misuse of research facilities to do harm. On August 1, 2008, the FBI identified a highly qualified researcher who had worked at USAMRIID for three decades as the individual whom they considered responsible for preparing and distributing the

anthrax preparation used in the Amerithrax events. In response, various authorities began to recommend additional biosecurity measures. For example, a two-person workplace rule and other measures were recommended to increase security in U.S. laboratories working with select agents. The congressionally mandated report, *World at Risk: The Report of the Commission on the Prevention of WMD Proliferation and Terrorism*, released in December 2008, recommended a review of domestic pathogen security and increased government oversight of high-containment laboratories. Nothing in those suggestions would seem to be particularly striking. As another author has noted:

In the United States, airplane and river barge pilots, physicians, nurses, clinical laboratory technicians and even cosmetologists must receive specialized education and training and pass federal or state licensing examinations in order to practice their respective professions. Licensure ... allows the government to keep records of who these professionals are and where they practice.⁷⁶

Suggestions of possible new restrictions beyond those already legislated in 2002 produced a dramatic response. The first published expression was authored, ironically, by five members of the NSABB. They warned in an editorial that

the damage to the future of America will be infinitely greater if one incident, no matter its extent, devastates our scientific endeavors because of precipitous regulatory responses so onerous as to cripple research in this country to our detriment and to the advantage of other countries. Our nation's strength has been in its willingness to accept risk as a necessary component of scientific development in diverse areas from vaccines and other therapeutic measures to space exploration. It is imperative that our political leadership remembers this

also and acts in a commensurate manner.⁷⁷

These claims appear dubious at best. First, added regulation would apply to a minute fraction of researchers in molecular biology, not to biological and medical sciences as a whole. Second, classification and segregation of important portions of nuclear physics after 1945 certainly did little to impede the mass of Nobel Prizes in Physics earned by U.S. physicists since then. Increased oversight and/or regulation would be unlikely to have any negative effect on U.S. science, health, or economic competitiveness.

Other “stakeholders” quickly lined up to oppose further regulation. At a meeting organized by the American Association for the Advancement of Science, Dr. Gronvall of the UPMC Center for Biosecurity claimed that the post-2001 regulations “hindered public health,” and that “she and her colleagues would like to see a more nuanced approach to countering the bioterrorism threat that includes increased security through robust research.”⁷⁸ The NSABB released a report titled *Enhancing Personnel Reliability among Individuals with Access to Select Agents*, which opposed any increase in personnel reliability programs, urged a reduction in the list of select agents, and suggested that working scientists observe their coworkers and report infractions of regulations.⁷⁹ A joint letter from the Federation of American Societies for Experimental Biology and the Association of American Medical Colleges endorsed the views of the earlier NSABB report and requested a regulatory system that allowed “the flexibility of developing site-specific performance based standards.”⁸⁰ Finally, administrators at the AAAS prefigured their own report due in July 2009 by an editorial in *Science* that repeated the NSABB warning of “unintended negative consequences, including over-restricted access to vital resources and a constrained ability to collaborate internationally on a broad range of topics.”⁸¹ One of the authors of the *Science* editorial argued that “we are basically cutting ourselves out of

the game for global health as well as the global research enterprise, and that's not good.”⁸² The comment was based on the fact that several swine flu samples were sent from Mexico to a laboratory in Canada instead of to the CDC in the United States—hardly evidence of a collapse of the U.S. role in “global health as well as the global research enterprise.”

Members of the NSABB have explained that the group feared a “chill” to the biodefense research community. History suggests that these reactions are unfounded. In 1988, a Senate committee held extensive hearings on the Biological Defense Research Program existing at that time, including safety management in the U.S. Army’s biodefense research facilities. In response, the Army wrote new safety regulations that formalized compliance with directives and standards of a dozen U.S. regulatory agencies. USAMRIID, its scientists, and its research are not known to have suffered in any way from those regulations 20 years ago.⁸³ It is important to recall that the current regulations and all the debate surrounding them concern *only* scientists working with select agents in high-containment facilities. Those opposing any further federal regulation and hoping for reversal of some of the existing regulations have been well organized, and they are virtually the only voice heard in the public arena. A study by Victoria Sutton published in 2009 indicated that 93 percent of responding scientists who were funded to do biodefense agreed that work on select agents should be regulated.⁸⁴

On November 4, 2009, the Senate Homeland Security and Governmental Affairs Committee approved a bill “intended to improve security at the nation’s biological research facilities.”⁸⁵ It was sent to the Senate floor after months of preparation. One of its provisions was that the secretaries of health and human services and agriculture should “stratify” the select agent list. That meant, in effect, *reduce* the number of agents being held under more rigid guidelines.

<<ahd>>A Final Word

The White House should institute oversight of all relevant biodefense research and development programs carried out by all departments, agencies, and subagencies to ensure that they comply with U.S. obligations under Article I of the Biological Weapons Convention, which prohibits the development (as well as production, stockpiling, acquisition, and retention) of biological weapons. Preferably, such oversight of all biodefense research carried out by federal agencies, or private contractors, should be reviewed at the level of the National Security Council. All oversight should include classified research.⁸⁶

Policymakers should also end the fearmongering and huckstering of the bioterrorism threat, which has been divorced from reality for years.⁸⁷ Unfortunately, such overheated rhetoric appears to be spreading to several other countries, notably India and Russia. Gross exaggeration, propaganda, and alarmism about BWs are counterproductive, inducing interest by nonstate actors in precisely the kinds of activities that the United States would like to prevent and generating a dangerous set of overreactions at home.

Chapter 9

¹ Portions of this chapter appeared in “The Self-Fulfilling Prophecy of Bioterrorism,” *Nonproliferation Review* 16, no. 1 (March 2009): 95–109. The author thanks the publishers for permission to use that material.

² For U.S. annual cancer mortality statistics, see “Cancer Statistics 2008 Presentation,” American Cancer Society, http://www.cancer.org/docroot/PRO/content/PRO_1_1_Cancer_Statistics_2008_Presentation.asp. For statistics on mortality due to smoking, see Centers for Disease Control and Prevention, “Cigarette Smoking among Adults United States, 2006,” *Morbidity and Mortality Weekly Report*, no. 56, November 9, 2007, pp. 1157–61. Because smoking is estimated to contribute roughly 160,000 of the cancer deaths per year, that amount was subtracted from the total to avoid double-counting. For statistics on mortality due to obesity, see, Ali H. Mokdad, James S. Marks, Donna

Stroup, and Julie L. Gerberding, “Actual Causes of Death in the United States, 2000,” *Journal of the American Medical Association* 291 (2004): 1238–45; David B. Allison, Kevin R. Fontaine, JoAnn E. Manson, June Stevens, and Theodore B. VanItallie, “Annual Deaths Attributable to Obesity in the United States,” *Journal of the American Medical Association* 282, no. 16 (1999): 1530–38; JoAnn E. Manson, Patrick J. Skerrett, Philip Greenland, and Theodore B. VanItallie, “The Escalating Pandemics of Obesity and Sedentary Life,” *Archives of Internal Medicine* 164, no. 3 (February 9, 2004): 249–58; and Katherine M. Flegal, Barry I. Graubard, David F. Williamson, and Mitchell H. Gale, “Cause-Specific Excess Deaths Associated with Underweight, Overweight, and Obesity,” *Journal of the American Medical Association* 298, no. 17 (2007): 2028–37. Mortality due to obesity costs the United States \$90 billion in direct health costs per year. The obesity mortality figure of 365,000 was based on U.S. data for 2000 and has certainly been surpassed by now.

³ Kevin Sack, “Guidelines Set for Preventing Hospital Infections,” *New York Times*, October 9, 2008; and Centers for Disease Control, *Public Health Report*, March–April 2007.

⁴ Tara Parker-Pope, “Stomach Bug Crystallizes a Threat from Antibiotics,” *New York Times*, April 14, 2009.

⁵ P. Harrison and J. Lederberg, eds., “Antibiotic Resistance: Issues and Options,” a workshop report of the Forum on Emerging Infections, National Academy of Sciences, Washington, 1990.

⁶ Infectious Disease Society of America, “Facts about Antibiotic Resistance,” Arlington, VA, revised May 21, 2009. This organization estimated that the sum reached as high as \$50 billion per year in 2009, although this is likely to be an overestimate given the figure for 2008.

⁷ Center for Arms Control and Non-Proliferation, “Federal Funding for Biological Weapons Prevention and Defense, Fiscal Years 2001 to 2009,” Washington, April 14, 2008, http://www.armscontrolcenter.org/media/fy2009_bw_budgetv2.pdf. An additional \$1 billion was added in August 2008, but the fiscal year 2009 figure includes a one-time allocation of \$2.5 billion, possibly leaving expected future annual levels at \$7.5 billion.

⁸ Milton Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat* (Carlisle, PA: Strategic Studies Institute, December 2005), pp. 11–20, <http://www.strategicstudiesinstitute.army.mil/pubs/download.cfm?q=639>.

⁹ U.S. Central Intelligence Agency, “Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July through 31 December 2003,” http://www.fas.org/irp/threat/july_dec2003.htm.

¹⁰ Lt. Gen. Michael Maples, “Current and Projected National Security Threats to the United States,” Statement for the Record before the U.S. Senate Select Committee on Intelligence, January 11, 2007, <http://intelligence.senate.gov/070111/maples.pdf>.

¹¹ Senior U.S. intelligence official, conversation with author, June 2008.

¹² I have picked one significant example from many. It appears in a chapter by the deputy director of the U.S. Air Force Counterproliferation Center that sets out to dispel “important myths” suggesting that the BW threat was less than imminent. “The likelihood that biological weapons will be used against our nation continues to rise.... Additionally, more countries today have active BW programs than at any other time.” Col. Jim Davis, “A Biological Wake-Up Call: Prevalent Myths and Likely Scenarios,” in *The Gathering Biological Warfare Storm*, by Jim Davis and Barry Schneider (Maxwell Air Force Base, AL: USAF Counterproliferation Center, April 2002), pp. 289–91.

¹³ Milton Leitenberg, *The Problem of Biological Weapons* (Stockholm: Swedish National

Defence College, 2004), p.18.

¹⁴ Senior U.S. intelligence official, conversations with author, 1997–1999.

¹⁵ The 2005 Silberman-Robb Commission report claims that al Qaeda in Afghanistan did obtain “Agent X,” which is understood to have meant a *B. anthracis* pathogenic strain and not a vaccine strain. The claim appears to be incorrect. See Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, pp. 36–38.

¹⁶ Amerithrax is the code name of the FBI investigation of the 2001 anthrax attacks.

¹⁷ Cross-topical comparisons can often provide useful insights. Although not a biological pathogen, the chemical contamination of a wide variety of food products in China with the chemical compound melamine demonstrated that the motive of financial profit and not “terrorism” led to the use of the compound as an adulterant in a wide array of processed foods.

¹⁸ Alan Cullison, “Inside al-Qaida’s Hard Drive,” *Atlantic Monthly*, September 2004, <http://www.theatlantic.com/doc/200409/cullison>; Alan Cullison and Andrew Higgins, “Forgotten Computer Reveals Thinking behind Four Years of Al-Qaida Doings,” *Wall Street Journal*, December 31, 2001; and Andrew Higgins and Alan Cullison, “Terrorist’s Odyssey: Saga of Dr. Zawahiri Illuminates Roots of Al-Qaida Terror,” *Wall Street Journal*, July 2, 2002.

¹⁹ Brian Jenkins, *Will Terrorists Go Nuclear?* (Amherst, NY: Prometheus Books, 2008); and RAND Corporation Capitol Hill briefing, September 9, 2008. The success of the ideas of Graham Allison, a major proponent of the imminence of nuclear terrorism, and like-minded others are indicated by public opinion polls that show that 40 percent of Americans reportedly believe that terrorists will detonate a nuclear weapon within 5 years. When American nuclear scientists were asked what that likelihood was within 10 years, the median answer was 10–20 percent likely; the reply from European nuclear scientists was 1 percent likely. This is described by Jenkins in his Capitol Hill briefing referenced above.

²⁰ White House, “Homeland Security Presidential Directive 10: Biodefense for the 21st Century,” April 2004, <http://www.fas.org/irp/offdocs/nspd/hspd-10.html>.

²¹ Alan Pearson, “Documents on the Department of Homeland Security 2006 Bioterrorism Risk Assessment,” Center for Arms Control and Non-Proliferation, Washington, January 9, 2008, p. 1.

²² Gregory S. Parnell, Luciana L. Borio, Gerald G. Brown, David Banks, and Alyson G. Wilson, “Scientists Urge DHS to Improve Bioterrorism Risk Assessment,” *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 6, no. 4 (October 2008): 353–56.

²³ *Ibid.*, p. 354.

²⁴ Anne Applebaum, “Only a Game,” *Washington Post*, January 19, 2005. O’Toole is now a senior official in the Department of Homeland Security.

²⁵ Former senior official in the Department of Homeland Security, conversation with author, March 8, 2007.

²⁶ William Clark, *Bracing for Armageddon? The Science and Politics of Bioterrorism in America* (New York: Oxford University Press, 2005), p. 19. Three other 2008 books of related interest are David P. Fidler and Larry Gostin, *Biosecurity in the Global Age* (Stanford, CA: Stanford University Press, 2008); Jacqueline Langwith, ed., *Bioterrorism, Opposing Viewpoints Series* (Detroit: Gale/Cengage Learning, 2008), a book designed for students, pairing essentially opposite viewpoints on 12 individual issues within the overall subject; and Anne L. Clunan, ed., *Terrorism, War, or Disease* (Stanford, CA: Stanford University Press, 2008), a more scholarly examination of case studies to determine whether an outbreak of disease is a deliberate use of biological weapons, a deliberate false allegation, or a natural disease outbreak.

²⁷ Elisabeth Bumiller and Eric Schmitt, “Threats and Responses: The Vice President; Cheney, Little Seen by Public, Plays a Visible Role for Bush,” *New York Times*, January 31, 2003; and Jane Mayer, “Excerpt: ‘The Dark Side,’” National Public Radio, July 15, 2008, <http://www.npr.org/templates/story/story.php?storyid=92528583>. Clark erroneously refers to Dark Winter as “a government exercise.” It was not. It was staged by a collaboration of several private groups.

²⁸ White House, “Homeland Security Presidential Directive 10”; Gregory S. Parnell and others, “Scientists Urge DHS to Improve Bioterrorism Risk Assessment,” National Research Council, “Department of Homeland Security’s Threat Risk Assessment: A Call for Change,” Washington, 2008.

²⁹ “U.S. Senate Leader Urges ‘Manhattan Project’ against Bio-Terror Threat,” *Agence France Presse*, January 27, 2005.

³⁰ Barry Kellman, *Bioviolence: Preventing Biological Terror and Crime* (Cambridge: Cambridge University Press, 2008), p. 1.

³¹ National Intelligence Council, “The Terrorist Threat to the Homeland,” National Intelligence Estimate, July 2007.

³² Bob Graham and others, *World At Risk: The Report of the Commission on the Prevention of WMD Proliferation and Terrorism* (New York: Vintage Books, 2008), p. 11, or at <http://www.preventwmd.gov/report>.

³³ Jeffrey W. Runge, Testimony before the U.S. House of Representatives, Committee on Homeland Security, Subcommittee on Emerging Threats, Cybersecurity, and Science and Technology, July 22, 2008, p. 2, <http://homeland.house.gov/SiteDocuments/20080723153005-80109.pdf>.

³⁴ “Joint Statement of Mr. Robert Hooks, Mr. Eric Myers and Dr. Jeffrey Stiefel, U.S. Department of Homeland Security, regarding ‘One Year Later—Implementing the Biosurveillance Requirements of the 9/11 Act,’” before the House Committee on Homeland Security, Subcommittee on Emerging Threats, Cybersecurity, and Science and Technology, July 16, 2008, p. 2, <http://homeland.house.gov/SiteDocuments/20080716143618-13187.pdf>.

³⁵ Siobhan Gorman and David Crawford, “WMD Panel Urges Focus on Biological Threats,” *Wall Street Journal*, September 9, 2008.

³⁶ *Ibid.*

³⁷ Letter to Kevin McCarthy, chair of the Platform Committee, Republican National Committee, from the Federation of American Societies for Experimental Biology, August 1, 2008.

³⁸ Johann Neuman, “Scientists Weigh In with Deductions on Anthrax Killer,” *Los Angeles Times*, April 21, 2002, <http://articles.latimes.com/2002/apr/21/news/mn-39193>.

³⁹ William J. Broad and David Johnston, “A Nation Challenged: Bioterrorism. Report Linking Anthrax and Hijackers Is Investigated,” *New York Times*, March 23, 2002; and Steve Fainaru and Ceci Connolly, “Memo on Florida Case Roils Anthrax Probe; Experts Debate Theory Hijacker Was Exposed,” *Washington Post*, March 29, 2002.

⁴⁰ Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism, “The Clock Is Ticking: A Progress Report on America’s Preparedness to Prevent Weapons of Mass Destruction Proliferation and Terrorism,” Washington, October 21, 2009, p. 3. The commission’s final report was due only three months later, in January 2010.

⁴¹ A model developed by the World Health Organization produced, under optimum conditions for all variables, a *maximum* of 100,000 deaths using 50 kilograms (112 pounds) of dry-powder

anthrax delivered over a city of 5 million people in an economically developed country, 35,000 deaths in a city of 1 million, and 24,000 deaths in a city of 500,000. Fewer than totally optimum conditions would produce proportionately lower mortalities. *Health Aspects of Chemical and Biological Weapons* (Geneva: World Health Organization, 1970), Table 10, pp. 98–99. The same estimate was used in Frederick R. Sidell, Ernest T. Takauji, and David R. Franz, eds., *Medical Aspects of Chemical and Biological Warfare* (Washington: Office of the Surgeon General, U.S. Army Medical Department, 1997).

⁴² Zbigniew Brzezinski and Brent Scowcroft, *America and the World: Conversations on the Future of American Foreign Policy* (New York: Basic Books, 2008), pp. 239–40.

⁴³ Richard Danzig, “Preparing for Catastrophic Bioterrorism: Toward a Long-Term Strategy for Limiting Risk,” Center for Technology and National Security Policy, National Defense University, Washington, May 2008, p. 47.

⁴⁴ Clark, *Bracing for Armageddon?*, p. 158. Clark does not provide the original source but relies on the quotation in a secondary source. Quoted in Susan Wright, “Terrorists and Biological Weapons: Forging the Linkage in the Clinton Administration,” *Politics and the Life Sciences* 25, no. 1–2 (2007): 100.

⁴⁵ David Koplow, “Losing the War on Bioterrorism,” *Security Law Commentary*, Georgetown Law Center on National Security and the Law, October 6, 2008, <http://www.securitylawbrief.com/commentary/2008/10/losing-the-war.html>.

⁴⁶ Bioterrorism seems peculiarly vulnerable to this problem. Pages could be filled with examples of false information on bioterrorism from publications in the professional literature authored by “experts.” There are also periodic outbursts of stories in the press and blogs that are totally fictitious. There were three examples early in 2009. In January 2009, there was a rash of stories about an Algerian terrorist group’s alleging that they had produced plague organisms, which caused their own death. The story was a fantasy. In June 2009, the *Washington Times* reported that al Qaeda was seeking to penetrate the Mexican-U.S. border so that one of its members could disperse anthrax on the White House lawn. The story was based on the ridiculous exhortation by an al Qaeda sympathizer in Kuwait aired on Al Jazeera television earlier in the year. See Sara A. Carter, “Al-Qaida Eyes Anthrax Attack on U.S. from Mexico,” *Washington Times*, June 3, 2009. The story was then picked up by the Pakistani press, *Stars and Stripes*, Fox News, “and across conservative talk radio and the blogosphere” (“Alarming Report of Attacks,” *thespectrum.com*, June 11, 2009). And in April and May 2009, there was another kind of disinformation: deliberate and opportunistic. When the recent swine flu outbreak began in Mexico and the United States, stories appeared in Israel (April 25, 2009), Iran (May 6 and 12, 2009), Syria (May 4–5, 2009), and Russia (May 14, 2009) accusing one or the other of having produced the swine flu virus in a laboratory and releasing it. The Russian article, which appeared in the newspaper *Argumenty I Fakti* and on a *Pravda* website, both of which are closely associated with the Russian government, accused the United States of being responsible for the swine flu outbreak.

⁴⁷ U.S. Central Intelligence Agency, “Iraq’s Weapons of Mass Destruction Programs,” 2002, unclassified, <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB80/wmd14.pdf>; and Kathleen M. Vogel, “‘Iraqi Winnebagos™ of Death’: Imagined and Realized Futures of U.S. Bioweapons Threat Assessment,” *Science and Public Policy* 35, no. 8 (October 2008): 561–73. An equally spurious claim, raised by Vice President Cheney as late as September 14, 2003, long after U.S. inspection teams were searching Iraq, was that Iraq had been working with smallpox in the period before the U.S. invasion. “Smallpox fears were part of the case the Bush administration

used to build support for invading Iraq—and they were raised again as recently as last weekend by Vice President Dick Cheney.” Dafna Linzer, “No Evidence Iraq Stockpiled Smallpox,” Associated Press, September 18, 2003. In addition, “Shortly after the first anthrax victim died in October, the Bush administration began an intense effort to explore any possible link between Iraq and the attacks and continued to do so even after scientists determined that the lethal germ was an American strain, sciences and government officials said....’ We looked for any shred of evidence that would bear on this, or any foreign source,’ a senior intelligence official said of an Iraq connection. ‘It’s just not there.’ ... ‘I know there are a number of people who would love an excuse to get after Iraq,’ said a top federal scientist involved in the investigation.” William J. Broad and David Johnston, “U.S. Inquiry Tried, but Failed, to Link Iraq to Anthrax Attack,” *New York Times*, December 22, 2001.

⁴⁸ Other cases are comparatively more trivial, such as a University of Texas researcher’s defending her research to produce a vaccine against ricin by stating, “Large stockpiles of ricin have been found in several countries in the Middle East.” The statement is a complete fiction: “Large stockpiles of ricin” have never “been found” in any country, in the Middle East or anywhere else. University of Texas Southwestern, “UT Southwestern Researchers Develop Effective, Safe Vaccine against Deadly Bioterrorism Toxin Ricin,” press release, September 4, 2002, <http://www.sciencedaily.com/releases/2002/09/020909065008.htm>.

⁴⁹ Data courtesy of Dr. Richard Ebright in a letter to author, June 8, 2009.

⁵⁰ U.S. Government Accountability Office, “High-Containment Biosafety Laboratories: Preliminary Observations on the Oversight of the Proliferation of BSL-3 and BSL-4 Laboratories in the United States,” GAO-08-108T, Washington, October 4, 2007, <http://www.gao.gov/new.items/d08108t.pdf>. Widely disparate numbers have appeared in the literature despite seemingly authoritative sources. In September 2005, a contractor study prepared for the National Institute of Allergy and Infectious Diseases identified 277 domestic BSL-3 labs, clearly an extremely incomplete survey, while in January 2007, the Department of Health and Human Services and the Department of Homeland Security estimated that there were 630 BSL-3 and BSL-4 labs, still only a fraction of the total number. Frank Gottron and Dana A. Shea, “Oversight of High-Containment Laboratories: Issues for Congress,” R-40418, Congressional Research Service, Washington, March 5, 2009.

⁵¹ Yudhijit Bhattacharjee, “Lawmakers Signal Tougher Controls on Pathogenic Research,” *Science* 326, no. 5949 (October 2, 2009): 28–29; U.S. Government Accountability Office, “High Containment Laboratories: National Strategy for Oversight is Needed,” GAO-09-574, September 21, 2009; Editorial, “Containing Risk: The Ad-Hoc Proliferation of High-Security Biological Labs Must Be Controlled, and Should Be Tied More Closely to Broader Research and Public-Health Goals,” *Nature*, November 17, 2009.

⁵² This subject has been treated extensively in two book-length publications and, therefore, is not further developed here. Leitenberg, *The Problem of Biological Weapons*, pp. 155–206, and Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, pp. 65–85.

⁵³ SRS Technologies, “Quantification of Open Source Research Publications in Biological Sciences for Biological Weapons Development Utility,” final report, prepared for Defense Threat Reduction Agency, June 16, 2003.

⁵⁴ This citation is being withheld to prevent the further spread of information to those interested in developing *B. anthracis* as a weapon.

⁵⁵ U.S. Government Accountability Office, “DOD Excess Property: Risk Assessment Needed on

Public Sales of Equipment That Could Be Used to Make Biological Agents,” GAO-04-817 N1, Washington, October 7, 2003. See Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, pp. 41–42.

⁵⁶ In the same period that legislation to strengthen U.S. food inspection and regulation was being considered, legislation that would regulate and restrict tobacco products under the jurisdiction of the Food and Drug Administration was also finally enacted. When the U.S. Senate passed regulations governing the tobacco industry in June 2009, after decades of efforts to achieve such legislation, Dr. Margaret Hamburg, the new head of the FDA, said, “We now have an opportunity to really make a difference with what is probably the No. 1 public health concern in the nation and the world.” Duff Wilson, “Senate Approves Tight Regulation over Cigarettes,” *New York Times*, June 12, 2009. It was a particularly notable statement given that Dr. Hamburg had for the previous half dozen years been in the forefront of emphasizing the bioterrorism threat.

⁵⁷ Gardiner Harris, “Infant Deaths Fall in U.S., Though Rate Is Still High,” *New York Times*, October 16, 2008; and Editorial, “29th on Infant Mortality,” *New York Times*, October 19, 2008.

⁵⁸ “Reduction in Disease Prevention Budget at CDC Questioned by Lawmakers,” *SeniorJournal.com*, March 12, 2007, <http://seniorjournal.com/NEWS/Politics/2007/7-03-12-ReductionIn.htm>.

⁵⁹ Sarah A. Lister, “An Overview of the U.S. Public Health System in the Context of Emergency Preparedness,” Congressional Research Service, Washington, March 17, 2005; Center for Arms Control and Non-Proliferation, “Federal Funding for Biological Weapons Prevention and Defense, Fiscal Years 2001–2009,” Washington, revised May 27, 2008, http://www.armscontrolcenter.org/resources/fy2008_bw_budget.pdf; and Henry H. Wills and others, “Initial Evaluation of the Cities Readiness Initiative,” RAND Corporation, Santa Monica, CA, 2009, http://www.rand.org/pubs/technical_reports/2009/RAND_TR640.pdf.

⁶⁰ For example, between 2003 and 2009, the National Institute of Allergy and Infectious Diseases awarded 20 grants for research on *Clostridium difficile*, a bacterial stomach bug, which, as noted above, sickens more than 350,000 Americans annually and kills 15,000–20,000 of them. In the same period, the institute awarded 306 grants for research on *B. anthracis*. For details, see the online database of the National Institutes of Health, <http://crisp.cit.nih.gov>. Total spending on grants likely follows the same pattern, but we cannot say for sure, as those data are unavailable. On *C. difficile*, see Parker-Pope, “Stomach Bug.”

⁶¹ Constraints on space required the omission of a review of U.S. pandemic flu vaccine production capacity. Readers can obtain this information by contacting the author at mleitenb@umd.edu.

⁶² Dr. Kellman, the conference organizer, followed this initiative with a book published in 2008 that presented the same argument. Kellman, *Bioviolence*, p. 1.

⁶³ Committee on Prevention of Proliferation of Biological Weapons in States Beyond the Former Soviet Union, *Countering Biological Threats: Challenges for the Department of Defense’s Nonproliferation Program beyond the Former Soviet Union* (Washington: National Academies Press, 2009).

⁶⁴ *Ibid.*, p. 8.

⁶⁵ J. G. Breman, “The Ears of the Hippopotamus: Manifestations, Determinants, and Estimates of the Malaria Burden,” *American Journal of Tropical Medicine and Hygiene* 64, nos. 1–2 Supplement (January–February 2001): 1–11. The figure of 1 million global mortality for malaria that is reproduced universally was taken from a paper published in the 1970s that referred to “at

least one million fatalities ... among children, in Africa annually.” In addition these numbers derive from a World Health Organization reporting system that accumulates data supplied by a handful of hospitals in only 30 countries, ensuring that the number is greatly undercounted.

⁶⁶ Further details and sources can be found in Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, pp. 1–5.

⁶⁷ Laura MacInnis, “WHO Tells Governments to Focus on Health Care,” Reuters, October 14, 2008. In 2005, the World Health Organization revised its International Health Regulations, which became binding law to its member states in June 2007. The goal of these revisions was to protect against the international spread of epidemics and other public health emergencies by enhancing the capacity of disease surveillance and response in member states. Clearly, these are capacities lacking in many developing nations, particularly the poorest ones.

⁶⁸ “The WHO reports that Africa’s overall [gross domestic product] is estimated to be 32 per cent lower as a result of malaria, equivalent to a loss of US\$100 billion annually. The HIV pandemic in Sub-Saharan Africa is just as devastating, and it is expected that by 2010 per capital GDP in some of the hardest-hit countries will drop by 8 per cent, with heavily affected countries losing more than 20 per cent.... Globally the economic costs of tuberculosis (TB) to the poor are estimated to be \$12 billion per year.” Tom Daschle and Tara O’Toole, “Biodefense in the 21st Century,” paper submitted to the Institute for Public Policy Research (UK), June 2008. Their data were taken from a 2003 report by the U.S. Institute of Medicine (NAS), “Microbial Threats to Health: Emergence, Detection and Response”; and the World Health Organization, “Scaling up the Response to Infectious Diseases: A Way Out of Poverty,” Report on Infectious Diseases, 2002.

⁶⁹ Center for Arms Control and Nonproliferation, “Federal Funding for Biological Weapons,” revised May 27, 2008.

⁷⁰ W. Seth Carus, *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents in the 20th Century* (Washington: National Defense University, 1998, 2001).

⁷¹ Nelson Hernandez, “Fort Detrick: Inventory Uncovers 9,200 More Pathogens: Laboratory Says Security Is Tighter, but Earlier Count Missed Dangerous Vials,” *Washington Post*, June 18, 2009. In another ironic example, the state of Kansas, which has campaigned for several years to become the still-to-be-designated location for the National Bio and Agro Defense facility, a BSL-4 laboratory, was one of the 14 states earning the lowest grades in a national health preparedness survey. Karen Shideler, “Report Ranks Kansas Low in Public Health Preparedness,” *Wichita Eagle*, December 30, 2001.

⁷² Yudhijit Bhattacharjee, “Biosecurity: Discovery of Untracked Pathogen Vials at Army Lab Sparks Concerns,” *Science* 324, no. 5935 (June 26, 2009): 1626.

⁷³ Sam Hannanel, “Investigators Find Biological Research Labs Slow to Upgrade Security Criticized a Year Ago,” Associated Press, August 5, 2009. Perhaps a more serious incident occurred in May 2009—a deliberate theft by a former researcher in the strictly controlled Canadian government’s National Microbiology Laboratory in Winnipeg. The researcher, with full Canadian government security clearances, was on his way to a new position at a biodefense facility in the United States. His work involved producing a vaccine for the Ebola virus. To save time and effort, he took along 22 vials of material, some of which included Ebola genes. The material was noninfectious, but the incident demonstrated the ease of insider violation of regulations. Jen Skerritt, “Ebola Gene Theft a Shocker; Sparks Serious Questions about Security at City’s Microbiology Lab,” *Winnipeg Free Press*, May 14, 2009.

⁷⁴ National Academy of Sciences, *Biotechnology Research in an Age of Terrorism* (Washington: National Academies Press, 2004), p. 5. See also Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, pp. 75–78.

⁷⁵ “Mandate for Failure: The State of Institutional Biosafety Committees in an Age of Biological Weapons Research,” Sunshine Project, Austin, TX, October 4, 2004. See also Leitenberg, *Assessing the Biological Weapons and Bioterrorism Threat*, pp. 82–83.

⁷⁶ Laura Kahn, “Licensing Life Science Researchers,” *Bulletin of the Atomic Scientists*, April 6, 2009.

⁷⁷ Arturo Casadevall, Susan A. Ehrlich, David R Franz, Michael J. Imperiale, and Paul S. Keirn, “Biodefense Research: A Win-Win Challenge,” *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science* 6, no. 4 (2008): 1–2.

⁷⁸ Elaine M. Grossman, “Science Groups Counter WMD Panel’s Prescription for Stemming Biological Threats,” *Global Security Newswire*, March 13, 2009.

⁷⁹ National Science Advisory Board for Biosecurity, “Enhanced Personnel Reliability among Individuals with Access to Select Agents,” May 2009; Yudhijit Bhattacharjee, “Experts Want Scientists to Monitor Their Colleagues,” *ScienceInsider*, April 30, 2009, <http://blogs.sciencemag.org/scienceinsider/2009/04/experts-want-sc.html>. A month later, a Defense Science Board report presented the remarkable insights that the theft of biological agents or toxins from a DOD lab was unlikely unless an insider was the thief, in which case theft was feasible, and that it was dubious that an insider could carry out weaponization of a biological agent except in the case where his laboratory work included the equipment that would be needed for the task. “Report of the Defense Science Board Task Force on Department of Defense Biological Safety and Security Program,” May 2009, pp. xi, 19, 40, http://www.acq.osd.mil/dsb/reports/2009-05-Bio_Safety.pdf.

⁸⁰ Richard B. Marchase and Darrell G. Kirch, letter to the U.S. Working Group on Strengthening the Biosecurity of the United States, Washington, May 29, 2009, http://opa.faseb.org/pdf/2009/Biosecurity_FASEB_AAMC_5.29.09.pdf.

⁸¹ Kavita M. Berger and Alan I. Leshner, “Editorial: New Rules for Biosecurity,” *Science* 324, no. 5931 (May 29, 2009): 1117.

⁸² “AAAS Report Warns That New Lab Security Measures Could Undercut Biological Research,” All American Patriots website, June 1, 2009, <http://www.allamericanpatriots.com/48752834-aaas-report-warns-that-new-lab-security-measures-could-undercut-biological-resea>.

⁸³ Charles F. Dasey, “Medical Benefits of the Biological Defense Research Program,” *Politics and the Life Sciences* 9, no. 1 (August 1990): 77–84.

⁸⁴ Victoria Sutton, “Survey Finds Biodefense Researcher Anxiety—Over Inadvertently Violating Regulations,” *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science* 7, no. 2 (2009): 225–26. See also Committee on Assessing Fundamental Attitudes of Life Scientists as a Basis for Biosecurity Education, National Research Council, *A Survey of Attitudes and Actions on Dual Use Research in the Life Sciences: A Collaborative Effort of the National Research Council and the American Association for the Advancement of Science* (Washington: National Academies Press, 2009).

⁸⁵ Martin Matishak, “After Delay, Senate Committee Approves Biosecurity Bill,” *Global Security Newswire*, November 5, 2009, http://gsn.nti.org/gsn/nw_20091105_8558.php.

⁸⁶ “Biodefense Research and the Biological Weapons Convention,” in Leitenberg, *Assessing the*

Biological Weapons and Bioterrorism Threat, pp. 68–85.

⁸⁷ Brian Jenkins offered a similar recommendation regarding nuclear terrorism: “The first thing we have to do is truly understand the threat. Nuclear terrorism is a frightening possibility but it is not inevitable or imminent, and there is no logical progression from truck bombs to nuclear bomb.” See James Kitfield, “Interview: How I Learned Not to Fear the Bomb,” *Global Security Newswire*, October 20, 2008, http://Bwww.nti.org/d_newswire/issues/2008_10_20.html#1D29B503.