

Chapter 7

Observations and Conclusions

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The possibility that terrorists would acquire and use unconventional weapons was, of course, around long before a religious cult went on a rampage in Japan in the mid-1990s. This problem had been discussed for decades, mostly behind closed doors among government national security, intelligence, and law enforcement officials. A fact quietly acknowledged then but trumpeted now is that the world is peppered with facilities that contain the very materials and expertise from which chemical and biological weapons can be made. Skyscrapers and sporting arenas and subways have been accessible terrorist targets for decades as well. Perhaps the dilemma of unconventional terrorism did not cause undue hand-wringing or headlines until the mid-1990s because no amount of spending could alter those aspects of the threat in the past. The same is true of the present.

Aum Shinrikyo radically altered perceptions of the terrorist threat. The cult's actions galvanized Senators Sam Nunn (D–Georgia, ret.), Richard Lugar (R–Indiana), and Pete Domenici (R–New Mexico) to initiate a program commendably aimed at helping US emergency responders better prepare for the contingencies associated with an unconventional terrorist attack. However, even good ideas can be poorly implemented and taxpayers' dollars misspent when entrusted to multiple and competing bureaucracies and overseen by myriad congressional committees.

Some good has definitely come out of the effort, for as chapter 6 indicates, US cities are making headway in preparedness. Also, despite complaints about the federal government's administration of training programs and equipment grants, local authorities readily acknowledge that these programs have compelled segments of the public safety and health care provider communities that should have been cooperating all along to do so at last.¹ Prompted by the larger preparedness exercises, squads from fire, police, and

¹ To illustrate the point, disaster coordinators in hospitals were standing up in one city's meetings to introduce themselves to the infection control officers and the administrators in their own hospitals. Some officials said this was the first program they had seen in over twenty years to forge such cross-disciplinary cooperation. Interviews with author: Physician/Director of Health, Public Health Department (20 September 2000); Director, Emergency Management Division, County Department of Public Safety (19 September 2000); Police Lieutenant, Tactical Support Office (18 September 2000); Hazmat Coordinator/Instructor (8 September 2000); Fire EMS Statistician (30 August 2000); Emergency Planner, Hospital Health Maintenance Organization (15 August 2000); Physician, Division of Disease Control, Public Health Department (8 August 2000); Federal Official, Office of Emergency Preparedness, Department of Health and Human Services (28 June 2000); Medical Toxicologist/Poison Control Center Director (13 June 2000); Battalion Fire Chief, Special Operations (25 May 2000); District Fire Chief, EMS Division (2 March 2000); Registered Nurse/Chief, EMS Division, State Department of Public Health (3 February 2000); Deputy Coordinator, Fire Emergency Preparedness and Disaster Services (3 February 2000); Detective/Bomb Squad (19 January 2000); Captain/Assistant Emergency Management Coordinator (5 January 2000); Battalion Fire Chief (15 November 1999); Physician (24 March 1999); Police Commander, Special Operations Division (23 March 1999); Lieutenant/Hazmat Commander (10 March 1999); Toxicologist, Poison Control Center (9 March 1999); Paramedic Operations

emergency medical service (EMS) agencies have begun routinely conducting smaller cross-agency drills. Bomb and hazardous materials (hazmat) teams in some cities began jointly deploying on certain emergency calls, reinforcing the cross-drills with genuine field experience.² Local officials expect such positive side effects of the domestic preparedness program to pay dividends in all sorts of emergencies.

In the late 1990s, the federal government clearly engaged in too much knee-jerk, unwise spending on unconventional terrorism response teams and training camps. Washington spent profusely, but it did not always spend wisely. Mixed in with the ill-advised programs, however, were efforts to erect plans and capabilities that would serve the public good in many ways, long after the national obsession with unconventional terrorism fades. Enhancements to public health laboratories, for example, would help to identify natural disease outbreaks more swiftly. In such dual-use programs lie the sound reasons for continuing the domestic preparedness effort. However, the perpetuation of this program must be contingent on a return to its original focus—front-line preparedness. In the years ahead, domestic preparedness must graduate to a program that puts as much emphasis on public health and hospital preparedness as on disaster scene rescue capabilities. Lives saved at the scene should not perish in hospitals because civilian medical professionals are unfamiliar with chemical casualty care. Likewise, the prerequisite to an effective response to a biological attack resides in the ability of the public health sector and the medical community writ large to detect its occurrence in time for life-saving intervention. Another sign of maturity in the program would be its transformation from an inside-the-beltway justification for a spending carnival to a set of standards and capabilities that are institutionalized and sustained over the long term.

To accomplish these goals, the federal government must implement the overall program in a better planned and coordinated, not to mention more cost-conscious, fashion. Congress and the executive branch can take giant steps in that direction by steering funds away from turf-hungry bureaucrats and defense contractors to the local level instead. There, much work remains to be done, particularly in the health care and public health sectors. Otherwise, the program will never achieve the lofty aims of its architects. With such reform in mind, the following pages present a series of observations and recommendations on the major issues and policy problems related to chemical and biological terrorism and America's response capabilities.

Supervisor (9 March 1999); Emergency Preparedness Director, Office of Emergency Services (9 February 1999); Police Captain/Firing Range Director (5 February 1999); Registered Nurse/Hospital Disaster Coordinator (4 February 1999); Director, Office of Emergency Services (4 February 1999); Director, Office of Emergency Services (4 February 1999).

² The cross-drills in some cities involved EMS, bomb, and hazmat squads. Interviews with author: Fire EMS Statistician (30 August 2000); MMRS Coordinator, Fire Department (9 May 2000); Deputy Coordinator, Emergency Preparedness and Disaster Services, Fire Department (3 February 2000); EMS Superintendent-in-Chief (24 March 1999). In other locations, police and fire units cross-drilled. Note that some police departments viewed the monthly cross-drills as a good opportunity for bomb squads to conduct regular equipment checks. Interviews with author: Police Lieutenant, Tactical Support Office (18 September 2000); Paramedic (12 May 2000); Battalion Fire Chief (15 November 1999); Division Chief, State Department of Emergency Management (13 April 1999); Police Commander, Special Operations Division (23 March 1999); Police Captain, Special Operations Division (23 March 1999); Paramedic/Emergency Planner, Public Health Department (4 February 1999). In one city, the regular drills incorporated hazmat teams from surrounding towns. Interview with author: Lieutenant/Hazmat Commander (10 March 1999).

DEFLATING THE HYPERBOLE

Much of the thinking that propelled the domestic preparedness program past its reasonable beginnings to a much more costly and less focused effort followed a one-plus-one-equals-two rationale. In other words, a rise in terrorist incidents causing mass casualties plus a claimed increase in the availability of unconventional weapons ingredients equals a greater likelihood that terrorists would use mass destruction weapons to kill large numbers of people. The unconventional terrorist threat, it turns out, is more nuanced than that, and some of the statements frequently used to imply a portentous threat can be deflated.

Along that vein, one often hears about the menace posed by someone brewing toxic chemicals or biological agents in their garages. Of course, small set-ups are possible, but their linkage to a mass-casualty scenario is misleading. Theoretically, a quart of nerve agent contains roughly a million lethal doses, but in practice, over a *ton* of nerve agent would be needed to kill ten thousand people outdoors. Using the production and casualty quantities from pages 34–5 of chapter 2, it would take a terrorist roughly two years to make enough sarin in a basement-sized operation to kill five hundred and another eighteen years to produce the ton of gas required to kill ten thousand. No one disputes that the bathtub manufacturing scenario poses a threat to public safety, but this setting is incongruous with the quantities of chemical agent needed to cause mass casualties unless those involved have specific tactical knowledge that enables a professionally efficient dispersal indoors.

Another amplification of the threat pertains to the spread of technology and scientific skills, wherein phrases like “genetic engineering” and “designer bugs” end up in the same sentence with terrorism. The basic components of biological and chemical weapons programs (e.g., materials, formulas, equipment) have been long known and were quite accessible decades before Aum’s attack. Scientific techniques have indeed advanced, but, as chapter 2 explains, the obstacles to the successful dissemination of biological agents are such that governments have found it necessary to employ hundreds, even thousands of top-flight scientists, to obtain a mass casualty biological weapons capability. If producing dry biological agents is a stretch for terrorists, as several well-known experts have pointed out, then more sophisticated, genetically engineered bugs are even further out of reach. Moreover, a mass casualty biowarfare capability requires more than a basement, Bunsen burner-type operation.³

³ “Theoretically, it is correct that ‘X’ thousands of people can be killed with ‘X’ amount of agent, but operationally and practically, that is 100 percent incorrect.” Interview with author: Dr. Jeff Mohr, Chief, Life Sciences, Dugway Proving Ground (18 September 2000). Also on this point, Biodefense Expert/PhD, International Relations (8 August 2000); former Military Officer/Biodefense Expert (7 July 2000); Jonathan B. Tucker, “Bioterrorism: Threats and Responses,” in *Biological Weapons: Limiting the Threat*, ed. Joshua Lederberg (Cambridge, Mass.: MIT Press, 1999), 174; Statement of Norman J. Rabkin, “Linking Threats to Strategies and Resources,” Testimony before the Subcommittee on National Security, Veterans Affairs, and International Relations, House Government Reform Committee (Washington, DC: General Accounting Office, 26 July 2000), 3–6.

Returning to the case that started the hyperbole, Aum Shinrikyo was brimming with highly educated scientists, yet the cult's bio program was a lemon. Aum's poison gas program certainly made more headway, but, as chapter 3 describes, it was rife with life-threatening production and dissemination accidents. True, almost any scientist can produce a toxic chemical or grow a biological agent in a laboratory beaker, but the scientists most likely to overcome the demands of causing mass casualties are the particularly innovative and dedicated ones, the types who excel in the creative environments of industry and academia. That modern-day Thomas Edisons and Madame Curies would flock to the next Shoko Asahara or Timothy McVeigh begs skepticism.⁴ Unless terrorists buy their scientists from the appropriate pool of talent, a matter discussed below, groups or individuals fabricating these agents are much more likely to kill dozens than thousands.

A look at the statistics charting terrorist behavior with chemical and biological substances over the past twenty-five years also helps to put the threat in perspective. With regard to the rash of late 1990s hoaxes, disgruntled individuals and terrorist groups quickly discovered they could attract moon-suited rescuers and splashy media coverage by phoning in an anthrax threat or penning a threat letter.⁵ Pouring talcum powder into an envelope or sending a petri dish labeled "antracis yersinia [sic]" to a targeted organization presents scant evidence, however, of any real weapons capabilities.⁶ No doubt in most, if not all cases, the perpetrators were capitalizing on the nation's preoccupation with unconventional terrorism and an easy method of harassment that garners cheap publicity. These hoaxes fed a perception that the unconventional terrorist threat had somehow gotten worse, but in reality they are a poor indicator of true terrorist intent to pursue such capabilities and use such weapons.

As noted in chapter 2, the Monterey Institute database shows that of 126 incidents worldwide where terrorists used chemical or biological substances over the past twenty-five years, a combined 45 percent involved either low-end materials (e.g., tear gas, butyric acid) or can be traced to Aum Shinrikyo. The Japanese cult remains the sole group to have inflicted mass casualties, if the term is defined as one thousand

⁴ The need for high technical aptitude was illustrated with a real-life test. In the late 1990s, the US Army Medical Research Institute for Infectious Diseases assigned a post-doctoral student the task of figuring out how to produce and disseminate a biowarfare agent to cause mass casualties, giving this individual a year to accomplish the task. When this person's game plan was presented to resident experts, it looked plausible, but contained a trio of key errors, any one of which would have caused the effort to fail. The conduct and outcome of this test were first told by Mr. William Patrick, formerly of Ft. Detrick and repeated in the remarks of Dr. Milton Leitenberg, Center for International and Security Studies, University of Maryland, at the Association of Politics and the Life Sciences Conference, 1 September 2000, Washington, DC.

⁵ The Federal Bureau of Investigation (FBI) suspects that the widespread media coverage of the 18 August 1998 anthrax threat to the Finney State Office Building in Wichita, Kansas helped to prompt copycat events. Federal Bureau of Investigation, National Security Division, *Terrorism in the United States: 1998* (Washington, DC: US Department of Justice, n.d.), 13; "Building Evacuated Because of White Powder, Note," *Associated Press*, 19 August 1998.

⁶ "Antracis [sic]" is a reference to a poorly spelled or informed attempt that was made on 25 April 1997 to threaten B'nai B'rith headquarters in Washington, DC, with exposure to anthrax. The box sent to the organization was labeled thusly, a fact that might have cued knowledgeable first responders to a possibly empty threat. Instead, the response was a circus of errors. See footnote 71 in chapter 6.

or more injured or dead. A total of five terrorist attacks—all involving chemical substances—inflicted ten or more deaths, with nineteen being the most fatalities caused by a single attack. In 96 percent of the cases where chemical or biological substances were used, three or fewer people were injured or killed. Many of the database cases were oriented toward assassination of specific individuals. More often than not, the cases involving mass-casualty plots were scientifically weak and operationally implausible.⁷

All of the publicity about unconventional terrorism fueled the impression that terrorist capabilities and plots involving chemical and biological agents somehow became more substantive and plausible in the late 1990s. Looking at the pertinent cases for the last several years, however, no individual or group has approached the replication of Aum's constellation of intent, resources, and technical skill to present a viable unconventional mass casualty threat. Domestically, Federal Bureau of Investigation (FBI) officials have characterized the non-hoax cases in the late 1990s as situations related to domestic disputes or disgruntled workers where the substances of choice tended to be household, industrial chemicals, and the scope of intended harm involved one or a few individuals (e.g., government officials), not dispersal at public gatherings or locations where mass casualties could result.⁸ Internationally, terrorist Osama bin Laden openly threatened to use these weapons, but public sources give no indication that bin Laden's loose-knit group acquired biological agent seed cultures. On 20 August 1998, the United States blew up a pharmaceutical facility in Sudan based on intelligence data that indicated the plant was producing a key nerve agent precursor chemical, possibly for bin Laden. Although the attack and the US justification for it were

⁷ See, for example, the cases of the Covenant, the Sword, and the Arm of the Lord and R.I.S.E. summarized in boxes 2.4 and 2.6 in chapter 2; Jonathan B. Tucker and Amy Sands, "An Unlikely Threat," *Bulletin of the Atomic Scientists* 44, no. 4 (July/August 1999): 49. Also, International Institute for Strategic Studies, *Strategic Survey 1998/99* (Oxford: Oxford Univ. Press, May 1999), 63.

⁸ Personal conversations with author: FBI Official (8 September 2000); FBI Official (1 August 2000); FBI Special Agent (16 May 2000); FBI Special Agent (13 May 2000). A few cases in the late 1990s deserve some note. For instance, Lawrence Moltz was arrested for violation of 18 USC Section 2332a (threat to use a weapon of mass destruction) on 8 April 1998 and pled guilty to the lesser charge of mailing threatening communications. On 10 October 1998, he received the maximum allowable sentence: sixteen months in jail, \$3,000 fine, and a three-year supervised release. FBI, *Terrorism in the United States: 1998*, 6. Moltz, whose plot involved sarin, was mentally unstable, which makes it doubtful that he had the mental faculties to fulfill his plot. Moreover, Moltz still had a long way to go before he acquired a chemical agent, much less disseminated one. In another case, three members of the Republic of Texas, a secessionist group, were arrested on 1 July 1998 for violation of 18 USC Section 2332a (threat to use a weapon of mass destruction). These men claimed to have access to anthrax as well as rabies and the AIDS virus and were plotting to assassinate a judge. Jack A. Grebe, Jr. and Johnie Wise were convicted on 29 October 1999 and sentenced to twenty-four years in prison. "Separatists Get 24-year Sentences For E-mail Threats," *Houston Chronicle*, 6 February 1999; FBI, *Terrorism in the United States: 1998*, 7. In a third case, a dissatisfied hospital laboratory worker in Dallas, Texas grew *Shigella dysenteriae* while on the job and gave twelve of her co-workers severe diarrhea by contaminating the staff's breakfast foods. Five had to be hospitalized. See Holly Becka, "20-year Sentence Given in Taintings," *Dallas Morning News*, 12 September 1998; Charles Ornstein, "Lab Bacteria Put in Pastries Caused Illnesses," *Dallas Morning News*, 11 November 1996; Michael T. Osterholm and John Schwartz, *Living Terrors* (New York: Delacorte Press, 2000), 85–6. Also on food tampering problems, see General Accounting Office, *Food Safety: Agencies Should Further Test Plans for Responding to Deliberate Contamination*, GAO/RCED-00-3 (Washington, DC: US General Accounting Office, October 1999).

very controversial,⁹ it is safe to say that US intelligence community is watching bin Laden's activities closely, as should be the case. Surveying the landscape elsewhere, the FBI's Deputy Assistant Director for Counterterrorism Terrie Turchie testified: "Currently there is no credible intelligence that a terrorist group has acquired, developed or is planning to use chemical, biological, or radiological agents in the United States."¹⁰

The subject of unconventional terrorism was tailor-made for hyperbole, and unfortunately much of what has been said has made it difficult to ascertain the gravity of the unconventional terrorist threat. Taken together, the technical realities, actual case histories, and statistical records of terrorist behavior with chemical and biological substances undercut the rhetoric considerably and point not to catastrophic terrorism but to small attacks where a few, not thousands, would be harmed. Despite assertions to the contrary, acquiring and using chemical and biological weapons in a manner that causes mass casualties is not shake-'n-bake easy, which may partly explain why no terrorists have followed in Aum's footsteps more than five years after the cult's subway attack. The weapons of choice for terrorists remain truck bombs and other conventional tools that are markedly less technically demanding, resource-intensive, and dangerous for the perpetrators than unconventional weapons.¹¹ Henceforth, policy makers, the media, and the general public would be well advised to scrutinize more closely statements about the unconventional terrorist threat. An astute reviewer would examine statements bearing in mind what the source *really* knows about terrorist behavior and the technical aspects of chemical and biological weaponry and what the source or their organization stands to gain from an artificially inflated threat. Sound public policy is best based on technical facts, not hypotheticals.

GENUINE UNCONVENTIONAL TERRORISM THREAT CONCERNS

Although assembling from scratch an unconventional weapons capability that could cause mass casualties is not that elementary, there are tangible routes whereby terrorists could inflict considerable harm

⁹ Michael Barletta, "Chemical Weapons in the Sudan: Allegations and Evidence," *Nonproliferation Review* 6, no. 1 (Fall 1998): 115–36; Tim Weiner and James Risen, "Decision to Strike Factory in Sudan Based on Surmise Inferred from Evidence," *New York Times*, 21 September 1998; James Risen, "Question of Evidence, A Special Report: To Bomb Sudan or Not, A Year Later, Debates Rankle," *New York Times*, 27 October 1999.

¹⁰ Terry Turchie, Deputy Assistant Director, FBI Counterterrorism Division, testimony before the House Government Reform Committee, Subcommittee on National Security, Veterans Affairs, and International Relations, 106th Cong., 2nd sess., 26 July 2000. Also, Louis Freeh, Director, FBI, testimony before the Senate Appropriations Committee, Subcommittee on Commerce, Justice, State and the Judiciary, 106th Cong., 1st sess., 4 February 1999. Even those who have expounded on the severity of the threat concede this point. Richard A. Falkenrath, Robert D. Newman, and Bradley A. Thayer, *America's Achilles' Heel: Nuclear, Biological, and Chemical Terrorism and Covert Attack* (Cambridge, Mass.: MIT Press, 1998), 214.

¹¹ *First Annual Report to the President and the Congress of the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction: I. Assessing the Threat* (Washington, DC: 15 December 1999), 36–7. Hereafter, the 1999 Gilmore panel report, so called for its chairman Virginia Governor James Gilmore. Also, Brian M. Jenkins, "Understanding the Link Between Motives and Methods" in *Terrorism with Chemical and Biological Weapons: Calibrating Risks and Responses*, ed. Brad Roberts (Arlington, Va.: Chemical and Biological Arms Control Institute, 1997), 51; Tucker and Sands, "An Unlikely Threat," 48; International Institute for Strategic Studies, *Strategic Survey 1998/99*, 70.

with chemical and biological substances. One shortcut involves foul play with industrial chemical storage tanks, the other hiring scientific expertise from the former Soviet biological and chemical weapons complexes. US policy makers can take constructive steps to cut off these avenues for would-be toxic terrorists.

Out on the front lines, emergency planners and responders wonder why such a big fuss has been made about warfare agents like sarin. They understand all too well that industrial chemicals with mass-casualty potential are ubiquitous in modern society.¹² In early 1999, the Environmental Protection Agency estimated that approximately 850,000 facilities in the United States were working with hazardous or extremely hazardous substances.¹³ Many of these sites are located in urban areas, and transport of hazardous substances is a routine matter. Hence, the principal chemical concern of local first responders revolves around sabotage of a hazardous materials facility, whether by terrorists breaching site security or a disgruntled employee pulling off an insider job.¹⁴ The worst industrial accident in history took place at a chemical plant in India, as box 7.1 recounts. Accidents on a much smaller scale have occurred in the United

¹² Interviews with author: Hazmat Coordinator/Instructor (8 August 2000); PhD Chemist/Chemical Weapons Expert (14 July 2000); Firefighter/Hazmat Instructor/Paramedic (28 June 2000); US Chemical Industry Expert/PhD Chemist (31 May 2000); Detective/Bomb Squad Member (19 January 2000); Fire Captain, Hazmat Unit (9 February 1999). Literally tens of thousands of common commercial chemicals are very poisonous. One source puts the number of organophosphate compounds alone at over fifty thousand. Robert K. Mullen, "Mass Destruction and Terrorism," *Journal of International Affairs* 32, no. 1 (Spring/Summer 1978): 69. On the FBI's concern that international terrorists may be procuring large quantities of industrial chemicals (e.g., arsenic, cyanide), see FBI, *Terrorism in the United States: 1998*, 14.

¹³ This figure constitutes the agency's estimate of the facilities that would be required to report under sections 311 and 312 of the Emergency Planning and Community Right-to-Know Act. *Federal Register* 64, no. 28, 11 February 1999. The Occupational Safety and Health Administration defines a hazardous chemical in the Federal Hazard Communication Standard as "any chemical which is a physical or health hazard" and would therefore require materials safety data sheets to be filed. Under sections 311 and 312, the reporting threshold for hazardous chemicals is a quantity in excess of 10,000 pounds and for extremely hazardous substances an amount surpassing the threshold planning quantity or 500 pounds, whichever is less. 42 USC Sections 11001–11022; 40 CFR 370. Among the other regulatory definitions for hazardous materials, the Environmental Protection Agency definition is "any chemical that, if released into the environment, could be potentially harmful to the public's health or welfare." The agency lists 366 substances in that category. The Department of Transportation considers a hazardous material to be "any substance or material in any form or quantity that poses an unreasonable risk to the safety and health and to property when transported in commerce." Chris Hawley, *Hazardous Materials Response & Operations* (Albany, NY: Delmar Publishing, 2000), 3, 200.

¹⁴ Occupational Safety and Health Administration regulation 1910.120 leaves security provisions at these facilities to the discretion of the operator, which means that such sites probably have some physical security barriers, as well as other precautions against intruders (e.g., guarded entrances).

Box 7.1: The Bhopal Tragedy

Although Bhopal had been settled over two thousand years ago, a 1984 disaster was what really put this Indian city on the map. Prior to the fateful night of 3 December 1984, this ancient burg 360 miles northwest of New Delhi was known mostly as the capital of the state of Madhya Pradesh that modernity had bypassed. In 1984, most people living there had access to running water for only a few hours each day, and only one inhabitant in one thousand had a telephone.¹ Few modern conveniences were available in this city of 900,000, but in the mid-1970s Union Carbide built a pesticide plant there using the same safety standards, design, and operating procedures that were employed in its US facilities. Each year, the Bhopal facility produced twenty-five hundred tons of pesticides. One of the chemical ingredients on hand in large quantities was methyl isocyanate, which must be refrigerated to remain in a liquid state. Methyl isocyanate is super toxic, colorless, and very flammable.²

Roughly an hour past midnight on December 3rd, methyl isocyanate began spewing from one of the holding tanks at the Union Carbide plant. Some workers donned gas masks and tried to plug the leak, but soon they just fled for their lives. Alarms were of little use to the thousands sleeping in nearby shanty towns as the thick, white, toxic cloud drifted off the seventeen acre plant compound, clinging close to the ground because the temperature that night was a cool 57 degrees. Men, women, and children awoke gasping, vomiting, blinded by the gas. Hundreds died in their beds, and panic ensued as thousands stumbled out of their homes struggling for air, confused. The fear was heightened as the loudspeakers on police vans urged people to “Run! Run! Poison gas is spreading!” The first victims began arriving at the city’s largest hospital at 2am. Soon, all five hospitals in the city were overflowing with victims, and aid stations were set up where ever room could be found, in stores and on sidewalks. Every minute, hospital officials pronounced another person dead. The death toll spiraled above two thousand, and over 200,000 were initially thought to be injured.³

The next day, Bhopal’s morgue was also overrun. To prevent an epidemic, city officials authorized mass cremations and burials. Bodies were simply covered with numbered sheets. That day and on into the night, some seventy pyres⁴ filled the air with a different kind of smoke as Indian health care officials, police, and social service providers struggled to take care of the wounded and find answers for the cause of the accident. Experts agree that water got into the methyl isocyanate and the ensuing reaction caused the tank to blow. Some believe the Bhopal disaster may have been prompted by a combination of poor maintenance and management of changes to the plant’s piping, which allowed water to enter the tank inadvertently.⁵ The more prevalently accepted explanation is the one provided by the international consulting firm Arthur D. Little, which concluded after a series of interviews with plant employees that a disgruntled employee deliberately caused the accident by attaching a water hose to the tank through an opening usually reserved for a pressure indicator. The Little report alleges that minor sabotage was the intention, that the perpetrator of act did not appreciate the magnitude and lethality of the chemical reaction that introducing water to the tank would create. In 1991, the Indian government’s official casualty toll from the Bhopal gas release was approximately 3,800 dead and over eleven thousand injured.⁶

NOTES

1. Stuart Diamond, “The Disaster in Bhopal: Lessons for the Future,” *New York Times*, 3 February 1985.

2. Robert D. McFadden, “India Disaster: Chronicle of Nightmare,” *New York Times*, 10 December 1984.

3. McFadden, “India Disaster: Chronicle of Nightmare.”

4. Ibid.

5. Prior to making structural changes at a plant, an analysis is supposed to be conducted of the possible negative effects of the proposed change. Interview with author: US chemical industry expert/Ph.D. chemist (31 May 2000).

6. Minor acts of sabotage are commonplace in commercial plants worldwide and had previously occurred at Bhopal. Ashok S. Kalkar, “Investigation of Large-Magnitude Incidents: Bhopal as a Case Study,” presentation to the Institution of Chemical Engineers Conference On Preventing Major Chemical Accidents, London, England, May 1988; Jackson B. Browning, “Union Carbide: Disaster at Bhopal,” in *Crisis Response: Inside Stories on Managing Under Siege*, ed. Jack Gottschalk (Detroit: Visible Ink Press, 1993).

States, and occasionally authorities suspect foul play as the cause.¹⁵ Logic dictates that if the same result can be achieved through a less arduous route, terrorists intent on causing mass casualties with chemicals would probably engineer the intentional release of industrial chemicals rather than wrestle with more complex warfare agents.

Regrettably, this possibility appears to be lost on some in Washington, because in the late summer of 2000 a long-standing policy about the public release of detailed information about hazardous and extremely hazardous substances facilities was altered. The change was the outcome of a clash pitting public safety advocates and chemical facility owners against those concerned about environmentally responsible behavior on the part of the companies involved. A dismally short-sighted compromise regulation finalized on 4 August 2000 satisfied the concerns of neither camp. This statute allows the Environmental Protection Agency to post sensitive data on the Internet regarding worst case accident scenarios at these sites and release even more details at reading rooms throughout the country. When reviewing these records, citizens can take notes.¹⁶

Not to mince words, but public safety always trumps environmental concerns. Accidental releases of chemicals can be documented and cleaned up, and companies held accountable for their actions through criminal and civil courts. Lives lost to terrorist sabotage of such facilities cannot be reclaimed. Nonetheless, Washington decided to hand any interested individual a road-map to the chemical calamities they could cause with the toxic materials located in communities across the country.¹⁷ Entire branches of government, namely the Environmental Protection Agency and the Occupational Safety and Health Administration, are charged with inspecting these businesses to ensure that they operate lawfully and safely. Moreover, those concerned

¹⁵ Such was the case on 28 February 2000, when someone deliberately opened a valve at a chemical plant near the small Missouri town of Pleasant Hill, causing a leak of 200 gallons of anhydrous ammonia and a poisonous cloud that forced more than 250 people to be evacuated. "Dozens Flee Deliberate Poison Cloud," *Reuters*, 28 February 2000.

¹⁶ The 1990 Clean Air Act that requires hazardous materials facilities to file risk management plans with the Environmental Protection Agency also stipulates these plans be made publicly available. These plans are supposed to demonstrate the facility's program to prevent, detect, and minimize the accidental release of chemicals. They include at least one hypothetical worst case accident scenario that details, among other things, the geographical reach of the release and how many injuries and deaths would likely result. Under the 4 August 2000 rule, some of the worst case scenario data will be posted on the Internet with the risk management plans, including the chemical concentration and physical state, the endpoint used for flammables in the worst case scenario, the duration and wind speed during the hypothetical release, the atmospheric stability, and the surrounding topography. Citizens providing proof of their residency and employment can also view but not remove or mechanically reproduce the complete the worst-case scenario details for up to ten facilities of their choice per month. By 31 December 2000, a decision will be made about where to create fifty nationwide reading rooms for this purpose. In addition, State Emergency Response Commissions and Local Emergency Planning Committees and other related state and local government agencies may also provide the public with read-only access to this data. Glenn Hess, "Analysis Confirms Terrorist Risk of Placing Hazard Data on Internet," *Chemical Market Reporter*, 14 September 1998, 1; Glenn Hess, "US Issues Final Rule on 'Worst-Case' Data Access," *Chemical News & Intelligence*, 4 August 2000. See also section 112(r) of the 1990 Clean Air Act, 42 USC Section 7412; 40 CFR, 68; and the Chemical Safety Information, Site Security, and Fuels Regulatory Relief Act, Public Law 106-40, passed by Congress on 5 August 1999.

¹⁷ "If someone really wanted to take a facility out, the risk management plan is the blueprint." Interview with author: Hazmat Coordinator/Instructor (8 August 2000).

citizens already have access to Local Emergency Planning Commissions, where they could gain a better understanding of existing safeguards, regulatory enforcement procedures, and emergency plans for these sites. Consultation between industry and citizens can also occur via the chemical industry's Responsible Care and Community Awareness and Emergency Response programs.¹⁸ Washington should promptly halt the implementation of this regulation before the information genie is further uncorked. Policy makers, federal bureaucrats, and interest groups should consider augmenting professional regulatory staffs and expanding existing consultative activities before watchdog duties are foolhardily abdicated to individuals who may not always have public safety in mind.

If industrial chemicals are the shortcut to chemical terrorism, then state sponsorship and former employees of state-run biowarfare programs are the shortest terrorist route to a genuine bioweapons capability. That state sponsors might assist terrorist groups is a well-acknowledged problem.¹⁹ According to the Pentagon, nations that have biological weapons capabilities have not yet cooperated with terrorists on this matter and the possible consequences mitigate against them doing so.²⁰ The US policy of "no sanctuary" for terrorists, first articulated by President Ronald Reagan and re-emphasized since, has been expanded with an assertion of the right to bomb the government facilities of any nation that gives safe haven to international terrorists.²¹ To inspire continued restraint regarding the sharing of weapons materials and know-how, the US government might consider articulating a similar retaliatory policy against the governmental assets of any country that knowingly aids terrorist acquisition of weapons of mass destruction.

Within the states of the former Soviet empire, many of the scientists who powered the USSR's

¹⁸ The Chemical Manufacturers Association, now the American Chemistry Council, debuted the Responsible Care program during the celebration of Earth Day 1990. For an insightful analysis of the background and skepticism, some warranted, some not, surrounding this program, see Peter M. Sandman, "Addressing Skepticism About Responsible Care" (Rosslyn, Va.: Chemical Manufacturers Association, n.d.). The Responsible Care program aims to help member companies work to improve their environmental and health and safety performance in a manner directly responsive to public concerns. Under this program's auspices, three hundred Community Advisory Panels have been established countrywide so that local citizens can meet with chemical plant managers to discuss concerns and improve communication. American Chemistry Council, *Responsible Care Progress Report 2000* (Rosslyn, Va.: American Chemistry Council, 2000). See also, the Council's Community Awareness and Emergency Response Code of Management Practice, specifically aimed at heightening local awareness of emergency response plans and capabilities.

¹⁹ For example, 1999 Gilmore panel report, 12; Walter Laqueur, *The New Terrorism: Fanaticism and the Arms of Mass Destruction* (New York: Oxford Univ. Press, 1999), 265–7; Raymond A. Zilinskas, "Aum Shinrikyo's Chemical/Biological Terrorism as a Paradigm?" *Politics and the Life Sciences* 15, no. 2 (September 1996): 239.

²⁰ US Department of Defense, Office of the Secretary of Defense, *Proliferation: Threat and Response* (Washington, DC: US Department of Defense, 1997), 49.

²¹ George de Lama, "US Bombs Libya Bases," *Chicago Tribune*, 15 April 1986; Windy S. Ross and Jane Morse, "President Clinton Vows 'No Sanctuary for Terrorists,'" *United States Information Agency*, 20 August 1998; John Diamond, "US Asserts Right To Bomb Regimes That Harbor Terrorists," *Associated Press*, 7 February 1999.

biowarfare program have been under- or unemployed since 1992.²² The Soviet Union's prodigious biological weapons program consisted of over fifty facilities now located across seven countries. Among other agents, the Soviets weaponized anthrax, smallpox, plague, Marburg, tularemia, and brucellosis, and they genetically altered strains of some diseases to make them more resistant to antibiotics. In their vast weapons complex where roughly 65,000 worked, scientists also began to experiment with disease combinations called chimeras.²³ By the US government's *conservative* estimate, about seven thousand scientists from the former Soviet biowarfare program pose a critical proliferation risk.²⁴

Astutely, under the umbrella of the Nunn-Lugar Cooperative Threat Reduction Program the US government started a quartet of cooperative research grant programs to help keep these weapons experts gainfully and peacefully employed and assist them in the transition to the commercial job market. Against a backdrop of economic and political turmoil in the former Soviet states, the International Science and Technology Center, the Civilian Research and Development Foundation, the Science and Technology Center in Ukraine, and the Initiatives for Proliferation Prevention program have managed to involve a great many weapons scientists in their grant assistance programs. Key weapons institutes and pockets of weapons expertise are not yet involved in these collaborative grant programs, however. This lack of progress is partly due to the secrecy that still surrounds these weapons programs and to the intransigence of hardliners in positions of authority who would like to retain a weapons capability.

In no small part, though, many weapons scientists have not received grant assistance because funding for these programs has been so modest. From 1994 to mid-1999, the average annual US investment in collaborative biological research grants was \$3.56 million. Even if the US contribution for biological grants across all four aid programs was raised to an amount calculated to keep these weapons scientists just above the poverty level in Russia, it would still be a mere \$12.4 million, or 0.0046 of the Pentagon's \$267 billion

²² Note another pool of talent may lie in the university programs that are combining instruction in key skill sets in the name of more efficient agricultural production. Interview with author: former State Epidemiologist (18 August 2000).

²³ Branches of the biowarfare program devoted to anti-crop and anti-livestock agents employed ten thousand. For an insider's account of Soviet biowarfare activities, see Ken Alibek, with Stephen Handelman, *Biohazard* (New York: Random House, 1999). Also, Jonathan B. Tucker, "Bioweapons in Russia: Stemming the Flow," *Issues in Science and Technology* 15, no. 3 (Spring 1999): 34–5; Anthony Rimmington, "From Military to Industrial Complex? The Conversion of Biological Weapons Facilities in the Russian Federation" *Contemporary Security Policy* 17, no. 1 (April 1996): 80–112; Milton Leitenberg, "The Conversion of Biological Warfare Research and Development Facilities to Peaceful Uses," in *Control of Dual-Threat Agents: The Vaccines for Peace Programme*, ed. Erhard Geissler and John P. Woodall, Stockholm International Peace Research Institute, Chemical and Biological Warfare Studies 15 (London: Oxford University Press, 1994), 77–105; Judith Miller, "Long Island Lab May Do Studies of Bioterrorism," *New York Times*, 22 September 1999; Judith Miller, "In a Gamble, US Supports Russian Germ Warfare Scientists," *New York Times*, 20 June 2000; Judith Miller, "Russia Opens Doors to Lab That Created Deadly Germs," *New York Times*, 24 May 2000; Judith Miller, "US Helps Russia Turn Germ Center to Peace Uses," *New York Times*, 8 January 2000.

²⁴ Note that the government's *conservative* estimate is that 3,500 critical former Soviet chemical weapons experts pose a significant proliferation risk. Amy E. Smithson, *Toxic Archipelago: Preventing Proliferation from the Former Soviet Chemical and Biological Weapons Complexes* (Washington, DC: Henry L. Stimson Center, December 1999), 47.

budget for the year 2000. Boosting funding for these cooperative grant assistance programs is a pragmatic investment in threat reduction. These scientists still have access to lethal biological weapons seed cultures and still carry in their heads the knowledge collectively gained from decades of intensive biowarfare research.

If former Soviet bioweaponers were to succumb to job offers from subnational actors, they could accelerate rudimentary terrorist weapons programs into ones capable of mass casualty attacks. Not only could such scientists tutor terrorists in the technical arcana needed to keep lethal microbes alive in a suspended aerosol of fine particles, they could hand over seed cultures of contagious diseases that obviate the need for effective aerosol distribution. An ounce of prevention via a hefty funding increase for these collaborative biological and chemical grant efforts could help cut this proliferation problem off at its source.²⁵ As Senator Lugar emphasized, there is an “organic relationship between domestic preparedness programs to cope with potential terrorist actions at home. . . and [programs] designed in part to prevent and deter terrorist acts abroad by dealing with the threat posed by weapons of mass destruction at the sourceOne makes no sense without the other. Together, they make a major contribution to [US] national security.”²⁶

PREPAREDNESS VERSUS PORK

A series of expert studies and panels, as well as the Congress’ own General Accounting Office, have labeled the federal preparedness programs a fractured mess and urged a national strategy to guide programs better.²⁷ This counsel has unfortunately fallen on deaf ears, for the executive branch continues to spawn duplicative programs, abetted by a Congress that has parceled oversight among at least a dozen committees and authorized virtually any program with terrorism in the title. Throwing money at a problem is a costly substitute for effective government.

²⁵ This proliferation dilemma, the cooperative research grant programs, and suggestions for improvement are discussed at length in Smithson, *Toxic Archipelago*. The author also has concerns about the technical expertise that scientists from the former Soviet chemical weapons complex might share with those willing to pay. The grant programs have not yet managed to reach the scientists involved in chemical weapons dispersal.

²⁶ “Remarks of Senator Richard Lugar,” at the Jane’s Information Group Conference on Countering Chemical and Biological Weapons: Government Programs, Industry Opportunities, 19 November 1997, Washington, DC.

²⁷ *Combating Proliferation of Weapons of Mass Destruction*, Report from the Commission to Assess the Organization of the Federal Government to Combat the Proliferation of Weapons of Mass Destruction, Issued Pursuant to Public Law 104-293, July 1999; 1999 Gilmore panel report; *Countering the Changing Threat of International Terrorism*, Report of the National Commission on Terrorism, Pursuant to Public Law 105-277, June 2000; General Accounting Office, *Combating Terrorism: Observations on Federal Spending to Combat Terrorism*, GAO/T-NSIAD/GGD-99-107 (Washington, DC: US General Accounting Office, 11 March 1999); General Accounting Office, *Combating Terrorism: Opportunities to Improve Domestic Preparedness Program Focus and Efficiency*, GAO/NSIAD-99-3 (Washington, DC: US General Accounting Office, 12 November 1998); General Accounting Office, *Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attack*, GAO/NSIAD-99-163 (Washington, DC: US General Accounting Office, 7 September 1999); General Accounting Office, *Combating Terrorism: Linking Threats to Strategies and Resources*, T-NSIAD-00-218 (Washington, DC: US General Accounting Office, 26 July 2000).

The original strategy for responding to an unconventional terrorist attack was to train and equip the locals to handle such unusual circumstances better; the federal government's role was to help a stricken city recover over the mid- and long-term. Had Washington taken full advantage of existing assets and spent funds according to this sensible division of labor, then the front lines might be better prepared and the federal government's response architecture might be comprehensible. What transpired instead can be partly understood through the documentation of the Office of Management and Budget.²⁸ Even the chief federal bean counters, however, have yet to develop a financial Rosetta stone to decode where the billions are going. Sharpened methodology and funding categorizations should make these reports even more useful. As is, the Office of Management and Budget's report should be a red-flag alert to Congress about the need to oversee this area of programming more diligently to arrest reason and transparency from the participating federal agencies. Some offices readily share information about their programs and funding, but others make ambiguous claims and shield even basic, non-sensitive data.

From the budget office's initial reports, it is obvious that spending priorities have strayed far from the intent of the domestic preparedness program's trio of Senate designers. In 2000, of the \$1.5 billion allotted for unconventional terrorism preparedness programs, roughly \$315 million went to the front lines in the form of training, equipment grants, and planning assistance. That amount translates to 22 percent of funding related directly to weapons of mass destruction programs, or 3.7 percent of the overall 2000 \$8.4 billion counter-terrorism budget. Bluntly put, an absurdly small slice of the pie has made it beyond the beltway.²⁹

Another major portion of the budget that has potential future benefits for the front-line is research and development, shown in figure 7.1. Falling under this heading are a panoply of projects to develop better personal protection equipment, agent detectors, decontamination products, and medical treatments. In 2000,

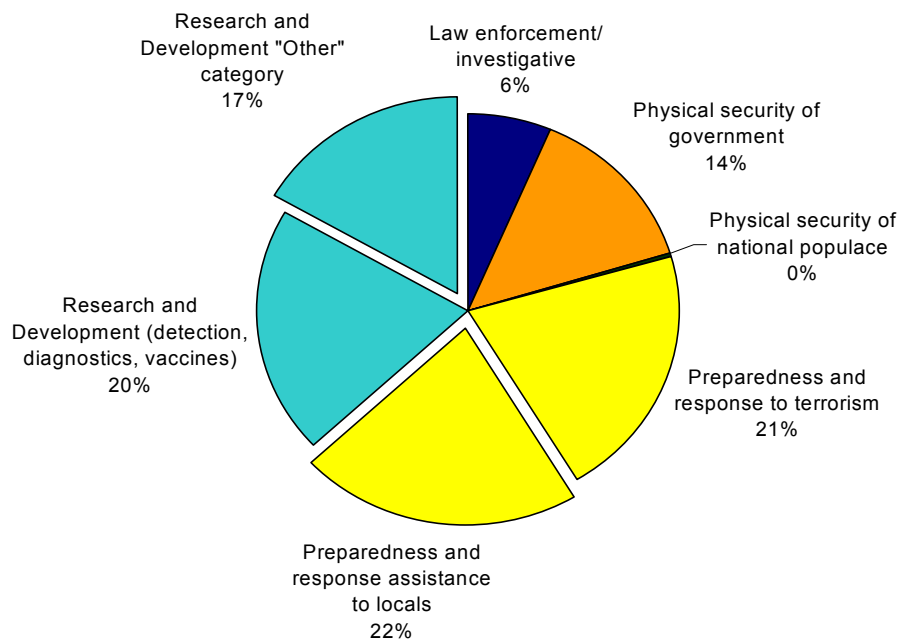
Source: Executive Office of the President, Office of Management and Budget, *Annual Report to Congress on Combating Terrorism*, Pursuant to Public Law 105-85, 18 May 2000.

²⁸ Executive Office of the President, Office of Management and Budget, *Annual Report to Congress on Combating Terrorism*, Pursuant to Public Law 105-85, 18 May 2000.

²⁹ Said one veteran rescuer of federal funds getting to the local level, particularly of the health care providers, "We're getting about a penny's worth out of every dollar." Interview with author: Fire/Rescue Instructor, former Director, Hospital Security (21 August 2000). Also on this point: General Manager, Emergency Department (22 September 2000); Physician/Director of Health, Public Health Department (20 September 2000); Director, Emergency Management Division, County Department of Public Safety (19 September 2000); Director, Office of Emergency Preparedness (19 September 2000); EMS Licensing Agent, State Department of Public Safety (27 January 2000); Physician, Hospital Department of Emergency Medicine (24 March 1999); Assistant Director, Office of Emergency Management (23 March 1999); Deputy Fire Chief (23 March 1999); Paramedic Operations Supervisor (9 March 1999); Physician/Associate Director, Hospital Department of Emergency Medicine (9 March 1999); Fire Captain, Hazmat Unit (9 February 1999); Battalion Fire Chief (9 February 1999); Emergency Preparedness Director, Office of Emergency Services (9 February 1999); Police Lieutenant (8 February 1999); Fire Lieutenant (5 February 1999); Director, Office of Emergency Services (4 February 1999); Paramedic/Emergency Planner, Public Health Department (4 February 1999); Registered Nurse/Hospital Disaster Coordinator (4 February 1999). A couple of interviewees believed the federal government had been quite generous: Police Lieutenant, Tactical Support Office (18 September 2000); Special Projects Program Manager, Department of Public Health (5 February 1999).

\$536.7 million in research and development funds related to weapons of mass destruction was parceled among six federal departments, and the largest single spending category at \$240.3 million or 44.8 percent of this portion of the budget was “other.”³⁰ The need for competitive research to improve equipment and medications is a given, so the simmering concern about this area of the budget is whether an effort with so many masters and research projects is coordinated and focused to produce the desired results in a cost-effective manner. A senior official, self-described as “about as plugged in as it gets,” could not even take a stab at making sense of all of these projects.³¹ Another federal official lamented that the government was “throwing money around in seven thousand different programs.”³² Moreover, figuring out whether spending levels are appropriate across government agencies is doubly difficult when just under one half of the spending is unnamed. While “other” can indicate a classified program or one that does not fit in one of the

Figure 7.1: US Budget in 2000 to Defend Against Unconventional Terrorism



³⁰ This point has also been made by John Parachini, particularly with regard to spending within the Department of Energy’s laboratories. See John Parachini, Center for Nonproliferation Studies, Monterey Institute for International Studies, testimony before the House Committee on Government Reform, Subcommittee on National Security, Veterans Affairs, and International Relations, 106th Cong., 2nd sess., 26 July 2000. Available at the Monterey Institute’s Center for Nonproliferation Studies website at: <http://www.cns.miis.edu/pubs/reports/paraterr.htm>.

³¹ Interview with author: Senior CDC Official (29 August 2000). The author whole-heartedly agreed with the interviewee’s self-description and heard other federal and local officials express similar sentiments on several occasions.

³² Interview with author: Area Emergency Manager, Department of Veterans Affairs (24 May 2000).

identified budget categories, it can also be Washington-speak for pet project, favored contractor, or hometown university. At this juncture, so many chemical and biological research centers have popped up on the map (e.g., the Developmental Center for Operational Medicine at Brooks Air Force Base, Texas, and the National Terrorism Preparedness Institute in St. Petersburg, Florida)³³ that taxpayers can rightfully question whether preparedness has taken a backseat to political favors.

Working clockwise around the budget pie in figure 7.1, funding for law enforcement and investigative efforts, including FBI, State Department, and Pentagon efforts, increased markedly from \$71.8 million in 1998 to \$93.8 million in 2000. The 2001 budget request for this area of the budget jumped to \$142.5 million. Given the difficulty of tracking terrorist activities and the importance of solid intelligence to thwarting terrorist plots, hiring more agents and augmenting specialized investigative assets, such as the FBI's Hazardous Materials Response Unit, was certainly in order. Before expanding the number of FBI field offices with hazmat evidence collection teams, however, a cost-benefit analysis of the existing teams' employment should be conducted. Anthrax hoaxes do not provide strong justification for training and equipping more field agents to operate in hazmat conditions, for they should be able to work collaboratively with local hazmat units to handle such situations.³⁴

The programmatic activities that were the principal focus of this report fall under the preparing for and responding to unconventional terrorism category, namely \$273 million for the federal government's own preparation activities and the aforementioned \$315 million in training, planning, and equipment programs aimed at the front line. Here, concerns again center on contracts awarded by the score to create dozens of training courses when less than a dozen would have been more than sufficient.³⁵ Moreover, at the very juncture when Washington ought to be bowing out of the training business, specialized training facilities continue to multiply. If one training camp can suffice for all of the bomb technicians nationwide, the same ought to be true for advanced unconventional terrorism responder training. Why, when the Justice Department has successfully transformed the live-agent facility at Ft. McClellan, Alabama, into just such an asset, is the National Guard building another training boot camp in West Virginia to the tune of \$60

³³ Brooks Air Force Base in Texas will house a new Developmental Center for Operational Medicine to coordinate research into chemical and biological detectors and protection gear. Cindy Tumieli, "Center At Brooks to Fight Disasters," *San Antonio Express-News*, 7 July 2000. For more information on the National Terrorism Preparedness Institute, see Amelia Davis, "SPJC Plays Top Training Role In Combating Terrorism," *St. Petersburg Times*, 15 June 1998.

³⁴ The frequency with which the recently created FBI field teams are employed should be studied before more are authorized. Unless the incidence of environmental crimes in US cities is high enough to support such field teams, the unconventional terrorist threats that cannot be ruled hoaxes with a conference call among federal experts might be more cost effectively handled with a larger Hazardous Materials Response Unit.

³⁵ By one count, the tally now stands at ninety. *Compendium of Weapons of Mass Destruction Courses Sponsored by the Federal Government* (Aberdeen, Maryland: Soldier and Biological Chemical Command, January 2000). The General Accounting Office has also decried the lack of coordination and redundancy in training programs. *Combating Terrorism: Need to Eliminate Duplicate Federal Weapons of Mass Destruction Training*, GAO/NSIAD-00-64 (Washington, DC: US General Accounting Office, March 2000).

million?³⁶ Were training to be institutionalized as recommended below, money could be saved by sunsetting the rest of the Justice Department's training consortium as well.

As for the profusion of federal chemical and biological response teams, one doubts whether Washington bothered to catalogue existing assets, which are described in chapter 4, before creating new ones. For instance, the Marine Corps inaugurated a 350-person chemical rescue team and the National Guard began creating specialized response teams despite the fact the Army had a long-standing group, the Technical Escort Unit, and the Air Force already had Prime BEEF units. On the civilian side, the Environmental Protection Agency also had a contamination clean-up team. As table 7.1 indicates, this pre-existing reservoir of manpower would appear to be deep enough to give local officials whatever assistance they might need with unconventional bomb disposal, chemical warfare agent identification, decontamination, and remediation duties. The federal government could also tap the Coast Guard Strike Force teams and Army Reserve chemical companies, active chemical companies, and explosive ordnance disposal units, as chapter 4 describes. Of course, these squads would have to be pulled from regular assignments, a contrast to the Marine Chemical/Biological Incident Response Force, which essentially trains and awaits disaster.³⁷ The costly price tag for this snappy Marine unit might be justifiable could they get to the scene within an hour or so after a chemical terrorist attack. However, as all of the locals recognize, *no* federal team, unless pre-deployed, will affect the outcome of rescue operations.

While the locals consider the Marine Corps unit superfluous, those who had seen it in action at least concluded that the Marines were quite competent. The same was not said of the National Guard's teams,

³⁶ At a total estimated cost of \$60 million, the National Guard hopes to build a vast weapons of mass destruction training center at Camp Dawson, West Virginia, including a miniature nine square block city for urban warfare training and an old abandoned tunnel for use in training front-line personnel in responding to subway attacks. Vicki Smith, "WVU, National Guard Sign Terrorism Training Pact," *Associated Press*, 10 August 2000; Brian Farkas, "Former Turnpike Tunnel Figures Prominently In National Defense," *Associated Press*, 23 June 2000. Note that the nation's cadre of explosive ordnance disposal technicians are trained at the Explosive Ordnance Disposal Training Department at Redstone Arsenal in Alabama. Lauding the COBRA course at Ft. McClellan, Police Lieutenant (8 July 2000); EMS Specialist/Paramedic (12 May 2000); Paramedic (12 May 2000); Fire Captain/Assistant Emergency Management Coordinator, Office of Emergency Management (5 January 2000).

³⁷ This unit's primary mission is responding to incidents at US Navy and State Department installations around the world, and the Marines concede the point that their utility is quite limited unless pre-deployed. Jonathan B. Tucker, "National Health and Medical Services Response to Incidents of Chemical and Biological Terrorism," *Journal of the American Medical Association* 278, no. 5 (6 August 1997): 365–6, 368. Despite this unit's name, it is highly unlikely that the Chemical/Biological Incident Response Force would have much utility after a biological attack, where doctors and nurses would be needed, not the agent identification, rescue, decontamination, and triage capabilities that are this unit's forte.

Table 7.1: Pre-existing Federal Response Assets*

Pre-existing Asset	Number of Assets
Army Technical Escort Unit	3 units
Air Force Prime BEEF	89 units
EPA Environmental Response Team	1 unit
Coast Guard National Strike Force	3 units
Army 52 nd Explosive Ordnance Disposal	40 companies
Army Active, Reserve, National Guard Chemical Companies	51 companies

*Chapter 4 contains a map with the location of these units.

a problem discussed in box 7.2. The overwhelming recommendation from the front lines—even from responders who are in the Guard—is that the Guard teams should be abolished. In fact, Washington should declare a moratorium on any new federal teams for unconventional terrorism response. Doing so would be the first step in eradicating mission creep, wherein federal agencies create new capabilities that duplicate existing ones. In the late 1990s, federal players augmented their capabilities at great cost to taxpayers because when they were not insinuating the terrorist threat was infinite, they were paradoxically describing it as a low probability.³⁸ With each agency that steps into unfamiliar and arguably invalid territory, the quality of federal crisis assistance to local personnel is compromised. More does not equal better. From the local perspective, it just means more federal command posts and more federal teams vying to make a useful contribution. One has to wonder why the Bureau of Alcohol, Tobacco, and Firearms deployed to the scene of a mock chemical terrorist attack during the Portsmouth, New Hampshire segment of the mid-May 2000 Topoff drill when the FBI and Pentagon already had plenty of bomb and chemical expertise on the scene. Similar questions should be asked of the proposal to train Urban Search and Rescue teams for hazmat operations when these teams could get to the scene no faster than the Marines or the National Guard.³⁹

³⁸ No agency, it seems, can resist the temptation of exploiting the terrorist threat “to call attention to their budgetary needs,” as the National Park Service did by pointing out “the vulnerability of the national monuments” just prior to the 4th of July holiday. John V. Parachini, Center for Nonproliferation Studies, Monterey Institute for International Studies, testimony before the House Committee on Government Reform, Subcommittee on National Security, Veterans Affairs, and International Relations, 106th Cong., 2nd sess., 26 July 2000. For the original story, Arthur Santana, “Monuments Are Found Vulnerable To Attack,” *Washington Post*, 2 July 2000.

³⁹ Urban Search and Rescue Teams have been of laudable assistance after earthquakes and other incidents (e.g., the bombing of the Murrah Building in Oklahoma City), but their deployment times bode against utility following a chemical terrorist attack and their rescue skills do not coincide with the type of aid needed after a bioterrorist attack.

Box 7.2: Axing a Costly Political Placebo

When elected officials eager to authorize a program to show they are “doing something” concrete about a problem collide with an organization in search of missions, something like the National Guard’s Rapid Assessment and Initial Detection (RAID) teams results. The RAID program was launched in 1998 with ten regional teams. Since the National Guard is an asset at the disposal of state governors, elected officials and the Guard happily expanded the number of teams to twenty-seven. Along the way, the mission of the teams, which the Guard re-christened Civil Support Teams, migrated in various directions. The RAID teams debuted as an asset to identify a hazardous threat and provide technical and tactical advice and assistance (e.g., plume projection, team and mass decontamination), then morphed to a vanguard that would guide the integration of other military units before finally settling in 1999 on an emphasis that portrayed them as a mobile communications center *nonpareil*. An entity trying to be all things to all consumers has a faint chance of doing any of those things well.

The teeth-to-tail ratio of the RAID teams and the inherent conflict that Guard faces in staffing them with qualified personnel further unmask the folly of the RAID concept. All but six of the 22-person team are administrative or command personnel. To their credit, some within the Guard recognize that pulling the Guard’s most qualified members (e.g., firefighters, emergency room nurses) for these teams would undercut an effective local response. Therefore, the teams consist of artillery, intelligence, and computer specialists whose only prior chemical or biological training was probably restricted to the annual drill in which Guard members must perform their regular duties in full Mission Oriented Protective Posture gear for a minimum of four hours.¹ In other words, these teams must be manufactured from scratch.

A complicating factor in that regard is that the National Guard has purchased multi-million dollar equipment suites for these teams, including such sophisticated items as gas chromatograph/mass spectrometers. Scientists who regularly work with these finicky laboratory instruments relate that considerable training and skill are required to maintain and operate them reliably. The price tag to stand up a RAID team is roughly \$3.5 million, and the annual maintenance costs will add up to a tidy sum considering the number of teams being created.² The combined 1999 and 2000 spending on the program totals \$135 million, followed by a 2001 budget request of nearly \$50 million.³ These figures gall first responders, and the program’s costs and meandering mission have also drawn fire from the General Accounting Office.⁴

The message from the front line about these National Guard teams is unified and clear: They have a minuscule, if not negative, utility. With grimaces or smirks, individuals described RAID team performances in joint drills and exercises. Two local rescuers recalled how one RAID team became so engrossed trying to figure out how to use its new equipment that their bored local counterparts had to remind the squad a couple of hours into the drill that the goal was to rescue victims quickly. The Guard members, who had no familiarity with local weather and commuter patterns, snapped to and started issuing orders to the flabbergasted locals about plume projections, perimeter setting, and evacuation.⁵ In the aforementioned Topoff exercise, the RAID team in the Denver insisted that it had identified the mystery biological agent with SMART tickets and the one in Portsmouth lacked the technical expertise to understand the minimal hazard posed by mustard on a chilly, forty-nine degree day.⁶ To veterans of hazmat operations and epidemiological investigations, the ludicrousness of these two anecdotes is readily apparent. Given three-year personnel turnover on these teams, it is unrealistic to expect them to attain the skill level necessary to accomplish the multiple missions that have been staked out for them. Taking all of this into account, one local official said: “The good thing about those teams is that it takes them as long as it does to get here.”⁷ *(continued, next page)*

Box 7.2: National Guard (continued)

Locally, the RAID program is alternately viewed as a training ground for defense contractors, a plumped budget for the National Guard, and a placebo for Congress and the state governors who are under the illusion that these teams will be a bona fide asset if an attack occurs. The idea of the RAID teams may have been politically convenient, but it was untenable from the outset. Governors and elected officials in Washington would serve preparedness much better by immediately disbanding the RAID teams.⁸ Their equipment should be disbursed within the respective states to front-line rescue units, where any left-over training monies from the program should be placed as well. Elected officials hesitant to cut a politically popular program should do a back-of-the-envelope cost-benefit analysis of paying these teams indefinitely to wait for the improbable versus reassigning this equipment and training funds to full-time, professional rescuers, thereby improving response to all manner of emergencies.

Even with the abolition of the RAID teams, the National Guard will always have an important role to play in responding to any and all disasters, whether natural or manmade. On countless occasions, the Guard has come through in its state and federalized capacity to provide public safety and humanitarian assistance. The traditional management skills and resources at the Guard's disposal (e.g., logistics, water purification equipment) will be sorely needed and prove invaluable to helping a stricken city recover from an unconventional terrorist attack.

NOTES

1. The RAID roster consists of one commander, one deputy commander, one operations officer, one recordkeeper, one training/administrative officer, three supply/logistics staffers, four medical staffers, two communications specialists, one on-scene commander, one on-scene operations officer, and six reconnaissance specialists, the latter being the team's workhorses. Interview with author: National Guard RAID Team Leader (20 April 1999). In the words of one National Guard member who advocated the Guard's participation in its traditional support and logistic roles, "They can't do this, they don't have this capability." Interview with Author: Hazmat Trainer/National Guard Member (19 April 1999).
2. The approximate cost for standing up a RAID team was derived by dividing the \$58 million dedicated in 2000 to launching the new teams by the number of new units.
3. US Department of Defense, Office of the Assistant Secretary of Defense, Public Affairs, "Department of Defense News Briefing," 13 January 2000. Internet: http://www.defenselink.mil/news/Jan2000/t01132000_t0113asd.html.
4. Observed one fire chief of the \$10 million that the National Guard spent on a study to ascertain what the guard's response role in a unconventional terrorist incident, "I could fix 90 percent of the problems in my city with that money. First responders are getting lost in the shuffle." Interview with author: Chief, County Fire Department (9 September 1999). Also, Hazmat Coordinator/Instructor (8 September 2000); Fire EMS Statistician (30 August 2000); former EMS Supervisor/Paramedic (12 July 2000); Firefighter/Hazmat Instructor/Paramedic (28 June 2000); Deputy Director, Office of Emergency Management (26 May 2000); Division Chief, State Disaster Medical Services Division (15 February 2000); Battalion Chief (19 January 2000); Detective/Bomb Squad Member (19 January 2000); Battalion Fire Chief (15 November 1999); Battalion Fire Chief/Emergency Services Administrator (15 November 1999); Project Manager, Emergency Management Planning (27 July 1999); EMS Supervisor (20 May 1999); Fire Commander (19 April 1999); Director of Hospital EMS and Disaster Medicine (19 April 1999); Hazmat Materials Specialist (19 April 1999); Police Lieutenant (23 March 1999); Lieutenant/Hazmat Commander (10 March 1999); Lieutenant/Hazmat Commander (10 March 1999); Emergency Planner, Office of Emergency Management (8 March 1999); Fire Captain, Hazmat Unit (9 February 1999); Battalion Fire Chief (9 February 1999); Emergency Preparedness Director, Office of Emergency Services (9 February 1999); Director, Office of Emergency Services (4 February 1999). As well, see General Accounting Office, *Combating Terrorism: Use of National Guard Response Teams Is Unclear*, GAO/NSIAD-99-110 (Washington, DC: US General Accounting Office, May 1999).
5. Interview with author: FBI Special Agent (31 May 2000); Senior Official, Department of Health and Human Services (6 May 2000); Chief, County Fire Department (9 September 1999). Similar remarks were in an interview with Deputy Director, Office of Emergency Management (26 May 2000).
6. Interviews with author: Hazmat Coordinator/Instructor (8 September 2000); Senior CDC Official (29 August 2000); former EMS Supervisor/Paramedic (12 July 2000).
7. Interview with author: Deputy Director, Office of Emergency Management (26 May 2000). *(continued, next page)*

Box 7.2: National Guard (continued)

8. Interviews with author: Hazmat Coordinator/Instructor (8 September 2000); Fire EMS Statistician (30 August 2000); Toxicologist/Poison Control Center Director (13 June 2000); Deputy Director, Office of Emergency Management (26 May 2000); Battalion Fire Chief/Special Operations Officer (25 May 2000); Director, Emergency Services Department (18 May 2000); Division Chief, State Department of Emergency Management (3 May 2000); Detective/Bomb Squad (19 January 2000); Battalion Fire Chief (19 January 2000); Chief, County Fire Department (9 September 1999); Project Manager, Emergency Management Planning (27 July 1999); Director of Hospital EMS and Disaster Medicine (19 April 1999); Fire Commander (19 April 1999); EMS Superintendent-in-Chief (24 March 1999); Police Lieutenant (23 March 1999); Assistant Director, Office of Emergency Management (23 March 1999); Paramedic Operations Supervisor (9 March 1999); Lieutenant/Hazmat Commander (10 March 1999); Fire Captain, Hazmat Unit (9 February 1999); Battalion Fire Chief (9 February 1999); Emergency Preparedness Director, Office of Emergency Services (9 February 1999); Fire Lieutenant (5 February 1999); Police Captain/Firing Range Director (5 February 1999); Registered Nurse/Hospital Disaster Coordinator (4 February 1999); Paramedic/Emergency Planner, Public Health Department (4 February 1999); Director, Office of Emergency Services (4 February 1999).

Inside the beltway, the response to such criticism may be that these enhancements really do not cost much—just a few million dollars here and there. Such a rejoinder truly belies the fact that national policy makers have lost perspective on the program's purposes. A million dollars may be pocket change in the Pentagon's budget, but it is serious money on the front lines that can make a real preparedness difference. Moreover, a few million poorly spent in several programs adds up to a tidy lump sum. To illustrate the point, 2,333 hospitals or fire stations could be outfitted with decontamination capabilities for the cost of standing up one National Guard Civil Support team. If the total 1999 budget for these National Guard teams had been used in such a fashion, 49,800 local rescue and health facilities could have been armed for decontamination.⁴⁰ With perseverance, Washington can clear the field of mission creepers. Only then will the federal organizational chart look less like a spaghetti maze and the federal response plan be feasible to execute.

Somewhat lost in the late 1990s rush to soup up federal teams for hot zone rescues was the one major federal support capability that would clearly be needed after an infectious disease outbreak and perhaps after a chemical incident as well—medical assistance. The National Disaster Medical System was one of several improvements made to federal disaster recovery capabilities over the last decade, a time during which the federal government demonstrated that it could bring appreciable humanitarian and logistic assets to bear after natural catastrophes and conventional terrorist bombings. While these events flexed the muscles of the Federal Emergency Management Agency-led recovery system, including the deployment of Disaster Medical Assistance Teams, they did not even approach the type of monumental challenge that a full-fledged infectious disease outbreak would present. Officials from the Health and Human Services Department and the Pentagon have stated that they could mobilize significant medical assets quickly, but considerable skepticism exists that these two departments combined could have met the medical aid requests made from Denver after the

⁴⁰ The cost of standing up a single National Guard RAID team is \$3.5 million, as noted in box 7.2. A rudimentary decontamination set-up runs from \$1,300 to \$1,500, as noted in chapter 5.

release of plague was simulated during the 2000 Topoff drill, much less a call for even more help.⁴¹

The only way to find out whether the federal government is truly up to the most important role it may have to perform after a bioterrorist attack or a natural disease outbreak is to hold a large-scale medical mobilization exercise. Despite the expense, Congress should mandate a realistic test of how much civilian and military medical assistance can be delivered, how fast. Unlike Topoff, where federal assets were pre-picked and pre-staged, the terms of the exercise should specify that teams deploy as notified. While the general nature and identity of the exercise location(s) would certainly be known beforehand and the timeframe of the drill agreed within a window of several months, local officials should trigger the onset of the exercise. In short, dispense with the tabletop games that allow everyone the comfort of claims of what they could do and see what a real exercise brings. A genuine and probably sobering measure of federal capabilities could be taken, and the lessons of the exercise could inform the structure of federal and local plans and programs.

For instance, such an exercise might unmask just how ill-suited the federal government's crisis and consequence management model is for dealing with a bioterrorist attack or any other major disease outbreak. In a public health crisis, the most pressing judgment warranted is that of public health officers. During the Topoff exercise, public health officials in Denver soon tired of having their requests questioned and reshaped by those in the local federal command posts who were untrained in epidemic control, so they began to circumvent FBI and Federal Emergency Management Agency representatives in Denver with direct calls back to cabinet members in Washington.⁴² Not only does the crisis and consequence management model directly contradict a time-tested approach that puts public health officials in charge of public health crises,⁴³ this upside-down power structure could well impede a federal response in a real emergency.

Another set of lessons likely to emerge from a full-scale exercise pertain to something that is already

⁴¹ As noted in chapter 5, public health officials asked for two thousand outside medical professionals to be brought in within a day. The exercise did not involve actual deployment of medical teams. When this exercise was curtailed, the hypothetical outbreak had not been contained. On the manpower and other problems encountered in lessons learned from this exercise, Thomas Inglesby, Rita Grossman, and Tara O'Toole, "A Plague on Your City: Observations from TOPOFF," *Biodefense Quarterly* 2, no. 2 (September 2000). Internet: <http://www.hopkins-biodefense.org/pages/news/quarter.html>. Downloaded 12 October 2000.

⁴² Interview with author: Senior Federal Public Health Official (28 August 2000). Several other officials also pointed out the inappropriateness of the crisis and consequence management model for these circumstances: former State Epidemiologist (18 August 2000); Commander, US Public Health Service (3 July 2000); Commander, US Public Health Service (28 June 2000); EMS Medical Director (13 November 1999); Project Manager, Emergency Management Planning, Office of Emergency Management (27 July 1999); Senior Government Official (13 April 1999); Emergency Preparedness Director, Office of Emergency Services (8 February 1999). Recounting multiple command posts and back-to-back conference calls with fifty to one hundred participants, Inglesby, Grossman, and O'Toole, "A Plague on Your City: Observations from TOPOFF."

⁴³ Terry P. O'Brien, "Legal Response to a Bioterrorist Event," paper presented at the National Disaster Medical System 2000 Conference, 1 May 2000, Las Vegas, Nevada, 60–1.

apparent in the Office of Management and Budget's figures. Preparedness funding at both the local and federal levels has focused disproportionately on the on-scene sirens and rescue components of unconventional terrorism response. In 1999 and 2000, as table 7.2 shows, an estimated \$148 and \$222 million, respectively, from the weapons of mass destruction budget line items were put toward hospital preparations, the public health infrastructure, and biomedical research *combined*. True, the first task after a chemical terrorist attack would be to keep victims alive at the scene, and hospitals see sick people by the score every day. No one, however, should assume that US hospitals can just throw a switch and handle a mass chemical casualty incident or a major outbreak of infectious disease. Nor should it be assumed, as chapter 6 explains, that the disease surveillance system as currently configured and funded can detect an outbreak quickly. A considerable increase of funds for hospital preparedness activities, improved disease surveillance, and the development of new antibiotics, vaccines, and antidotes is in order. Otherwise, the real preventable tragedy could occur in the hospitals. Should the federal government be unable to land a literal army of medical professionals and medications at the scene of an infectious disease outbreak within a couple of days, that almost certainly would be the case.

At the end of the day, front-line rescuers, health care providers, and emergency managers only ask that Washington take a coherent, pragmatic approach to unconventional terrorism preparedness, one that holds to a sensible division of labor and grounds a response in pre-existing local and federal capabilities that can be sustained cost-effectively regardless of whether a terrorist attack occurs. These heroes of everyday emergencies, many of whom have seen first-hand the misfortune of headline-making natural and manmade tragedies, are a candid lot. They know when pork is taking precedence over preparedness. So far, that is their assessment of the federal effort.

EXPANDING, SUSTAINING, AND INSTITUTIONALIZING PREPAREDNESS

A capability worth establishing in the first place should be a capability worth preserving. One of the frequently expressed front-line concerns was that the hard-won progress in the cities would gradually erode if steps were not taken to sustain preparedness. Another issue that front-line personnel often raised was that the federal programs were severely skewed toward on-scene chemical incident response. These concerns have not fully registered in Washington, for the federal government has left the what-next question hanging in the air and has also left much undone in the hospital and public health sectors. Policy makers clearly got the message, however, that cities outside of the chosen 120 were equally deserving of a helping hand with unconventional terrorism preparedness. Actually, the solution to expanding and sustaining preparedness is in some respects interrelated.

Table 7.2: Defense Against Weapons of Mass Destruction Funding Geared to Public Health, Hospitals, and Medical Research (in millions of dollars)

Program	1999	2000
Metropolitan Medical Response System*	3.3	3.3
Domestic Preparedness Program Training**	5.0	3.2
CDC Health Alert Network	28.0	50.0
CDC Surveillance, Epidemiology, Plans	42.8	40.0
R&D, Vaccines	35.7	82.6
R&D, Therapeutics/Treatments	16.0	20.9
Basic Research, Health and Human Services Department	17.2	21.8
Medical Investment Total	147.9	221.8

*These figures represent 20 percent of the Metropolitan Medical Response System budget. Twenty percent is intended to reflect the extent to which hospitals were involved in this program, a percentage chosen based on interviews conducted for this report. These teams are designed for on-scene rescue activities, but the planning activities are supposed to involve hospital personnel, and sporadically hospitals received equipment and drug supplies under this program.

**These figures represent 10 percent of the Domestic Preparedness Program budget. Ten percent is intended to reflect the extent to which hospitals were involved in this program, a percentage chosen based on interviews conducted for this report. In comparison to other response disciplines, relatively few health care providers have trained, and only occasionally did cities purchase decontamination gear for hospitals with equipment grant funds.

Sources: Executive Office of the President, Office of Management and Budget, *Annual Report to Congress on Combating Terrorism*, Pursuant to Public Law 105-85, 18 May 2000; "The Laboratory Response Network for Bioterrorism" presented at the National Bioterrorism Preparedness and Response Initiative Philadelphia Regional Meeting, 17 May 2000; Center for Civilian Biodefense Studies, "DHHS FY2000 Anti-terrorism Funding," *Biodefense Quarterly* 1, no. 4 (March 2000): 4.

To date, Washington has taken a haphazard approach to plugging the geographic holes in domestic preparedness aid. Various agencies have created specialized courses so that states can ship city personnel off to be trained, but local officials have begun to bark about who does and does not get to attend these training camps.⁴⁴ The Justice Department also endeavored to fill the geographic gaps by switching grants

⁴⁴ The Department of Justice offers hazmat technician and weapons of mass destruction incident command training through the Center for Domestic Preparedness at Ft. McClellan, Alabama. Additional training opportunities come via four other members of the National Domestic Preparedness Consortium. The Federal Emergency Management Agency also offers courses at its National Fire Academy and Emergency Management Institute in Emmitsburg, Maryland. For the medical community, courses on managing chemical and biological casualties are offered via satellite through the US Army Medical Research Institute of Infectious Diseases and the Medical Research Institute of Chemical Defense. More in-depth accounts of these training centers appear in chapter 4. For example, officials representing areas that had received no preparedness aid noted that all candidates that had been nominated from their states were declined, but cities that had been in the Pentagon training and MMRS programs had

awards to states instead to cities. City officials report that some of their state counterparts want to test pet ideas instead of replicating concepts that the cities have validated, while others have spent their initial Justice grants hiring contractors who turn out to be high-priced middlemen because their reports consist of ideas they cull from city officials.⁴⁵ Not only do these two programming efforts have the potential to exacerbate frictions between state and local officials, their long-term cost-effectiveness is questionable. Training is cheaper if it is available locally, and just switching the recipient of the grants to states would do little good if state agencies siphon off most of the funds instead of sending the monies to the cities.

The time-tested and commonsense alternative to specialized training camps and state planning grants is one that also underpins the all-hazards, echelons-of-response system that both states and cities know and advocate: institutionalization. If preparedness is truly to take hold nationwide on the front lines and be sustained in perpetuity, then it belongs in the local and state training academies, and well as in the nursing and medical schools. A few cities have already added a course at some or all of their responder academies, but a great many more indicated they had no plans to do so.⁴⁶ Yet, institutionalization is the cost-effective way to spread training geographically and build a tiered response capability.

Institutionalization would also bring with it an important feature that has been lacking to date in training programs, namely the regular testing of professional knowledge and skills. Moreover, this approach also involves refresher courses that update materials and skills. After graduating from respective professional schools, rescue personnel and health care providers are required to take a certain number of

trainees accepted. Interviews with author: EMS Licensing Agent, State Department of Public Safety (27 January 2000); EMS System Analyst/Paramedic, State Department of Health and Social Services (25 January 2000).

⁴⁵ Interviews with author: Fire Captain/Assistant Emergency Management Coordinator, Office of Emergency Management (5 January 2000); Assistant Director, Office of Emergency Management (23 March 1999). Pointing out the problems of some state emergency offices being reactive instead of pro-active, as well as of state-level philosophies wherein very small towns get funded equitably with larger cities, despite the inequity in the populations at risk in cities and towns: Fire EMS Statistician (30 August 2000); Physician, Division of Disease Control, Public Health Department (8 August 2000); Deputy Director, Office of Emergency Management (26 May 2000); Assistant Director, Office of Emergency Management (23 March 1999); Emergency Preparedness Director, Office of Emergency Services (9 February 1999). Giving credence to tales related by locals, one state official conceded that a small Justice Department grant had been “wasted” in this fashion. Interview with author: EMS System Analyst/Paramedic, State Department of Health and Social Services (25 January 2000).

⁴⁶ Those reporting local institutionalization of training for all public safety responders (e.g., fire, police, and EMS) in interviews with the author were: Physician/University Hospital Department of Emergency Medicine (20 September 2000); Physician, Hospital Division of Emergency Medicine (31 May 2000); Deputy Director, Office of Emergency Management (26 May 2000); Director, City Emergency Services Department (18 May 2000); Assistant Director, Office of Emergency Management (12 May 2000); MMRS Coordinator, Fire Department (9 May 2000); Division Chief, State Department of Emergency Management (13 April 1999); City Emergency Planner (8 March 1999); Police Captain/Firing Range Director (5 February 1999). Reporting institutionalization of training for all EMS personnel: Fire EMS Statistician (30 August 2000); Fire Captain, EMS Division (27 July 1999); Battalion Fire Chief (8 February 1999). On institutionalizing training for firefighters: Fire EMS Statistician (30 August 2000); Fire Commander (19 April 1999); Battalion Fire Chief (19 January 2000).

continuing education hours each year. First responders also take regular skills tests to remain certified.⁴⁷ For police patrolling beats, for instance, a skills test and equipment check could be incorporated into their routine re-certification at the firing range. Police refresher training might take the form of ten-minute videos played after roll call that review basic do's and don'ts or provide news of advances in tactics and equipment.⁴⁸ For their part, physicians and nurses could be required to bone up on infectious diseases, the latest in epidemiology, and chemical casualty care through continuing education, even making such refresher courses a condition of employment and promotion.⁴⁹

The prerequisite for institutionalization is standards, and all of the response disciplines—fire, police, EMS, hospital care providers—expressed an abundance of frustration over the absence of standards and protocols to guide them.⁵⁰ Standards command the attention of rescue and health care personnel because they are the backbone of accountability. Without them, field personnel are likely to treat preparedness like any number of other fads that have come and gone. Some standards of care and performance are set nationally and violations result in fines (e.g., Occupational Safety and Health Administration regulations). Others are established at the state level, flowing from the responsibility of governors to ensure public safety. In some disciplines, major professional organizations articulate standards, a role played most strongly by the National Fire Protection Association and to a lesser by the International Association of the Chiefs of Police. In the health care field, treatment protocols and standards of care evolve gradually through the publication of peer-

⁴⁷ The skills needed to respond to an unconventional terrorist attack—how to don personal protection gear, chemical casualty care procedures—would probably fit into the category of seldom-used skills, which are usually tested on an annual basis.

⁴⁸ If police are issued respirators, they require an annual fit test. Interviews with author: Police Lieutenant (23 March 1999); Police Captain/Firing Range Director (5 February 1999). Other law enforcement officers who thought this was a sound idea for police refresher training: Battalion Fire Chief (15 November 1999); Police Captain/Staff, Office of the Chief (9 March 1999); Police Lieutenant and Police Captain, Special Operations Division (8 February 1999). On incorporating EMT and paramedic preparedness into the seldom-used skills test: Paramedic Operations Supervisor (9 March 1999); Battalion Fire Chief (8 February 1999). Interviewees state, as noted in chapter 5, that the Domestic Preparedness Program has provided updated materials irregularly.

⁴⁹ Physicians in one set of health maintenance organizations must attend initial hazmat awareness training, as well as yearly refresher training. They are required to take an annual respirator fit test. These activities are mandatory and figure into physicians' yearly raise. Interview with author: Emergency Planner, Hospital Health Maintenance Organization (15 August 2000). Also on the importance of mandatory training for medical professionals: former State Epidemiologist (18 August 2000).

⁵⁰ "The woeful lack of standards for this situation is the biggest breach" in our response capability. Interview with author: Division Chief, State Department of Emergency Management (13 April 1999). Also on the problem of the lack of standards: District Fire Chief, EMS Division (2 March 2000); Division Chief, State Disaster Medical Services Division (15 February 2000); Registered Nurse/Chief, EMS Division, State Department of Public Health (3 February 2000); Battalion Fire Chief (19 January 2000); Chief, County Fire Department (9 September 1999); Fire Commander (19 April 1999); Physician/Associate Director, Hospital Department of Emergency Medicine (9 March 1999); Paramedic Operations Supervisor (9 March 1999); Fire Captain, Hazmat Unit (9 February 1999); Battalion Fire Chief (9 February 1999); Fire Lieutenant and Fire Captain (5 February 1999); Director, Office of Emergency Services (4 February 1999); Paramedic/Emergency Planner, Public Health Department (4 February 1999).

reviewed journal articles.⁵¹ Eventually, a body such as the Accreditation Council for Graduate Medical Education arbitrates whether a new protocol will be taught in US residency programs.⁵² Adding a subject to the curricula of medical and nursing schools takes at least six years. Once standards and protocols are agreed, state academies, universities, and colleges may incorporate them. The National Governors Association could play a key role in seeing that standards are adopted nationwide.

Unconventional terrorism preparedness is on the radar screens of several of the above-named organizations. For instance, in 1998, the National Fire Protection Association issued a tentative interim standard on chemical terror attacks for EMS personnel, as well as for hazmat responders.⁵³ Pre-hospital and hospital treatment protocols are being developed at a sluggish pace.⁵⁴ No overarching structure is in place, however, to move any of these organizations or the state governments forward smartly to create and incorporate standards. Given the advantages that institutionalization offers, Washington could best demonstrate its seriousness about nationwide preparedness by bringing together the pertinent organizations in each discipline to lay the groundwork for institutionalization, complete with time lines. The federal government's job is to be the catalyst and convener that prods the tangle of entities involved in institutionalization to articulate and promulgate standards. One success story has occurred in that regard, namely the 7 August 2000 announcement of a consortium to develop consensus-based standards and codes for the clothing and equipment that firefighters, police, and EMS rescuers would use in an unconventional

⁵¹ The *New England Journal of Medicine*, *Journal of the American Medical Association*, *Annals of Emergency Medicine*, and *Journal of Emerging Infectious Diseases* are among the premier professional journals, but dozens of others exist for more specialized areas of medicine.

⁵² Within the Accreditation Council for Graduate Medical Education (ACGME), twenty-six specialty review committees are free to suggest a change in their curricula at any time, but otherwise conduct reviews every five years. When a change is suggested, one of the review committees examines the suggestion and formulates a proposal for outside reviewers. The ACGME can vote on a final draft proposal at one of its tri-yearly sessions. Once this review process is initiated, approval of a curriculum change can take one to two years. Explanation of ACGME provided in a telephone interview with Rose Cross, ACGME staff (31 August 2000). The equivalent organizations for nurses are the National League for Nursing Accrediting Commission and the Commission on Collegiate Nursing Education.

⁵³ This tentative interim amendment to the National Fire Protection Association (NFPA) standard on EMS response to hazmat incidents outlines potential terrorist targets, signs that a chemical attack might have occurred, and appropriate personnel responses. *Standard for Competencies for EMS Personnel Responding to Hazardous Materials Incidents*, NFPA 473 (Quincy, Mass.: National Fire Protection Association, 1998). The pertinent documents for hazmat responders are *Recommended Practice for Responding to Hazardous Materials Incidents* and *Standards for Professional Competence of Responders to Hazardous Materials Incidents*, NFPA 471 and 472, respectively. Hazmat personnel recommended that terrorism response be taught as the fourth-level certification for hazmat technicians. Interviews with the author: Firefighter/Hazmat Instructor/Paramedic (28 June 2000); Fire Captain, Hazmat Unit (9 February 1999). In the law enforcement arena, the International Association of Chiefs of Police issues model policies that local departments may adjust to fit the particulars of their own jurisdiction. The organization has not issued a model policy specific to terrorism or weapons of mass destruction, although several of its seventy-nine models—including bomb threats and searches—could have application to terrorist attack responses. In 1997, the International Association of Chiefs of Police issued three training keys that provide general information on weapons of mass destruction threats and incident responses.

⁵⁴ As noted in chapter 6, the Department of Health and Human Services has sponsored an expert review panel, and a few biowarfare treatment protocols have been published.

terrorist event.⁵⁵

Five years after the domestic preparedness effort, the time has come for Washington to get out of the training business and turn it over to the appropriate organizations that will take preparedness forward more systematically and cost effectively. The hand-off should be concentrated in these organizations and curtailed elsewhere, so that various branches of the federal government, not to mention enterprising universities and contractors, stop churning out training programs at taxpayers' expense. Without such reform, ineffective spending will continue at both the federal and local levels and training lacking in standards will be implemented unevenly, in pockets. Specification of standards and institutionalization of training clearly make more sense than that.

SOLIDIFYING AND SUSTAINING PREPARATION: CHARTING A FORWARD COURSE FOR COST-SHARING

The domestic preparedness program was structured as a cost-sharing arrangement, such that the federal government provided training and equipment while city governments paid local labor costs. As chapter 5 explains, response agency chiefs, city council members, hospital administrators and CEOs, and mayors all too rarely showed appreciation for the consequences that a chemical or biological terrorist attack would have for their city's first responders and health care providers, so it was often an uphill battle to get authorization for the overtime labor costs needed for training and the other expenditures that came along with the program (e.g., equipment maintenance). While local officials are obligated to allocate resources to deal with emergencies that occur in their jurisdiction with relative frequency, one city emergency manager quipped that preparation for an unconventional terrorist attack rated "somewhere below the likelihood of a tsunami and a step above an alien invasion."⁵⁶

⁵⁵ This consortium will be governed by a memorandum of understanding between the association, the Occupational Safety and Health Administration, the National Institutes of Standards and Technology and of Occupational Safety and Health, the Departments of Labor, Commerce, and Health and Human Services, and the Office of Law Enforcement Standards. "NFPA Partners With Life Safety and Government Groups to Address Safety Issues for Emergency Responders." Internet: http://www.nfpa.org/Central/For_the_media/Latest_News_Releases/NFPA_partners_address_safety/nfpa_partners_address_safety.html. Downloaded 12 August 2000. This collaborative effort is the outgrowth of the InterAgency Board for Equipment Standardization and InterOperability, which teams federal civilian and military personnel with local responders and relevant nongovernmental organizations. This committee addresses communication, detection, decontamination, medical, operations, and personal protective equipment. The board published its first recommended equipment list in April 2000. InterAgency Board for Equipment Standardization and InterOperability, *1999 Annual Report* (Washington, DC: Department of the Army, n.d.). The board expected to release a buyers' guide of personal protective equipment early in October 2000, identifying what standards listed items meet and whether those that do not meet standards have been tested. Interview with author: Steven Foley, National Fire Protection Association staffer and co-chairman of the InterAgency Board (31 August 2000).

⁵⁶ Interviews with author: Director, Office of Emergency Services (4 February 1999). Similar remarks were made by: Hazmat Coordinator/Instructor (8 September 2000); District Fire Chief, EMS Division (2 March 2000); Captain/Assistant Emergency Management Coordinator (5 January 2000); Assistant Director, Office of Emergency Management (23 March 1999); Lieutenant/Hazmat Commander (10 March 1999); Physician/Associate Director, Hospital Department of Emergency Medicine (9 March 1999); City Emergency Planner (8 March 1999); Emergency Preparedness Director, Office of Emergency Services (9

Locally, preparedness advocates employed several tactics, described in chapter 5, to solicit fiscal support for the effort. Much to the astonishment and chagrin of local preparedness stalwarts, Washington gave them little help in that regard. For instance, the federal government did not stipulate any “sticks” (i.e., a requirement to put the training into effect citywide) that could be used to goad local officials into action. After federal trainers blew through town, no one returned to inquire about their progress or see if they could pass even the simplest of preparedness tests, such as producing specialized call-down lists or drilling a response to an anthrax threat letter. In other words, there was no built-in accountability for the federal investment.⁵⁷ When combined with the above-noted reluctance to authorize initial funds, the lack of accountability for current and future preparedness bodes poorly for expectations that local officials will continue to approve training time and funds to maintain and update equipment. Their reticence will only grow as time passes without a major chemical or biological terrorist incident in their city.⁵⁸

One of the mantras of front-line response is a capability parked in the warehouse is unreliable in an actual emergency. Put another way, a capability atrophies when personnel do not use skills frequently, equipment is not maintained and replaced, and seldom-used plans and procedures are not exercised. An emergency manager in one city reported that staff rotations and retirements have already left that city without personnel certified to use some of the equipment purchased with federal grants, and firefighters in another stated that their department’s personnel policies showed absolutely no recognition of the need to keep specially trained units fully staffed, around the clock.⁵⁹ Preparedness, it would seem, has already begun to degrade in some cities.

February 1999); Fire Lieutenant (5 February 1999); Paramedic/Emergency Planner, Public Health Department (4 February 1999); Registered Nurse/Hospital Disaster Coordinator (4 February 1999). Note that equipment maintenance costs for a city of 500,000 have been estimated at between \$4.6 and \$43 million for basic and high capability items, respectively, over a ten-year period. General Accounting Office, *Combating Terrorism: Analysis of Potential Emergency Response Equipment and Sustainment Costs*, GAO/NSIAD-99-151 (Washington, DC: US General Accounting Office, June 1999), 2.

⁵⁷ Interviews with author: Hazmat Coordinator/Instructor (8 September 2000); Project Manager, Emergency Management Planning (27 July 1999); Battalion Fire Chief (8 February 1999); Fire Lieutenant and Fire Captain (5 February 1999). The federal equipment grants do stipulate some conditions with regard to equipment maintenance and availability. See chapter 5.

⁵⁸ Unless a city is situated in a disaster-prone area—an earthquake fault, a flood plain, tornado or hurricane alley—administrators and elected officials generally have a mindset that catastrophes happen somewhere else. Interviews with author: Director, Emergency Management Division, County Department of Public Safety (19 September 2000); Hazmat Specialist (9 February 1999); Emergency Preparedness Director, Office of Emergency Services (8–9 February 1999); Director, Office of Emergency Services (4 February 1999).

⁵⁹ Interview with author: Emergency Preparedness Director, Office of Emergency Services (8–9 February 1999). According to two firefighters involved in their city’s MMRS program, sufficient personnel had not been trained so that fully qualified rescuers could be rotated into MMRS units when primary personnel were out on sick leave or vacation. Instead, ordinary firefighters, sometimes even rookies, were rotated into these units, which arguably would put the entire squad under duress if an actual event occurred. Interview with author: Fire Lieutenant and Fire Captain (5 February 1999).

Part of the solution to sustainment of local preparedness lies in institutionalization of the training, as discussed previously. The other part concerns how bills are to be paid for capital improvements (e.g., regional communication networks connecting public health, hospitals, and public safety organizations), equipment replacement and maintenance, and exercises, all of which are expensive. The domestic preparedness effort was conceived as a one-shot deal as opposed to an ongoing program, so an impasse looms in the near-term future. City officials would certainly prefer for the federal government to pick up the sustainment tab, and many in Washington would just as soon like to pronounce the 120 cities, perhaps even the entire country, “prepared” to avoid having to sustain an ongoing federal program.

If anything, chapters 5 and 6 should shatter any impressions that the 120 cities can be checked off the list as prepared and hopefully help bring both national and local leaders to recognize the immediate need to chart a forward fiscal course to solidify the preparedness gains that have been made, fill in the remaining gaps in local capabilities (e.g., increasing hospital planning and response capacities, sparking awareness in 911 call centers and the police ranks), and sustain preparedness over the long term. Unless a long-term cost-sharing arrangement is created, both the local and federal investments to date could well evaporate.

In all fairness, local governments should pick up part of the bill because, as the saying goes, all emergencies are local. Moreover, the cities have already received a significant amount of federal aid that has helped to enhance local response for emergencies of all types. For its part, Washington should pick up a share of the sustainment tab because an unconventional terrorist attack would have a debilitating effect not just on the stricken city, but the entire nation.⁶⁰ Washington has a vested interest in making sure that the front-line remains as prepared as possible, lest the whole nation be paralyzed by a single local event or the copycat incidents that could follow.

The subject of add-on fees and taxes is universally unpopular, but the fact of the matter is that many programs and capabilities that serve public safety and health are funded this way. A cost-sharing arrangement between federal and local partners could be built from any number of platforms, including the following concepts:

- * *Ongoing federal domestic preparedness funding.* Congress should establish ongoing appropriations for domestic preparedness, administered by the Federal Emergency Management Agency for general disaster planning and drilling activities and by the Office of Emergency Preparedness, Health and

⁶⁰ Note that a wave of fear swept Japan after Aum Shinrikyo’s 1995 attack. The psychological and economic dimensions of an unconventional terrorist attack are not to be trivialized. One study estimated an anthrax attack without any post-attack prophylaxis could cost over \$26 billion for every 100,000 people exposed, including the hospital charges and societal costs of tens of thousands of deaths. Arnold Kaufmann, Martin Meltzer, and George Schmid, “The Economic Impact of a Bioterrorist Attack: Are Prevention and Postattack Intervention Programs Justifiable?” *Emerging Infectious Diseases* 3, no. 2 (April/June 1997): 83–94.

Human Services for similar activities and capital improvements at hospitals.⁶¹ This concept somewhat resembles the community rating system under the National Flood Insurance Program, wherein cities receive fiscal benefits for taking steps to reduce flood risks.⁶² Cities would have to meet a certain number of criteria to qualify for federal aid. Since no two cities are alike, a menu of qualification criteria should be created. For example, one category could consist of training and exercising activities, such as completion of a certain number of joint drills between bomb and hazmat squads or notice of a city's availability for surprise drills administered by federal personnel who show up to grade the performance of whoever is on shift at the time. The latter option not only motivates cities to train and be ready, it enables Washington to ascertain progress, status, and problem areas that inform adjustments in federal programs. A second category might consist of planning activities (e.g., milestones achieved by community-wide hospital planning committees, completion of contingency plans for high-risk sites, emergency operations center unconventional terrorism drills, modification of mutual aid agreement to address specialized issues in unconventional terrorism response) and a third of equipment use and maintenance tasks (e.g., documented use of equipment in an unconventional terrorism drill or in other, real-life circumstances). The key to this concept is not to make it a simple handout: objectives must be identified and measures of progress set and evaluated so that Washington gets proof that its investment is paying preparedness dividends.⁶³

- * *State and local disaster preparedness trust funds.* From one area to another, various mechanisms are used to fund emergency response planning and capabilities. In 1993, after Hurricane Andrew flattened much of the state, the Florida legislature passed a bill that should stand as the model for disaster preparedness funding throughout the country. Florida legislators considered various tax formulas (e.g., an increased gasoline tax, a surcharge on eighteen-wheel transports, an assessment on mobile homes) before settling on an annual \$2 surcharge on every homeowner's insurance policy and an annual \$4 surcharge on every commercial property insurance policy. The bulk of these revenues reverts to county agencies and programs for local disaster planning and capabilities, including training. Within a couple of years, these revenues enabled local and state emergency

⁶¹ Note that this recommendation takes the Justice Department out of the role of chief grant maker for domestic preparedness and reassigns this responsibility to the federal entities that have traditionally worked with local communities on disaster preparedness.

⁶² The 1994 National Flood Insurance Reform Act formalized the community rating system to reduce flood losses and achieve other goals. Among other activities, communities can have their flood insurance premiums discounted by creating a comprehensive flood plain management plan, maintaining drainage systems, relocating or retrofitting floodprone structures, and creating flood warning, levee safety, and dam safety programs. Public Law 103-325, enacted 23 September 1994.

⁶³ Interviews with author: Battalion Fire Chief (17 November 1999); Emergency Preparedness Director, Office of Emergency Services (9 February 1999); Fire Lieutenant and Fire Captain (5 February 1999).

agencies in Florida to make considerable strides in many areas of disaster preparedness.⁶⁴ Florida was not the first government to mandate local investment in disaster preparedness. In 1980, Canada developed the Joint Emergency Preparedness Program, which splits the costs of emergency preparedness projects between local municipalities and the federal government. The local contribution can be made through funds or resources in kind, either in the development or long-term maintenance stage of a project.⁶⁵ Still another approach for raising local disaster preparedness revenues can be found in the taxes used to fund hazmat crews. Some hazmat teams are funded with local taxes, others with a statewide tax, and still others with a user fee on companies that produce, consume, process, store, or transport hazardous materials. An add-on to the tax or fee system already in place could be funneled into overall disaster preparedness, providing funds for local exercises, planning activities, and capital improvements.⁶⁶

- * *Local user fees.* A surcharge could be added for regular and emergency hospital admissions, as well as clinic and outpatient visits, with the funds allocated to upgrade decontamination and isolation capabilities, support hospital and citywide disaster planning, and conduct preparedness drills.⁶⁷ Since disaster preparedness is a public good, a surcharge could also be considered for various other public activities, such as tickets to sporting events, concerts, and amusement parks or add-on charges to local toll roads.

⁶⁴ A maximum of 60 percent of the Emergency Management, Preparedness, and Assistance Trust Fund monies go to state and local emergency management programs, of which 80 percent goes to county agencies and programs. These funds can be used for training. The remainder of the revenue is split between state aid in disasters that are not declared under the Stafford Act for federal assistance and grants to state and local entities for projects that further disaster preparedness objectives, with a 5 percent ceiling on administrative costs. Note that the insurance industry opposed the legislation, as did many legislators from 1990 to 1992. See Senate Bill 1853, Chapter 93–128, Laws of Florida. For more detail, see also Elliott Mittler, “A Case Study of Florida’s Emergency Management Since Hurricane Andrew,” Natural Hazards Research Working Paper no. 98 (Boulder, Colo.: Institute of Behavioral Science, University of Colorado, 8 October 1997).

⁶⁵ The local municipalities are represented in this arrangement by their provincial/territorial governments. Interview with author: David Neville, Chief, Financial Assistance Programs, Emergency Preparedness Canada (11 September 2000). For further information, see the Joint Emergency Preparedness Program Fact Sheet (August 1997) at http://www.epc-pcc.gc.ca/publicinfo/fact_sheets/joint_emer_x.html.

⁶⁶ The user-fee approach often includes a tax per hazmat chemical that companies declare, as well as charges for individual response calls and replacement of any damaged equipment. One city used funds from its user fee to purchase a mobile decontamination truck. Interviews with author: Firefighter/Hazmat Instructor/Paramedic (28 June 2000); Deputy Director, Office of Emergency Management (26 May 2000); Deputy Fire Chief (23 March 1999).

⁶⁷ The surcharge per night in the hospital or clinic visit might be something on the order of \$2. Local citizens would contribute, as would the federal government via payments for Medicare patients. Interviews with author: Physician, Hospital Division of Emergency Medicine (31 May 2000); Associate Hospital Administrator/Registered Nurse (13 November 1999); Chief, County Fire Department (9 September 1999).

Some would say that no time is the right time to discuss a new federal program or local tax. Elected officials and the public need to consider carefully, however, just how much blood can be squeezed from a turnip that has in some respects been watered sparingly for a while.

That resources are stretched painfully thin within the emergency response community is not exactly a secret. The most crucial shortages are in the hospital sector, where hospital CEOs consider disaster planning a staff frill, as discussed below, and hospitals are reduced to emergency drills with “foamies”—foam cutouts of people—not actual mock casualties.⁶⁸ Similarly, an EMS chief laments that the mass casualty drills that they conduct nowadays are unrealistic because overtime pay is scarce and he cannot pull enough ambulance crews out of active service for full-scale exercises.⁶⁹ Only a nationally televised high-wire rescue in 1999 won Atlanta’s firefighters replacements for the faulty respirators they had been using since 1993.⁷⁰ State public health laboratories, thanks to the domestic preparedness programming, are receiving their first infusion of funds in decades, but the lion’s share of public health laboratories remained untouched by this program. Conceptually, this matter is similar to the need for Delta Force snipers to get sufficient target practice and Navy pilots to execute a certain number of aircraft carrier landings to reach and maintain the proficiency required to do their jobs reliably under life-and-death circumstances.

Elected officials and citizens must help the public health and safety sectors prepare to handle the spiraling demands of modern emergencies (e.g., mass transport crashes, school shootings, terrorist attacks) or not blame the rescuers when response falls short of expectations. The time has come, in other words, for both local and national politicians to grit their teeth and discuss these or other proposals to fund disaster preparedness over the long term. Considerable leadership at the local, state, and national levels will be required, but implementing a cost-sharing arrangement to that effect would serve the entire country well in large-scale industrial accidents, natural outbreaks of infectious disease, weather disasters, influenza seasons, and, yes, unconventional terrorist attacks.

ADDRESSING DEFICIENCIES IN THE PREPAREDNESS OF HEALTH CARE FACILITIES

The advent of managed care has caused significant upheaval in the provision of medical care nationwide. Elected officials and health care providers have yet to grasp the ramifications of this change on

⁶⁸ Interviews with author: former State Epidemiologist (18 August 2000); Associate Hospital Administrator/Registered Nurse (13 November 1999); Physician/Director of Hospital Disaster EMS (27 July 1999); Registered Nurse/Hospital Disaster Coordinator (4 February 1999).

⁶⁹ Interview with author: EMS Superintendent-in-Chief (24 March 1999).

⁷⁰ The mayor also promised to replace fire trucks/engines every ten years instead of fifteen, and the City Council changed the city charter to give each firefighter a \$2,000 bonus. Lyda Longa, “A Big Thanks to Atlanta’s New Heroes,” *Atlanta Journal and Constitution*, 14 April 1999.

the ability of hospitals to furnish services after any type of disaster, much less after a large-scale chemical or biological event. Funding cutbacks have forced public hospital administrators to pinch pennies to continue basic services, and cost-conscious private hospital managers have too often shrugged off suggestions to enhance their unconventional terrorism preparedness. Compliance with the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requirement to draft and drill mass casualty plans, they posit, is sufficient for such an improbable event. According to front-line professionals, however, inadequate hospital planning and training on chemical and biological casualty care is a major problem. Moreover, hospitals have glaring capacity deficiencies when it comes to decontamination of casualties and the availability of isolation and intensive care unit (ICU) beds.

Most US cities have a standing inter-hospital committee to address community-wide health care issues.⁷¹ As hospitals labor under shrinking resources to provide health care to an expanding population, the increased demands on staff time have turned such planning activities into a luxury of a bygone era. If personnel time cannot be billed to a procedure that an insurer or the federal government will reimburse, then the activity in question essentially comes out of pocket. Volunteered time and resources go first and foremost to treating the uninsured ill, with little time left over for anything else. Also contributing to the erosion of communications is the fact that hospitals are now business competitors.

The road to the ability of any community's health care system to cope successfully with a massive influx of infectious disease or chemical casualties must run first through the portal of joint planning among metropolitan hospitals.⁷² Steps to revive community-wide hospital planning activities are therefore of vital importance, which means a way must be found to pay for the staff time required. In the interim, local health care personnel and emergency planners might employ some of the interpersonal strategies described in chapter 5 to increase the participation of community hospitals in disaster preparedness activities. These methods were used in some cities to considerable success.

A truly small number of US hospitals have a decontamination capacity worthy of the name. Embarrassingly high and persistent statistics document the closure of hospitals from one or two contaminated patients, so it stands to reason that the health care sector is grossly unprepared for a throng of chemical

⁷¹ Sometimes, these committees are free-standing. In other instances, they might be a subcommittee of another disaster planning group, such as a hospital subcommittee of the Local Emergency Planning Commission.

⁷² The agenda for these joint planning committees is lengthy, beginning with a survey to identify contemporary community hospital capacities (e.g., number of available ICU beds) and moving on to such issues as special security demands of mass casualty events, staffing problems, and redesign of patient reception and triage concepts. Overlapping relationships with supply distributors need to be identified so that all hospitals are not relying on the same suppliers' pledge to come through in an emergency. Concepts of designated recipient hospitals and patient transfer under these contingencies need to be discussed and agreed upon. Last, but certainly not least, logistical arrangements need to be planned for distribution of regional and national drug caches. Interviews with author: Physician/Director of Hospital Disaster EMS (15 August 2000); former State Epidemiologist (18 August 2000).

casualties. An interim fix, described in chapter 6, has cities and outlying towns designating fire companies to perform decontamination chores at hospitals during emergencies. Whether chemical terrorism ever reaches America's shores, the number of ordinary hazmat incidents that result in hospital closures demands a more permanent solution.

Standards that govern hospitals can be enacted by cities, states, and national entities. Hospitals interpret the present, loosely worded and enforced JCAHO standard as a requirement to have a one-patient decontamination capability.⁷³ A hospital committee in one city passed an ordinance requiring all hospitals to create an outdoor decontamination capability in 1999, only to have it rejected at the state level.⁷⁴ This situation may explain why medical professionals were convinced that JCAHO needed to be compelled—by congressional fiat if necessary—to stiffen and enforce decontamination standards in the next revision of its standards, effective in 2002.⁷⁵ While JCAHO is at it, hospitals should also be required to have plans for handling large numbers of biological casualties.⁷⁶

The other major capacity deficiency in the health care system involves the shortage of ICU beds and isolation rooms where infectious disease patients can be housed. Tales abound of community hospital capacity being overwhelmed in recent years by even a mild influenza season: The health care system is

⁷³ Chapter 6 provides more detail on this problem, as well as Occupational Safety and Health Administration standard 1910.120(q)(6) and JCAHO standard EC.1.6.

⁷⁴ The guideline asked for the bare minimum, that all hospitals have an external capacity to decontaminate patients in proximity to the hospital. The committee was operating under the auspices of the regional EMS system, and the hospitals subsequently sued in court because the regional EMS system did not have the appropriate jurisdiction to pass such a rule. Interviews with author: Physician/Director, Hospital Disaster Emergency Medical Services (27 July 1999); Project Manager, Emergency Management Planning, Office of Emergency Management (27 July 1999).

⁷⁵ Interviews with author: Medical Toxicologist/Poison Control Center Director (13 June 2000); Physician, Hospital Division of Emergency Medicine (31 May 2000); Director, City Emergency Services Department (18 May 2000); Registered Nurse/Emergency Planner, Public Health Department (7 April 2000); Registered Nurse/Chief, EMS Division, State Department of Public Health (3 February 2000); Deputy Coordinator, Fire Emergency Preparedness and Disaster Services (3 February 2000); EMT-Paramedic Licensing Agent, State Department of Public Safety (27 January 2000); Physician/EMS Medical Director (13 November 1999); Registered Nurse/Hospital Disaster Coordinator (4 February 1999). Expressing concern that JCAHO inspectors do not have sufficient knowledge to assess a decontamination capability properly, if a demonstration were required: Firefighter/Rescue Instructor, former Director, Hospital Security (21 August 2000). JCAHO strengthened its disaster planning standards in 2000, but the changes did not impinge directly on decontamination capabilities. Among the 2000 revisions were specific recording requirements for semi-annual hospital disaster drills, including the type of disaster exercised, the effectiveness of staff response, and areas for improvement. In January 2001, JCAHO will require hospitals to conduct vulnerability analyses and include security and media arrangements in disaster plans. See JCAHO, *Comprehensive Accreditation Manual for Ambulatory Care*, Environment of Care Chapter, Standards EC.2.9 and EC.1.6.

⁷⁶ John G. Bartlett, "Applying Lessons Learned from Anthrax Case History to Other Scenarios," *Emerging Infectious Diseases* 5, no. 4 (July/August 1999): 563.

constantly described as having “no give.”⁷⁷ Some have noted that more beds can be squeezed into ICUs. Another quick-fix option is for entire wards or hospitals to be designated to convert into infectious disease patient care centers during an outbreak, while others would be identified to be trauma centers and to care for the moderately ill and surgical patients. This type of approach would require community-wide agreement among health care providers, which may be difficult to reach given the privatization of health care facilities and the moribund state of most inter-hospital planning committees. Over the long term, the cost-effective answer to handling a huge swell in the number of communicable disease patients lies in robust regional planning. Taking advantage of all opportunities to compartmentalize hospital ventilation systems is also advisable, such that additional hospital areas could be turned into isolation wards, as needs arose.⁷⁸

Given the circumstances, as a rule any new hospitals under construction or those undergoing major renovation should be required to include decontamination showers and compartmentalized ventilation systems. The costs for building decontamination and isolation capabilities at older hospitals are neither insurmountable nor insignificant.⁷⁹ The idea is not for hospitals to construct fancy indoor decontamination facilities, but rather to set up an outdoor decontamination capacity with regular drills.⁸⁰ Were JCAHO to make an example out of a few hospitals by putting them on probation or closing them down for violation of the decontamination standard, some health care providers might move forward with improvements. Standards will have to change to prompt real progress, but some within the health care community warn that an unfunded mandate via JCAHO to upgrade decontamination capability could backfire. For-profit and public hospitals will not take money out of other patient care budgets for these tasks, and some in the health

⁷⁷ Beds are in such short supply that a modest influenza season routinely sends many hospitals into code blue status, unable to receive even emergency patients. Interviews with author: Fire EMS Statistician (30 August 2000); former State Epidemiologist (18 August 2000); Emergency Planner, Hospital Health Maintenance Organization (15 August 2000); Physician, Division of Disease Control, Public Health Department (8 August 2000); Medical Toxicologist/Poison Control Center Director (13 June 2000); Physician, Hospital Division of Emergency Medicine (31 May 2000); Paramedic (12 May 2000); Registered Nurse/Chief, EMS Division, State Department of Public Health (3 February 2000); Physician/EMS Medical Director (13 November 1999); Project Manager, Emergency Management Planning, Office of Emergency Management (27 July 1999); Physician, Hospital Department of Emergency Medicine (24 March 1999); EMS Superintendent-in-Chief (24 March 1999).

⁷⁸ At a minimum, in addition to the intensive care units, emergency departments should have isolation capability. Interviews with author: Medical Toxicologist/Poison Control Center Director (13 June 2000); EMS Medical Director (13 November 1999); Project Manager, Emergency Management Planning, Office of Emergency Management (27 July 1999); Physician, Hospital Department of Emergency Medicine (24 March 1999); Registered Nurse/Hospital Disaster Coordinator (4 February 1999); Paramedic/Emergency Planner, Public Health Department (4 February 1999).

⁷⁹ For example, the decontamination capability at Parkland Hospital in Dallas, described in chapter 5, cost \$26,000, most of which went to construction of drainage. Interview with author: Hospital Emergency Department Physician (22 January 2000). One hospital emergency director estimated the annual cost to maintain to equip, fit, train, and certify a minimum of two people to function in self-contained breathing apparatus respirators and level B protective garb at \$30,000. Interview with author: Director of Hospital EMS and Disaster Medicine (19 April 1999).

⁸⁰ Note that outdoor decontamination may be impracticable in colder areas of the country, but even in such areas, a well-drilled team should be able work with heated water and other temperature precautions to get patients through a decontamination process and indoors quickly. The appointed decontamination squad on all shifts might be required to drill once annually.

care community thought hospitals might close their emergency departments rather than make the requisite improvements. According to this logic, stiffer standards cannot come without some reimbursement funds.⁸¹ The funding options for community-wide disaster preparedness were discussed earlier.

Prominent among the reasons that hospital administrators and elected officials will find to object to these funding suggestions is the fact that many hospitals are now private businesses. Before public funding of hospital improvements is dismissed as a political non-starter, everyone should reflect first on the many ways that public funds are routinely used to support private interests. For example, municipalities impose taxes to build sporting arenas and civic auditoriums and to expand airports, even though these venues all host private businesses. Therefore, the no-public-funds-for-private-business-support canard must not be allowed to block something as important as improvements for hospital disaster preparedness.

Next, elected officials need to recognize that between 1987 and 1996, a hazardous chemical incident of some severity took place in 95 percent of US counties. An average of 60,500 chemical incidents occurred per year at fixed facilities and in transit, injuring or killing roughly 2,550 each year.⁸² The law of averages says that sooner or later a hazmat accident will occur where these elected officials live. Also, if the hospitals are already buckling under the patient surges of an influenza season, it follows that capacity to handle a communicable disease outbreak of any significant proportions is flagrantly insufficient. Unconventional terrorism concerns aside, hospitals must be better prepared to handle what collocation with industrial facilities and routine disease outbreaks will bring their way.

DIGGING INTO THE “TOO HARD” BOX

Even in cities that have gotten a handle on various aspects of unconventional terrorism preparedness, the tasks that invariably end up in the “too hard” box, as discussed in chapter 6, are those relating to the conduct of an evacuation and the imposition of isolation or quarantine orders. Evacuation is supposedly the easier task, but plans that look reasonable on paper have floundered when implemented with large populations during natural disasters. As for quarantining a geographic area, once this public health decision

⁸¹ Interviews with author: Medical Toxicologist/Poison Control Center Director (13 June 2000); EMS Medical Director (13 November 1999); Associate Hospital Administrator/Registered Nurse (13 November 1999); Physician/Associate Director, Hospital Department of Emergency Medicine (9 March 1999).

⁸² Of the total number of incidents 42 percent occurred at fixed locations and 43 percent were related to the transportation of chemicals. On average, 127 incidents per year resulted in at least one fatality. US Chemical Health and Safety Investigation Board, *The 600K Report: Commercial Chemical Incidents in the United States 1987-1996*, Special Congressional Summary (Washington, DC: US Chemical Health and Safety Investigation Board, 24 February 1999), 10. Since no omnibus reporting requirement regarding chemical accidents in the United States exists, five separate federal agencies collect this data in a variety of formats. State data varies from detailed reports to only the most basic accident information. Given these circumstances, the *600K Report* figures cannot be considered exact, but they are the most comprehensive chemical accidents statistics available.

is made, a minefield of legal conflicts and logistical hurdles stands in the way of swiftly implementing it.⁸³ None of the cities surveyed for this report had made more than a dent on quarantine matters. Given the country's growing population and transportation capacities, evacuations will become ever more congested and quarantines will have to be instituted ever more swiftly upon recognition of a contagious disease case. None of these tasks, in other words, will get any easier.

Since every jurisdiction is equally stumped and would face similar legal and logistic problems in trying to enforce evacuation, isolation, or quarantine orders, the level of discussion and policy formulation would be facilitated if a national conference were convened to focus on these thorny problems. Appropriate co-chairs for such an event would be the Department of Justice and the Centers for Disease Control and Prevention (CDC). The main focus of the conference would be the imposition of quarantines in the 21st Century, but a subset of issues associated with evacuation could also be addressed when they overlap naturally with quarantine topics. For example, the conference agenda might address such matters as 1) a definition of the circumstances, if any, in which decision making authority should switch from the local to the state to the national level; 2) the applicability of isolation and quarantine laws to groups as opposed to individuals; 3) the best approaches to restrict or propel the movement of people through transportation choke points, depending upon whether an evacuation or quarantine is ordered; 4) the conflict between interstate commerce laws and quarantine orders; 5) use-of-force standards for law enforcement; 6) a definition of circumstances where quarantine violators should be prosecuted; and 7) the stage in the progression of a communicable disease through a community at which quarantine is advisable, then mandatory. Modernizing local, state, and national policies and laws on these matters is a challenge befitting the best public health, public safety, and legal minds in the country.

This national conference should be the prelude to the establishment of a multidisciplinary commission dedicated to pushing all the way through this particularly onerous set of intersecting legal and public health issues. Co-chaired again by the CDC and Justice Department, Congress should charter this commission to craft legislative proposals for the consideration of individual states and Congress.⁸⁴ These

⁸³ See Terry P. O'Brien, "Legal Response to a Bioterrorist Event"; Lawrence O. Gostin, Scott Burris, and Zita Lazzarini, "The Law and the Public's Health: A Study of Infectious Disease Law in the United States," *Columbia Law Review* 99, no. 59 (1999): 59–128.

⁸⁴ A variant of this recommendation was made by David P. Fidler, David L. Heymann, Steven M. Ostroff, and Terry P. O'Brien, who suggested that this task be accomplished via such organizations such as the American Bar Association, the National Attorneys General Association, and the National Health Lawyers Association on the legal side and on the public health side by the Association of State and Territorial Health Officers and the Council of State and Territorial Epidemiologists. See Fidler et al., "Emerging and Reemerging Infectious Diseases: Challenges For International, National and State Law," *International Lawyer* 31, no. 3 (Fall 1997): 773–79. A congressionally chartered commission, overseen by government bodies that have a major role in facilitating the local response to a bioterrorist event, should prove a stronger impetus to craft the legislative proposals than voluntary action by the organizations concerned. The above-named organizations would all participate, as should those representing the implementers of quarantine and evacuation orders, namely the International Association of Chiefs of Police, National Sheriffs' Association, and the National Guard. Note that the CDC has created a collaborative in the public health law area, the purpose of which is broader, but complimentary to, the proposed commission.

complex issues must be dealt with regardless of whether terrorists ever master the microbe. Public health experts say that it is only a matter of time before some bug from deep in the rainforest or a strain of influenza as virulent as the one that devastated the country in 1918 resurfaces.⁸⁵ Such an occasion is no time to be caught flat-footed, which is exactly where the country is today.

A SOUND, LONG-TERM PRESCRIPTION FOR PUBLIC HEALTH

Among the soundest investments made thus far under the rubric of domestic preparedness have been the efforts to strengthen the public health infrastructure. Spearheaded by the CDC, these programs aim to align the public health infrastructure with the realities of modern life, such as the quick and frequent intercity and intercontinental travel that simultaneously facilitates the spread of contagious diseases and makes it much more difficult to contain them. Just over 6 percent of the unconventional terrorism preparedness budget was allocated to public health infrastructure improvement programs in 2000, a proportion far too small for the multiple benefits that the public will reap from both an increase in the number of laboratories able to identify infrequently seen diseases and improved communications between different segments of the health care community.⁸⁶ Aside from improved laboratory capabilities, the real future of modern disease surveillance may lie in the syndrome surveillance prototypes being pioneered by New York City's Department of Health and Sandia National Laboratory's Center for National Security and Arms Control, which are described in chapter 6. The CDC has conducted a few trials with its own prototype, and it would be prudent to push forward with more extensive trials to refine syndrome surveillance and evaluate its effectiveness for recognizing unusual disease patterns and thereby cuing more intensive laboratory analysis, epidemiological investigation, and medical intervention as early as possible in a disease outbreak.

This collaborative is part of the CDC's creation of a Public Health Law program, which will study the intersection of public health affairs and law, follow pertinent developments in state legislatures, and offer training in public health law. Thomas B. Cole, "When a Bioweapon Strikes, Who Will Be in Charge?" *Journal of the American Medical Association* 284, no. 8 (23/30 August 2000): 947–8.

⁸⁵ The Spanish Influenza pandemic of 1918–19 killed 675,000 people in the United States and exacted a death toll of between twenty and forty million people worldwide. Lynette Iezzoni, *Influenza 1918: The Worst Epidemic in American History*, (New York: TVBooks, 1999).

⁸⁶ As shown in table 7.2, the 2000 budget for the CDC's Surveillance, Epidemiology, and Plans program and Health Alert Network were \$40 and \$50 million, respectively. From a broader funding perspective, the public health funding picture is not bright either. According to Dr. Margaret Hamburg, Assistant Secretary for Planning and Evaluation at the Health and Human Services Department, less than 1 percent of the \$1 trillion in US funds going to health care is devoted to public health functions. Joshua P. Lederberg, "Summary and Assessment," in *Public Health Systems and Emerging Infections: Assessing the Capabilities of the Public and Private Sectors: Workshop Summary*, ed. Jonathan R. Davis and Joshua P. Lederberg, Institute of Medicine (Washington, DC: National Academy Press, 2000), 2, 10.

In the framework of critical steps that should be taken to reduce the biowarfare threat to US troops and citizens, escalation of research for new vaccines and antibiotics has been recommended consistently.⁸⁷ In fact, concerns about bioterrorism increased research monies to the CDC, the Defense Advanced Research Projects Agency, the US Army Research Institute for Infectious Diseases, and the National Institutes of Health for new antibiotics and vaccines by roughly \$162.7 million in 2000.⁸⁸ Bioterrorism worries also awakened the Pentagon's effort to develop vaccines against biowarfare agents, launching the Joint Vaccine Acquisition Program in mid-1997.⁸⁹ After considerable bureaucratic wrangling and lengthy delays, in October 1999 the Food and Drug Administration proposed an adjustment to its regulatory framework for licensing candidate vaccines necessitated by the high lethality rate of many biowarfare diseases.⁹⁰ This move set the stage for tests over the next several years of candidate vaccines against seven biowarfare agents.

The development of new drug therapies, however, is not just a matter of preparedness against the deliberate use of biological agents in cities or on the battlefield. For many a year, the nation's most esteemed scientists and public health watchdog organizations have talked of a looming global public health crisis that would plunge medicine back to a pre-antibiotic era. Human development that encroaches further on various ecosystems is rousing new diseases. Moreover, physicians increasingly find that their arsenal of medications is powerless against old diseases that keep resurfacing.⁹¹ Penicillin is no longer effective against 30 percent

⁸⁷ For example, see Ernest T. Takafuji, Anna Johnson-Winegar, and Russ Zajtchus, "Medical Challenges in Chemical and Biological Defense for the 21st Century," in *Medicine: Medical Aspects of Chemical and Biological Warfare*, Part I: Warfare, Weaponry, and the Casualty, ed. Frederick R. Sidell, Ernest T. Takafuji, and David R. Franz (Office of the Surgeon General: US Department of the Army, 1997): 683; Institute of Medicine, *Chemical and Biological Terrorism: Research and Development to Improve Civilian Medical Response*, National Research Council (Washington, DC: National Academy Press, 1999), 9, 121, 125, 161–4.

⁸⁸ This figure totals the medical research monies in the 2000 unconventional terrorism budget and includes funding for research into chemical warfare agent antidotes. This sum equates to just over 30 percent of the research and development budget and 6.4 percent of overall unconventional terrorism spending. Office of Management and Budget, *Annual Report to Congress on Combating Terrorism*.

⁸⁹ This program is run by the Army's Joint Program Office for Biological Defense with a goal of developing, testing, producing, storing, and fielding sufficient quantities of Food and Drug Administration-licensed vaccines to meet military force protection needs. To that end, the Pentagon awarded DynPort LLC a \$747 million research and development contract for work on vaccines against seven biowarfare agents. This program encompasses two vaccines against botulinum toxin, one vaccine apiece against Q fever, tularemia, ricin, smallpox, and plague, and four vaccines against variants of equine encephalitis. See, "Army Pursues Joint Vaccine Acquisition Program," press release no. 97-59 (Washington, DC: US Army, Office of Public Affairs, 12 June 1997); "Joint Vaccine Acquisition Program: Questions and Answers" (Ft. Detrick, Md.: Joint Vaccine Acquisition Program, Program Management Office, n.d.).

⁹⁰ The FDA's proposed regulation would rely on animal instead of human trial data. See 21 CFR 314 and 601. See also, Kathryn C. Zoon, "Vaccines, Pharmaceutical Products, and Bioterrorism: Challenges for the US Food and Drug Administration," *Emerging Infectious Diseases* 5, no. 4 (July/August 1999): 535–6. On the politics that have slowed the military vaccine development and production efforts, Richard Preston, "Demon in the Freezer," *New Yorker*, 12 July 1999, 60–1.

⁹¹ For more authoritative and detailed explanation of these dilemmas, see Institute of Medicine, *Emerging Infections: Microbial Threats to Health in the United States*, National Research Council (Washington, DC: National Academy Press, 1992); US Congress, Office of Technology Assessment, *Impacts of Antibiotic-Resistant Bacteria*, OTA-H-629 (Washington, DC: US Government Printing Office, September 1995); American Society of Microbiology, *Report of the ASM Task Force on Antibiotic*

of *Streptococcus pneumoniae* cases, 11 percent of pneumonia cases are also resistant to third generation, cephalosporin antibiotics, and reports have begun to surface of cases that are not susceptible even to the newer fluoroquinolone treatments.⁹² Given the crystal clear data on how microbes are ganging up on mankind, the Institute of Medicine, the American Society of Microbiology, the now-defunct Office of Technology Assessment, and the World Health Organization, among other respected bodies, have given virtually identical counsel about the exigency of boosting medical research to counter the twin threats of emerging infectious diseases and antibiotic resistant disease strains.

In decades past, US leaders have declared war on all types of public scourges—poverty, crime, and drugs, to name a few. In mid-June 1996, President Bill Clinton issued a directive to improve disease surveillance and prevention. Two interrelated task forces were formed to address the problem, both of which have plowed the ground previously tilled by non-governmental experts, and, not at all surprisingly, advocated strengthening disease surveillance and stimulating scientific research to manifest the next generations of antibiotics and vaccines.⁹³ A National Intelligence Estimate on the security implications of the infectious disease threat was also prepared.⁹⁴ Meanwhile, government funding for biomedical research led by the National Institutes of Health underwent a marked increase, reaching over \$15 billion in 1999. In 1999, however, approximately 15 percent of the National Institutes of Health's budget was earmarked for infectious

Resistance (Washington, DC: American Society of Microbiology, 1995); World Health Organization, *Overcoming Antimicrobial Resistance: World Health Report on Infectious Diseases 2000* (Geneva: World Health Organization, 2000). These problems are also the subject of countless journal articles. See also, Laurie Garrett, *The Coming Plague* (New York: Farrar, Straus and Giroux, 1994) and *Betrayal of Trust: The Collapse of Global Public Health* (New York: Hyperion, 2000).

⁹² Interagency Task Force on Antimicrobial Resistance, *Draft Public Health Action Plan to Combat Antimicrobial Resistance* (June 2000), 9. Internet: <http://www.cdc.gov/drugresistance/actionplan/index.htm>. Downloaded 29 August 2000.

⁹³ The Emerging Infectious Disease Task Force operates out of the White House Office of Science and Technology Policy and teams a host of federal agencies under the chairmanship of the Department of Health and Human Services, the CDC, and the Food and Drug Administration. Many of the same players are involved in the Task Force on Antimicrobial Resistance, created in 1999 and co-chaired by the CDC, the Food and Drug Administration, and the National Institutes of Health. *Ibid.* Also, *Emerging Infectious Disease Task Force: PDD/NSTC-7 Annual Report*, Committee on International Science, Engineering and Technology (Washington, DC: White House, National Science and Technology Council, 19 December 1997). Note also hearings by the Senate Subcommittee on Public Health of the Committee on Health, Education, Labor, and Pensions on 25 February 1999 and the House International Affairs Committee on 29 June 2000.

⁹⁴ National Intelligence Council, *National Intelligence Estimate: The Global Infectious Disease Threat and Its Implications for the United States* (Washington, DC: National Intelligence Council, January 2000).

disease research.⁹⁵ If Clinton meant this 1996 directive to be a declaration of war, the battle has subsequently been waged with paper and pennies.

When combined, the National Institutes of Health infectious disease and bioterrorism medical research budget total \$1.08 billion. While that amount is certainly an appreciable chunk of money, the figure should be viewed in the context of the expense to introduce new drugs to the marketplace. The pharmaceutical industry estimates that the average cost to bring a *single* new drug on line is \$500 million.⁹⁶ No small wonder, then, that the Pentagon had trouble luring bidders to test and develop the multiple vaccines involved in its Joint Vaccine Acquisition Program, budgeted at \$747 million.⁹⁷ Even if money were not an issue, time is. At least nine and up to fifteen years can be required to take a promising drug from laboratory to market.⁹⁸ No new classes of infectious disease-fighting drugs have been introduced since the 1970s, when the market was saturated with antibiotics. Since then, pharmaceutical companies have not considered it cost-effective to plow funds into the development of additional antimicrobials. The industry's decision to refrain from this research has also been heavily influenced by the lack of secure patent protection for products that are very costly to develop.⁹⁹ Therefore, except for a handful of candidate biowarfare agent vaccines, there are no new drugs or vaccines against infectious diseases in the developmental pipeline. Absent corrective action, in the foreseeable future there will be no drugs that can fight the more common form of pneumonia

⁹⁵ In 1999, the National Institute for Allergies and Infectious Diseases, which is the main branch of the National Institutes of Health conducting research into emerging, infectious, and antibiotic-resistant diseases, had a budget of \$422.8 million for such research. Elsewhere within the National Institutes of Health family of research organizations, \$494.3 million was budgeted for these categories of research, but six of the other twenty-two institutes conducting this work included some of their AIDS research dollars in this budget category. Therefore, the exact figure for non-AIDS infectious diseases funding cannot be determined from the figures available. Budgetary data obtained from the National Institute for Allergies and Infectious Diseases Budget Office on 6 September 2000. Note that the budget for the infectious disease research has undoubtedly increased. The Institute's research program was budgeted at about \$13 million in 1994 and 1995. Office of Technology Assessment, *Impacts of Antibiotic-Resistant Bacteria*, 14.

⁹⁶ Generating new medicines is very expensive because out of every five to ten thousand chemical compounds screened for further development, only 250 make it through to the preclinical trial stage. From this number, only five pass through to clinical testing, and of those five, only one is approved by the FDA. Pharmaceutical Research and Manufacturers of America, *Pharmaceutical Industry Profile 2000*. Internet: <http://www.phrma.org/publications/industry/profile00/toc.html>. Downloaded 14 August 2000.

⁹⁷ The Pentagon states that this budget is adequate because the candidate vaccines were already identified, obviating the need for firms to screen other chemical compounds. However, pharmaceutical industry representatives still guffawed at the amount when the Pentagon sought bidders for this contract. Development costs for a vaccine can run in the neighborhood of \$1 billion. Interview with author: PhD Microbiologist/Senior Scientist, US Pharmaceutical Company (15 October 1998); PhD Microbiologist/Senior Pharmaceutical Industry Representative (3 April 1998). Also: Senior CDC Official (29 August 2000).

⁹⁸ On the nine-year time line, Office of Technology Assessment, *Impacts of Antibiotic-Resistant Bacteria*, 14, 18. See also Joseph A. DiMasi, "Trends in Drug Development Costs, Times, and Risks," *Drug Information Journal* 29, no. 2 (April/June 1995): 375–84.

⁹⁹ Roughly one hundred antibiotics were on the market in the 1970s and 1980s. Office of Technology Assessment, *Impacts of Antibiotic-Resistant Bacteria*, 33–6; David P. Fidler, "Legal Issues Associated with Antimicrobial Drug Resistance," *Emerging Infectious Diseases* 4, no. 2 (April/June 1998): 174.

and many other ailments, much less emergent infectious diseases.¹⁰⁰ If that alone does not shatter Washington's complacency about the microbial threat, then elected officials should consider another ominous indicator of the frailty of modern medicine in the face of this threat: every year, roughly two million Americans acquire an infection while in the hospital. An estimated nineteen thousand die annually because the infections they caught in the very place they went to get well were resistant to drug therapies.¹⁰¹ These numbers reflect the steady march of infectious diseases up the chart of leading causes of death, with deaths from respiratory infections ranking sixth nationally in 1997 and 1998.¹⁰²

Even if a future disease calamity never arrives courtesy of terrorists, mankind is still in a race against time to develop new medications before the natural mutation of pathogens renders impotent all of those currently on the shelves. The scale of effort required to win this contest resembles in many respects what was mounted to emerge victorious from World War II and put the first man on the moon—a creative, dedicated, extensive, and expensive collaboration between government and the private sector. The purpose of this collaboration would be to take laboratory discoveries from the National Institutes of Health and elsewhere through the process of clinical trials and licensing. Industry is much more adept at this process than government research laboratories. To forge this partnership, Washington must come to terms with the need to address the pharmaceutical industry's worries about intellectual property rights and to underwrite some biomedical research, development, and testing costs within the private sector. Elected officials jittery about allocating taxpayers dollars for such an effort might recall how remarkably and for the better similar collaborations have altered the lives of Americans. World War II weapons development programs and the race to the moon pushed the evolution of technology and spun off countless products that define and facilitate modern life (e.g., office computers). Given the exorbitant cost of drug development, Washington must also shed any illusion that this job

¹⁰⁰ Among the diseases that now have drug-resistant strains are tuberculosis, malaria, gonorrhea, the AIDS virus, and typhoid. The reasons for antibiotic resistance are well known: 1) over prescription of antibiotics in developed countries; 2) patients' failure to complete the specified course of drug treatment; and 3) use of antibiotics in livestock feed to promote growth. One equally well understood solution is for physicians to stop prescribing antibiotics unnecessarily. In addition to the aforementioned reports, this matter is discussed briefly in Marc Kaufman, "Microbes Winning War: Resistance to Antibiotics Raises Disease Peril, Agency Says," *Washington Post*, 13 June 2000.

¹⁰¹ According to the CDC, some 70 percent "of the bacteria causing such infections are resistant to at least one of the drugs most commonly used to treat these infections. In some cases, these organisms are resistant to all approved antibiotics and must be treated with experimental and potentially very toxic drugs." Centers for Disease Control and Prevention, "Antimicrobial Resistance: A Growing Threat to Public Health," Hospital Infections Program (Atlanta, Ga: CDC, October 1998). Updated 5 August 1999. Internet: www.cdc.gov/ncidod/hip/Aresist/am_res.htm/. Downloaded on 18 September 2000. US General Accounting Office, *Emerging Infectious Diseases: Consensus on Needed Laboratory Capacity Could Strengthen Surveillance*, HEHS-99-26 (Washington, DC: US Government Printing Office, February 1999), 4. For more on this problem, see also Office of Technology Assessment, *Impacts of Antibiotic-Resistant Bacteria*, 69–96; Robert A. Weinstein, "Nosocomial Infection Update," *Emerging Infectious Diseases* 4, no. 3 (July/September 1998). Internet: www.cdc.gov/ncidod/eid/vol4no3/weinstein.htm/. Downloaded 24 August 2000.

¹⁰² In 1997 and 1998, pneumonia and influenza were the sixth leading cause of death in the United States, above diabetes, suicide, and homicide. The top five causes of death were heart disease, malignant tumors, cerebrovascular diseases, chronic obstructive pulmonary diseases and allied conditions, and accidents. Sherry L. Murphy, "Deaths: Final Data for 1998," *National Vital Statistics Reports* 48, no. 11 (24 July 2000): 6–9; Donna L. Hoyert, Kenneth D. Kochanek, and Sherry L. Murphy, "Deaths: Final Data for 1997," *National Vital Statistics Reports* 47, no. 19 (30 June 1999): 7–10.

can be done on the cheap. When a real war was being fought, the Pentagon spent \$1.9 billion on the Manhattan Project from 1942 to 1945 to develop the first atomic weapon. In 1999 dollars, this sum equates to \$22.5 billion.¹⁰³ The amount needed to conduct pioneering research and bring industry to the table is probably well shy of that total, but far above the government's tepid investment to date.

The nation will know that Washington has really declared war against the microbes when the captains of the pharmaceutical industry are called to town to hammer out agreements on how to proceed. For their part, industry leaders must come to the table ready to meet the government halfway, in the same constructive spirit that other industries exhibited when the nation's well-being was gravely threatened. If industry does not help to forge this alliance, it would be improvident. Microbes, it has been said, take no notice of borders. Nor do they discriminate between those inside or outside of boardrooms. While settling the above-mentioned cost and patent issues, industry and government leaders must not forget to craft a liability policy for the development and administration of vaccines against biowarfare agents. The long overdue progress in the Joint Vaccine Acquisition Program will stall if government and industry do not soon define liability for giving these vaccines to military personnel and to civilian populations either as a preventative measure or to stem a disease outbreak.¹⁰⁴

These days, Washington's invariable response to any ambitious new policy proposal is the hem-and-haw shuffle—calls for another committee or another study. This recommendation is certainly ambitious, but it is not new. Exhaustive, authoritative studies of the microbial threats that necessitate a monumental investment in trail-blazing biomedical research are available by the truckload. All that is missing is the political fortitude to get such a program off the ground. If the specter of bioterrorism makes such a decision politically feasible, so be it. For the public good, someone in Washington must exercise leadership and have the guts to make a fiscal investment commensurate with what it takes to research, develop, and test new drug therapies against infectious and antibiotic resistant diseases.

¹⁰³ Kevin O'Neill, "Building the Bomb," in *Atomic Audit*, ed. Stephen I. Schwartz (Washington, DC: Brookings Institution Press, 1998), 58.

¹⁰⁴ This liability policy would address such matters as the definition of the acceptable number of adverse reactions to a vaccine administered as a preventative measure in the absence of a disease outbreak. The shape of a biowarfare agent vaccine liability policy would influence significantly a decision on whether the government should build a dedicated biowarfare agent vaccine production facility, a matter currently under study within the Pentagon.