

COUNTERING BIOLOGICAL TERRORISM IN THE U.S.: **AN UNDERSTANDING OF ISSUES AND STATUS**

David W. Siegrist
Janice M. Graham
Potomac Institute for Policy Studies
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Yonah Alexander
Donald J. Musch
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Preface

The Potomac Institute for Policy Studies (the Institute) is a not-for-profit organization dedicated to the development and support of non-partisan analysis of technology and technology policy. The Institute has conducted studies that provide insight into the impact of new technologies and processes on our society, the proper relationship between government and industry in meeting future needs, and the state of the U.S. industrial base.

This is the final report of a study conducted by the Institute, which addresses the biological component of weapons of mass destruction, in an attempt to clarify and promote awareness of the catastrophic consequences of this type of agent. Biological weapons continue to be known as the “poor man’s atomic bomb” due to relatively low production costs and the potentially devastating effects of deployment. As the world’s only superpower, the US cannot be easily challenged through conventional military means. Therefore, logic dictates that adversaries will exploit US weaknesses, such as the unwillingness to tolerate casualties, through unconventional, or “asymmetric,” means. As expected, more nations are trying to acquire chemical and biological weapons than nuclear weapons.

The Institute would like to thank the Smith-Richardson Foundation for its financial support of this study and for insights provided by the Foundation and their reviewers. We are especially grateful to Dr. Marin Strmecki for his guidance and encouragement. Members of our Counter Biological Terrorism Panel generously provided their time and impressive experience to this effort. Views expressed in the following are our own, however, and do not necessarily reflect the opinions of the Foundation or other contributors.

Executive Summary

As America positions itself for the 21st century, US decision-makers are faced with a national security strategy *woefully* inadequate to counter the proliferation and deployment of Weapons of Mass Destruction (WMD). On the battlefield, WMD has been considered a major threat for many years and it has not gone away. Recently, Iraqi dictator, Saddam Hussein, provided the international security environment an unfortunate, albeit insightfully stunning, view of a regional aggressor armed with WMD and the means, and will, to deliver them.¹ Much has been said of the nuclear threat possessed by the cash-strapped former Soviet Republics, less discussion has occurred concerning the proliferation of chemical weapons and the absolutely daunting challenge of the development and proliferation of *biological* weapons and the means to deliver them.

The focus of the papers in this study is an even more serious prospect -- WMD in the hands of state-sponsored or transnational terrorists. Many of the papers argue that terrorism within the US and abroad is a genuine likelihood. We believe there are groups with both the desire and the will to conduct terrorist attacks on US soil and against US targets. The **Potomac Institute for Policy Studies** strongly believes that a fundamental shift in direction is imperative if the US national security policy is to counter this threat.

The Institute's decision to address the biological component of WMD was made because we believe it is vital to clarify and promote awareness of the catastrophic consequences of a release of this type of agent. Biological weapons continue to be known as the "poor man's atomic bomb" due to relatively low production costs and the potentially devastating effects comparable to those of nuclear weapons. To this end, we assembled noted researchers to address key aspects of countering biological terrorism and to select those issues that cut across the disciplines.

Findings and Conclusions

The goals of this study were to *better understand* and *document the status* of important aspects of US counter biological terrorism today, and to articulate the major issues encompassing this important and difficult national endeavor. These aspects include counter biological terrorism policies (at the international, national, and local levels), organizational interfaces, intelligence and detection, crisis and consequence management, information infrastructure, and the entire spectrum of applicable technology research and development. The Institute will use the results of this study as the foundation for the follow-on work that will continue over the next two years, dedicated to finding solutions to the problems cited.²

¹ The reality of this threat was recently accentuated by Secretary of Defense Cohen's statement that, "a paradox of the new strategic environment is that American military superiority actually increases the threat of nuclear, biological, and chemical attack against us by creating incentives for adversaries to challenge us asymmetrically."

² Some solutions are discussed (and even recommended) in the chapters to follow, but this was not the principal intent of the study.

1. WMD terrorism (state and non-state sponsored) against US citizens is a significant and increasing risk.

A. While the *number* of terrorist incidents is somewhat declining, the *severity* of individual attacks is dramatically increasing. This trend indicates the terrorist's use of ever-increasing bomb size or more deadly devices and weapons. Therefore, it seems likely that a future group will elect to use a biological weapon rather than an explosive device or a firearm. The most often cited reasons for the selection of a biological weapon are: 1) high lethality; 2) modest weapon size relative to its destructive potential; 3) relatively simple and rapid deployment; and 4) the capability of covert deployment. The special equipment needed is neither expensive nor difficult to obtain. Active live cultures are available naturally in the environment or can be ordered from a biological supply house. Often, the limiting factor is the necessity for technical knowledge in the field of microbiology.

B. The new terrorism is increasingly motivated by body count. There is a shift in the motivation behind terrorism from political issues, to those that are of a more fatalistic orientation—as is often the case in religious and/or ethnically motivated terrorism.³ The resulting shift in the goals and operations of the terrorist is having grave effects. Politically-motivated terrorism tends to limit the violence in order to avoid losing supporters' sympathy or encouraging public demands for retaliation against the terrorist group. However, with nihilistic terrorism, often the goal is simply massive death and destruction of property. Indeed, we see that the goal of certain terrorists, such as Ramzi Yusef and Aum Shinrikyo, is to wage war on a society, as opposed to merely *influencing* society in a different direction.

C. Biological terrorism is uniquely worrisome. In spite of the over 100 signatories to the 1975 Bacteriological and Toxin Weapons Convention, proliferation of biological weapons continues unabated. These weapons are particularly difficult to monitor and regulate because it is difficult to differentiate between efforts to develop biological materials for rogue purposes, and those directed toward legitimate purposes, such as the production of vaccines. Furthermore, it is relatively simple to produce pathogens and toxins in small, easily concealed facilities. Finally, the materials and knowledge necessary to create and sustain a biological weapons program are both widely available around the world.

2. Our National Security Strategy and infrastructure are *inappropriate* to counter WMD.

A. Development and implementation of clear policy can help to minimize the potential for terrorist incidents. A strategy, and *strong leadership* to support it, are needed to counter biological terrorism and asymmetric threats. Although PDD-62 was the necessary first

³ We have referred to this as “nihilistic terrorism” throughout the report.

step in clarifying and strengthening US responsibilities toward countering this enormous threat, it is equally clear that much remains to be done. In particular, the potential for biological terrorism raises critical issues of the proper relation between civilian and military sectors; federal, state and local authorities; and domestic and international affairs. This convergence needs to be explored to establish the best division of responsibility among the stakeholders. Preservation of civil liberties for Americans may become an important issue under the threat of terrorism, a situation that has some elements of both peace and warfare. Due to the increased risk of WMD terrorism discussed earlier, it is imperative that this nation take measured, but galvanizing and continuing, steps *now* to prevent such attacks; and to provide the means to minimize the effects, if such an attack should occur. This preparation has the additional benefit of mitigating the effects of natural or other disasters by enhancing emergency responses in general.

B. Intelligence collection and sharing is inadequate and not properly structured for countering WMD terrorism. For terrorism operations, both on US territory and abroad, the most likely sources of information are local citizens “on the scene.” In order to maximize its value, it is important to match information from these witnesses with national or global intelligence existing at the federal level. Yet, rules and procedures are sufficiently different between local law enforcement and federal intelligence agencies to produce major problems. A large part of these difficulties is the profound procedural and legal differences between gathering evidence and collecting intelligence data.

Further problems are encountered because the intelligence community is prohibited from collecting or holding the information on US citizens. In general, these cultural differences and procedures often result in a lack of collaboration between law enforcement and intelligence organizations -- and a reluctance to share data that can be vital in investigating and preventing terrorist actions.

C. Traditional methods of deterrence have inherent limitations and tend to be ineffective in countering proliferation of WMD today. The Cold War strategy for stemming the proliferation of WMD consisted almost exclusively of deterrence through arms control, intelligence collection, diplomacy, and, as a last resort, threats of armed force. Yet in the emerging strategic environment, these methods of deterrence are no longer as effective. For example, deterrence has proven difficult against religiously-motivated terrorists who believe they are carrying out the will of their supreme Being. Often, lacking an identified perpetrator, the US has no viable target for its retaliation. As a result, rogue states or actors tend to believe that they can launch a clandestine attack on the US and escape punishment. The components of deterrence need to be reexamined, then *refocused*, adding other more pertinent options.

D. Homeland defense is a major DoD mission, cutting across civil and military sectors; and federal, state, and local governments. Protecting the territory of the US and its citizens from “all enemies foreign and domestic” is the principle task of government, with the armed forces the necessary defender in most cases. We concur with the recommendation in the 1997 National Defense Panel report that an integrated set of active and passive measures for deterring and defending against the use of WMD is needed. These measures will necessarily involve a range of federal, state, and local government agencies in their planning. Managing the consequences of a WMD attack will also require action and coordination at all levels of

government. There are also complex legal and sociological problems associated with the use of uniformed troops in this role. These must be rationally solved if we are to bring sufficient and effective resources to play.

E. Further developments in technology are needed, as this holds the potential to address nearly every aspect of countering biological terrorism. In the past it was assumed that not much could be done to counter a biological attack. Advancements in technology have begun to create new capabilities in detection, information systems, medical prevention, and consequence management that may change this pessimistic view. Now, with better sensors and effectors, an active defense may be achievable, in addition to passive defense. For instance, a network of biosensors in an urban area could warn of multiple contaminants in the atmosphere, including deadly microorganisms. Civil authorities would know to commence emergency medical relief to the area before the outbreak of symptoms.

Currently, stockpiling vaccines and antibiotics does not represent a robust solution. Advanced medical countermeasures offer a more promising means than standard antibiotics for countering biological weapons, but further research is desperately needed. Unconventional pathogen countermeasures should be aggressively pursued, not only for national security reasons, but also because infectious disease is the number one killer throughout the world.

Finally, the dual use nature of many of the technologies needed to counter the biological threat may be key to their cost efficient acquisition. This approach has validity in satisfying technology needs in nearly every aspect of counter biological terrorism. In general, a time-phased approach for the nation is needed to place resources against long term research requirements, and to provide near-term acquisition of priority items.

Countering Biological Terrorism in the US: An Understanding of Issues and Status

1. Introduction

Background

Historically, the terrorist has had a political agenda that in his mind was being thwarted by a government, corporation, or perhaps a large segment of the population. His goal in using terrorism was to attract attention to his cause. For this reason, the “conventional” terrorist generally preferred prompt-effect weapons, such as firearms or explosives. The number of casualties did not need to be large for an attack to create shock or coercion. In fact, violence was often purposely constrained to avoid alienating supporters or attracting retaliation.

As odious as these crimes can be, there are now a growing number of nihilistic or apocalyptic terrorist groups who aim for higher body counts and greater destruction. This introduces a new and horrifying threat to our society: terrorists armed with, and willing to deploy, what is now commonly known as Weapons of Mass Destruction (WMD). This relatively new post-Cold War phenomenon multiplies the complexity of countering terrorism and managing its consequences. This study focused on one class of WMD -- biological agents -- a growing and frightening addition to the terrorist’s arsenal⁴. Biological terrorism is of particular concern because of its unique combination of high lethality, relative ease of manufacture, and possibility of covert deployment. It is potentially so destructive that it now ranks as a strategic threat to the US, one that represents such possible widespread and profound suffering as to cause significant political consequences.

Despite the over 100 signatories to the 1975 Bacteriological and Toxin Weapons Convention, proliferation of biological weapons continues unabated. These weapons are particularly difficult to monitor and regulate, partly because it is hard to differentiate between efforts to develop biological materials for rogue purposes, and those directed toward legitimate, peaceful purposes such as the production of vaccines. Furthermore, it is relatively simple to produce pathogens and toxins in small, covert facilities. Finally, the materials and knowledge necessary to create and sustain a biological weapons program are both widely available around the world.

Recent History

⁴ Biological agents represent the highest lethality density of any of the major WMD, coupled with ease of manufacture and potential for covert deployment. The Office of Technology Assessment noted that a lethal biological agent dose may be at as much as eight orders of magnitude below that required for the most lethal chemical/nerve agent. An impressive figure, since only about 1 milligram of some nerve agents are required to kill a human (a paper clip weighs around 500 milligrams). Biological agents may be deadly at doses as low as .0000001 milligram.

President Clinton has declared a state of national emergency regarding the proliferation of WMD, and he subsequently issued Presidential Decision Directive 39 (PDD 39) outlining responsibilities to detect, defeat, prevent, and manage the consequences of WMD terrorism⁵.

An extremely important federal initiative, the Domestic Preparedness Program, was introduced in 1997 to improve the nation's readiness to confront and defeat terrorism. At its 1997 Conference on Countering Biological Terrorism, the Potomac Institute noted that a focal point for leadership was lacking and the appointment of a "Terrorism Czar" should be considered to manage or coordinate the program. This view was shared by a recent Presidential Commission that emphasized the need for close cooperation between the federal government and the crucial industry sectors on cyber-threats. The Commission also recommended the establishment of an Office of National Infrastructure Assurance as the top-level policy-making office, connected closely to the National Security Council and the National Economic Council. This resulted in PDD 62—Combating Terrorism Directive, and PDD 63—Critical Infrastructure Protection Directive, issued on May 22, 1998.

According to the White House, these directives strengthen the nation's defenses against emerging unconventional threats: terrorist acts, WMD, assaults on the critical infrastructures, and cyber-attacks⁶. The Combating Terrorism Directive details a new and more systematic approach to fighting terrorism by creating a program management process to guide US counter terrorism efforts. The directive also establishes the office of the National Coordinator for Security, Infrastructure Protection, and Counter Terrorism, which will oversee a broad variety of relevant policies and programs dealing with WMD.

The Critical Infrastructure Protection Directive calls for a national effort to assure the security of the increasingly vulnerable and interconnected infrastructures of the US, such as telecommunications, banking and finance, energy, transportation, and essential government services. The directive requires immediate federal government action, including risk assessment and planning to reduce exposure to attack. It stresses the importance of cooperation between the government and the private sector by linking designated agencies with private sector representatives.

The President then appointed Richard Clarke as the National Coordinator for Security, Infrastructure Protection and Counter-terrorism (effectively making him the "terrorism czar" previously discussed) and Jeffrey Hunker as Director of the Critical Infrastructure Assurance Office.

On May 19, 1998 Deputy Secretary of Defense John J. Hamre announced the selection of Dr. Jay C. Davis to head the proposed Defense Threat Reduction Agency (DTRA). The creation of this agency reflected a key element in the Secretary's Defense Reform Initiative (DRI)--strengthening DoD's ability to deal with the proliferation of WMD. DTRA will be the DoD's focal point for addressing this complex problem. The new agency, which will begin operating in October 1998, is being formed by consolidating the On-Site Inspection Agency, the Defense Special Weapons Agency, the Defense Technology Security Administration, and some program

⁵ PDD-39 states: "The United States shall give the highest priority to developing effective capabilities to detect, prevent, defeat and manage the consequences of nuclear, biological or chemical (NBC) materials or weapons use by terrorists. The acquisition of weapons of mass destruction (WMD) by a terrorist group, through theft or manufacture, is unacceptable. (U) There is no higher priority than preventing the acquisition of this capability or removing this capability from terrorist groups potentially opposed to the U.S. (U)"

⁶ White House Fact Sheet

functions of the Assistant for the Secretary of Defense for Nuclear, Chemical and Biological Defense Programs. The director of DTRA will report directly to the Under Secretary of Defense for Acquisition and Technology. In a similar move, The Chemical Biological Defense Command (CBDCOM) is to be combined with Soldier Systems and the Chemical School currently located at Fort McClellan, thus concentrating the chemical/biological response under one command.

The actions of PDDs 62 and 63, together with the realignment of DSWA and CBDCOM, demonstrate clearly the policy and strategic underpinnings of the Domestic Preparedness Program by providing both a focus and a concentration of resources.

The Study

The Potomac Institute for Policy Studies (the Institute) assembled noted researchers from many disciplines to address the various key aspects of countering biological terrorism. At the end of their research, the Institute conducted a conference with those experts to discuss cross cutting issues, and to begin to identify overall priority thrusts for policy and process initiatives needed to counter biological terrorism. The Institute published a proceedings from the conference⁷.

Goals of the Study

The goals of this study were to *better understand* and *document the status* of important aspects of US counter biological terrorism today, and to articulate major issues concerning this important and difficult national endeavor. These aspects include counter biological terrorism policies (that affect the international, national, and local levels), organizational interfaces, intelligence and detection, crisis and consequence management, information infrastructure, and the entire spectrum of applicable technology research and development needed to make it all work well. The Institute will use the results of the study as a foundation for follow-on work over the next two years, dedicated to seeking *solutions* to problems noted⁸.

Organization of This Report

Central to this report are the papers presented in Chapters 1 through 13. The papers were written by members of our Counter Biological Terrorism Panel. They confront some of the most critical issues involved in countering biological terrorism. An abstract of each paper is presented below. Later in this Introduction, a summary of findings and conclusions is offered. Both are drawn from analysis in the papers, with references to direct the reader to the appropriate paper for further details.

Abstract of Papers

- Chapter 1: Terrorist Organizations and the Potential Use of Biological Weapons:

⁷ The publication, "Proceedings Report on the Conference on Countering Biological Terrorism: Strategic Firepower in the Hands of Many?," PIPS-97-2, 12-13 August 1997, is available through the Institute. It may also be found on our web site (www.potomacinstitute.com).

⁸ Some solutions are discussed (and even recommended) in the chapters to follow, but this was not the principal intent of the study.

Mr. Donahue discusses why terrorists have rarely chosen biological means to carry out their plans, and why they may be persuaded to do so in the future. He also cites the potential for destruction if they carry out such an attack, referencing such groups as Aum Shinrikyo in Japan. He identifies factors that terrorists consider when selecting means of attack, as well as the likelihood of biological terrorist attacks and who may mount them.

- Chapter 2: The Case for a Special Operations Response to Biological Terrorism.
Mr. Hinkle makes the case that active military measures against suspected biological terrorist cells will likely require the use of highly skilled teams of armed forces on the ground. Destruction of such cells must be accomplished with care in order to disrupt operations without producing potentially hazardous collateral damage, to collect evidence of biological terrorist activities, and to provide positive assurance of neutralization of threat agents. Mr. Hinkle addresses types of military capabilities required for various operations and their availability. He also discusses command and control issues, intelligence information needs, and government concerns with such operations. Finally, he offers comments on foreign counter terrorist operations, led by the military, with reference to those aspects of tactical operations related to domestic counter terror military actions.
- Chapter 3: Strategic Firepower in the Hands of Many?
Dr. Kupperman and Mr. Siegrist outline the threat of biological terrorism. They discuss the emerging geopolitical environment, including the devolution of war-making to subnational groups in a world with only one remaining military superpower, positing that unconventional means would be called upon to engage in a deadly quarrel with the US at the current time. Second, Kupperman and Siegrist consider the technical means becoming available to support the unconventional "firepower requirements" of such subnational groups. Biological agents have significant potential for such a role due to their unique combination of lethality density, relative ease of manufacture, and the covertness with which they can be obtained, stored, and deployed.
- Chapter 4: Defeating Terrorist Organizations: Lessons Learned from Two Incidents.
Ambassador Busby, an expert in working with foreign governments to counter narco-terrorist threats, advocates enhancing the capabilities of local governments to defeat terrorism, rather than relying on predominantly US means. Ambassador Busby was intimately involved in virtually all aspects of the destruction of the Medellin narco-terrorist organization, and draws on this experience to describe what is needed to detect and defeat terrorists, while simultaneously maintaining US constitutional guarantees. Using two historic international terrorist incidents, the civil-military theme is discussed.
- Chapter 5: Bioterrorist Attack Pathways and Social/Civil Infrastructure.
Mr. Bosma uses recent examples to characterize some of the more likely means to spread biological agents. These include "closed loop" systems to attack particular structures, such as aircraft or air handling systems in buildings; subways; water supplies; tainted meat; and the introduction of new animal vectors into target environments. This paper identifies some of the most threatening access points and describes means to lessen their accessibility. The civil-military perspective highlights the need to upgrade domestic infrastructure to protect potential infection paths.
- Chapter 6: Countering Biological Terrorism: Local Threats and Responses.
Mr. Benwell-Lejeune's paper indicates that although the federal government has a great interest in tracking and detecting terrorists, the immediate response to terrorism is at the local

and municipal level. However, American municipal governments and non-governmental organizations remain largely unprepared to deter, prevent, defeat, or effectively manage the consequences of WMD terrorism. The focus of this section is a CARVER analysis of relative vulnerabilities to differing terrorist threats in a specific municipal context, as well as a discussion of the wider applicability of the analysis.

- Chapter 7: Countering Biological Terrorism: Federal Cooperation.
In his second paper, Mr. Benwell-Lejeune reviews the recent Presidential report detailing federal plans and capabilities to counter acts of terrorism, and applies this specifically to biological terrorism. He then compares federal incident response plans, including some from the Department of Health and Human Services and the Federal Bureau of Investigation.
- Chapter 8: Countering Biological Terrorism: DoD Assistance.
General Al Gray, USMC (Ret.) and Stephanie Tennyson assert that DoD is a primary source of assets to assist state and local authorities in responding to biological and other major terrorist incidents. Their paper discusses the overall process for providing DoD aid from the national level and its part in the Federal Emergency Management Plan. They then examine the operational concept of the US Marine Corps Chemical/Biological Incident Response Force (CBIRF), recently activated at Camp Lejeune. CBIRF is responsible for critical assistance functions used in countering the biological threat.
- Chapter 9: Medical Response to Biological Terrorist Attack.
Dr. Brown and Mr. Meltzer review the medical treatment capability to respond to intentional biological release, with special attention to the Public Health Service's Office of Emergency Preparedness Medical Strike Teams concept. This concept is being tested in the Washington metropolitan area, where an exercise simulating crisis response was conducted. Dr. Brown parallels this to his work in surveying and assessing domestic military capabilities. This is a good example of the convergence of military and civilian capabilities to mitigate the consequences of a biological threat. The authors also address the role of the Centers for Disease Control Epidemiological Intelligence Service in investigating suspicious outbreaks of disease, and assess its part in the overall need to respond to outbreaks that may reflect biological terrorism.
- Chapter 10: Likely Threat Pathogens in Biological Terrorism.
Dr. Crowell presents his view of the most likely microbes that would be used by terrorist groups. He also characterizes them, identifying likely dissemination means, ways to quickly recognize the onset of a biological terrorist attack, medical treatment requirements, possible microbial countermeasures, and future developments.
- Chapter 11: Technology and Counter Biological Terrorism.
Mr. Siegrist sets the stage for the final two papers, which address the critical need for various technologies in countering biological terrorism. Both medical and non-medical technologies are crucial to all aspects of these operations, from intelligence-gathering and detection to consequence management.

- Chapter 12: Combating Terrorism: Report from the DARPA Tiger Team.
Dr. Regina Dugan discusses the conclusions of a recent Defense Advanced Research Projects Agency (DARPA) “Tiger Team” assessment of the Agency’s responsibilities in developing advanced technologies to counter terrorism. Although DARPA currently has significant ongoing efforts to develop technical means to fight terrorism, further areas of needed technology are identified. One of Dr. Dugan’s themes is the requirement for a common technology base for domestic civilian and military use in countering terrorism.
- Chapter 13: New Approaches to Countering Biological Terrorism with Electrotechnologies.
Dr. Curry will consider new technical approaches to neutralizing biological agent drifting clouds and decontaminating equipment in crisis situations. His paper is intended to present an example of the kind of technology choices policy-makers may face as they look for solutions to the challenge of biological terrorism in a constrained budget environment.

Summary of Findings and Conclusions

During the next chapters of this final report, the insights of authors with knowledge and experience in various aspects of biological terrorism are presented. Below is a summary of observations and conclusions taken from these chapters.

1. WMD terrorism (state and non-state sponsored) against US citizens is a significant and increasing risk.

A. While the number of terrorist incidents is somewhat declining, the severity of individual attacks is dramatically increasing. This trend indicates the terrorist’s use of ever-increasing bomb size or more deadly devices and weapons. Therefore, it seems quite probable that a future group would elect to use a biological weapon rather than an explosive device or a firearm. Thus, it is imperative that this nation take measured, but galvanizing and continuing, steps to prevent such attacks, and to provide the means to minimize their effects if they occur. Preparation for such deliberate attack also serves to help mitigate natural or other disasters by enhancing emergency response in general.⁹

The most often cited reasons for the likely future selection of a biological weapon are: 1) high lethality; 2) modest weapon size relative to its destructive potential; 3) relatively simple and rapid deployment; and 4) the capability of covert deployment. The special equipment needed is neither expensive nor difficult to obtain. Active live cultures are available naturally in the environment or can be ordered from a biological supply house. Most often the limiting factor is the necessity for technical knowledge in the field of microbiology. Chapter 3 discusses this trend in detail, and other aspects of this theory are discussed in chapters 1, 4, 5, and 10.

⁹ The need for a fundamental shift in direction was recently accentuated by Secretary of Defense Cohen’s statement that, “a paradox of the new strategic environment is that American military superiority actually increases the threat of nuclear, biological, and chemical attack against us by creating incentives for adversaries to challenge us asymmetrically.” We believe there are groups with both the desire and the will to conduct terrorist attacks on US soil and against US targets.

B. The new terrorism is increasingly motivated by body count. There is a shift in the motivation behind terrorism from political issues, to those that are of a more fatalistic orientation—as is often the case in religious and/or ethnically-motivated terrorism. We have adopted the term “nihilistic terrorism” to describe this new type of terrorism. The resulting shift in the goals and operations of the terrorist is having grave effects. Politically-motivated terrorists tend to limit violence in order to avoid encouraging public demands for retaliation against the terrorist group. However with nihilistic terrorism, the goal is often simply massive death and destruction of property. Indeed, we see that the goal of certain terrorists, such as Ramzi Yusef and Aum Shinrikyo, is to wage war on a society, as opposed to *influencing* society in a different direction--the rationale for most politically-motivated terrorism. Moreover, the technical means of perpetuating mass casualties are rising to accommodate an increasingly common motivation to do so.

Criminals would not seem to be logical perpetrators of biological attacks, since this type of attack would bring heavy pressure to catch and punish the perpetrators. However, there have been several extortion threats involving biological agents. Conceivably, a criminal might deliberately release a biological agent in some limited area in order to establish credibility for larger demands of funds and means of escape.

Such different groups may have widely different motives, as well as different potential targets and means of attack. State sponsored terrorists, including those intent on waging sub rosa war on the US, might have fairly sophisticated infectious agents and effective dispensers. However, the state sponsor might well be deterred from providing such support if there existed a fear that the US could trace the attack to that country, and then inflict retribution. Conversely, cult groups might choose to deliberately unleash contagious agents and not fear detection and punishment.

C. Biological terrorism is uniquely worrisome. In spite of the over 100 signatories to the 1975 Bacteriological and Toxin Weapons Convention, proliferation of biological weapons continues unabated. These weapons are particularly difficult to monitor and regulate because it is difficult to differentiate between efforts to develop biological materials for rogue purposes, and those directed toward legitimate purposes--such as the production of vaccines. Furthermore, it is relatively simple to produce pathogens and toxins in small, easily concealed facilities. Finally, the materials and knowledge necessary to create and sustain a biological weapons program are both widely available around the world.

2. Our National Security Strategy and infrastructure are no longer appropriate to counter WMD.

A. Development and implementation of clear policy can help to minimize the potential for terrorist incidents. These differing motivations and attacks indicate that there is not a "one-size-fits-all" strategy to counter biological terrorism. Instead, there must be a mutually reinforcing set of methods that together provide a reasonable approach to the most likely, and the most potentially lethal, threats. For instance, deliberate release of highly contagious agents is not

very probable. However, if such a release were to occur, it would be potentially very deadly. Finally, any decision concerning the amount of resources to allocate toward defense against biological terrorism should also account for the benefits to be gained by defending against *naturally*-occurring viruses.

Although PDD-62 was the necessary first step in clarifying and strengthening US responsibilities toward countering this enormous threat, it is equally clear that much remains to be done. In particular, the potential for biological terrorism raises critical issues of the proper relation between civilian and military sectors; federal, state and local authorities; and domestic and international affairs. This convergence needs to be explored to establish the best division of responsibility among the stakeholders. Preservation of civil liberties for Americans may become an important issue under the threat of terrorism, a situation that has some elements of both peace and warfare. Due to the increased risk of WMD terrorism, it is imperative that this nation take measured, but galvanizing and continuing, steps now to prevent such attacks; and to provide the means to minimize the effects, if such attack should occur. (See Chapters 4, 6, 7, and 8.)

B. Intelligence collection and sharing is inadequate and not properly structured for countering biological terrorism. For terrorism operations, both on US territory and abroad, the most likely sources of information are the local citizens, “on the scene.” In order to maximize its value, it is important to match information from these witnesses with national or global intelligence existing at the federal level. Yet, rules and procedures are sufficiently different between local law enforcement and federal intelligence agencies to produce major problems.

First of all, the US intelligence community is not experienced in collecting information to support law enforcement activities. If data related to criminal activities is discovered as part of collecting national security information, it may be passed to the law enforcement community. However, national foreign intelligence resources are not regularly used to support law enforcement activities. If national intelligence is applied as part of a criminal investigation, it subjects the intelligence sources and methods to the legal system’s “discovery” process, thereby allowing defense lawyers to gain access to what may be extremely sensitive information.

Furthermore, there are cultural differences between the law enforcement and intelligence communities. The law enforcement community gathers data, draws conclusions, and arrests those involved in criminal activities, convicting them in court based upon its members’ charter. There are strict procedures that must be followed in order to collect information that will become evidence. Therefore, to enable national intelligence data to support law enforcement, these strict procedures must also be followed, so that the data can become admissible evidence.

The US intelligence community, on the other hand, has fewer constraints. It generally gathers, analyzes, and catalogs data for the purpose of providing the US leadership with warning of attack, or to gain awareness and understanding of foreign nations. By its nature, intelligence is generally focused well into the future, is much less specific, and is source-sensitive. As a result, the intelligence community is reluctant to allow law enforcement agencies the use of its information and products. It is generally agreed that the “discovery process” would allow sensitive sources and methods to be widely exposed and compromised, resulting in the sources becoming endangered or much less effective at providing further information.

Further problems are encountered because the intelligence community is prohibited from collecting or holding information on US citizens. These cultural differences and procedures often result in a lack of collaboration between law enforcement and intelligence organizations—and a

reluctance to share data that can be vital in investigating and preventing terrorist actions. (See Chapters 1 and 2.)

C. Traditional methods of deterrence have inherent limitations and tend to be ineffective in countering proliferation of WMD today. The Cold War strategy for stemming the proliferation of WMD consisted almost exclusively of deterrence through arms control, intelligence collection, diplomacy, and, as a last resort, threats of armed force. Yet in the emerging strategic environment, these methods of deterrence are no longer as effective. For example, deterrence may prove difficult against religiously-motivated terrorists who believe they are carrying out the will of their Supreme Being. The components of deterrence need to be reexamined, then *refocused*, with other more pertinent options added. (See Chapter 13.)

D. Homeland defense is a major DoD mission, cutting across civil and military sectors; and federal, state, and local governments. Protecting the territory of the US and its citizens from “all enemies foreign and domestic” is the principle task of government, with the armed forces the necessary defender in most cases. We concur with the recommendation in the 1997 National Defense Panel report that an integrated set of active and passive measures for deterring and defending against the use of WMD is needed. These measures will necessarily involve a range of federal, state, and local government agencies in their planning. Managing the consequences of an attack by WMD will also require action and coordination at all levels of government. However, there are complex legal and sociological problems associated with the use of uniformed troops in this role. These must be rationally solved if we are to bring sufficient and effective resources to play. Chapters 6, 7, and 8 discuss this subject in detail.

E. Further developments in technology are needed, as this holds the potential to address nearly every aspect of countering biological terrorism. In the past it was assumed that not much could be done to counter a biological attack. Advancements in technology have begun to create new capabilities in detection, information systems, medical prevention, and consequence management that may change that pessimistic view. Now, with better sensors and effectors, an active defense may be achievable, in addition to passive measures. For instance, a network of biosensors in an urban area could warn of multiple contaminants in the atmosphere, including deadly microorganisms. Civil authorities would know to commence emergency medical relief to the area before the outbreak of symptoms. Some promising areas of research are listed in Chapter 11 and 12.

In the future, one consideration would be to deploy active decontamination means cued by the sensor net. One example would be a variant of the electrotechnologies identified by Professors Randy Curry and Tom Clevenger in Chapter 13. Due to cost, such a large piece of infrastructure would be justified only in high threat target areas. However, it would certainly be warranted if biological attacks prove to be probable, and of an increasingly larger scale, in the future—as is predicted.

Advanced medical countermeasures (discussed in Chapters 9 and 10) offer a more promising means than standard antibiotics for a robust approach to countering biological weapons. For example, the Defense Advanced Research Projects Agency (DARPA) recently sponsored work on polymer “blood scrubbers” at the University of Virginia that successfully removed viral surrogates from the blood streams of monkeys. DARPA is also working on a substance that would keep anthrax from progressing from its sturdy but relatively benign spore state to its pathogenic, vegetative state.

Further research is desperately needed. For example, Anthrax is the most recognized of all germ weapons. Although there are few civilian cases, it represents one of the more accessible, likely, and devastating threats in a terrorist's arsenal. Since receptors for the "protective antigen" of anthrax have been identified on CHO-K1 cells, it appears reasonable that small molecules may be identified in the laboratory to preferentially bind to similar sites in human lung lymph nodes, where inhalational anthrax grows and spreads its devastating effects. Blocking these particular binding sites may be effective even once the human host has been fully colonized, a fatal situation under current circumstances.

Unconventional pathogen countermeasures should be aggressively pursued, not only for reasons of national security, but also because infectious disease is the number one killer throughout the world. The US asymmetric advantage in biotechnology must be leveraged against the asymmetric threat represented by germ weapons and disease. The "dual use" nature of many of the technologies needed to counter the biological threat may be key to their cost efficient acquisition. This rationale for cost effective acquisition of needed advanced technology is valid for nearly *every* aspect of countering biological terrorism. A suggested framework for this acquisition approach might look like this:

- In the **near-term**, a detailed plan and coherent organizational structure are needed to forge a *national* effort to counter biological terror. The 1997 Defense Science Board on Transnational Threats called for an integrated strategic plan, and an end-to-end systems approach. This should be developed *now* under the NSC.
- In the **medium-term**, a strategy is needed that counters biological threats by capitalizing on their latency. Given functional, proliferated, biological sensors, centralized national assets could then be shipped in and brought to bear early on, thereby mitigating the worst effects of biological terrorism. For instance, inhalation anthrax generally takes at least a day to incubate in a human host. If appropriate antibiotics are administered before the onset of symptoms, there is an relatively favorable prognosis for recovery.
- In the **long-term**, advanced medical and other countermeasures are needed that will overcome a broad spectrum of biological threat agents, and regain the initiative for the defender, making a biological attack much less likely, while significantly mitigating its effects if it nevertheless occurs.

In general, a time-phased approach for this nation is desperately needed to counter biological terrorism--one that places resources against long-term research needs *now*, as well as provides for near-term acquisition of high priority items.