Terrorists and the Potential Use of Biological Weapons

A Discussion of Possibilities

Jeffrey D. Simon
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PREFACE

The research reported here was sponsored by the United States Armed Forces Medical Intelligence Center (AFMIC) under a project entitled "Terrorist Use of Unconventional Weapons." It is part of a series of studies undertaken to provide a better understanding of the potential use of biological weapons by terrorists. This report does not attempt to predict where or when a terrorist attack with biological agents might take place, nor does it purport to describe all the types of biological agents that could be used by terrorists. Rather, its intent is to explore the reasons why terrorists have not yet used biological weapons, and what might lead to the use of such weapons by terrorists in the future.
SUMMARY

Terrorists can cause death and destruction through a variety of means. They can mount traditional attacks, such as hijackings, kidnappings, shootings, and bombings. Alternatively, they can turn to unconventional attacks using biological, chemical, or nuclear weapons. This report addresses one aspect of the unconventional threat: the potential for terrorists to use biological weapons.¹

The report first discusses the implications of recent trends in terrorism for the future use of biological agents and the reasons why terrorists might be motivated to use them. It then identifies several constraints that inhibit terrorists from venturing into this new type of conflict and the factors that could break down these constraints. The report then establishes some broad characteristics that could identify the types of terrorist groups that might be more likely than others to use biological weapons.

Recent trends in terrorism have shown an increase in the number of incidents with fatalities and in the number of people killed in terrorist attacks. The 1980s witnessed the growth of religiously inspired terrorism, where acts of violence are expected to be rewarded in the afterlife. There has also been a rise in state-sponsored terrorism, which may make it easier for terrorists to acquire biological weapons.

Biological weapons would provide terrorists with new ways to threaten or inflict violence on potential victims. They would produce far more casualties than traditional types of terrorist attacks. Terrorists may also view biological weapons as a way to undermine the economy of a country or inflict heavy casualties upon its military forces, objectives that are precluded by most types of traditional attacks.

Terrorists, nevertheless, have rarely ventured into the area of biological warfare. Although there have been a number of threats, neither interviews with terrorists nor terrorists' writings have made specific references to the use of biological weapons.

This can be attributed to several factors. First, despite popular perceptions of terrorists as "irrational," many terrorist groups have specific constituencies to whom they try to appeal. The use of biological agents could alienate these supporters, as the casualties from an

¹Although this study focuses on biological agents, much of its argument could also be applied to chemical weapons. The use of chemical or biological agents would involve significant departures from traditional types of terrorism, and either would therefore require a decision by a terrorist organization to escalate to a higher level of violence.
attack with such agents would far exceed those from other types of terrorist incidents. In addition, a government attacked by terrorists with biological weapons could very well respond with a crackdown that would destroy the group. There is also a reluctance among terrorist groups to experiment with unfamiliar weapons. Finally, the supporters of a terrorist organization—and the terrorists themselves—might be among the casualties of a biological-weapons attack.

However, the constraints against the use of biological weapons may be weakening. In recent years, terrorists have found it necessary to launch more dramatic and more violent attacks to attain the kind of publicity that was once generated by less spectacular incidents. Car bombings, airplane sabotage, and kidnappings have now become routine, and the desire to obtain immediate attention could be a prime motivation for a terrorist group to turn to biological agents. The reluctance of terrorists to experiment with unfamiliar weapons may also be weakening, as state-sponsored terrorism becomes a dominant form of international violence. A state sponsor would have little trouble training a terrorist group in the proper use of biological agents and would be able to supply a wide variety of such weapons.

Independent terrorist groups may also find the uncertainty factor eroding, as more information about biological agents becomes available. Several agents exist that can be used without sophisticated technical knowledge. Furthermore, it would not be difficult to recruit people with enough scientific background to produce the desired agents.

Existing constraints against the use of biological weapons would be most severely weakened, however, by an attempt by some terrorist group to use them in a highly publicized incident. Terrorists tend to copy the actions of others, and an incident involving biological weapons would not even have to be successful to open up a floodgate of further assaults. Since terrorism is a highly symbolic type of conflict, “failed” attacks—e.g., bombs that do not explode or missiles that miss their target—can be almost as effective, in terms of publicity and public fear, as successful ones. Furthermore, terrorist groups can learn from the mistakes of others and use new weapons more effectively in the future.

It is difficult—if not impossible—to predict which specific groups might use biological weapons or what their targets might be. Nevertheless, potential biological-weapon users would be likely to exhibit certain characteristics. First, they would be likely to have a general, undefined constituency that presents few restraints concerning the moral implications or the potential public backlash associated with a biological-agent attack. Second, they would be likely to have a previous pattern of large-scale, high-casualty-inflicting incidents. Third,
they would have demonstrated a certain degree of sophistication in weaponry or tactics. And finally, they would probably have shown a tendency to take risks in their attacks.

Since the technological, logistical, and financial barriers to the use of biological agents are not insurmountable, a key determinant in the potential use of such agents will be the willingness of terrorists to engage in this new type of violence. Therefore, efforts to improve intelligence regarding terrorist group strategies and capabilities will become increasingly critical in the future.
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I. INTRODUCTION

The widespread fear of terrorism stems from several sources. On the individual level, everyone sees himself as a potential victim. Whenever a hijacking or bombing is reported in the media, people wonder whether they might be the next target. In the aftermath of a series of major international terrorist events in 1985 and 1986—including the hijacking of TWA Flight 847, the seizure of the Achille Lauro cruise liner, the massacres at the Rome and Vienna airports, and the midair bombings of Air India and TWA jets—Americans became fearful of traveling abroad. This fear intensified following the U.S. air raid on Libya and was renewed with the 1988 bombing of Pan Am Flight 103 over Lockerbie, Scotland.

Yet on both the individual and national levels, terrorism, for the most part, poses a less serious threat to the United States than is commonly believed. In 1985 and 1986—two years during which the terrorist threat was perceived to be at its highest level for the decade—American fatalities accounted for only 3 percent of the worldwide totals. Moreover, the number of U.S. fatalities due to indigenous terrorism is miniscule.

The threat that most forms of terrorism pose to U.S. national security and global interests is also minimal. Even the hijacking of an airliner with Americans aboard, which generates a great deal of emotion and extensive media coverage, has limited consequences for the country's security.¹

However, a single incident involving the use of biological weapons by terrorists could have catastrophic results. With a very small amount of certain biological agents and an effective means for dispersing them, terrorists could conceivably kill tens of thousands of people and create an unprecedented crisis for the United States.

Many accounts have been written of the possible consequences of terrorists unleashing biological agents on the world's population.² To understand the threat of terrorists with biological weapons, however, it is necessary to examine the diversity in terrorist groups and tactics

¹For a discussion of the terrorist threat to U.S. interests and a critique of U.S. policy responses, see Jeffrey D. Simon, “Misunderstanding Terrorism,” Foreign Policy, Summer 1987, pp. 104–120.

that might make some groups more likely than others to utilize biological agents. It is also necessary to identify the constraints that probably inhibit terrorists from using such weapons, and the conditions under which those constraints might be removed.

Because there is no substantive track record of biological-weapons attacks by terrorists—beyond a number of threats and a few "low-level" incidents—any assessment of the threat is necessarily speculative. Moreover, neither interviews with terrorists nor terrorists' own writings have made specific reference to the use of biological weapons.3

This report focuses primarily on the terrorist threat regarding biological agents, but much of the argument presented could also be applied to the potential terrorist use of chemical weapons. The use of either type of agent would represent a significant departure from traditional types of terrorism and would require a decision by a terrorist organization to escalate to a higher level of violence.

There are, however, some important differences between chemical and biological agents in terms of potential terrorist use. There have been more incidents—albeit at a relatively low level of violence—in which terrorists and criminals have used chemical agents (e.g., the Tylenol poisoning and various product contamination cases) than incidents involving biological weapons. Also, biological agents are microorganisms and are therefore likely to be less controllable than chemical weapons.

Nevertheless, the use of biological agents is not as difficult as is commonly assumed. The term biological "weapons"—as used in this report—tends to conjure up images of elaborate systems such as bombs, missiles, etc. In reality, however, a biological "weapon" can be something as unexpectedly simple as the use of a low-flying airplane or even a spray can to disperse anthrax spores, or the use of an umbrella with a ricin-poisoned tip. These are slightly more complicated operations than using a gun or setting off a bomb, but they can yield disproportionately dramatic results in terms of capturing world attention or inflicting heavy casualties upon terrorists' targets.4

The exact form of a future biological terrorist incident cannot be determined. The type of attack will depend on the motivations and

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3However, Abu Tayyib, the commander of Fatah's Force 17, stated in an interview that the Palestine Liberation Organization (PLO) has chemical weapons and would not hesitate to use them in future wars. (See Foreign Broadcast Information Service (FBIS), January 13, 1986, p. 47.)

4The use of biological agents can also carry significant political and personal risks for terrorists. These are discussed below.
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capabilities of the specific terrorist group and the vulnerability of the targets.⁵

Also, while the thought of terrorists using more lethal weapons usually evokes images of nuclear terrorism, there is less likelihood of a nuclear terrorist attack than there is of a biological attack. The tight security around nuclear facilities, the problems of transporting a nuclear weapon, and the lack of technical knowledge needed to detonate or fire such a device all make the use of nuclear weapons very difficult for terrorists.⁶ While sabotaging nuclear power plans may be easier than stealing a nuclear bomb or nuclear materials, terrorists are likely to be deterred from either type of attack by the security around nuclear plants.

Biological agents may also present a more attractive option for terrorists intent on using "new" kinds of weapons. The laboratories from which such agents could be stolen do not have the same level of security as nuclear plants or nuclear weapons depots. Furthermore, attempts have already been made to obtain the ingredients for developing biological agents through the mail. In 1984, two Canadians were arrested in Buffalo for placing orders with a U.S. research firm for cultures of botulism and tetanus. The Canadians claimed to be representing a research company which turned out to be nonexistent.

Biological agents are also more readily available and cheaper to purchase and develop into weapons than nuclear materials. In addition, less technical knowledge is required to use certain types of biological agents than is required for nuclear devices. Biological agents include viruses, bacteria, fungi, protozoa, and rickettsiae. Toxins, i.e., chemicals that can be extracted and purified from biological entities, can be considered as between chemical and biological agents.⁷

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⁵ An experiment by the Army in the late 1960s revealed the vulnerability of New York City's subway system to an attack with biological agents. Aerosol clouds of a harmless bacteria were sprayed through sidewalk vents into subway stations in Manhattan. The bacteria were then spread by the wind of the speeding trains throughout many stations. In addition, light bulbs containing the bacillus were tossed from the trains into subway tunnels. The vulnerability of various targets to a biological-agent attack was also illustrated by placing colored dye into the water system of a government building in Washington, D.C. (See New York Times, September 19, 1975, International Herald Tribune, April 23, 1980.)

⁶ The increasing role that state sponsors are playing in international terrorism, however, has made the nuclear terrorist threat less remote than it was a decade ago. (See Bruce Hoffman et al., A Reassessment of Potential Adversaries to U.S. Nuclear Programs, The RAND Corporation, R-3363-DOE, March 1986.)

Biological material can be obtained from academic, biological, biotechnological, or commercial sources. According to the World Health Organization, aerosol transmission of yellow fever has already been achieved in a laboratory setting, and aerosol infection of Rocky Mountain spotted fever has also been proven possible. Aerosol dispersion of heavy concentrations of anthrax spores is also feasible.\textsuperscript{8}

Clearly, then, the potential exists for terrorists to use a whole new class of weapons. This report does not attempt to predict where or when a terrorist attack with biological agents might take place, nor does it purport to describe all the types of biological agents that could be used by terrorists. Rather, it explores the reasons why terrorists have not yet used biological weapons, and the motivations that could lead to the introduction of such weapons as a form of terrorism in the future.

The following key questions are addressed below:

- What are the implications of current trends in terrorism for the potential terrorist use of biological weapons?
- What current constraints inhibit the use of biological weapons by terrorists, and what factors would tend to remove these constraints?
- Which types of terrorist groups may be more likely than others to use biological weapons?

\textsuperscript{8}Health Aspects of Chemical and Biological Weapons, World Health Organization, Geneva, 1970, pp. 60–83. It should be noted that toxicity alone is not a sufficient measure of the ability of a substance to affect large numbers of people. Means for dispersing the substance to maximize exposure are also required. I would like to thank Jerry Aroesty for raising this point.
II. IMPLICATIONS OF RECENT TRENDS IN TERRORISM

TRENDS IN TERRORIST ACTIVITY

Several trends point to the potential introduction of biological weapons by terrorists in the future:

- A recent increase in high-casualty events.
- The incidence of more spectacular terrorist events.
- Increasing blackmail/extortion terrorist threats.
- The growth of state-sponsored terrorism.
- An increase in religiously inspired terrorism.

The nature of terrorism has changed dramatically in the past few decades. Bombings of airliners, suicide car- and truck-bombing attacks, and massacres of civilians have all become commonplace in the 1980s. More terrorist groups are active today than ever before, and more terrorist incidents are being perpetrated. In 1968, 134 international terrorist incidents were recorded; by 1986, the number had risen to 412. Figures for 1988 indicate a total close to 400.\(^1\)

There has also been an increase in the number of incidents with fatalities. During the 1970s, an average of 44 terrorist incidents per year resulted in at least one death. Between 1980 and 1987, this average increased to 77 incidents per year. The number of people killed in terrorist attacks has also increased. There have been wide fluctuations, however, because in some years, a single incident has caused hundreds of deaths. For example, in 1985, 854 people were killed in international terrorist incidents, compared with 223 in 1984 and 329 in 1986. A large percentage of the 1985 death toll was due to the midair bombing of an Air India jet, which claimed 363 lives. Similarly, three incidents in Lebanon in 1983—the bombings of the U.S. Marine barracks, the U.S. Embassy, and the French paratroopers headquarters—accounted for more than half (350) of that year's international terrorism fatalities. And 270 of the 649 fatalities in 1988 resulted from a single incident, the bombing of Pan Am Flight 103.

\(^1\)These and other data in this report are based on the RAND Chronology of International Terrorism. The chronology includes only international incidents; indigenous terrorism, such as attacks by the Basque separatist group E.T.A. against Spanish targets in Spain are not recorded.
The growing lethality of international terrorism may indicate an increasing potential for the use of biological weapons by terrorists. Since attacks involving biological agents would be likely to result in extensive deaths and injuries, the increasing violence of terrorists in recent years is an ominous trend.

The tendency for a few spectacular incidents to capture world headlines and elicit dramatic government responses is another trend that has implications for the future use of biological weapons. The bombing of Pan Am Flight 103 illustrated how terrorists can use a single dramatic attack to heighten a sense of fear among the public in many countries. Since almost any type of biological incident would certainly be even more dramatic, it would fit into this recent pattern.

Terrorists have also threatened blackmail, with respect to both chemical and biological agents. Although most of the threats have turned out to be hoaxes, the consequences of a real incident are so great that each threat must be taken seriously—at least initially. Some groups or individuals may possess enough of an agent to effectively carry out the threat. In 1980, two casinos in Lake Tahoe were sent extortion notes demanding $10 million to prevent their water supply from being poisoned. A sample of the poison, which was believed to be an herbicide containing an element of Agent Orange, accompanied the notes. But officials were able to discount the threat, since approximately 7,000 pounds of the poison would have been needed to contaminate the 1.5-million-gallon water tank of one of the casinos.

In another case, four people were arrested in 1987 in London after threatening to release a poison gas over Nicosia, the capital of Cyprus, if they were not paid $15 million. The threat specified that dioxin would be released on the mountains south of Nicosia and then carried over the city by the wind. The blackmailers had planned to carry out several bomb attacks to force the Cypriot government to give in to their demands. There was no indication that the group actually possessed dioxin, and Scotland Yard stated that the terrorists did not appear to have the means to carry out the threat. However, the threat was taken seriously enough by Cypriot government officials to initiate studies on how to cope with the aftermath of a dioxin attack.²

The rise of state-sponsored and religiously inspired terrorism also needs to be considered in assessing the biological-weapons threat. Terrorists who have the financial, technical, and logistical support of foreign governments have many advantages over other terrorist groups—easier access to sophisticated weapons and false passports, assistance in penetrating tighter security, and protection after

incidents. Terrorists contemplating a biological attack would find it easy to obtain virtually any type of biological agent, as well as instructions in how to use such agents, once they acquired government support.  

The religious dimension of terrorism also points to the possible use of biological weapons. If a terrorist believes that acts of violence are not only politically, but also morally justified, he has a powerful incentive for any type of terrorist attack. The belief that one is rewarded in the afterlife for violence perpetrated on earth encourages undertaking high-risk attacks. The suicide bombings in Lebanon by Shiite extremists loyal to the late Ayatollah Ruhollah Khomeini were only one manifestation of this type of thinking. The growth of Islamic fundamentalist terrorism may have raised existing thresholds of the death and destruction terrorists are willing to inflict on others.

Religious fundamentalist terrorism, however, is not indiscriminate violence, since specific targets are pursued. In Lebanon, these targets have included U.S. military and diplomatic personnel and rival political and religious factions. Since biological weapons are less controllable than conventional bombs, they would claim far more unintended victims. This may be a risk that even the religious extremists are unwilling to take. However, if the background violence in a country is extensive—as it is in Lebanon, where car-bombing wars, militia skirmishes, and other attacks are almost daily occurrences—more dramatic and deadly attacks may be deemed necessary to attain the desired attention and objectives. This, combined with the blind-faith attitude of some followers of religious fundamentalist leaders, could make a biological-weapons attack likely if a leadership determined that such an attack would be beneficial to its cause.

OBJECTIVES OF BIOLOGICAL WEAPONS FOR TERRORISTS

In addition to the higher numbers of casualties in recent incidents, the spectacular nature of several incidents, and the rise of state-

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3There are many variations in state-sponsorship of terrorism. For example, a state can assist independent terrorist groups in certain actions when it believes those actions are in its interests. A state may also directly control a terrorist group that is acting primarily as its agent, or it may even use its own agents. Each of these types of state sponsorship carries different risks and benefits for the foreign government, particularly with respect to the use of biological agents. A government would not want to be found responsible for a terrorist act, particularly one with the potential backlash of biological weapons, and using one's own terrorist group or agents could leave a trail directly to the government. Use of independent groups might allow for more ways to cover up a state's involvement, but a group that is supplied with biological weapons could some day use those weapons against the supplying state itself or embark upon unauthorized operations.
sponsored and religiously inspired terrorism, there are other reasons to believe that terrorists may be inclined to use more lethal weapons in the future. The use of biological weapons could meet several terrorist objectives, including the following:

- To create fear in the general population.
- To protest a government's policies.
- To perpetrate an extortion.
- To undermine the economy of a target nation.
- To deliver a serious blow to a country's military forces.
- To allow for "quiet" terrorist assaults.

The creation of fear is a central characteristic of terrorism. The very term terrorism implies fear and terror. Terrorists can attack the general public, diplomats of a particular country, airline travelers, and many other kinds of groups and individuals. Terrorists often attempt to create a sense of fear in order to portray a government as either unable to prevent attacks on its citizens and representatives or losing control over events. This in turn can lead to a loss of public confidence. It can also lead to repressive measures by a beleaguered government—e.g., declarations of states of emergencies, detentions without trial—that might alienate the public.

A terrorist incident or threat involving biological agents would hold even greater promise for creating this cycle of fear. The release of deadly agents into the atmosphere would very likely cause a crisis for both the federal and local governments. In India, the disclosure by a terrorist suspect that other terrorists might poison drinking water tanks led to a statewide alert in 1986. In West Germany, published reports in 1979 that Palestinians in Lebanon were training the leftist Red Army Faction (RAF)—a group originally made up of remnants of the Baader-Meinhof gang—in the use of bacteriological weapons created concern in Bonn. A few years earlier, the Baader-Meinhof gang had threatened to poison water in 20 West German towns if three radical lawyers were not allowed to defend a comrade who was on trial. And in 1980, police raided an RAF apartment in Paris and found a miniature laboratory containing a culture medium of \textit{Clostridium botulinum}, which produces the botulinal toxin. Police also found notes about bacteria-induced diseases in the apartment.\textsuperscript{4} In another case, Australian authorities received an anonymous threat in 1984 warning that foot-and-mouth bacteria would be released if reforms in Queensland Prisons were not implemented.

In addition to being a means for protesting policies or attempting to create public fear, the use of biological or chemical agents might also be attractive to terrorists seeking an extortion or blackmail device. As pointed out above, governments can be the target of blackmail attempts made to attain funds, but most such threats—especially in the case of chemical agents—have been issued against private companies. In Japan, the “Man with 21 Faces” extortion group placed cyanide-laced candy on store shelves to obtain money from the Morinaga Candy Company. In the United States, several individuals attempted to capitalize on a series of incidents in which people died after taking Tylenol capsules laced with cyanide. Following the deaths and the discovery of several additional tainted bottles, extortionists throughout the country tried to blackmail companies with threats of product contamination. In a separate incident, a California man was arrested for threatening to set off a “toxic bomb” unless he received a $1 million ransom payment. Other incidents included a 1978 threat to contaminate the water supply of Phoenix, Arizona, if extortion payments were not made.

Terrorists may also be drawn to biological or chemical agents as a means of achieving objectives that are precluded by the use of conventional weapons. For example, a bombing, hostage episode, or shooting will have virtually no effect on a nation’s economy. However, the threat of poisoning key export products can create serious problems. This tactic has already been used effectively in several cases. Palestinian extremists injected Israeli oranges in 1978 with mercury, stating that their goal was not to “kill people in nations that import the oranges but [rather] to sabotage the Israeli economy.” Several children in the Netherlands became sick after eating the oranges. Poisoned Israeli oranges were also discovered in Great Britain and West Germany. One year later, the same Palestinian group, the Arab Revolutionary Army, threatened to poison Israeli agricultural exports to the European Economic Community. In 1986, Tamil guerrillas in Sri Lanka sent letters to the embassies of several Western nations claiming to have put potassium cyanide in Sri Lankan tea that was destined for export. And in 1988, minute traces of cyanide were found in two Chilean grapes, resulting in the quarantine and recall of all Chilean fruit in the United States for several weeks. The Chilean economy was seriously damaged by this incident.

Against military targets, biological terrorist attacks might yield more significant results than conventional or even chemical attacks. The potential for terrorists to incapacitate a military base or kill all personnel at a facility is likely to be greater with the use of biological weapons than with other types of attacks. Thus, terrorists might see
biological agents as a replacement for car bombings, rocket attacks, and assassinations in their operations against military targets.

Finally, biological agents may offer terrorists certain logistical advantages over conventional weapons. Biological weapon attacks can be more "quiet" than conventional attacks. Terrorists who want to facilitate their escape after an incident might find biological weapons well suited for that purpose. In 1978, Bulgarian defector Georgi Markov was assassinated by a Bulgarian agent on a London street. Rather than shoot the victim with a gun and draw attention, the Bulgarian agent used an umbrella weapon that fired microscopic pellets into Markov's leg. The pellets contained the deadly poison ricin, which inhibits the cells that synthesize protein and eventually causes death.\(^5\) Thus, while we tend to think about biological weapons as agents of mass destruction—which they certainly can be—there is also a more "practical" side to these weapons from the terrorists' perspective.

Biological weapons can thus provide terrorists with new ways of committing violent acts, ranging from extorting bigger payoffs from governments or companies to inflicting damage to a country's economic, political, and even military structure. If biological weapons would indeed serve many purposes for terrorists, why has this form of terrorism not become more prevalent? The answer lies in the constraints that have thus far inhibited terrorists from the large-scale use of biological weapons.

III. CONSTRAINTS AGAINST USING BIOLOGICAL WEAPONS

FACTORS INHIBITING TERRORIST USE OF BIOLOGICAL WEAPONS

The absence of large-scale terrorist incidents involving biological agents can be attributed to at least five factors:

- Terrorists may not want to create a backlash among their supporters.
- Terrorists may not want to unleash too strong a response from a government that is the target of a biological agent attack, since such a reaction could virtually eliminate the group.
- Terrorists may be fearful of the personal risks involved in using biological weapons.
- Most terrorists are reluctant to experiment with unfamiliar weapons.
- Terrorists may perceive conventional attacks as meeting their objectives.

Despite popular perceptions of terrorists as "irrational," the majority of terrorist groups have specific constituencies to whom they try to appeal. These constituencies include financial backers as well as larger segments of a population. The use of biological agents could create a backlash among these supporters as the numbers of casualties mount. The supporters of a terrorist organization may condone certain killings as necessary to further their cause, but it is quite another thing to justify killing thousands of people. That terrorist groups are well aware of the political costs of miscalculated attacks was evident in 1987 when both the Irish Republican Army (IRA) and E.T.A. issued public apologies for bombings that killed innocent civilians.

Terrorists may also fear that a government subjected to a biological attack will retaliate with a very strong response against the group itself. While eliciting a repressive response could serve the interests of a terrorist group, it is likely that the response of the targeted government, the public, and other governments will be unprecedented anger at the group responsible for the attack, and the result could be the virtual elimination of the group through arrests and other acts.

The use of biological agents also carries the risk that the terrorists' supporters—and the terrorists themselves—might be among the casu-
alties. Unlike conventional or even chemical attacks, which usually can be limited to the intended targets, biological weapons represent virtually unexplored terrain for terrorists. They cannot estimate the consequences of dispersing microorganisms into the atmosphere. It may thus be that reluctance to experiment with unfamiliar weapons is a major constraint inhibiting terrorists' use of biological agents.

Terrorists can also be deterred from embarking on attacks with biological agents if they perceive that conventional attacks are meeting their objectives. While terrorists have not succeeded in toppling governments or creating separate states, they are nevertheless well aware that a major hijacking, bombing, or kidnapping will generate worldwide publicity for their cause. Such incidents also put them on an equal footing with governments, forcing high-level officials to engage in a war of words with the terrorists. Thus, as long as terrorists believe that present-day tactics are sufficient to meet their objectives and they remain fearful of the political and personal risks associated with biological agents, there will be a reluctance to utilize these weapons.

WEAKENING OF THE CONSTRAINTS

However, there are a number of indications that the constraints against terrorists' use of biological weapons may be weakening. In recent years, terrorists have found it necessary to launch more dramatic and violent attacks to attain the same degree of publicity and government responses that smaller incidents previously generated. With terrorist attacks occurring on an almost daily basis, the public and the media have become somewhat desensitized. And with a multitude of terrorist groups "competing" for the international spotlight, more dramatic incidents are likely in the future. It would be difficult to conceive of a terrorist incident more dramatic—or guaranteed to gain more attention—than one involving biological agents.

The reluctance of terrorists to experiment with unfamiliar weapons may also be weakening as state sponsorship of terrorism increases. A state sponsor would have little trouble training a terrorist group in the use of biological agents and would be able to supply a wide variety of such agents. Foreign governments could also give false assurances to terrorists about the safety of using biological agents to get them to carry out an unknowingly suicidal attack that would thus eliminate any connection to the state sponsor. This possibility is not without prece-

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dent: Many bombs have been unknowingly carried into airports and other facilities by people who were tricked by somebody else.

Independent terrorist groups may also find the uncertainty factor in biological weapons eroding as more information becomes available. Several biological agents can be produced either at home or in a small laboratory, without sophisticated scientific knowledge. And terrorist groups that decide to use biological agents would have little difficulty recruiting somebody with enough scientific expertise to produce certain agents.

Finally, the political risks associated with using biological weapons might be deemed worth taking—or even necessary—by a terrorist group under certain circumstances. Conventional terrorism has been characterized by increasingly extreme attacks in response to defeats and setbacks. In May 1987, the IRA suffered its worst defeat in 18 years of conflict in Northern Ireland when British security forces killed eight IRA members in a shoot-out near a police station. The IRA responded several months later with a bombing on Remembrance Day—an annual ceremony to honor those who lost their lives in both World Wars—that killed 11 people and injured 55 others. In 1983, the African National Congress (ANC) set off its most powerful car bomb attack in downtown Pretoria, killing 20 people and injuring 170. This followed a South African raid into Lesotho several months earlier in which 12 ANC members had been killed. Thus, groups that suffer major setbacks at the hands of a government may one day turn to unconventional weapons as a last resort to either regain momentum or avert total collapse of their movement.

But the event most likely to break down existing constraints against using biological agents would probably be the use of such weapons by some terrorist group in a highly publicized incident. Terrorists tend to copy the actions of other terrorists; for example, a rash of car bombings followed the first few that occurred in Lebanon, and the midair bombing of an Air India jet in 1985 was followed by several attempts to place bombs aboard other airliners. Several recent incidents—including the crash of the Pan Am airliner in 1988—have involved bomb explosions.

Even an unsuccessful terrorist attack with biological weapons could open up a floodgate of further assaults. Since terrorism is a highly symbolic type of conflict, “failed” attacks can be almost as effective as successful ones. The publicity that is generated, the fear that is instilled in the public, and the government responses that arise are often the same, regardless of the degree of “success” of a terrorist incident. And other terrorist groups might learn from the mistakes of
others, enabling them to use the weapons more effectively in the future.

Iraq's successful use of chemical weapons in its war against Iran and its subsequent chemical attacks against Kurdish insurgents may already have weakened the constraints against terrorist use of biological or chemical weapons. If a government demonstrates that such weapons can prove decisive on the battlefield, this provides a powerful incentive for terrorists. The disclosure that Libya is building a chemical weapons factory also indicates that it may become easier for terrorists to obtain more lethal types of weapons. Since Libya is a state sponsor of terrorism, its ability to manufacture such weapons could hasten the day when terrorists acquire and utilize them.

Thus, there are several reasons to believe that biological weapons will eventually be seriously considered—and probably used in some manner—by terrorists. With more than 100 terrorist groups active around the world and new ones arising every month, a key question becomes how to distinguish the groups that are most likely to attempt an attack with biological or chemical weapons.
IV. DISTINGUISHING AMONG TERRORIST GROUPS

Ever since terrorists turned to hijackings in the 1960s, efforts have been under way to identify the individual characteristics of terrorists. The airline industry has used personality and physical profiles to try to identify potential hijackers, while several scholarly works have been written on the background of terrorists, their childhoods, their personality characteristics, and a variety of other traits.\(^1\) Equally important are assessments of entire terrorist groups, which can reveal important differences among the targets, tactics, and motivations of terrorist organizations.

The likelihood of various terrorist groups to use biological weapons can be compared in several ways. One way is by examining the extent of the groups' state sponsorship, since terrorists backed by foreign governments could overcome many technological obstacles to the use of biological weapons. From facilitating the acquisition of such agents to assistance in transporting and dispersing them, state sponsors could play an important role.

However, a terrorist group would not necessarily need a state sponsor to initiate an attack with biological weapons. Dispersing various biological agents into the atmosphere can be done by "independent" terrorist groups that have some understanding of science. For operations that require more technical knowledge, a terrorist group can always recruit the necessary people. Independent terrorist groups could also acquire biological agents from laboratories and other facilities.

Thus, the degree of state sponsorship of a terrorist group may not necessarily be the determining factor in the use of biological weapons.\(^2\) Another important factor might be the availability of finances. The more money a terrorist group has, the more options it presumably has. However, some biological agents are very inexpensive to obtain. Some observers have gone so far as to label biological weapons the "poor

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\(^1\)See, for example, Konrad Kellen, Terrorists—What Are They Like? How Some Terrorists Describe Their World and Actions, The RAND Corporation, N-1300-SL, November 1979; and Sue Ellen Moran (ed.), Court Depositions of Three Red Brigadists, The RAND Corporation, N-2391-RC, February 1986.

\(^2\)A separate issue is the use of biological or chemical weapons by foreign governments directly, and not through the proxies of terrorist groups.
man's atomic bomb.\textsuperscript{3} Thus, wealthier terrorist groups would not necessarily have any special advantage in terms of using biological agents.

Therefore, it is virtually impossible to "predict" which terrorist groups are most likely to embark upon biological terror: attacks. However, we can identify some basic characteristics that would make certain types of groups more likely than others to experiment with these weapons.

One important characteristic is a perception by the members of a group that biological weapons would not create a backlash among the group's supporters. Thus, nationalistic groups such as the IRA and E.T.A.—which at times have engaged in bombings and shootings that claimed the lives of innocent civilians—would most likely find the possible repercussions of biological weapons too risky. These types of groups depend upon the support—political, logistical, and financial—of significant segments of the population that may not necessarily approve of a group's violent tactics, even though they support its political and territorial objectives. However, the much greater violence of a biological attack and the moral implications of using biological weapons will probably continue to inhibit terrorist groups that are concerned about public opinion.

Groups that have demonstrated a previous pattern of relatively low-level types of attacks are also unlikely candidates for utilizing biological weapons. For example, the Red Brigades, who were very active during the 1970s, killed numerous Italian and Western government, military, and business officials. However, the killings were usually individual assassinations. While such groups could be potential perpetrators of "exotic" types of assassinations (e.g., shooting poison pellets into victims), large-scale biological attacks would be highly unlikely tactics for them. Other groups that have a past history of high-profile but relatively low-casualty-inflicting incidents include the Belgian Communist Combatant Cells (inactive since the mid-1980s) and the West German Revolutionary Cells.

Groups that lack technological sophistication or have never shown a tendency to take high risks in their attacks would also be unlikely

\textsuperscript{3}Neil C. Livingstone and Joseph D. Douglass, Jr., \textit{CBW: The Poor Man's Atomic Bomb,} Institute for Foreign Policy Analysis, Inc., National Security Paper no.1, Cambridge, Mass., January 1984. For a longer treatment of the issue of biological and chemical warfare, see Douglass and Livingstone, \textit{America the Vulnerable.}

\textsuperscript{4}As pointed out above, the impact of public opinion on IRA and E.T.A. strategy was evident by each group's "apology" after separate bombings resulted in many civilian deaths. During a meeting of the IRA early in 1989, Gerry Adams, the head of Sinn Fein, the legal political wing of the IRA, called for care in picking targets in order to avoid civilian casualties. (See \textit{Los Angeles Times}, February 12, 1989, p. 2.)
candidates for biological-weapons incidents. While all terrorist activity involves some risk for the terrorists—e.g., the risk of being caught or killed, or of having the operation go wrong—certain types of attacks involve more planning and daring than others. For example, the crash of the Pan Am jetliner in December 1988 was caused by a sophisticated bomb with a two-stage detonating system that included a timer and an altimeter, i.e., a barometric device that measures changes in a plane’s altitude. The bomb would explode only when the timer had run its course and the plane had reached a certain altitude. The purpose of the altimeter was to ensure that the bomb would not explode while the plane was on the ground without passengers in the event of a delay, while the purpose of the timer was to ensure that either the bomb would not be detected if the suitcase were placed in a decompression chamber at the Frankfurt airport—where the bomb had been first put on a Boeing 727 airliner—or that it would not explode on the Frankfurt-to-London route when it reached a high altitude. The London-to-New York flight involved a Boeing 747 with more passengers—and thus more potential victims—on board.

This incident illustrates the growing sophistication of some terrorist groups. The Popular Front for the Liberation of Palestine-General Command (PFLP-GC), for example, which is a leading suspect in the Pan Am bombing, is technologically very sophisticated, while other groups rely upon relatively simple types of explosives such as pipe bombs or grenades.

Terrorist groups that could conceivably initiate an attack with biological weapons would thus probably exhibit the following characteristics:

- A general, undefined constituency whose possible reaction to a biological-weapons attack does not concern the terrorist group.
- A previous pattern of large-scale, high-casualty-inflicting incidents.
- Demonstration of a certain degree of sophistication in weaponry or tactics.
- A willingness to take risks.

Several terrorist groups can be described as having amorphous constituencies for which concern about a public backlash would not be likely to deter the use of biological weapons. The Japanese Red Army (JRA), for example, whose goals and objectives include vague notions about world revolution, would not be likely to feel any constraints regarding negative public reaction toward a chemical or biological terrorist attack. In 1972, three JRA terrorists, working on behalf of the
PFLP, launched a machinegun and grenade attack at Lod Airport in Tel Aviv, killing 25 people and injuring 76. In an interview in the 1970s, Kozo Okamoto, the lone surviving JRA participant in the Lod Airport massacre, revealed that he had no clear conception of what he was seeking and felt no inhibitions about killing innocent people:

One of the ambiguities of Okamoto's revolutionary conception is that the enemy is not clearly defined. . . . He regards [ordinary people] as faceless, inevitable casualties of the revolution. Because he foresees total overthrow of the existing arrangements of society, he does not feel bound in any way by the moral values of the present world. . . . [But] he is not really certain of what society will be like after the revolution has occurred. This uncertainty about what will come after the all-important revolution requires that he suspend judgment about revolutionary methods. Since his revolution is not being fought in the name of any specific values, there are no constraints on how it may be fought. It is not simply a question of ends justifying means, but a more fundamental vagueness about what are ends and what are means. (Italics added)\(^5\)

European left-wing terrorist groups such as the RAF also have undefined constituencies and vague objectives. While the RAF seized upon the issue of intermediate nuclear missiles in Europe to justify a bombing campaign against NATO and U.S. military targets, the group does not have a specific constituency that might inhibit it from unleashing biological agents.\(^6\) Neo-Nazi groups, both in the United States and in Europe, would also be unlikely to feel any restraints because of public opinion. In fact, one U.S. white-supremacist group plotted during the early 1980s to poison the water supplies of Chicago and Washington, D.C. A police and federal government raid on the group's headquarters in Arkansas in 1984 uncovered a stockpile of 30 gallons of cyanide.\(^7\)

Another important factor in the likelihood of a group using biological or chemical weapons is the group's previous level of violence. Although all terrorist groups are "violent," some are clearly more violent than others, in terms of the number of casualties per incident. Pro-Iranian Shiite fundamentalist groups, such as Hizbollah, and Palestinian extremists, such as the Abu Nidal organization, have been par-


\(^6\)The RAF, as noted in Sec. II, has already produced a culture medium of *Clostridium botulinum* and has made threats in the past concerning the use of biological and chemical agents. One unconfirmed report—which authorities denied—stated that RAF members during the spring of 1989 had secretly photographed the Federal Research Institute for Animal Virus Diseases in Tuebingen, West Germany, in order to steal infectious viruses. See Risks International, Inc., *Risk Assessment Weekly*, Vol. 6, No. 20, May 19, 1989, p. 3.

ticularly violent in the 1980s. *Hizbollah* was responsible for the suicide truck bombing at the U.S. Marine barracks in Lebanon that killed 241 Marines, as well as bombings of the U.S. Embassy and the French peacekeeping troops headquarters. Abu Nidal was responsible for the simultaneous massacres at El Al ticket counters at the Rome and Vienna airports during the 1985 Christmas season that killed 20 people and injured 101, and for the massacre of 22 Jewish worshippers at an Istanbul synagogue in September 1986. There have also been unconfirmed reports that *Hizbollah* is having a Shiite scientist manufacture toxic gases.\(^8\)

The suicide truck and car bombings perpetrated by Islamic fundamentalists in the early 1980s illustrate how a belief in martyrdom can justify any type of terrorist attack. Furthermore, since there are many factions within both the Islamic and Palestinian movements, internal divisions could lead certain factions to decide that a higher level of killing is necessary to preserve their own goals.

Other highly violent terrorist groups include the JRA and Sikh extremists in India. Although the JRA has not perpetrated any large-scale attacks since the Lod Airport massacre, one member of the group, Yu Kikumura, was arrested in the United States in 1988 and convicted of possessing three powerful bombs. Sikh extremists were responsible for the blowing up of an Air India plane in 1985 which killed more than 300 people and for the massacres of large groups of Hindus.

Since the number of deaths and injuries in large-scale conventional terrorist incidents is minuscule compared with the potential casualties that would result from most chemical or biological attacks, the fact that a group has inflicted hundreds of deaths in a single incident does not necessarily mean that it would venture into the world of biological warfare. A key factor, therefore, in any decision to escalate to biological or chemical attacks would be a perception by the group that conventional bombings, hijackings, and shootings no longer serve the group's objectives and that more violence is necessary. A group might perceive a need to generate more publicity in an environment where traditional types of terrorist attacks no longer get extensive media coverage, or it might feel a need to take advantage of new types of weapons as they become available.

Terrorist groups that have demonstrated a certain degree of technical sophistication and a willingness to take risks in their attacks might also be more likely to consider using biological or chemical weapons. The PFLP-GC, as pointed out above, is suspected of placing sophisticated plastic explosives aboard Pan Am Flight 103. A few weeks

prior to that incident, West German police raided a PFLP-GC cell and discovered 10.5 ounces of plastic explosives hidden inside a portable radio.\(^9\)

While placing anthrax spores into a device for aerial dispersion might prove more risky for terrorists and might require more scientific knowledge than designing a bomb, groups that have favored high-technology weapons would nevertheless be more likely to experiment with different types of lethal weapons than would less-inventive groups.

Finally, the threat of guerrilla armies acquiring and using biological or chemical weapons has implications for the potential use of these weapons by terrorists. While the distinction between terrorists and guerrillas is sometimes unclear, there are nevertheless some real differences. Guerrilla armies are usually larger and better organized, and they pursue different tactics and goals than terrorist groups (e.g., engaging the military forces of a government in skirmishes, attempting to win the support of—or intimidate—peasants, gaining territory, etc.). While terrorism may be a part of guerrilla strategy, it is not its defining characteristic. However, if guerrillas begin using biological or chemical weapons, it is likely that terrorist groups will eventually follow suit, since terrorists tend to copy what they perceive to be successful tactics by other terrorists or other groups. With guerrillas acquiring increasingly sophisticated weapons from state supporters and on the international arms market, the potential for biological or chemical weapons to become a part of guerrilla warfare may not be very remote.

The difficulties of identifying potential terrorist users of biological weapons makes the role of intelligence critical in attempting to combat the terrorist threat. The nature of terrorism precludes predictions of the exact target, tactic, or weapon that a terrorist group may use, and situations can change or opportunities arise that may make even the most unlikely terrorist group consider using biological agents.

Counterterrorist intelligence, however, is more of an art than a science. It ranges from trying to track the worldwide movements of known terrorists to uncovering plots for specific operations. Many pieces of information have to be sorted out, and it is often necessary to obtain the cooperation of other government intelligence agencies. Because failure to prevent even a single biological-weapons incident could prove disastrous, intelligence officials will be under increased pressure to uncover any such plots. While there is no blueprint that can be followed, there are some indicators that could point to a terrorist group planning a biological-agent attack. These include recruitment

of new members who have scientific backgrounds; contacts with scientific laboratories or attempts to purchase or steal biological agents; and suspicious inquiries by individuals concerning infectious diseases. Furthermore, the activities of state sponsors of terrorism must be continually monitored to uncover any movement toward the development of biological weapons.
V. CONCLUSION

The possibility that terrorists may one day use biological agents cannot be ignored. Although the risk today is quite low, the technological, logistical, and financial barriers to using such weapons are not insurmountable. The key determining factor is likely to be the willingness of terrorists to engage in this most deadly type of conflict.

Recent trends in terrorism have shown that terrorists have become more violent in their attacks. Shooting down airliners, planting bombs aboard planes, and massacring civilians on buses and in villages have all become regular elements of the terrorist repertoire.

This higher level of bloodshed, however, does not automatically translate into the use of biological agents. There are many constraints that may inhibit groups from venturing into the world of biological warfare, e.g., unwillingness to experiment with unfamiliar weapons or uncertainty about the possible political repercussions of inflicting mass casualties.

There are indications, however, that these constraints may be weakening. The knowledge necessary for using many types of biological agents is not beyond university-educated terrorists. And the rise of state-sponsored terrorism facilitates the acquisition and potential dispersal of even the most sophisticated biological agents.

The threshold for taking multiple lives is also declining as religiously inspired terrorism increases. The belief that one's acts of violence will be rewarded in the afterlife is a powerful incentive for even higher levels of violence.

Since physical security measures against terrorists with biological weapons cannot be foolproof, the consequences of terrorists even attempting such an attack will be serious. This makes the task of uncovering terrorist groups' strategies and capabilities all the more critical.

Terrorism will continue to be a problem. While it is not necessarily true, as some observers have claimed, that "time is running out," we cannot afford to be complacent about the threat of terrorists using biological weapons. Hijackings and hostage episodes do not threaten our national security. The same cannot be said for terrorists with biological weapons.

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1Douglass and Livingstone, America the Vulnerable, p. 169.
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