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COMBATING TERRORISM

Observations on the Threat of Chemical and Biological Terrorism

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Mr. Chairman and Members of the Subcommittee:

I am pleased to be here to discuss our report, *Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks* (GAO/NSIAD-99-163, *Sept. 7, 1999)*, issued last month to you, the Chairman and the Ranking Minority Member of the Senate Veterans' Affairs Committee, and the Ranking Minority Member of the House Armed Services Committee. My testimony today summarizes the two principal messages of that report. First, it discusses the ease or difficulty for a terrorist to create mass casualties (defined as at least 1,000 deaths or illnesses) by making and using chemical or biological agents without the assistance of a state-sponsored program. Second, it addresses the need to use intelligence estimates and risk assessments to better guide and prioritize appropriate countermeasures and programs.

Because of the technical nature of the topic, we consulted numerous experts in the course of our work. For example, we obtained from intelligence agencies, the Federal Bureau of Investigation (FBI), military medical experts, and others lists of specific chemical and biological agents that might be used by terrorists. Experts formerly with U.S. and foreign government warfare programs provided detailed information on the production, weaponization, and delivery of chemical and biological agents. In addition, we interviewed experts in the fields of science, medicine, law enforcement, intelligence, and terrorism. We spoke with and obtained documentation from a number of federal agencies, including the U.S. Army Medical Research Institute of Infectious Diseases, the Centers for Disease Control and Prevention, the U.S. Army Soldier and Biological Chemical Command, and the Defense Threat Reduction Agency. We also analyzed manuals, handbooks, texts, reports, and studies on infectious diseases and on biological and chemical casualties.

Summary

According to the experts we consulted, in most cases terrorists would have to overcome significant technical and operational challenges to successfully make and release chemical or biological agents of sufficient quality and quantity to kill or injure large numbers of people without substantial assistance from a state sponsor. With the exception of toxic industrial chemicals such as chlorine, specialized knowledge is required in the manufacturing process and in improvising an effective delivery device for most chemical and nearly all biological agents that could be used in terrorist attacks. Moreover, some of the required components of chemical agents and highly infective strains of biological agents are difficult to

obtain. Finally, terrorists may have to overcome other obstacles for a successful attack, such as unfavorable environmental conditions and personal safety risks.

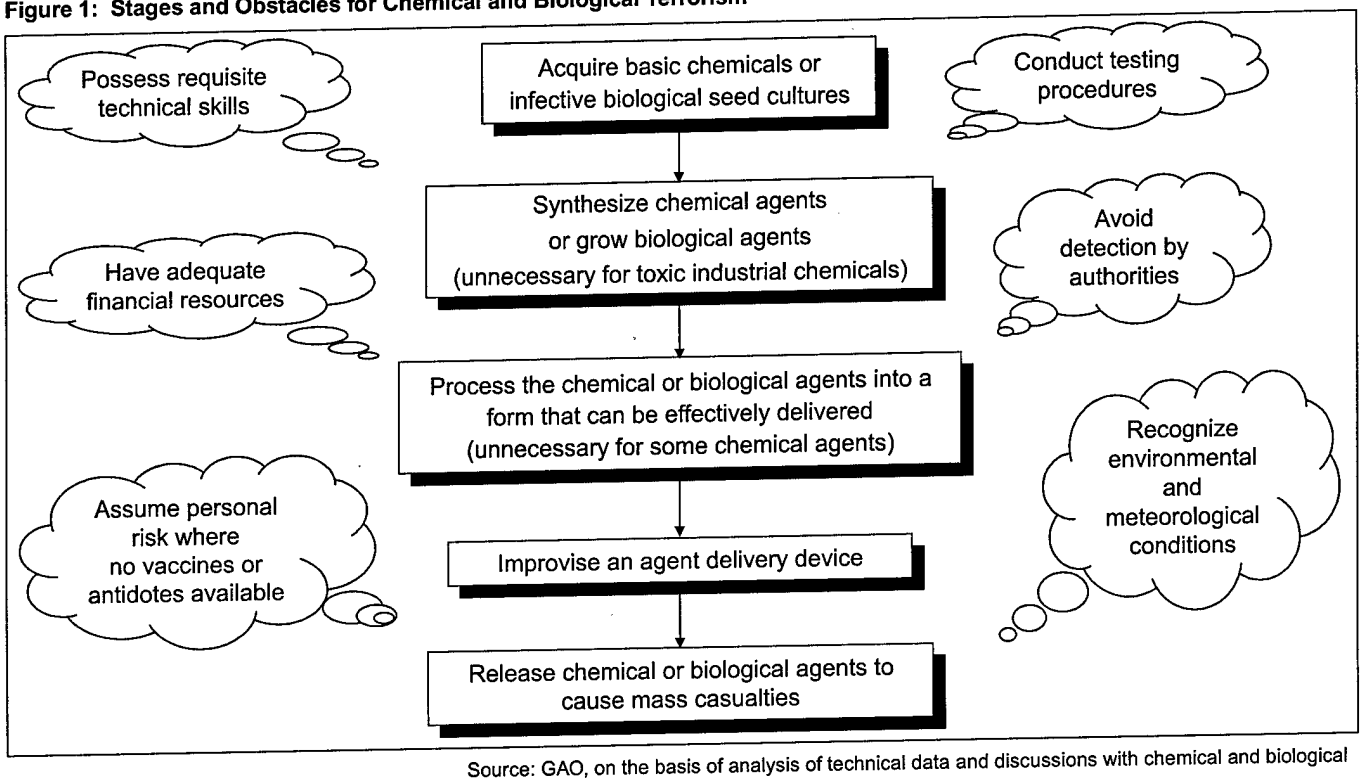
The President's fiscal year 2000 budget proposes $10 billion for counterterrorism programs—an increase of more than $3 billion over the requested funding of $6.7 billion for fiscal year 1999. To assess whether the government is spending appropriate levels on counterterrorism and spending these funds on the most appropriate programs, policymakers need the best estimates of the specific threats the U.S. faces. The intelligence community has recently produced estimates of the foreign-origin terrorist threat involving chemical and biological weapons. However, the intelligence community has not produced comparable estimates of the domestic threat. In our report we recommended that the FBI prepare these estimates and use them in a national-level risk assessment that can be used to identify and prioritize the most effective programs to combat terrorism. The FBI agreed.

Production and Delivery of Chemical and Biological Agents Generally Requires Specialized Knowledge

Terrorists face serious technical and operational challenges at different stages of the process of producing and delivering most chemical and all biological agents. The Special Assistant to the Director of Central Intelligence for Nonproliferation testified in March 1999 that "the preparation and effective use of BW [biological weapons] by both potentially hostile states and by non-state actors, including terrorists, is harder than some popular literature seems to suggest."[1] We agree. A number of obstacles exist for terrorists. Figure 1 shows the stages involved in making and using chemical or biological agents. It also illustrates some of the other impediments that terrorists may have to overcome such as obtaining source materials, risks to the terrorists, and environmental challenges.

[1]Unclassified statement on the worldwide biological warfare threat to the House Permanent Select Committee on Intelligence, March 3, 1999.

Figure 1: Stages and Obstacles for Chemical and Biological Terrorism



Source: GAO, on the basis of analysis of technical data and discussions with chemical and biological warfare experts.

Some chemical agents are commercially available and require little sophistication or expertise to obtain or use, but other chemical agents are technically challenging to make and deliver. Toxic industrial chemicals such as chlorine, phosgene, and hydrogen cyanide are used in commercial manufacturing and could be easily acquired and adapted as terrorist weapons. In contrast, most chemical nerve agents such as tabun (GA), sarin (GB), soman (GD), and VX are difficult to produce. To begin with, developing nerve agents requires the synthesis of multiple chemicals that, according to the experts we consulted, are very difficult to obtain in large quantities due to the provisions of the 1993 Chemical Weapons Convention, which has been in force since April 1997. In addition, a 1993 Office of Technology Assessment report on the technologies underlying weapons of mass destruction indicated that some steps in the production process of these nerve agents are difficult and hazardous. For example, although tabun is one of the easier chemical agents to make, containment of the highly toxic hydrogen cyanide gas that is produced during the process is a

technical challenge. In general, production of chemical nerve agents could be technically unfeasible for terrorists without a sophisticated laboratory infrastructure because their production requires the use of high temperatures and generates corrosive and dangerous by-products. On the other hand, chemical blister agents such as sulfur mustard, nitrogen mustard, and lewisite can be manufactured with little to moderate difficulty; but again, according to experts, purchasing large quantities of certain chemicals needed to make blister agents is difficult due to the Chemical Weapons Convention. Even if chemical agents can be produced successfully, they must be released effectively as a vapor, or aerosol, for inhalation exposure, or they need to be in a spray of large droplets or liquid for skin penetration. To serve as terrorist weapons, chemical agents require high toxicity and volatility (tendency of a chemical to vaporize), and need to maintain their strength during storage and release.

Causing mass casualties with biological agents also presents extraordinary technical and operational challenges for terrorists without the assistance of a state-sponsored program. For example, highly infectious seed stock for nearly all biological agents is difficult to obtain, particularly since controls over the stocks have improved. The only known sources of the smallpox virus, for example, are within government-controlled facilities in the United States and Russia. Ricin, a biological toxin, is easy to obtain and produce but requires such large quantities to cause mass casualties that the risk of arousing suspicion or detection prior to dissemination would be great.

Although most biological agents are easy to grow if the seed stock can be obtained, they are difficult to process into a lethal form and successfully deliver to achieve large scale casualties. Processing biological agents into the right particle size and delivering them effectively requires expertise in a wide range of scientific disciplines. Since the most effective way to deliver a biological agent is by aerosol (to allow the simultaneous respiratory infection of a large number of people), the particles need to be small enough to reach the small air sacs in the lungs and bypass the body's natural filtering and defense mechanisms. Terrorists can try to process biological agents into liquid or dry forms for release, but both forms pose difficult technical challenges. Experts told us that although liquid agents are easy to produce, it is difficult to effectively deliver them in the right particle size without reducing the strength of the mixture. Further, a liquid agent requires larger quantities, which can increase the possibility of raising suspicion and detection. Dry biological agents are easier to deliver, but they are more difficult to manufacture than liquid agents, are less stable, and are dangerous to work with. Other important technical hurdles

include obtaining the right equipment to generate properly sized aerosols, calculating the correct output rate (i.e., speed at which the equipment operates), and having the required liquid composition.

Terrorists have additional hurdles to overcome. For example, outdoor delivery of chemical and biological agents can be disrupted by environmental (e.g., pollution) and meteorological (e.g., sun, rain, mist, and wind) conditions. Once released, an aerosol cloud gradually dissipates over time and as a result of exposure to oxygen, pollutants, and ultraviolet rays. If wind conditions are too erratic or strong, the agent might dissipate too rapidly or fail to reach the desired area. Indoor dissemination of an agent could be affected by the air exchange rate of the building. In addition, terrorists risk capture and personal safety in acquiring and processing materials, disposing byproducts, and releasing the agent. Many agents are dangerous to handle. In some cases the lack of an effective vaccine, antibiotic/antiviral treatment, or antidote poses the same risk to the terrorist as it does to a targeted population.

National-Level Assessment of the Risk of Chemical and Biological Terrorism Is Needed to Focus Resources

A national-level assessment of the risk of chemical and biological terrorism, based on analyses of both the foreign-and domestic-origin threats, could help determine the requirements and priorities for combating terrorism and target resources where most needed. Much of the intelligence information that can be incorporated into a national-level risk assessment already exists. The U.S. foreign intelligence community has issued classified National Intelligence Estimates and Intelligence Community Assessments that discuss the foreign-origin chemical and biological terrorist threat in some detail. These intelligence assessments identify the agents that would more likely be used by foreign-origin terrorists.

The FBI is responsible for assessing domestic-origin threats. However, FBI analysts' judgments concerning the more likely chemical and biological agents that may be used by domestic-origin terrorists have not been captured in a formal assessment. The FBI has not specified or ranked individual chemical or biological agents as threats, but instead ranked groups of agents according to the likelihood that a category of chemical or biological agent would be used. The FBI analysis was based on law enforcement cases where chemical or biological agents were used or their use was threatened, including hoaxes. The FBI's categories are:

- Biological toxins: any toxic substance of natural origin produced by an animal or plant. An example of a toxin is ricin, a poisonous protein extracted from castor beans. (Ricin, due in part to the ton quantities required to cause mass casualties, is more appropriate for attacking individuals or small numbers of people and is not generally considered to be useful as a mass casualty weapon.)
- Toxic industrial chemicals: chemicals developed or manufactured for use in industrial operations such as manufacturing solvents, pesticides, and dyes. These chemicals are not primarily manufactured for the purpose of producing human casualties. Chlorine, phosgene, and hydrogen cyanide are industrial chemicals that have also been used as chemical warfare agents.
- Biological pathogens: any organism (usually living) such as a bacteria or virus capable of causing serious disease or death. Anthrax is an example of a bacterial pathogen.
- Chemical agents: a chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate people. Excluded from consideration are riot control agents and smoke and flame materials. Two examples of chemical agents are sarin (nerve agent) and mustard gas (blister agent).

By combining an FBI estimate of the domestic-origin threat with existing intelligence estimates and assessments of the foreign-origin threat, analysts could provide policymakers with a better understanding of the threat from terrorists' use of chemical or biological weapons. A national-level risk assessment based in part on the threat estimates would better enable federal agencies to establish soundly defined program requirements and prioritize and focus the nation's investments to combat terrorism. For example, in March 1999 we testified[2] that the Department of Health and Human Services is establishing a national pharmaceutical and vaccine stockpile to prepare medical responses for possible terrorist use of chemical or biological weapons. We pointed out that the Department's effort was initiated without the benefit of a sound threat and risk assessment process. We also found that some of the items the Department plans to procure do not match intelligence agencies' judgments of the more likely chemical and biological agents that terrorists might use and seem to be based on worst-case scenarios. We questioned whether stockpiling for the items listed in the Department's plan was the best approach for

[2]*Combating Terrorism: Observations on Biological Terrorism and Public Health Initiatives* (GAO/T-NSIAD-99-112, Mar. 16, 1999).

investing in medical preparedness. A sound threat and risk assessment could provide a cohesive roadmap to justify and target spending for medical and other countermeasures to deal with a chemical or biological terrorist threat. We recommended that the FBI sponsor a national-level threat and risk assessment, and the FBI agreed to do so.

Mr. Chairman, Members of the Subcommittee, that concludes my prepared remarks. I would be happy to answer any questions you may have.

Related GAO Products

Combating Terrorism: Need for Comprehensive Threat and Risk Assessments of Chemical and Biological Attacks (GAO/NSIAD-99-163, Sept. 7, 1999).

Combating Terrorism: Observations on Growth in Federal Programs (GAO/T-NSIAD-99-181, June 9, 1999).

Combating Terrorism: Analysis of Potential Emergency Response Equipment and Sustainment Costs (GAO/NSIAD-99-151, June 9, 1999).

Combating Terrorism: Issues to Be Resolved to Improve Counterterrorist Operations (GAO/NSIAD-99-135, May 13, 1999).

Combating Terrorism: Observations on Biological Terrorism and Public Health Initiatives (GAO/T-NSIAD-99-112, Mar. 16, 1999).

Combating Terrorism: Observations on Federal Spending to Combat Terrorism (GAO/T-NSIAD/GGD-99-107, Mar. 11, 1999).

Combating Terrorism: FBI's Use of Federal Funds for Counterterrorism-Related Activities (FYs 1995-98) (GAO/GGD-99-7, Nov. 20, 1998).

Combating Terrorism: Opportunities to Improve Domestic Preparedness Program Focus and Efficiency (GAO/NSIAD-99-3, Nov. 12, 1998).

Combating Terrorism: Observations on the Nunn-Lugar-Domenici Domestic Preparedness Program (GAO/T-NSIAD-99-16, Oct. 2, 1998).

Combating Terrorism: Observations on Crosscutting Issues (GAO/T-NSIAD-98-164, Apr. 23, 1998).

Combating Terrorism: Threat and Risk Assessments Can Help Prioritize and Target Program Investments (GAO/NSIAD-98-74, Apr. 9, 1998).

Combating Terrorism: Spending on Governmentwide Programs Requires Better Management and Coordination (GAO/NSIAD-98-39, Dec. 1, 1997).

Combating Terrorism: Federal Agencies' Efforts to Implement National Policy and Strategy (GAO/NSIAD-97-254, Sept. 26, 1997).

Chemical Weapons Stockpile: Changes Needed in the Management Structure of Emergency Preparedness Program (GAO/NSIAD-97-91, June 11, 1997).