Chemical and Biological Weapons Nonproliferation Project Information Sheet

Frequently Asked Questions: Likelihood of Terrorists Acquiring and Using Chemical or Biological Weapons

Since the September 11th attacks on the World Trade Center and the Pentagon, the Stimson Center's Chemical and Biological Weapons Nonproliferation Project has received numerous inquiries from citizens and the media about whether terrorists could execute a chemical or biological attack. Such queries are understandable given concerns about subsequent attacks on US soil, so the project's director, Amy E. Smithson, Ph.D., answers below the most frequently asked questions. She discusses these matters in much more detail in Chapter 2 of the project's publication *Ataxia: The Chemical and Biological Terrorism Threat and the US Response*, which is available on the web at www.stimson.org/cwc/ataxia.htm. Chapter 3 of *Ataxia* details what Aum Shinrikyo, the Japanese group responsible for the 1995 attack on the Tokyo subway system, was and was not able to achieve in its extensive efforts to acquire and use chemical weapons. While she has never made chemical or biological weapons herself, Dr. Smithson has spent a great deal of time in the company of weaponeers and defense specialists, as well as hazardous materials experts. Her responses draw from their first-hand knowledge and authoritative reference books, not speculation or hypotheses. A separate FAQ page titled "Personal Protection & Chemical or Biological Terrorism" provides information for individuals looking for ways to protect themselves and their families. Both sheets of frequently asked questions can be found online at www.stimson.org/cwc/terror.htm.

Would it be easy for terrorists to acquire chemical agents?

Chemical weapons formulas have been published and publicly available for decades. Mustard agents came of age during World War I, and nerve agents were discovered in the mid-1930s. The production processes used over seventy years ago are still viable. The ingredients and equipment a group would need to produce these agents are readily available because they are also the same items that are used to make various commercial items that we use everyday---from ballpoint pens to plastics to ceramics to fireworks. Scientists with a solid chemical background could likely make certain agents in small quantities.

However, two factors stand in the way of manufacturing chemical agents for the purpose of mass casualty. First, the chemical reactions involved with the production of agents are dangerous: precursor chemicals can be volatile and corrosive, and minor misjudgments or mistakes in processing could easily result in the deaths of would-be weaponeers. Second, this danger grows when the amount of agent that would be needed to successfully mount a mass casualty attack is considered. Attempting to make sufficient quantities would require either a large, well-financed operation that would increase the likelihood of discovery or, alternatively, a long, drawn-out process of making small amounts incrementally. These small quantities would then need to be stored safely in a manner that would not weaken the agent's toxicity before being released. It would take **18 years** for a basement-sized operation to produce the more than **two tons** of sarin gas that the Pentagon estimates would be necessary to kill 10,000 people, assuming the sarin was manufactured correctly at its top lethality.

How easy would it be for terrorists to disperse a chemical agent effectively?

The options for delivering poison gas range from high to low tech. Theoretically, super toxic chemicals could be employed to foul food or water supplies, put into munitions, or distributed by an aerosol or spray method. Because of safeguards on both our food and water supplies as well as the difficulty of covertly

disbursing sufficient quantities of agent, this method is unlikely to be an effective means to achieving terrorist aims. Chemical agents could also be the payload of any number of specially designed or modified conventional munitions, from bombs and grenades to artillery shells and mines. However designing munitions that reliably produce vapor and liquid droplets requires a certain amount of engineering skill. Finally, commercial sprayers could be mounted on planes or other vehicles. In an outdoor attack such as this, however, 90 percent of the agent is likely to dissipate before ever reaching its target. Effective delivery, which entails getting the right concentration of agent and maintaining it long enough for inhalation to occur, is quite difficult to achieve because chemical agents are highly susceptible to weather conditions.

Would it be easy for terrorists to acquire biological agents?

Oftentimes, obtaining biological agents is portrayed as being as easy as taking a trip to the country. The experience of the Japanese cult Aum Shinrikyo proves that this is not the case. Isolating a particularly virulent strain in nature---out of, for example, the roughly 675 strains of botulinum toxin that have been identified---is no easy task. Despite having skilled scientists among its members, Aum was unable to do so. Terrorists could also approach one of the five hundred culture collections worldwide, some of which carry lethal strains. Within the United States, however, much tighter controls have been placed on the shipment of dangerous pathogens from these collections in recent years.

How easy would it be for terrorists to disperse a biological agent effectively?

Terrorists cannot count on just filling the delivery system with agent, pointing the device, and flipping the switch to activate it. Facets that must be deciphered include the concentration of agent in the delivery system, the ways in which the delivery system degrades the potency of the agent, and the right dosage to incapacitate or kill human or animal targets. For open-air delivery, the meteorological conditions must be taken into account. Biological agents have extreme sensitivity to sunlight, humidity, pollutants in the atmosphere, temperature, and even exposure to oxygen, all of which can kill the microbes.

Biological agents can be dispersed in either dry or wet forms. Using a dry agent can boost effectiveness because drying and milling the agent can make the particles very fine, a key factor since particles must range between 1 to 5 *microns* to be breathed into the lungs. Drying an agent, however, is done through a complex and challenging process that requires a sophistication of equipment and know-how that terrorist organizations are unlikely to possess. The alternative is to develop a wet slurry, which is much easier to produce but a great deal harder to disperse effectively. Wet slurries can clog sprayers and undergo mechanical stresses that can kill 95 percent or more of the microorganisms.

Are terrorists trying to create genetically engineered biological agents to target certain ethnic groups?

It is impossible to know what is happening behind closed laboratory doors worldwide. However, this type of sophisticated activity is likely to be carried out by governments (e.g., former Soviet Union), not terrorists just beginning to explore bioweapons.

What places are terrorists likely to target for a chemical or biological agent attack?

Part of what terrorists count on to "terrorize" is that it is never really possible to know where they will strike next. Conventional wisdom says that terrorists intent on causing mass casualties would target large buildings, sporting arenas, or transit systems. Given my knowledge of how difficult it would be for terrorists to successfully execute a poison gas or germ attack, I have no concern about frequenting such locations.

Could terrorists poison the water supply?

The "pill in the water supply" is a myth about chemical terrorism that is not true. All metropolitan water supplies have certain safeguards in place between their citizens and the reservoir. Everyday, water goes through various purification processes and is tested repeatedly. If terrorists were to attempt to poison a reservoir, they would need to disperse tons of agent into the water---smaller amounts would be diluted---and the vessels required for such a feat would be difficult to miss. Many cities have implemented heightened security around their reservoirs in order to further monitor any questionable activities.

Have terrorists been actively seeking chemical and biological weapons capabilities? If so, what have they been doing with them?

There have been reports in the media that a handful of terrorist organizations have been exploring chemical and biological weapons. However, for the reasons discussed above, the technical hurdles to actually developing an effective large-scale chemical or biological weapons program---as opposed to investigating or experimenting with them---may well turn out to be so sizeable that terrorists would choose to remain reliant on more conventional means.

FINAL THOUGHT: The Japanese cult **Aum Shinrikyo** was brimming with highly educated scientists, yet the cult's biological weapons program turned out to be a lemon. While its poison gas program certainly made more headway, it was rife with life-threatening production and dissemination accidents. After all of Aum's extensive financial and intellectual investment, the Tokyo subway attack, while injuring over 1,000, killed only 12 individuals.

In 96 percent of the cases worldwide where chemical or biological substances have been used since 1975, three or fewer people were injured or killed.