

Bioterrorism, Homeland Security, and the Food Supply

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Let me express my appreciation for the honor of delivering today the 2002 D.W. Brooks lecture. It is perhaps fitting that here at one of our country's oldest institutions of higher learning we will be discussing one of our country's newest threats.

Before proceeding, however, let me add a caveat necessary for those of us who work for the federal government. The views you will hear today do not necessarily reflect those of the National Defense University, the Department of Defense, or the U.S. government.

My topic is the food supply and the threat from bioterrorism. My remarks will focus on three issues. I will start with some observations on the evolving terrorist threat, and point out some of the implications of the transformation. Then, I will discuss the nature of the biological warfare threat, examining the dangers from both state and terrorist use of biological agents. Finally, I will relate these initial discussions to the food supply.

Although my subject today is only a subset of the broader issues of terrorism in general and bioterrorism in particular, it remains a large topic. Threats to the food supply really cover two related but clearly distinct topics. People might be the intended target. In that case, food serves as the means for dissemination of the biological agents. Alternatively, livestock and crops might be the intended targets. In one instance, the aim is to harm people, while in the other the focus

is really the economy. Both are important, and both will be discussed in my remarks.

Let me also say a few words about bioterrorism. There is no commonly accepted definition of bioterrorism. In other contexts, I have defined bioterrorism as the threat or use of biological agents by individuals or groups motivated by political, religious, ecological, or other ideological objectives. I will return to this definition in a few moments, because how you define the threat not just a scholastic exercise.

The Evolving Terrorist Threat

To understand bioterrorism, we must start with the terrorists who might resort to use of biological weapons.

Today, our country is fighting terrorists, specifically a large, loosely organized group known as Al Qaida. This is a transnational group, meaning that it has members from many nationalities, all willing to work together for a common cause. It has many supporters who accept its peculiar view of Islam, providing money and other support even if they are unwilling to become terrorists themselves. It has many capable adherents, including more than a few willing to die to further its aims. And, as we discovered to our shock on September 11, 2001, it is capable of killing thousands of Americans.

What is the nature of Al Qaida? It is committed to a particular vision of the world, drawn from its interpretation of Islam, that finds Western values and culture—and particularly as found in the United States—an abomination. Al Qaida's adherents view the United States as an enemy trying to undermine the very foundations of Islam, and thus must be fought and destroyed.

The true target of Al Qaida and its core adherents are the central tenets of Western civilization. They dislike the tolerance for diversity that is at the heart of liberal democracies.

Defining Terrorism

These comments lead me back to my definition of bioterrorism. Most students of terrorism would probably object to my definition, noting that there is something missing from it. Most commonly accepted definitions of terrorism—including those that appear in most but not all U.S. laws and official government publications—declare that it is the use of violence to intimidate governments or societies. You will note that this thought is omitted from my definition of bioterrorism: the threat or use of biological agents by individuals or groups motivated by political, religious, ecological, or other ideological objectives.

Why reject what many terrorism experts have argued is the core concept behind terrorism? The word “terrorism” derives from “terror”, a psychological state induced by fear of physical acts. The phenomenon we call terrorism, however, encompasses activities that go well beyond the historical origins of the term. In today’s context, traditional definitions of terrorism—and traditional views of what terrorism is all about—can be dangerously misleading.

Let me give a simple example from recent history. In March 1995, the Japanese cult Aum Shinrikyo released sarin nerve agent in the Tokyo subway, killing 12 people and injuring another thousand. The group was clearly interested in causing mass deaths. Surprisingly, when Congress held hearings on the attacks, senior officials from the law enforcement and intelligence communities said that they did not monitor the cult because it was not a terrorist group. Moreover, even after the attacks these officials relied on the official definitions of terrorism to argue that their organizations had no responsibility to track groups similar to Aum.

The New Terrorism

Whatever the linguistic purity of the common definitions of terrorism, the focus on political intimidation was inappropriate in the case of Aum Shinrikyo. It diverted our attention from the most important characteristics of the emerging threat that some have called the New Terrorism.

In the past, most terrorists used violence to achieve discrete political ends. For this reason, they carefully calibrated their use of violence. They wanted to shock the enemy, but were careful not to undermine or antagonize their political supporters. Nor did they want to take steps that legitimized government responses. Often they hoped to provoke overreactions that undermined the legitimacy of their enemy. From this perspective, too much violence was potentially counterproductive.

For the New Terrorist, violence may remain a tool, but the ultimate objective is far different. They are not interested in forcing changes in government policies. Rather, they use covert violence to wage war on our society and on our way of life. They are less concerned about calibrating the level of violence, because the objective is not influence or coercion. Rather, they want to destroy our society. From this perspective, causing mass casualties or severe economic disruption is the objective.

Before the September 11 attacks on the World Trade Center and the Pentagon, some terrorism experts disparaged those who spoke of the New Terrorism. Some attempted to square the circle by arguing that even millenarian groups such as Aum Shinrikyo fit the classic definition. After all, it was sometimes asserted, even Aum Shinrikyo ultimately had political objectives and was using violence to intimidate and coerce. The ideological underpinnings and apocalyptic visions that promoted mass destruction were considered irrelevant. The critics dismissed the importance of considerations that went beyond the traditional terrorist political agendas of influence and coercion.

This is a dangerous intellectual route, because it ignores the means and treats the ends simplistically. Compare the relative sophistication of our thinking about war. The German general and theorist von Clausewitz argued that war is a "continuation of politics by other means." From this perspective, broader political forces define all wars. Having reached this conclusion, Clausewitzians still understand that all wars are not the same, and that we need to distinguish between the limited war fought for narrowly defined objectives and the general

war that raises existential concerns. Both are fought for political reasons, but they are profoundly different in ways that matter.

A definition of terrorism that cannot distinguish between groups that seek mass death and destruction from those that do not has limited utility. Terrorists with apocalyptic visions and willingness to cause mass casualties may not be common, but they do exist and they can do us harm.

Bioterrorism and Biological Warfare

What does this discussion of the changing character of terrorism have to do with bioterrorism and threats to the food supply?

The real answer to that question is ambiguous. Bioterrorism is a subset of terrorism, and from that perspective our understanding of terrorists is critical. However, bioterrorism is also a subset of biological warfare, and from that different perspective we must focus on the broader threat that biological weapons pose to our nation's security.

State Biological Warfare Programs

Let me start by insisting that despite concerns about terrorist use of biological agents, state biological weapons programs are the greater threat to international security. State programs to develop biological weapons are not new. All through the 20th Century, states have viewed biological agents as potential weapons of war. Moreover, while the capabilities of terrorists to employ biological agents are debated, there is little doubt about the existence of state biological weapons programs.

The Germans had a biological weapons program during the First World War. Their primary target was military transport during an era when armies still relied on animals for much of their mobility. The program was global in scope: they covertly infected animals in Europe and in both North and South America. Even before the United States entered the war on behalf of the Allies in 1917, German secret agents were infecting horses and mules with the organisms that cause

anthrax and glanders. Similarly, a German spy caught in Norway during 1917 was found with a vial of anthrax, which was intended for reindeer that the British used to move supplies overland to Russia.

Interest in biological warfare was even larger during the Second World War. Every major power had a program, including Japan, Germany, the Soviet Union, Britain, and the United States. Except for allegations of small-scale use, only the Japanese are known to have used biological agents during the war.

According to the available evidence, the Japanese invested enormous resources in their biological warfare program. They developed a huge research and development infrastructure in occupied areas of China. They studied numerous pathogens and toxins, and included many organisms aimed at plants and animals in their program. In addition to possibly murdering as many as 10,000 people in research experiments, Japanese operational use of biological weapons in 1941 and 1942 caused thousands of additional deaths. Although some Chinese sources claim more than 250,000 people were killed in Japanese biological warfare attacks, there is no solid corroboration. Reportedly, many Japanese soldiers also were infected, which may account for the surprising absence of follow-on attacks later in the war.

During the Cold War, interest in biological warfare continued. The Soviet Union had the largest program. According to Milton Leitenberg, one of our leading experts on biological warfare, "In the decades after WWII the USSR built the largest, most ambitious, and most advanced offensive BW system that the world ever saw." Although the United States also had a biological weapons program until President Nixon shut it down in 1969, Leitenberg assesses that the Soviet effort was an order of magnitude larger. Although both programs concentrated primarily on agents intended for use against humans, they also had anti-agriculture components. Thus, the Soviets had a substantial effort involving plant and animal pathogens while the United States focused primarily on plant pathogens.

Continued Proliferation

Rather than discussing what we know about biological warfare programs during the Cold War era, let me concentrate on today's threat.

Why do states remain the most significant threat? In the early 1970s, the international community negotiated an arms control treaty, the Biological and Toxin Weapons Convention, which prohibited signatories from developing or possessing biological weapons. For various reasons, however, the Convention has failed to stop the spread of biological warfare capabilities.

Several factors account for the uneven success of the Convention.

First, biological weapons are uniquely cost effective. They are relatively inexpensive to acquire and develop, yet have the potential to inflict truly catastrophic consequences. The massive disruption that biological agents can cause was clearly evident during the anthrax letter attacks of October 2001. What the anthrax attack did not demonstrate was the potential of biological weapons to infect large numbers of people. Some experts believe that pound for pound biological weapons can be more lethal than thermonuclear weapons.

Second, the technology to acquire and use biological weapons is widely available. It is ironic that such a horrific weapon draws almost exclusively on science and technology that has legitimate uses. Biological agents themselves are found in nature. The need to protect and respond to natural disease outbreaks makes possession and research on these agents a necessity.

The extent to which expertise on biological agents has spread is suggested by some estimates issued by the government in connection with the new Select Agent Rules that Congress has mandated. According to government estimates, there may be 95,000 facilities that possess biological agents that the Centers for Disease Control and Prevention believes need regulation. Similarly, the Animal and Plant Health Inspection Service believes that an estimated 50,000 facilities across the country might possess one of the biological agents on its list of those

most dangerous to animals. Only 1,000 facilities are thought to possess dangerous plant agents.

Unfortunately, those who would develop biological weapons exploit science and technology created for peaceful purposes. Thus, the same biological reactors used to produce bacterial vaccines could be employed to grow pathogens for a weapons program, just as the same freeze drying techniques used in vaccine production can produce a dry formulation of a biological agent. Similarly, it is often noted that sprayers developed for crop dusting are well suited for dissemination of biological agents.

A third advantage of biological weapons is the ease with which they can be hidden. The facilities to research, develop, and produce biological weapons have few if any unique signatures, and thus cannot easily be detected. All that is required is a reasonably sophisticated deception and denial plan, and it seems that countries smart enough to initiate biological warfare programs are smart enough to hide them.

This was clearly demonstrated by the failure of the United Nations Special Commission—UNSCOM—to get its arms around the Iraqi biological weapons program. Despite intensive efforts, UNSCOM ended its mandate with more questions than answers about the Iraqi biological weapons program. What we do know is that that Iraq weaponized several agents, and that it was researching at least one plant pathogen, wheat cover smut.

The result is the continued proliferation of biological warfare capabilities despite arms control agreements. Looking at the public statements of government officials, press accounts, and the assessments of academic researchers, it appears that there are currently about twelve countries with offensive biological weapons programs.

Significantly, the list of countries of concern includes the three “Axis of Evil” countries that President Bush highlighted in his January 2002 State of the Union address: Iran, Iraq, and North Korea. Equally important, there are concerns about every one of the state sponsors of terrorism identified by the State

Department. That list includes the three "Axis of Evil" countries as well as Cuba, Libya, Sudan, and Syria. With the exception of Iraq, however, little is publicly known about the activities of any of these countries, so it is difficult to assess the nature of the biological warfare threat that they might pose.

The Iraqi threat is well known due to the work of the UNSCOM established in the wake of the 1991 Gulf War. Inspectors demonstrated that Iraq had a substantial, sophisticated biological warfare program. Recent press reports and statements by senior government officials suggest that Iraq continues its efforts.

Terrorist Use of Biological Agents

Let me return again to the terrorist use of biological agents.

Much of my research during the past five years has focused on answering one question: what might motivate terrorists to adopt bioterrorism? The reason for posing the question is simple. There is remarkably little evidence of past terrorist interest in biological agents.

The History of Bioterrorism

To date, I have identified only 27 cases in which a terrorist group has shown some interest in biological weapons. In only 8 of those cases is the terrorist group known to have acquired a biological agent. There are only 5 instances of use of any sort.

What are these past uses?

Polish resistance. The first identifiable case dates to the early days of the Second World War. Polish scientists connected to resistance organizations apparently used biological agents against German troops and security personnel on multiple occasions. One Polish officer reportedly told the allies that they killed "a few hundred" German troops in this manner, but the report was never confirmed. (Some people might object to my defining members of the Polish resistance as terrorists, but my definition of a terrorist includes any non-state actor irrespective of the merits of their cause.)

Mau Mau. The second case is from late 1952, when the British determined that Mau Mau guerrillas had poisoned 33 steers—killing 8 of them—using a poisonous plant, the African milk bush. The British investigation determined that the latex of the plants was placed in incisions cut into the skin of the cattle. Significantly, the British had to undertake extensive scientific tests to determine the cause of death. They suspected, but were never able to prove, that the Mau Mau might have been responsible for other unexplained cattle deaths.

Dark Harvest. The next case illustrates the difficulty in finding verifiable cases of bioterrorism. In October 1981, an otherwise unknown group that called itself Dark Harvest dumped anthrax contaminated soil on the grounds of Porton Down, the British biodefense establishment, to protest the failure of the government to decontaminate Gruinard Island. That island was used to test anthrax bombs in 1941, and the soil at the test site remained heavily contaminated. Dark Harvest claimed that the contaminated soil came from the island, and press reports suggest that studies of the material supported that claim. Clearly, this incident was unlikely to cause harm to anyone.

Rajneeshees. The fourth instance of bioterrorism remains the most significant proven instance of terrorist use of biological agents. In 1984, a cult group known as the Rajneeshees poured cultures of *Salmonella typhimurium* onto salad bars in restaurants in the small town of The Dalles, Oregon. This was a trial run for a subsequent attack plot by the cult to seize control of the county government. The Rajneeshees hoped that they could prevent the locals from voting by making them sick. Ultimately, more than 750 people became sick.

Aum Shinrikyo. The last confirmed case was Japanese cult, Aum Shinrikyo. This group devoted considerable effort to acquire biological agents, including anthrax and botulinum toxin. According to Japanese press reports, prosecutors discovered that the group disseminated both agents in a series of attacks. The first of these attacks was in April 1990 and the last in April 1995. None caused any harm. The failure of the final biological attack apparently led the group to release sarin in the Tokyo subway.

When more evidence is available, I probably will have to add a sixth case to this list: the 2001 anthrax letter attacks. Because the motivation of the perpetrator remains a mystery, it is not yet possible to characterize it as a terrorist event.

Bioterrorism and the Food Supply

Before proceeding with a discussion of the bioterrorist threat to the food supply, I need to emphasize my debt to a great many people who over the years took the time to make me smarter about agriculture in general and the food supply in particular. Indeed, most of what I have to say on these subjects derives from the efforts of others, both in and out of government, who are concerned about the subject.

I certainly do not need to remind this audience of the economic importance of agriculture. Roughly one-sixth of the gross domestic product comes from the agricultural sector, contributing over \$1 trillion to our economy. Agricultural exports amount to \$50 billion a year, reflecting the high productivity of our farmers. In fact, our country produces 50 percent of the world's soybeans, 40 percent of its corn, and about 12 percent of its wheat.

Americans spend less on food as a proportion of their income than other countries, only 11 percent of disposable income compared with 20 to 30 percent globally. Nevertheless, more than 24 million people are employed in a job that is directly related to the food supply. This includes everyone from the farmer who grows the food to the waiter who delivers it to the table at a restaurant.

Vulnerabilities

Unfortunately, some of the same characteristics that make our agriculture so productive also may make it more vulnerable to bioterrorism. For example, production of food has grown increasingly concentrated. Only 10 percent of cattle producers are responsible for 75 percent of sales. Similarly, only 20 percent of grain, vegetable and citrus farms each account for 75 percent of sales. The situation is hardly better in other areas. Only 25 percent of dairy cattle and pig farms and 30 percent of poultry farms control 75 percent of sales. This

concentration ensures that would-be bioterrorists will have attractive targets where they can have a significant effect.

The vertical integration of the agricultural sector also poses a potential problem. Only about a half dozen companies dominate the pork/swine business from farm to table. At one time, most meat was processed in a local butcher shop, so that food contamination was likely to affect only a small number of people who shopped at that establishment. For that reason, biological warfare experts considered food contamination a form of sabotage likely to have localized effects. Today, however, butchering is an industrial scale process, and contamination can affect tens of millions of pounds of product. As a result, the food is likely to be sold nationally and may even be exported. This makes processed food a far more attractive target than was the case a few decades ago.

Third, terrorists would have little difficulty accessing the food supply. Securing the food supply along the entire farm to table continuum would be difficult, if not impossible. Terrorists who spend years planning their attacks would have little difficulty getting access to almost any part of the food supply.

Other factors also could be mentioned, such as the increased geographic concentration of production within many farm sectors and the decreasing genetic diversity of plants and animals used in agriculture.

The consequences of a biological attack could be severe.

Consider the impact on tiny Taiwan of the 1997 appearance of foot and mouth disease (FMD), a highly contagious disease specific to hooved animals.

Although endemic in mainland China, Taiwan was FMD free. In the six weeks after it appeared in March 1997, it spread throughout Taiwan. As a result, more than 8 million pigs were killed before the disease was eliminated. Other countries embargoed pork from Taiwan, destroying a vibrant export industry.

The economic impact was devastating. Some estimates put the cost at \$19 billion: \$4 billion in direct costs to eradicate the disease and another \$15 billion in indirect costs resulting from the collapse of exports.

Agricultural Biological Warfare Capabilities

How does the significance and vulnerability of agriculture relate to the prospect of biological attack?

Targeting plants and animals with biological agents is not a new idea. During the Cold War, the United States thought about attacking the food supply of our Communist adversaries. We developed capabilities to infect Chinese rice and Russian wheat and rye.

The Iraqis admitted to working on wheat cover smut, which they called Agent D. UNSCOM reports indicate that Iraqi scientists began working on smut in 1984 and continued working on it through the 1980s. The strategic rationale for this program was never discovered.

The Iraqis reportedly conducted field tests in 1985 that determined wheat cover smut spores were lethal to young wheat plants. Iraq claimed to have destroyed its stocks of this agent in 1991, but UNSCOM was never able to verify this assertion.

It was the Soviet Union, however, that set a new standard for biological weapons research in the attack on agriculture. The revelations of defectors and the reports of investigative journalists tell us that the Soviets researched numerous plant and animal pathogens for use as biological weapons, including food and mouth disease and rinderpest.

Responses

Originally, I had intended to devote much of my talk to how we will respond to bioterrorism attacks on our food supply. Bioterrorism has received considerable attention in the past year. There is strong bipartisan support in Washington for Bioterrorism response. Earlier this year, the President announced a \$6 billion Bioterrorism Initiative as part of his fiscal year 2003 Homeland Security budget. In June, he signed into law the Public Health Security and Bioterrorism Preparedness and Response Act originally introduced by Senators Bill Frist and

Ted Kennedy. It appeared that we were well on our way to creating a new bioterrorism response architecture equal to the magnitude of the threat.

The Bush Administration decision to create a new Department of Homeland Security, however, has changed the picture. When and if it is finally established, this new department will likely assume a significant role in responding to attacks on the food supply, working in concert with existing organizations. However, until Congress enacts legislation that the President signs into law, we will not know for sure what responsibilities will be assigned to the new department. Even then, it will take time to sort out the relationships between the new Department of Homeland Security and existing departments. With so much in flux, it is currently difficult to talk specifics.

Accordingly, let me focus exclusively on a few general principles that should guide our actions.

First, existing capabilities should be the starting point of our responses. Thus, we have organizations, the Food and Drug Administration and the Food Safety and Inspection Service, with the mandate to protect us from unsafe food. Rather than building capabilities that duplicate the existing infrastructure, we should strengthen what is already there. Similarly, our capabilities to respond to bioterrorism aimed at crops or livestock should build on the infrastructure that exists to deal with natural outbreaks of disease.

Second, we need to build balanced programs that invest in both prevention and response.

Finally, scientific research and development is central to these efforts.

Conclusion

Let me conclude my remarks by reiterating four points.

First, some terrorists now view the United States as the enemy. These terrorists are committed to taking whatever steps are needed to destroy our country. They

seek not merely to change our policies, but are bent on inflicting mass destruction to undermine our way of life.

Second, the danger posed by biological weapons is growing. The magnitude of the threat will accelerate as the 21st Century progresses. The increasing availability of the underlying science and technology, the diffusion of the required expertise, and the growing understanding of biological processes will work together to enhance the dangers from biological warfare.

Third, the ability and willingness of terrorists to use biological weapons will grow. Today, it appears that only a few terrorist groups are interested in biological warfare, and the available evidence suggests that their capabilities are limited. This will gradually change. At some point in time, a terrorist group will be able to disseminate biological agents in a way that inflicts mass casualties.

Finally, our food supply may be an attractive target for some terrorists. Biological warfare provides an opportunity for mounting such attacks, with the objective of either killing people or inflicting serious economic damage.

The challenge is clear. Less clear is our response. If we take appropriate steps, it is possible over the course of the next decade we could significantly reduce the bioterrorism threat. But we should have no illusions that it will be easy to defeat bioterrorism. Defeating bioterrorism will require a sustained national commitment to devote the needed resources and brainpower. Will we be up to the task? Only time will tell.