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Carnegie Challenge

Defining the Debate on Controlling Biological Weapons

by B. Alan Rosenberg

CARNEGIE CORPORATION of NEW YORK

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In July 1945, the U.S. government's "Project Trinity" culminated in the detonation of the first nuclear device over the New Mexico desert. The following month, when the first nuclear bomb was exploded over Hiroshima, Japan, it seemed that no more lethal weapon could be conceived of or employed by humankind. But little more than a few decades later, J. Robert Oppenheimer's famous, fearful comment about that first product of Trinity—"I am become death, the destroyer of worlds"—holds true for the triumvirate of deadly weapons that are the descendants of that first foray into mass destruction. In addition to nuclear weapons, our arsenal of wholesale annihilation now also includes chemical weapons and—perhaps most sinister and threatening of all—biological weapons.

There are many reasons that biological weapons are, to many, the most threatening of all weapons of mass destruction:

- Biological agents are easy—and often inexpensive—to produce from existing pharmaceutical products.
- Any country with a reasonably sophisticated pharmaceutical industry has the ability to produce them.
- It is relatively easy to hide bioweapon facilities within legitimate biotechnology sites, compared to chemical and nuclear weapons.
- International laws against developing biological weapons are hindered by a lack of verification and inspection.

Add to all that the lethality and death on a massive scale that could be caused by biological agents—it is estimated that one gram of the right toxin could kill 10 million people—and the world is faced with a threat potentially as troubling as the proliferation of nuclear weapons. It is for all those reasons that biological weapons are often referred to as the "poor man's atomic bomb."

"Historically, there has been a close connection between the dominant technologies of an age and the forms of warfare and other social violence in which it engages," states the recent report, *Averting the Hostile Exploitation of Biotechnology and the Proliferation of Biological and Chemical Weapons*, published by the Harvard/Sussex Project of Harvard University and the University of Sussex, both grantees of Carnegie Corporation.

"All major technologies—metallurgy, explosives, internal combustion, aviation, electronics, nuclear energy—have been extensively exploited, not only for peaceful purposes, but also for hostile ones," the report continues. "If this pattern is allowed to be repeated for biotechnology—certain to be a dominant technology of this new century—the nature of the weapon and the contexts in which it is employed would be dramatically changed."

And from all indications, that change is underway—and is swifter and more dramatic than anyone would have imagined.* Adding to the pressures

** The facts and status of issues discussed in this paper are current and correct as of the date of the paper's publication. However, because this is a field in which events do take place at a rapid pace, it is possible that some circumstances may have changed at the time this report is being read.*

on this volatile situation is the continuing scientific exploration of the human genome: there is no doubt that the medical, social, economic and scientific benefits beginning to flow from our understanding of human genetic structure will ensure that continued knowledge of biological agents, for good or ill, will continue to spread throughout the world.

Still, the threat of biological weapons seems to be one of the world's best kept, if not most dangerous secrets, focused on by a relatively small international policy and academic community. These groups are working to ensure that procedures are put in place so that biotechnological products and processes are used for peaceful and productive purposes and not as weapons of mass destruction. In the coming months, many of these agencies and organizations will be part of a major effort to enhance the Biological and Toxin Weapons Convention, the 30-year-old treaty that was designed to curb the development of biological weapons. It has not really served its purpose, though, because it contains no real means of either enforcing its provisions or of punishing nations that illegally engage in biological weapons development. The international community is attempting to rectify that flaw by supporting a series of measures designed to add enforcement teeth to the treaty—primarily through inspections of facilities suspected of producing biological weapons.

However, there are serious concerns among analysts and scholars that years of political wrangling over what shape and form enforcement should take have resulted in too many compromises. The fear is that a series of watered-down enforcement measures could do more harm than good by leading the world to think that the problem is being dealt with and that biological weapons are being contained.

"The stakes are too high because if we put something in place and it doesn't perform as advertised, we'll put false promises in place," says Amy Smithson, senior associate at the Henry L. Stimson Center in Washington, D.C., a long-time Carnegie Corporation grantee working on issues relating to weapons of mass destruction.

Scholars and policymakers may be wary of the process aimed at developing a workable, effective means of verifying that nations comply with the biological weapons treaty, but there are also other forces that come into play around the negotiations. A major impediment, for example, is the pharmaceutical industry, which is concerned about proposed inspections because it fears losing biological secrets potentially worth billions of dollars. Echoing similar sentiments, the U.S. government believes that the country's advanced pharmaceutical industry will be left open to industrial espionage if inspections are not strictly controlled.

But if there is one thing that everyone seems to agree upon, it is the unquestionable need to control biological weapons, one of the most serious threats ever to face humanity.

DEFINING THE DEBATE. One fact that must be confronted at the beginning of any discussion of weapons of mass destruction is this: more countries possess biological (and chemical) weapons than possess nuclear weapons. And while nuclear and chemical weapons have relatively strong regulations governing their production and stockpiling, biological weapons have none. *None.*

Unlike the Chemical Weapons Convention (CWC) of 1993—which banned the production of chemical weapons and approved procedures to inspect suspected chemical weapon production facilities—the 1972 Biological and Toxin Weapons Convention has no organization, no budget and no inspection provisions, merely a pledge by the signatories "never in any circumstances to develop, produce, stockpile or otherwise acquire or retain" biological agents or toxins that have no preventative, protective or peaceful purposes. (See Appendix—History of the Biological and Toxin Weapons Convention.)

That's not to say that the Biological and Toxin Weapons Convention doesn't serve an important purpose. It does, by creating a clear standard against the development of biological and toxin weapons. A total of 143 countries have agreed to that standard by signing the convention.

However, the effectiveness of the treaty as a tool to inhibit development of biological weapons is hindered by the lack of inspections and other means of determining that nations are complying with its provisions. For the purposes of negotiation, these verification tools are known jointly as the "Verification Protocol." It is hoped that ratification of the Verification Protocol will be enough of a deterrent that any nation valuing its standing in the world will refrain from developing a biological weapons program sure to alienate it from an international community striving to find cooperative ways to ensure productive and peaceful global development.

One factor blurring both national and international focus on the need to create a strong, effective and enforceable biological weapons treaty is that so much governmental and public attention—particularly in the U.S.—is fixed on preparing for a biological weapons attack rather than preventing one. This may be an understandable reaction. Terrorists have attacked in Europe and the Middle East as well as in the U.S., at the World Trade Center in New York City and the Federal Building in Oklahoma City. But it is as if the world believes that it is impossible to prevent such attacks, so the best thing to do is to prepare for the clean-up in the aftermath.

To observers, that's a very dangerous stance.

"Clearly in this age of terrorism, the threat posed by biological weaponry becomes even more frightening, and it is incumbent on American leadership to move now to curb the production and deployment of microorganisms that can cause specific diseases in humans and animals and plants," says for-

mer Senator Sam Nunn, a trustee of Carnegie Corporation of New York.

STRENGTHENING THE BIOLOGICAL AND TOXIN WEAPONS CONVENTION. The world is not completely bereft of safeguards against biological weapons. As mentioned, some nations are preparing themselves for both civil and military responses to an attack. At the same time, they're attempting to restrict exports of materials and technologies that can be used for production of biological weapons, as well as dual-use equipment, which is commercially available hardware and technology that can be employed for both legitimate commercial and scientific purposes as well as for weapons production.

And, of course, there is a long-standing, widespread moral repugnance on the part of most nations and their people against the use of biological weapons on the grounds that they are cruel and inhuman. But that said, the century just passed witnessed numerous uses of such weapons, from poison gas deployed on European battlefields during World War I to the lethal gassing of Kurdish people in Iraq in the 1990s.

Still, the world community seems to be in agreement that some type of enforceable measures must be put in place to prevent future uses of such weapons. The major action now being negotiated to control biological weapons is something like the enforcement measures contained within the 1993 Chemical Weapons Convention (CWC). This treaty includes provisions for verified declaration and destruction of existing chemical weapons, and for international coordination and cooperation to discourage, detect and punish any future development, possession, transfer or use of such weapons.

The Verification Protocol now under discussion to strengthen the Biological and Toxin Weapons Convention (BWC) includes three major elements, all of which would be legally binding on signatory nations:

1. Annual declaration of dual-use facilities (those that could be used to develop pharmaceuticals for either peaceful purposes or as weapons).
2. Challenge investigations, which would occur when a nation is accused of producing biological weapons and a certain percentage of nations that have signed the treaty agree that an inspection must be conducted.
3. Non-challenge visits, which would occur on a random basis to ensure BWC signatory nations are complying with the treaty.

The Protocol also addresses matters of trade and scientific cooperation, as well as offering measures to promote compliance. These include: confidentiality provisions, assistance and protection against biological and toxin weapons, scientific and technological exchange for peaceful purposes and technical cooperation, confidence-building measures and national implementation measures.

But anyone who has followed the recent turmoil associated with inspection of suspected chemical weapons facilities, particularly those in Iraq, knows how politically sensitive such inspections can be. Since Iraq banned United Nations-sanctioned chemical weapons inspectors from its soil, following allegations that some inspectors were spying for the United States, there's been little political will to engage in another round of weapons inspections of any kind.

Still, treaty officials have worked since the early 1990s to come up with a series of verification measures that would be amenable to all parties. However, regardless of what shape or flavor the ultimate measures take, the key is in generating the political will necessary to enact the Verification Protocol. The ultimate success or failure of the biological weapons treaty depends greatly on whether the nations that presently possess or have the capability to develop biological weapons believe that the global threat of bio-warfare is greater than the individual security interests of individual nations.

WHAT NEEDS TO BE DONE. Many voices will have to be raised, and many government and pharmaceutical industry leaders moved to action in order to, first, create a set of verification measures that will curtail the development of biological weapons, and, second, provide the support necessary for approval.

"There is a limited window of opportunity to make an impact on the policy and policymaking debate, and we believe the time to do it is now, before threats become tragedies," comments Thomas Kean, former New Jersey governor and chair of the Carnegie Corporation's board of trustees.

Kean's concerns are echoed by Vartan Gregorian, president of Carnegie Corporation. He says, "The goals of the 1972 biological weapons treaty have not been attained, partially because there has been too little attention paid to this lethal family of weapons. What's critical now is not only to reinvigorate the [verification] protocol discussion but to elevate the issues to the realm of public debate so that everyone understands what is at stake should these deadly weapons ever be used, either by governments or terrorists."

Gregorian continues: "Not only recent history but examples drawn from conflicts stretching back into time can show us how quickly humanity can be overwhelmed by forces it wasn't watching for. Biological weapons are a force we must not only watch for but vigilantly control, and that's an obligation that should be shared by government, industry and any individual concerned with our global future."

Adds David Speedie, chair of the Corporation's International Peace and Security program, "The recent standoff with Iraq over their suspected offensive biological weapons capability indicated that the issue of biological weapons is a current and present danger."

To help address these issues, the Corporation has made a series of grants to organizations working with governments and the pharmaceutical industry to develop an effective Verification Protocol that can be approved at the Fifth Biological and Toxin Weapons Convention Review Conference in 2001 and then later ratified by the nations involved. Corporation grantees working on different aspects of the treaty, including policy analysis and related matters, include the University of Bradford, Department of Peace Studies; the Harvard Sussex Program; the Federation of American Scientists Fund; and the Henry L. Stimson Center, Chemical and Biological Weapons Nonproliferation Project.

These organizations are not new to the battle against the proliferation of biological weapons. But as negotiations toward a Verification Protocol come to a head in the next year or so, they are tasked with one of their most important challenges. Their goal is not necessarily only to get the nations of the world to sign on the dotted line: it is to help craft a series of measures that will make the world safer then it is today.

"It is simply a display of political will that is needed to go the final distance, and the window of opportunity for completion is indeed now," writes Graham Pearson, visiting professor of International Security in the Department of Peace Studies at the University of Bradford in the UK, in a June 2000 article in *Arms Control Today*, entitled, "The Protocol to the Biological Weapons Convention is Within Reach."

Says Pearson, "Already, the protocol is showing signs of being overelaborated and is becoming unnecessarily detailed in some areas, thereby removing flexibility from the future protocol organization. If the negotiations are not completed within the coming year, there is real danger that the protocol's provisions will become so corrupted that the resulting regime will be ineffective and inefficient and will fail to meet the objective of strengthening the convention."

"Never have the reasons for concluding the protocol been so acute," he adds. "Ultimately, the choice is about the kind of world that we want to live in. The wrong choice, or even the right choice made too late, too grudgingly, could be devastating."

WORKING THE PROBLEMS. Even though proposed verification measures for the Biological and Toxin Weapons Convention are virtually identical to those already approved under the Chemical Weapons Convention, there are still numerous roadblocks in the way of implementation. The issues range from details about on-site visits and inspections—such as length of advance notice, access decisions, number of inspectors, approved equipment and sampling and analysis—to the larger issue of a disconnect between scientists/biologists and arms control experts. Members of the security community know little biology, and those with backgrounds in biology and medicine are rarely interested in arms control. The result is that mutual ignorance and disinterest is causing a lack

of concern in conducting the necessary negotiations. And because each group has different expectations and goals, negotiations can be somewhat muddled because of difficulty in communicating those desires.

The question of declaring a pharmaceutical facility as a suspected biological weapons production site and then approving inspections of that facility also raises the acrimonious question of haves versus have-nots when both developed and undeveloped countries can call for inspections.

"What conditions would require a state-party to declare a certain facility or activity [to be suspect]?" asks Pearson in his *Arms Control Today* article. "The tension in this aspect is again between the developed and developing countries. The developed countries are aiming for the triggers (to declare an inspection) to strike the right balance so that the most relevant facilities are declared in all countries without placing a disproportionate burden on themselves. The developing countries, however, want to see the burden placed primarily on the developed countries, who have the most facilities of concern to the treaty provisions, and therefore advocate triggers that would accomplish such a result."

And no matter how many safeguards are put in place to protect intellectual property, there are always going to be some in the pharmaceutical industry who believe that proprietary information will walk out the door with inspectors. This can have significant economic consequences; estimates are that it can cost a pharmaceutical company $500 million to develop and market a drug and double that for a vaccine.

"The pharmaceutical industry's position is that they support the treaty, protocol and declarations, but don't believe the value of visits (and inspections) is great enough to compensate for the negative aspects of them," says Barbara Hatch Rosenberg, chairperson of the Federation of American Scientists (FAS) Working Group on Biological Weapons Verification. "They are concerned about their reputations and losing confidential information."

That is exactly the official position of the main pharmaceutical industry trade association, the Pharmaceutical Research and Manufacturers of America (PhRMA). "Since the nature of microbiology is such that it is often easy to remove traces of any development, manufacture or storage of a biological-warfare agent, any routine on-site activity is not a useful concept under the Protocol," states the official PhRMA position on the BWC Verification Protocol.

The pharmaceutical industry does support what it calls non-routine, non-random "familiarization" visits as long as they are voluntary and completely controlled by the company being inspected. Industry executives agree that there are legitimate reasons to conduct challenge inspections—such as an unusual outbreak of disease or evidence of use

of biological agents. However, PhRMA believes that the rights of the biotech companies should remain paramount. "Challenge inspections must strike the proper balance between the need to clarify a substantial claim of noncompliance on the one hand and the legitimate rights of private industry to protect its confidential business information," states the PhRMA position. "Therefore, strict managed access must be employed and the inspected site must have the final determination of what is confidential or proprietary information."

It is that position, as well as reluctance among U.S. government officials to bend the pharmaceutical industry to the will of stronger weapons-of-mass-destruction measures, that are most likely to derail long-fought-for negotiations over the Verification Protocol.

"Now in their sixth year, the negotiations have reached the endgame," states an August 2000 report from the Federation of American Scientists Working Group on the challenges that need to be overcome in order to approve an effective Verification Protocol, "with only the most important and controversial issues awaiting solution: the criteria for annual declaration of certain facilities and programs; the question of random transparency visits to confirm the accuracy of declarations; onsite measures for clarifying ambiguities or uncertainties concerning declarations; and the requirements for launching a challenge investigation. But in the last several years," the report continues, "progress has slowed almost to a halt. Prolonged lack of leadership and unilateral demands by the United States have inspired despair among our allies in Geneva. The inability of the West to form a solid front is a primary reason why the regime likely to emerge from the negotiations, if any does emerge, will be considerably weaker than it could have been otherwise."

Part of the reason for the long, drawn-out negotiations toward a Verification Protocol could be a misunderstanding about what the ultimate purpose is, or should be. Says Rosenberg, "There is widespread misconception that the purpose of a biological weapons treaty compliance regime is to catch violators red-handed. Given the difficulty of biological weapons verification because of the dual-use problem, together with the political limitations on the regime under negotiation, that is not likely. Rather, the purpose is to raise, strengthen or resolve suspicions, in response to which the state parties can focus their intelligence capabilities appropriately or take further action."

All well and good, but many believe it is unlikely that all political issues will be resolved in time for the next treaty review conference, which, as noted earlier, is scheduled to take place toward the end of this year.

As Tibor Toth, chairman of the Ad Hoc Group of the States Parties to the Biological and Toxin Weapons Convention writes in a recent article in the widely respected *CBW* (Chemical & Biological Weapons) *Conventions Bulletin*, "Complex techni-

cal aspects still need to be refined, but the majority of the decisions facing the [Ad Hoc Group] are political in nature and thus require the most serious engagement of all parties in an active manner."

For the organizations working on the treaty, those words are most telling. According to most observers, Toth is saying that an effective Verification Protocol doesn't have a chance of being adopted if politicians at the very highest levels in the U.S. and elsewhere don't become engaged in the process. And to this point, they have not.

While the U.S. government officially endorses the biological weapons treaty and proposed Verification Protocol, many within the NGO community are concerned that the support exists more in theory than in practice. There are, for example, few senior-level people from the current U.S. administration involved in the negotiations, and it's hard to predict the kind of emphasis that a new administration will place on the treaty and on participation in the verification process. The reticence of the U.S. to support a strong regimen for inspections has done more than anything to muddy the possibility of approving an effective Verification Protocol, according to many.

"Except for the [Biological and Toxin Weapons Convention] ambassador himself, there is not a single U.S. assistant or deputy secretary currently involved in the process," said Matthew Meselson, co-director of the Harvard Sussex Program. "There was much higher-level participation in the Chemical Weapons Convention. It is because of a failure on the part of the current U.S. government administration to say this is of top-notch importance, and a failure of the secretary of state and other secretaries to elevate this to a high level."

In this respect, the U.S. is at odds with many other developed nations—particularly those in Europe, where senior government officials routinely take a more active role in negotiations. Europe favors procedures that would make inspections of suspected bio-weapon facilities more likely by letting them go ahead unless a majority of the Biological and Toxin Weapons Convention's Executive Council votes to stop them. This is the so-called "red-light procedure," and is the way that inspections are conducted under the Chemical Weapons Convention.

The U.S. favors what is commonly called the "green-light procedure," under which inspections only go forward if a majority of Executive Council approves them. It is a subtle, but important difference that makes it easier to stop inspections and harder to approve them.

"The United States' reluctance to support a strong regime is surprising and worrying, as in the past it has generally been a leader in developing strong regimes to counter the proliferation of weapons of mass destruction," states Graham Pearson of the University of Bradford in his recent *Arms Control Today* article. "This reluctance appears to parallel the U.S. position on the Chemical Weapons Convention(CWC). As a consequence of condi-

tions in the Senate's advice and consent to ratification, the United States issued CWC implementing legislation in 1998 that refused to allow samples obtained during a challenge inspection to leave the United States and granted the president the right to veto a challenge inspection on national security grounds.

The lack of high-level support from the pharmaceutical industry is also a disappointment for those supporting strong inspection measures. Without the support of the pharmaceutical industry, observers of the biological weapons treaty believe there is little chance that the U.S. Senate will ratify any Verification Protocol. Most say that the U.S. Senate would never have ratified the Chemical Weapons Convention in the early 1990s if not for the proactive support of chemical industry executives.

Some positive news for those supporting verification measures for the biological weapons treaty came in recent months when the Federation of American Scientists and the Pharmaceutical Research and Manufacturers of America (PhRMA) issued a joint paper that came to some agreement on means for protecting the pharmaceutical industry's trade secrets while still supporting an effective treaty compliance regime.

"PhRMA and the Federation of American Scientists (FAS) have often been thought to stand at opposite poles regarding verification measures for the biological weapons treaty," says FAS Working Group chairperson Barbara Hatch Rosenberg. "[However], the willingness of the U.S. pharmaceutical industry to cooperate with the declarations, non-challenge visits and investigations that may be adopted under the protocol is now clear, provided that the United States agrees to include specific safeguards for industry in legislation to implement the protocol."

Both scientists and members of the pharmaceutical industry have called on the U.S. government to implement legislation that would address the industry's fears of possible loss of confidentiality during on-site inspections. The hope is that such legislation would be enough to convince senior executives in the pharmaceutical industry to support the biological weapons treaty and, maybe more importantly, persuade the federal government to take a higher level, strategic view of the Biological and Toxin Weapons Convention.

Finally, failure to settle on a suitable Verification Protocol in the near future will also do significant damage to another key aspect of the biological weapons treaty, the provisions for strengthening scientific and educational cooperation between developed and non-developed nations. These include scientific cooperation for preventing infectious diseases such as AIDS, promoting economic competitiveness within the worldwide pharmaceutical industry, and the transfer of medical knowledge from developed to under-developed nations.

On the eve of World War I, Andrew Carnegie,

who had devoted the last years of his life to international efforts to bring about peace, declared that while it was always necessary "to keep a vigilant eye upon events," it was also the duty of men of good will to work toward "the education of the public for peace, to spread arbitral justice among nations and to promote the comity and commerce of the world without the dangers of war." The current issues and opportunities surrounding the potential of nations to use biological weapons—or to put them away forever—provides us with the opportunity to heed both of Carnegie's exhortations: to be vigilant, yes, but also to always work towards ending threats to international stability. Mindful of its founder's mandate, Carnegie Corporation of New York invites continued debate and discussion about ways to control biological weapons; as the Corporation's president, Vartan Gregorian has written in regard to cooperative international engagement on difficult issues: "The stakes are high, the risks are great, but the opportunities are immensely exciting and the outcome potentially groundbreaking."

APPENDIX

HISTORY OF THE BIOLOGICAL AND TOXIN WEAPONS CONVENTION

It has become clear over the last century—since it was demonstrated that specific microorganisms cause diseases in humans, animals and plants—that a series of major countries have established significant biological weapons programs.

While the Japanese used biological weapons on a large scale in China before and during World War II, it was the British and Americans who demonstrated that the most effective means of using such weapons was by generating an aerosol and infecting human beings via their lungs. Used in this way, in certain circumstances, some pathogens can have equivalent or greater lethality than nuclear weapons.

The U.S. closed down its own biological weapons program at the end of the 1960s, and helped spearhead the adoption of the Biological and Toxin Weapons Convention (BWC), which was approved in 1972 and went into force three years later.

The BWC prohibits the possession, development and stockpiling of biological weapons, but lacks verification measures like inspections of facilities suspected of manufacturing biological weapons and toxins. That may not have seemed like an important oversight in 1972 when few had the scientific and technological know-how to develop such weapons, but that loophole has become increasingly widened over the past three decades.

When the treaty was negotiated in the early 1970s, many countries considered biological weapons to have little military utility. By the mid-1970s that had suddenly changed with the dawn of genetic engineering—which brought the promise (and threat) of new technologies and capabilities to manufacture heretofore unknown and unseen viruses and toxins.

Despite the Soviet Union being a Depository State for the Biological and Toxin Weapons Convention, meaning it signed the treaty and promised to abide by its declarations, it proceeded on a vast expansion of its own offensive biological weapons program. The Soviets produced very contagious agents like plague and smallpox and then developed means to deliver those diseases to the battlefield with rockets and bombs.

In 1979 there was an anthrax outbreak in Sverdlovsk, Soviet Union, which is now known to have resulted from an accident at a Soviet biological weapons facility. This coincided with the first review conference of the biological weapons treaty, where the treaty nations reaffirmed "their determination to act with a view to achieving effective progress towards general and complete disarmament including the prohibition and elimination of all types of weapons of mass destruction [and] the prohibition of the development, production and stockpiling of chemical and bacteriological (biolog-

ical) weapons and their elimination, [in order to achieve] general and complete disarmament under strict and effective international control."

The opportunity represented by the era of Russian "glasnost," as well as increasing suspicions and allegations that a few signatories were violating the treaty, led the signatory nations to agree to a second Biological and Toxin Weapons Convention review conference in 1986. That resulted in a series of confidence-building measures such as annual information exchanges between the U.S. and USSR.

When these confidence-building measures appeared inadequate, international concern provided impetus for enhancing global security by negotiating a legally binding regime to strengthen the effectiveness of the BWC.

The third review in 1991 resulted in the establishment of a committee of verification experts, commonly known as the VEREX Committee, who were charged with developing a series of legally binding verification measures for the BWC. The necessity of doing so became clear in 1992 when the Soviet Union admitted to its large-scale bioweapons program. It was also around that time that the United Nations Special Commission (UNSCOM) appointed to investigate Iraq's suspected chemical weapons program found evidence of just such a program after the Persian Gulf war, the Japanese terrorist cult Aum Shinrikyo released a deadly biological agent into Tokyo's subway system, and evidence surfaced of a significant South African biological weapons development program during the white-rule era.

The VEREX report was presented at a Special Conference in 1994, leading to the establishment of a committee—the Ad Hoc Group of the States Parties to the Biological and Toxin Weapons Convention—whose job it is to develop and negotiate a series of enforcement measures to strengthen the treaty. Those enforcement measures are typically referred to as the Verification Protocol.

Its purpose is clear: to prevent the revolutionary discoveries of biotechnology from being used to fuel a massive, new arms race. That, combined with better surveillance and intelligence, as well as stronger and more effective export controls may be able to provide the "web of deterrence" needed to reverse this dangerous trend.

Presently, the countries suspected of having biological weapons programs include: the U.S., Russia, China, Taiwan, North Korea, Iraq, Syria, Egypt, Iran, Cuba, Israel and Japan.

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