Putting the Nonproliferation of Biological Weapons on the Right Track

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The recent years have seen the rising threat of the spread of biological weapons. Despite the fact that biological weapons have been outlawed since the Biological and Toxin Weapons Convention (BWC) went into force in 1975, problems concerning the potential development, production, stockpiling, acquisition and even the use of these weapons have not been truly solved. With the rapid development of the life sciences and other related advanced technologies as well as the rise of international terrorism, a potential threat posed by the acquisition and use of these weapons by terrorists seems to loom even larger. In short, the rising threat of biological weapons proliferation seems to be far outpacing international nonproliferation efforts, which adds a great amount of urgency to the need to strengthen international efforts to curb the spread of this category of deadly weapons. Yet the international community is still struggling to find a concerted approach to put biological weapons nonproliferation efforts on the right track.

Two fundamental questions are at the root of the international community's difficulty in addressing the biological weapons proliferation problems. The first question concerns how to arrive at an accurate picture and understanding of the threat of the spread of biological weapons. Without the right diagnoses, one can hardly find the right therapy. The second issue of equally vital importance is related to the therapy itself and that is if the international community is able to define an effective and sustained strategy to head off the threat. Unfortunately, thus far, there has been no consensus on either of these two questions.

Understanding the biological weapons threat

With regard to the first question, although there is an increasing awareness in the international community of the biological weapons threat, views seem to be polarized in terms of the nature and scope of this threat. The Western world, and the United States in particular, has appeared to focus solely in recent years on the rising danger of

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bioterrorism. Serious concerns about bioterrorism have been discussed in major U.S. newspapers and in Congressional hearings.[2] According to a 2006 article, a German-born molecular geneticist by the name of Eckward Wimmer declared that he had found it not so difficult "to create live and artificial viruses" in his lab at the State University of New York from nonliving parts, using equipment and chemicals on hand. "The most crucial part, the genetic code, was picked up for free on the Internet. Hundreds of tiny bits of viral DNA were purchased online, with final assembly in the lab," Wimmer said. He reckoned that "…tens of thousands of scientists worldwide already are capable of doing [this]"[3]. Supporting this point is Stanford University biophysicist and former president of the Biophysical Society Steven M. Block: "The biological weapons threat is multiplying and will do so regardless of the countermeasures we try to take. You can't stop it, any more than you can stop the progress of mankind. You just have to hope that your collective brainpower can muster more resources than your adversaries."[4] Reinforcing the message that the new life sciences technologies have opened the door simultaneously to new tools for defeating disease and saving lives as well as to horrific new weapons, Block states: "Today, in hundreds of labs worldwide, it is also possible to transform common intestinal microbes into killers. Or to make deadly strains even more lethal. Or to resurrect bygone killers, such as the 1918 influenza. Or to manipulate a person's hormones by switching genes on or off. Or to craft cheap, efficient delivery systems that can infect large numbers of people."[5] Numerous other reports on the same subjects in the public discussion in the United States also highlight the primary Western fear that the growing threat of bioweapons may chiefly result from the development of science and high-technology, offering terrorists easier access to biological weapons.

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[2] See, for example, Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services, *Hearing on Multilateral Non-proliferation Regimes, Weapons of Mass Destruction Technologies and the War on Terrorism* (Washington, D.C.: U.S. Congress, 12 February 2002); Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services, *Hearing on Federal Efforts to Coordinate and Prepare the United States for Bioterrorism: Are They Adequate?* (Washington, D.C.: U.S. Congress, 17 October 2001); House Committee on Energy and Commerce Subcommittee on Oversight and Investigations, *A Review of Federal Bioterrorism Preparedness Programs From a Public Health Perspective* (Washington, D.C.: U.S. Congress, 10 October 2001).

[3] See Joby Warrick, "Custom-Built Pathogens Raise Bioterror Fears," *Washington Post*, 31 July 2006. http://www.washingtonpost.com/wp-dyn/content/article/2006/07/30/AR2006073000580_pf.html

[4] Ibid.

[5] Ibid.

In fact, the U.S. experts, politicians, and the media began to discuss bioterrorism concerns publicly during the aftermath of Aum Shinrikyo's 1995 attack in the Tokyo subway, when the Japanese cult used a chemical agent, sarin, to kill a dozen people and seriously injure over 100 others.[6] Although Aum Shinrikyo used a nerve agent in that attack, it was known afterwards that they had also made serious efforts to acquire biological weapons, although that program failed.[7] Another news report noted the possibility that terrorists may use disease as a tool of choice. They, for example, could genetically alter the smallpox virus utilizing biotechnological techniques and equipment that are inexpensive and widely available, including in the developing countries, to make a "juiced up" virus that would not only be more lethal than "ordinary smallpox" but also impervious to smallpox vaccines.[8]

According to the Western specialists, there are many reasons why biological and toxin weapons are likely to become ever more attractive to criminals and terrorists as mankind moves further into the 21st century. First, as the biotechnology, pharmaceutical, environmental, and health care industries grow, more and more people will possess expertise in microbiology and the related biosciences. Second, information on how to produce and disseminate pathogens and toxins is already readily available in open sources. Third, a modest quantity of pathogens delivered effectively can cause a great many people to become ill and die.[9] Fourth, pathogens or toxins can be produced in small facilities so that they can be easily hidden. Police and nearby citizens are unlikely to discover a terrorist or criminal producing, transporting, or using a biological weapon. Fifth, the delivery systems for biological agents do not necessarily require sophisticated methods. A sprayer will suffice. Sixth, although efforts are being made to improve defensive technologies, none are available that are, or could be, deployed at civilian

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[6] Aum's 20 March 1995 attack is described in D.W. Brackett, *Holy Terror: Armageddon in Tokyo* (New York: Weatherhill, 1996); David E. Kaplan and Andrew Marshall, *The Cult at the End of the World* (New York: Crown Publishers, Inc., 1996).

[7] Milton Leitenberg, "Aum Shinrikyo's Efforts to Produce Biological Weapons: A Case Study in the Serial Propagation of Misinformation," *Terrorism and Political Violence* (1999); Milton Leitenberg, "Biological Weapons and Bioterrorism in the First Years of the 21st Century," *Politics & the Life Sciences* 21, no. 2 (2002).

[8] Lawrence Lessig, "Insanely Destructive Devices", WIRED, April 2004. http://www.wired.com/wired/archive/12.04/view.html.

[9] The quantity of biological agent used can be particularly small if a contagious agent is employed. In that scenario, the original delivery system does not have to expose thousands of people to the agent because soon enough, the disease will begin to spread from person to person, multiplying casualties considerably.

facilities to detect and identify deliberately disseminated biological agents in real or near real time. The fact that a biological attack has occurred would therefore not become known until some time later, when many individuals become simultaneously begin to fall ill.[10]

No one questions the legitimacy of the U.S. apprehension about the rising possibility of terrorists' acquisition of biological weapons, particularly after the events of September 11th and the anthrax letters attacks that followed, nor can one afford to ignore the growing danger of bioterrorism. That said, however, one should not lose sight of the fact that the ambiguous attitude of many countries towards biological weapons with their possible ongoing biological warfare programs presents a stark background against which all other problems concerning the spread of biological weapons is generated.

Historically, nations, particularly the major powers, have traditionally sought biological weapons.[11] At least one nation, Japan during World War II, even used these weapons in modern warfare.[12] As the Cold War began, the United States and the Soviet Union were both developing large-scale biological weapons programs. More than a dozen other countries were also believed to have their own biological programs. The end of the Cold War evidently abated the interests of some nations to retain biological weapons, providing further incentive for the international community to push for the thorough implementation of the BWC. However, deep-rooted mistrust among global and regional powers remains a factor driving nations to maintain biological programs under the pretext of self-defense, allegedly to "hedge" against the possibility of other countries engaging in covert biological weapons development, production, and stockpiling.

Against that backdrop, activities of the two former military superpowers – the Soviet Union/Russia and the United States – have been most noteworthy. The Soviet Union ratified the Biological Weapons Convention (BWC) in 1975. Nevertheless, the world learned that Moscow had, in fact, continued to develop a secret offensive biological

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[10] Raymond Zilinskas, "Assessing the Threat of Bioterrorism," testimony to the House Subcommittee on National Security, Veterans Affairs, and International Relations (Washington, D.C.: U.S. House of Representatives, 20 October 1999). Available at: http://cns.miis.edu/pubs/reports/zilin.html.

[11] Erhard Geissler and John van Courtland Moon, *Biological and Toxin Weapons: Research, Development, and Use from the Middle Ages to 1945*, Stockholm International Peace Research Institute Chemical and Biological Warfare Series, vol. 18 (London: Oxford Univ. Press, 1999).

[12] Sheldon H. Harris, *Factories of Death: Japanese Biological Warfare, 1932-45 and the American Cover-up* (New York: Routledge, 2002).

weapons capability throughout the 1970s and 1980s. Soviet defectors began to give detailed descriptions of this program's nature and scope in the late 1980s and early 1990s. Accordingly, the Soviet/Russian biological warfare program was evidently aimed at wartime production of large quantities of a range of biological agents, including those that cause plague, tularemia, glanders, anthrax, smallpox, and Venezuelan equine encephalitis. When necessary, formulated agents would have been loaded into a variety of delivery systems, including aerial bombs and ballistic missile warheads. In short, the Soviet Union is believed to have developed a comprehensive bioweapons program that comprised dozens of research, development, production, and test facilities that employed tens of thousands of personnel over a few decades.

After the Soviet Union collapsed, Russia, to its credit, officially announced the banning of the offensive biological weapons work. Moreover, in 1992 Russian President Boris Yeltsin explicitly acknowledged the existence of the Soviet biowarfare program. Russia currently participates in the treaties pertaining to biological weapons nonproliferation, and Russia's current leaders deny involvement in the further development of biowarfare agents. Although most of the former Soviet biological weapons facilities continue to operate, they apparently focus only on civilian research activities, which was in part also a result of a project undertaken under the auspices of the Cooperative Threat Reduction Program in conjunction with the International Science and Technology Center. A small number of biological facilities that are part of the Ministry of Defense have yet to allow any foreign visitors or to participate in any collaborative research. This lack of transparency causes some Western officials to worry that although the biowarfare agent stockpiles have been destroyed, activities that contravene the BWC may still continue at military biological facilities in Russia.

Another proliferation concern stemming from the vast former Soviet bioweapons complex is the possibility of "brain drain," which refers to the potential for former Soviet bioweapons scientists to spread their knowledge to other states or to subnational actors. Once the USSR fell, lack of funding for the continuation of extensive biowarfare programs could have driven many of the underpaid or unpaid weapons scientists to immigrate to developing countries that for various reasons had a strong interest in acquiring biological weapons. A considerable amount of relevant technology may also

have been exported to these countries legally or illegally. Longstanding domestic turbulence and instability in some parts of Russia has led many Western countries to express concern that the radical Muslim insurgents, the mafia, or other crime organizations in unstable areas of the former Soviet empire may ply illicit trade to exacerbate the prospects for bioweapons proliferation.[13]

The United States also had a long history of developing offensive biological warfare programs and weaponized a variety of pathogens and toxins for use against humans and plants. During the Korean War, charges were made that the United States engaged in germ warfare although Washington has vehemently denied that this was the case.[14] In 1969, President Nixon decided to terminate the offensive biological warfare program, thereby destroying the U.S. stockpiles of warfare agents. In the meantime, Washington ratified the BWC in 1975, and played a significant role in the process of developing confidence-building measures during several BWC review conferences. This situation began changing when George W. Bush was elected president. The Bush administration has clearly decided to rely on U.S. military power rather than international laws and institutions to cope with various threats in the post-Cold War era. The Bush administration found justification for an active biodefense program in the 9/11 terrorist attacks and the 2001 anthrax letter attacks in particular, which became a powerful catalyst for new activities said to ensure America's security. No matter what their justification, many suspect these biodefense activities are in violation of the BWC.

In addition to sponsoring research on detectors for biological agents and new vaccines and other medical treatments for bio-warfare agents, the Bush administration has funded the construction of over a dozen, new, high-level bio-containment facilities. One such facility, being constructed on the grounds of Ft. Detrick, which is home to the U.S. Army Medical Research Institute for Infectious Diseases, will be a massive

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[13] For more discussion on the biowarfare program of the Soviet Union and Russia, see "Biological overview of Russia," Nuclear Threat Initiative, February 2006. Available at: http://www.nti.ogr/e_research/profiles/Russia/Biological/index.html. See also, Christopher J. Davis, "Nuclear Blindness: An Overview of he Biological Weapons programs for the Former Soviet Union and Iraq," Johns Hopkins University Center for Civilian Biodefense Studies, July 1999. Available at: http://www.cdc.gov/ncidod/EID/vol5no4/davis.html. Finally, see C.L. Staten, "EmergencyNet Exclusive: Questions and Answers on Bio-Warfare/Bio-Terrorism with Dr. Ken Alibek," EmergencyNet NEWS Service Special Report, 14 July 1999. Available at: http://www.emergency.com/1999/alibec99.html.

[14] "Evidence of U.S. Waging Germ Warfare Is Firmly Established and Brooks No Denial," Editorial, *China People's Daily*, 12 November 1953.

laboratory "unlike any seen since biological weapons were banned 34 years ago."[15] The institution is called the National Bio-defense Analysis and Countermeasures Center (NBACC), to which only individuals with a high-level security clearance will have access. Few U.S. government facilities, including the U.S. national nuclear laboratories, operate with such a high level of secrecy. The mission of the NBACC is:

> to get inside the head of a bioterrorist. It considers the wide array of potential weapons available. It looks for the holes in society's defenses where an attacker might achieve the maximum harm. It explores the risks posed by emerging technologies, such as new DNA synthesizing techniques that allow the creation of genetically altered or man-made viruses. And it tries in some cases to test the weapon or delivery device that terrorists might use.[16]

For example, NBACC could simulate anthrax attacks or create viruses that are genetically engineered to be resistant to vaccines. Officials from the Department of Homeland Security, which will operate NBACC, insist that NBACC's work "is purely defensive and thus fully legal."[17]

Some U.S. scientists quickly objected to the terms of operation set for NBACC, but the Department of Homeland Security rejected calls for oversight by independent observers.[18] Without outside oversight, no one has a chance of being able to tell whether NBACC's activities are offensive or defensive. The description of NBACC's work agenda by its own officials leads to questions as to whether some of NBACC's work would violate the BWC's prohibitions, so the opaqueness of the whole effort is creating a very bad precedent that could undermine international biological weapons nonproliferation norms and mechanisms. In this manner, it can be argued that NBACC and the other U.S. programs have opened doors to the spread of these weapons by others under the cover of legitimate motivations.

Reports also surfaced that the United States has been developing a dangerous fungus, making use of the talents of former Soviet scientists who used to create anti-crop and anti-livestock pathogens. The fungus reportedly could be used to destroy drug crops in

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[15] Joby Warrick, "The Secretive Fight against Bioterror," *Washington Post*, 30 July 2006. Available at: http://www.washingtonpost.com/wp-dyn/content/article/2006/07/29/AR2006072900592_pf.html.
[16] Ibid.
[17] Ibid.
[18] Ibid. For an example of such criticism, see Milton Leitenberg, James Leonard, Richard. Spertzel, "Crossing the Line," *Politics & the Life Sciences* 22, no. 2 (2003).

countries like Colombia and Afghanistan, which grows the opium poppy, the source of heroin. The U.S. objective is allegedly to eradicate the source of the illegal drugs being smuggled into America, but the environmental and human effects from these fungi could be very serious. Control of the use of this agent to destroy drug crops reportedly lies not with the Pentagon, but with the State Department's anti-narcotics division.[19] While the U.S. government may feel justified in taking extraordinary steps to stop the illegal trade in drugs, others would question whether the use of fungi is appropriate, particularly given the prohibitions of the BWC and the 1925 Geneva Protocol, which bans the use of biological and chemical weapons.

Another U.S. program that could be crossing the line from proper to prohibited research is the Joint Non-Lethal Weapons Program, which utilizes both biological and chemical substances, among other materials and technologies. Non-lethal weapons are supposed to incapacitate humans, but they could cause much more grievous harm. The Joint Non-Lethal Weapons Program has considered proposals to develop chemical and biological substances for use against people (e.g., rioters), such as sedatives, calmatives, opioids, muscle relaxants, and bad-smelling substances. "[This program] has weighed using genetically engineered microbes to destroy enemy vehicles, machinery, and supplies. . . .The Pentagon claims. . . .that these arms are not chemical and biological weapons, rather, that they are a potentially less bloody way to conduct peacekeeping operations, isolate terrorists, and squelch civil disobedience."[20] But, again, the Pentagon has not released public information about the status of these non-lethal programs. The mere fact that such research proposals are being entertained gives rise to the impression of activity that is hardly benign and could be inconsistent with international treaties.

Biological weapons programs are of course not merely confined to the two most significant military powers. According to a Western calculation, over a dozen mid-sized countries may also be conducting offensive biological warfare programs.[21] Many of these countries—Egypt, Israel, Syria, Algeria, Iran, Sudan—are located in the most

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[19] Edward Hammond, "Averting Bioterorism Begins with U.S. Reforms," Director, Sunshine Project, Winter 2002. Available at: http://www.greens.org/s-r/27/27-15.html.
[20] Ibid.
[21] "Chemical and Biological Weapons: Possession and Programs Past and Present," CBW Resource Homepage, Center for Nonproliferation Studies (CNS), 4 September 2002. Available at: http://cns.miis.edu/research/cbw/possess.html.

turbulent region of the world, the Middle East. Most of them have either refrained from joining the BWC, or failed to ratify the treaty after signing it. In the framework of the Arab-Israeli confrontation, many Arab countries take biological and chemical weapons as "the poor man's nuclear bomb," providing a countermeasure to offset Israeli military superiority.

To summarize, the threat of biological weapons is multifaceted with diverse sources. While bioterrorism is no doubt part of the threat of proliferation of biological weapons, it is only part of the picture. At the root of the biological weapons threat is the attitude and behavior of the nation-states. An unbalanced emphasis on bioterrorism may obscure the complex nature of the spread of biological weapons and will not be helpful to the nonproliferation efforts in the end.

The Need for a New Vision for Biological Weapons Nonproliferation

Like the lack of consensus regarding the threat of biological weapons, there is no consensus as how to deal with the threat of proliferation. Essentially, two approaches exist concerning an effective strategy for the nonproliferation of weapons of mass destruction, including biological weapons.

The Bush Administration embodies one approach, a unilateralism that focuses on military superiority to ensure security rather than global approaches and treaty making. Washington has promoted a counterproliferation policy as its principal means to deal with perceived weapons of mass destruction threats. Counterproliferation encompasses such activities as the Proliferation Security Initiative, which involves the seizure of materials and/or equipment that could be employed to proliferate weapons of mass destruction.[22] The Bush administration's unilateral approach has disturbed the international community profoundly and been criticized even by U.S. elected officials.

[22] According to the Bush administration, these measures were intended to eliminate the immorality of mutually assured destruction, to provide the United States with more flexible options to develop new military capabilities, and to give the United States maximum freedom of action in the international arena. For more details about the U.S. new strategic doctrine, see *Quadrennial Defense Review* (Washington, D.C.: Department of Defense, 30 September 2001); "Briefing on the Nuclear Posture Review" (Washington, D.C.: Department of Defense, 9 January 2002). Available at: http://www.defenselink.mil/news/Jan2002/d20020109npr.pdf. See also, State of the Union Address, White House, (Washington, D.C.: Office of the President, 20 January 2002). Available at: http://www.defenselink.mil/news/jan2002/t01092002-0109npr.html.

"Our country's lost credibility," lamented Democratic Congressman Dennis J. Kucinich. "One of the biggest challenges to our nonproliferation goals may, in fact, be our own policies and actions. The U.S. has rejected the comprehensive test ban treaty, refused to sign the land mind treaty, withdrawn from the ABM treaty, unsigned the Kyoto Protocol, blocked the verification protocol for the biological weapons convention."[23] The United States has also withdrawn from the Anti-Ballistic Missile Treaty, which paved the way for its new missile defense systems, and undermined efforts to curb the spread of biological weapons.

In addition to rejecting the draft monitoring protocol for the BWC in July 2001, later that year the Bush administration blocked any further negotiating efforts toward a monitoring protocol. One factor that might have affected the American position is the attitude of the U.S. pharmaceutical industry, which seemed reluctant to see the introduction of monitoring arrangements, lest they have adverse impacts on corporate interests.[24] Such a view is short-sighted. In fact, the pharmaceutical and biotechnology industry has much to gain in the prevention of the abuse of biological materials, equipment, and know-how, as was the case with the nuclear and chemical industries, which are monitored under the Nuclear Nonproliferation Treaty and the Chemical Weapons Convention. The draft verification protocol was designed to give teeth to the BWC by, inter alia, mandating declaration of biodefense research and permitting the regular inspection of facilities engaged in pertinent activities (e.g., high level containment laboratories, pharmaceutical production plants) and inspection of sites suspected of bioweapons activities, all of which should have gone a long way to curbing illegal activities. The U.S. government said that implementation of the proposed verification protocol might compromise U.S. national security and trade secrets and that the monitoring measures therein would not enable verification of treaty compliance.[25]

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[23] See transcript of the Hearing on Nuclear Nonproliferation by the House Committee on Government Reform: Subcommittee on National Security, Emerging Threats and International Relations, Washington, September 26, 2006. (C) 2006 CQ Transcriptions, Inc.

[24] Pharmaceutical Research and Manufacturers of America, "PhRMA Position on a Compliance Protocol to the Biological Weapons Convention" (Washington, D.C.: PhRMA board, May 1998); "Summary of PhRMA's Position on a Compliance Protocol to the Biological Weapons Convention" (Washington, D.C.: PhRMA board, July 1998); "PhRMA Position on a Compliance Protocol to the Biological Weapons Convention" (Washington, D.C.: PhRMA board, 9 January 1997)

[25] Don Mahley, "Statement by the United States to the Ad Hoc Group of Biological Weapons Convention States Parties" (Geneva: U.S. Department of State, 25 July 2001). See also, Michael R. Gordon and Judith

Arguably, the reasoning for the United States putting the brakes on efforts to negotiate a verification protocol is so that it could retain maximum freedom of action to maintain an absolute global superiority in weaponry.

Washington's unilateral policies and actions have drawn the world's attention away from the other approach to the threat of weapons of mass destruction, an approach articulated largely through an international Commission on Weapons of Mass Destruction, known as the Blix Commission for its chairman, Hans Blix. The Blix Commission proposed roughly sixty recommendations, including short- and mid-term steps towards the eventual elimination of all weapons of mass destruction, which merit serious attention. More importantly, the Blix Commission offered a vision that should serve as spiritual guidance for the nonproliferation of WMD.[26] In a nutshell, this vision stresses that there is no alternative to a multilateral, cooperative, and comprehensive approach to the nonproliferation of all weapons of mass of destruction. For several reasons, this approach is particularly relevant to the international efforts to check the spread of biological weapons.

First of all, this multilateral, cooperative, and comprehensive approach is based on the understanding that nonproliferation is essentially a political matter. The international community is no more than an aggregation of sovereign states, some of which wish to resort to the acquisition of the WMD as a result of a careful calculation to ensure their national security and interests. For better or for worse, it must be acknowledged that decisions to that effect fall within the rights of sovereign states. Thus, under certain circumstances a state with considerable indigenous capabilities to develop WMD is virtually unstoppable if it is determined to do so. A state's decision to pursue such a course of action is more often than not closely related to its perception of the global strategic and political environment and to its regional security concerns in particular.

Miller, "U.S. Germ Warfare Review Faults Plan on Enforcement," *New York Times*, 20 May 2001.

[26] The Swedish government launched this commission in Stockholm on 16 December 2003 in response to the recent developments in international security and in particular to investigate ways of reducing the dangers from nuclear, biological, chemical, and radiological weapons. Chaired by Dr. Hans Blix, the commission comprised 14 members representing a broad and geographical and political base with a vast expert knowledge and political experience. The commissioners met periodically, discussed the issues, assessed a range of expert studies, and contributed their analyses, thoughts, and proposals. For more detail, see *Weapons of Terror: Freeing the World of Nuclear, Biological and Chemical Arms* (Stockholm: Commission on Weapons of Mass Destruction, 1 June 2006). Available at: http://www.wmdeommission.org.

While coercive measures under Chapter VII of the United Nations (UN) Charter could be taken as a last legitimate resort, outside pressure, including sanctions or military strikes to dissuade or block the efforts of a state to obtain WMD, may serve to prolong the process of the acquisition but can never guarantee a permanent resolution of the issue.

The only sustained and effective way to stop proliferation, in the view of the author, is to create a political and security environment in which states feel no need to seek WMD as a weapon of last resort or have better alternatives to secure its interests than the acquisition of these horrible weapons. A good nonproliferation strategy, therefore, requires international cooperation in an atmosphere of mutual trust and confidence among states rather than perpetual confrontation caused by deep-rooted suspicion and hatred. Actions taken must be in complete accordance with the UN Charter and the fundamental principles of the international relations. The devastating consequences of the 2003 invasion of Iraq in the name of counterproliferation of chemical and biological weapons should have provided enough lessons to learn that a unilateral and confrontational approach is just dead wrong.

Secondly, this multilateral, cooperative, and comprehensive approach is based on the understanding that no country can single-handedly cope with the threat of WMD proliferation. In fact, faced with the common scourge of this rising danger, all states are stakeholders and must be included in the effort. To achieve the goal of curbing the proliferation of WMD, it is imperative to attend to the core interests of all the members of the international community, not just the interests of one nation or a group of nations at the expense of other states. This approach involves international collaboration on the basis of equality and mutual respect among states, a cooperative rule-based international order, applied and enforced through effective multilateral institutions, with the UN Security Council as the ultimate global authority.

Thirdly, this multilateral, cooperative, and comprehensive approach is based on the understanding that nonproliferation must ensure broad participation. National governments no doubt bear the greatest share of the responsibility. Governments make the decisions whether or not to develop biological weapons; governments have the most valuable resources, the legitimacy, and all sorts of means to affect fundamentally the progress of nonproliferation. To illustrate the point, the acquisition or use of the WMD

by terrorists or organized crime groups would virtually be inconceivable without their close association with the political, social, and economic background of the country that these groups are operating in and the "host" government's specific policies with regard to terrorism or organized crime. Some of these policies may be deliberate, others may be inadvertent. Thus, a broad and solid basis for the success of efforts to prevent bioterrorism will be firmly established as long as all governments are able to implement in good faith the obligations of the existing international legal documents like the BWC or other nonproliferation mechanisms like UN Security Council Resolution 1540,[27] taking all necessary national preventive measures.

Nonproliferation efforts, however, should extend beyond sovereign states. In fact, everyone must contribute. Research communities, businesses, non-governmental organizations, the media, and the general public all share ownership of the challenges of WMD nonproliferation. This shared responsibility is particularly true in the case of biological weapons nonproliferation. Unlike nuclear or chemical weapons, which are usually manufactured with certain materials, adequate expertise, and significant infrastructure, most bacteria, viruses, and toxins that have the potential to be used as weapons exist in nature. Thus, in comparison to other weapons categories, access to biological agents is far wider and more divergent. Moreover, biological weapons can be used to injure and kill not only humans, but also animals and plants. They can also be designed, or genetically engineered, to make them resistant to known vaccines, antibiotics, and antiviral medications. According to some, the greatest potential biological threat from terrorists or criminals is the possible use of pathogens to wage economic warfare by destroying important agricultural crops and/or livestock.[28] Against this backdrop, the roles of the international organizations like the World Health Organization, the World Organization for Animal Health, and the UN Food and Agriculture Organization are all indispensable in the fight against the spread of biological weapons and also in the response to any possible biological attacks.

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[27] This resolution asks states to take domestic action to prevent sub-national actors from obtaining WMD or their means of delivery. United Nations Security Council, 4956th Meeting. "Resolution 1540 (2004)" Doc. S/Res/1540. 28 April 2004.

[28] Zilinskas, "Assessing the Threat of Bioterrorism."

Next, this multilateral, cooperative, and comprehensive approach is also based on the understanding that the nonproliferation of biological weapons cannot be isolated from the international progress towards peace, order, and the reduction of arms. In the first place, nonproliferation is closely linked with the arms competition of major powers. As mentioned above, the efforts of a major or regional power to create new military capabilities or the maintenance of biodefense programs that appear to be crossing the line to offensive activity would inevitably generate fears of other nations, pushing them to accelerate their military programs in response. Precisely in this context, the great powers, the United States in particular, have a special responsibility to contribute to nonproliferation efforts by exercising restraint in their own arms build-ups and by playing a leading role in revitalizing true and effective arms control and disarmament.

Nonproliferation is also linked to regional stability. The chaotic and conflict-ridden Middle East provides a living example how the Israeli-Arab confrontation underpins the growing threat of proliferation of WMD in the region. Israel's acquisition of nuclear weapons actually has led many Arab countries to keep as a deliberate countermeasure chemical and biological weapons options. Thus, a regional security arrangement plus the creation of a zone free of weapons of mass destruction would go a long way towards sustained and effective efforts to curb the spread of biological weapons in the region.

Last but not least, nonproliferation has much to do with the technical and economic circumstances of developing countries. The probability that biological attacks would occur in developed countries, not developing ones, is assumed. However, the poor living conditions of the citizenry, inadequate public health capabilities, unscientific modes of development, and the lack of expertise, funds, and mechanisms to deal with the outbreak of disease in most developing countries have all combined to have a negative impact on the fight against the spread of biological weapons worldwide. First, a large group of the developing countries are poorly positioned to implement the BWC. Second, disease could spread quickly around the world if an outbreak occurs in a developing country unable to detect and quickly contain the disease. The spread of the disease will be enabled by the ever-expanding global transport of goods and livestock and the growth in international travel. Third, particularly at the early stages of a pandemic, it may be extremely difficult to tell if the source of the outbreak is a deliberately induced biological

attack or a natural eruption of a communicable disease. In short, biological weapons nonproliferation efforts will have to encompass a strong public health infrastructure; enhanced health and safety regulations, measures, and resources; controls on transfers of materials and equipment relevant to proliferation; the building of norms against biological weapons among all those engaged in the life sciences and in society as a whole; and public education about the importance of preventing biological weapons proliferation. These measures all require the concerted efforts of all the members of the international community. Most developing countries, however, have great difficulties putting such measures into practice.

Three Major Areas for Action

Under the above guidelines and also in view of the current obstacles to biological weapons nonproliferation, the Commission on Weapons of Mass Destruction offered six specific recommendations as essential to strengthening the international biological weapons nonproliferation regime.[29] At the risk of oversimplifying these recommendations, three major areas can be defined as focal points in the author's view.

The first area for nonproliferation activity involves promoting the effective enforcement of the relevant international agreements on biological weapons. In that respect, strengthening the role of the BWC should be the focal point of international efforts. Despite its shortcomings, the BWC remains the only treaty with a broad consensus that provides an international standard by which biological activities can be judged. As of March 2007, the Convention had 155 members, reflecting the strong political will of the overwhelming majority of states to outlaw biological weapons. Thus, the BWC will continue to constitute the primary cornerstone of whatever biological weapons nonproliferation mechanisms evolve in the future. In the meantime, it must also be acknowledged that the treaty needs to be strengthened in many ways.

First, the parties to the BWC need to promote further universal adherence to the treaty. So far, the BWC has fewer members than either the Nuclear Nonproliferation Treaty or the Chemical Weapons Convention (CWC). Sixteen states have signed but not

[29] *Weapons of Terror: Freeing the World of Nuclear, Biological and Chemical Arms* (Stockholm: Commission on Weapons of Mass Destruction, 1 June 2006), 117-23. Available at: http://www.wmdeommission.org.

ratified the treaty, while more than twenty remain fully outside of the BWC regime.[30] Most of these non-members come from the developing countries, indicating either indifference to the BWC or reluctance to give up the biological weapons option on the part of those countries. Thus, expansion of the BWC's membership will be significant in augmenting the overall effectiveness of the international biological weapons nonproliferation regime.

Second, the treaty needs to establish arrangements to verify compliance with its prohibitions. Unlike the CWC, the BWC has no provisions for the formal monitoring of the compliance. Negotiations to close this loophole in the BWC were made and came close to actual results but, as mentioned, the Bush administration thoroughly obstructed that process. Even today, many proposals are still on the table aimed at introducing some monitoring mechanisms like strengthening the BWC's verification capabilities, either directly associated with the BWC or as part of a broader effort to build on the lessons and institutional capabilities of the UN Special Commission in Iraq or its successor, the UN Monitoring, Verification, and Inspection Commission. The key to the success of the efforts, at least to regaining some momentum in the process, evidently lies in the U.S. policy. If the United States is willing to modify its policy and commit to a multilateral approach and instruments, then progress will be possible. Of course, the ultimate success of such endeavors will also depend on whether all states at the negotiating table can come to agreement on the proposed measures.

Third, the BWC has no standing institution to monitor and oversee compliance and implementation. Just as no other monitoring institution is able to perform the functions that the Technical Secretariat of the Organization for the Prohibition of Chemical Weapons carries out for the CWC or that the International Atomic Energy Agency performs for the Nuclear Nonproliferation Treaty, the institutional deficit for the BWC needs to be rectified to enable permanent support for the BWC. Like the discussion on the verification provisions, the debate on the introduction of a standing BWC inspectorate has been going on for years, but without substantial agreement. Consensus seems in sight at least on two matters. One is the establishment of a standing secretariat to handle

[30] For a list of members, signatories, non-signatories, and other details about the BWC, go to: http://www.opbw.org.

organizational and administrative matters related to the treaty, such as Review Conferences and expert meetings.[31] The other is the use of UN capabilities to investigate allegations of biological weapons use or suspicious disease outbreaks pending the establishment of the BWC's own inspectorate.[32]

The second area of activity is to ensure better national participation in the biological weapons nonproliferation regime. As discussed above, the prospect of nonproliferation lies almost solely in the attitudes of various states, the major powers in particular. Even the future of the BWC lies in the willingness of the state members to implement all its obligations and to develop the international nonproliferation regime on the basis of the agreed rules of the game. Like any other arms control agreement, the BWC is no more than an agreement of intention among states that is codified in law. A law is only as good as its implementation and enforcement, so the positions of the member states truly matter. The success in implementing the BWC in the future will rely on a combination of the policies and capabilities of the treaty's member states. With respect to policies, the challenge is how to regulate the related behavior of the treaty's members. All states should understand that in the implementation of the BWC, there is only one standard to be followed: the BWC's provisions. Double or multiple standards should not and will not be allowed to apply. Stress again must be placed on the role by major powers, particularly the United States. America has such a great impact on nonproliferation efforts that it is particularly disappointing for many to see the United States practice double standards. "They are always suspicious of the normal scientific research and production activities under the Convention carried out by other states parties in the area of biology, while frequently lecturing others," said Chinese Ambassador Sha Zhukang.

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[31] At the 2006 Review Conference, agreement was reached to provide modest institutional support to the series of technical discussion meetings scheduled from 2007 to 2010. The small three-person Implementation Support Unit is also to facilitate the confidence-building measures of the BWC, established at the 1986 Review Conference, that ask states to report data on biological research, high containment laboratories, and the outbreak of diseases. The 1991 Review Conference also asked states to provide data on offensive and defensive bioweapons programs back to 1946, current biodefense programs, vaccine production facilities, and steps to implement the BWC. Sixth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction. *Final Document*. 8 December 2006 (BWC/CONF.VI/6). Geneva, 2006. Part III, 5. Available at: http://www.opbw.org.

[32] In 2006, agreement was reached to update the roster of experts that might conduct investigations on behalf of the UN Secretary General as well as the inspection procedures that are to be employed in the field. UN General Assembly. "The United Nations Global Counter-Terrorism Strategy." 6 September 2006 (Doc. A/60/L.62). New York, 2006. 6-7. Available at: http://www.un.org/terrorism/strategy.

"They remain silent about their own relevant activities and facilities. By way of analogy, this is like a man with a flashlight in hand only to cast light on others while he himself stays in the dark."[33]

From the technical point of view, this problem can be addressed in part by encouraging greater transparency in all biological activities by states parties, no matter what the purpose of the activity. In fact, it was agreed as early as in the second BWC Review Conference in 1987 that confidence-building measures, namely voluntary annual declarations on various biological weapons-related activities, could play an important role in enhancing transparency. But over the years far too few states have provided declarations on a regular basis.[34] This situation requires improvement. Discussions need to be held to seek more effective ways to expand the implementation of these confidence-building measures so that nations can begin to demonstrate the status of their implementation of the BWC and pave the way for the future of multilateral verification.

With regard to the capacity, the challenge is how to improve the capability of most developing countries to implement the BWC. The top priority is to help such states develop national legislation and enforcement procedures. Given the uneven level of activity and expertise among the BWC state members, the Commission on Weapons of Mass Destruction suggested that states should be in a position to help

> promote a network of designated national authorities or functional focal points. Such a network could coordinate implementation support and assistance. It could promote best-practice models for national legislation and training in the range of activities needed to ensure national compliance; it could share information to assist parties to comply with all their BTWC obligations; and it could serve as a clearing-house for technical assistance and advice.[35]

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[33] Ambassador Sha Zhukang, "Remarks of the Head of Chinese Delegation to The Fifth Review Conference of the BWC." (Geneva, 19 November 2001). Available at: http://www.china-un.ch/eng/gjhyfy/hy2001/t85217.html.

[34] For more on these confidence-building measures, briefly, see footnote 31, or, at length, Marie I Chevrier, "Doubts About Confidence: The Potential and Limits of Confidence-Building Measures for the Biological Weapons Convention," in *Biological Weapons Proliferation: Reasons for Concern, Courses of Action*, report no. 24 (Washington, D.C.: Henry L. Stimson Center, January 1988): 53-75; Erhard Geissler, ed., *Strengthening the Biological Weapons Convention by Confidence-Building Measures*, Stockholm International Peace Research Institute Chemical and Biological Warfare Series, vol. 10 (London: Oxford Univ. Press, 1990).

[35] *Weapons of Terror: Freeing the World of Nuclear, Biological and Chemical Arms* (Stockholm: Commission on Weapons of Mass Destruction, 1 June 2006), 117-8. Available at: http://www.wmdeommission.org.

To a certain extent, the staff of the 1540 Committee is attempting to provide some assistance, and the Implementation Support Unit established at the BWC's Sixth Review Conference may also be able to provide modest help to states seeking implementation aid.[36]

The third major area for nonproliferation activity is to manage the impact of the advancement of life sciences and the related technologies on the nonproliferation of biological weapons. This aspect of nonproliferation involves the eternal dilemma of how to deal with the development of the dual-use technologies, which can be summarized as follows:

> New developments in biotechnology have always taken a central position in the debate over biosecurity issues with regard to strengthening the Biological and Toxin Weapons Convention (BWC). Biomedical research employing advances in biotechnology, including modern methods of molecular biology, genetic engineering and genomics, is explicitly pronounced in its dual-use character. The application of these modern methods in biomedical research is absolutely essential for elucidating pathogenic mechanisms that will define targets for countermeasures, allowing a more precise and directed battle to be waged against infectious diseases. At the same time, it is quite evident that the advances in biotechnology may be misused to develop and produce biological agents more dangerous than natural pathogens. Biosecurity measures designed to counteract misuse of biotechnology for biological warfare and bioterrorist activities will invariably affect biomedical research developments and must therefore be carefully drafted so as not to impede this research and the benefits that can be gained from it.[37]

Many proposals have been advanced in the hopes of striking a balance between the maintenance of national security and facilitating scientific development. The mainstream view is that reasonable monitoring and regulation of research activities, control of related sensitive material, and enhancing of the sense of social responsibility of the scientists and

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[36] The 1540 Committee is attempting to match states seeking assistance with national implementation measures to prevent the proliferation of weapons of mass destruction and their means of delivery to states that have indicated a willingness to provide such aid. For more, go to: http://disarmament2.un.org/committee1540/dir-assist.html. On the charter for the Implementation Support Unit, see The United Nations. Sixth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, *Final Document*, BWC/CONF.VI/6 (Geneva: 8 December 2006), Part III, 5. Available at: http://www.opbw.org.

[37] Statement on Biosecurity, International Network of Engineers and Scientists Against Proliferation, INES Working Group on Biological and Toxin Weapons Control, Bulletin 22-Role of Scientists in Disarmament, December 2003. Available at: http://www.inesap.org/bulletin22/bul22art14.html.

researchers are not only essential but also feasible. In this regard, it is of special importance for all countries and competent institutions to provide bioweapons awareness training for biologists and biotechnologists working in the public and private sectors. After all, at the end of the day, it is these men and women who would carry out any conceivable good or bad activities. Active consideration should therefore be given to centering these educational programs on two kinds of normative approaches—a code of ethics and a code of conduct.[38]

On the other hand, restrictions in the name of counterterrorism and the nonproliferation of biological weapons should not go beyond what is reasonably necessary. A balance should carefully be maintained in the relationship between the prevention of proliferation and international cooperation. "Both the prevention of the proliferation of biological weapons and the promotion of the peaceful use of biological technology constitute the purposes and objectives of the Convention. They should be complementary and mutually reinforcing."[39] Already there are complaints that "[t]he impact of the September 11 terrorist attacks on security questions brought new barriers for scientific exchange between the First and the Third World."[40] The Bush administration has enacted new regulations to enable U.S. immigration authorities to determine if foreign scholars or students can remain in the United States beyond their visa permits. Some have argued that these regulations have been implemented in an excessive manner, which could impede normal academic exchanges and would not be conducive to the peaceful use of biological technology, or, for that matter, exchanges in all fields of science.

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[38] *Weapons of Terror: Freeing the World of Nuclear, Biological and Chemical Arms* (Stockholm: Commission on Weapons of Mass Destruction, 1 June 2006), 121-2. Available at: http://www.wmdeommission.org.

[39] Ambassador Sha Zhukang, "Remarks of the Head of Chinese Delegation to The Fifth Review Conference of the BWC," 4.

[40] Fernando de Souza-Barros, "Counterterrorism and Third World Science," International Network of Engineers and Scientists Against Proliferation, INES Working Group on Biological and Toxin Weapons Control, Bulletin 22-Role of Scientists in Disarmament, December 2003. http://www.inesap.org/bulletin22/bul22art14.html.

China's Position on the Nonproliferation of Biological Weapons

In the last century, China suffered greatly from the use of biological weapons on its citizenry during the Second World War as well as the Korean War. Audaciously, the Japanese Imperial Army even used Chinese civilians and the prisoners of war in live experiments to develop the biological weapons that the Japanese later used on Chinese soil in multiple attacks. This bitter and painful history has added to China's determination that biological weapons should be outlawed, never to be manufactured and used again. For its part, China has never developed or manufactured any biological weapons, nor has it ever assisted, encouraged, or induced any state, group of states or international organizations to manufacture or otherwise acquire biological weapons.

China holds that the BWC has played an irreplaceable role in the prohibition and complete destruction of biological weapons and in the prevention of their proliferation. China consistently supports the objectives and purposes of the BWC, advocating thorough prohibition and complete destruction of biological weapons. China is firmly opposed to the proliferation of biological weapons. In the current circumstances, the Chinese government contends that it is an important common historical mission to strengthen the authority, universality, and effectiveness of the BWC, to promote the biological arms control and disarmament process, and to prevent and address the threat of biological weapons through multilateral efforts.

Accordingly, China calls for all members of the BWC to do everything possible to strengthen national legislation against biological weapons and to adopt comprehensive and specific measures to provide international legal and technical assistance among states to enhance capabilities to prevent bioterrorism and to promote biosafety. China encourages all states parties to conduct confidence-building measures, which are an important dimension of the BWC's implementation. Currently, participation rates in submitting confidence-building declarations remain very low. China calls on more BWC members to provide their confidence-building data voluntarily and in a timely fashion.

The Chinese government contends that while biotechnology has been playing an increasingly important role in improving human health and the environment in recent years, the potential danger of the abuse of this technology is also on the rise. While benefiting from the achievements in the development of biotechnology, the international

community should work together to meet the new common challenge of its possible misuse. International exchanges and cooperation in the peaceful uses of biotechnology should parallel efforts at biological arms control and nonproliferation and bioterrorism prevention efforts. In this regard, all BWC members should adopt measures to ensure that developing countries truly benefit from related international cooperation and realize their legitimate rights to the peaceful use of biotechnology, as enshrined in the Convention.[41]

In the meantime, China has taken a number of important measures with the aim of fully implementing its various obligations under the BWC. China's actions include:

1) promulgating a series of laws and regulations to enhance the power of the government to implement the BWC;

2) exercising more strict control over exports of dual-use biological agents and related equipment and technologies in line with common international practices;

3) collecting and submitting to the UN annually and in a timely manner confidence-building data on activities pertinent to BWC compliance;

4) taking active part in international cooperation in the life sciences, including extensive and useful cooperation and exchanges with many countries and with international organizations (e.g., World Health Organization) for effective monitoring and prevention of infectious human, animal, and plant diseases;

5) proceeding to strengthen nationwide disease surveillance capabilities and to ensure effective crisis management during disease outbreaks;

6) developing a code of conduct concerning all the scientific activities for individuals (e.g., scientists, technicians) engaged in the life sciences in China;[42]

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[41] For the detailed discussion of China's position on the nonproliferation of biological weapons, see "China's Endeavors for Arms Control, Disarmament and Non-Proliferation," (Beijing: Information Office of the State Council, September 2005); "Statement by Ambassador Cheng Jingye," Head of the Chinese Delegation, Sixth Review Conference of the BWC (Geneva, 20 November 2006). Available at: http://www.fmprc.gov.cn/eng/wjb/zzjg/jks/jkxw/t281262.html.

[42] The Chinese Academy of Sciences passed guidelines in November 2001 about the ethical conduct of science and peace. In addition, China Association of Science and Technology established a Commission on Rights of Scientists and Engineers to attend with the behavior of scientists. A Committee on Ethics was also created to strengthen scientific codes and to investigate cases where scientists have violated the ethics code. "China's Views and Practices in Adopting Code of Conduct of Scientists," Meeting of Experts, BWC/MSP/2005/MX/WP.20. (Geneva: People's Republic of China, 14 June 2005), 2. Available at: http://www.opbw.org.

> 7) making great efforts to strengthen education to enhance the awareness of Chinese citizens of the importance of combating the spread of biological weapons and their significance in contributing to the success of nonproliferation; and,
>
> 8) promoting biological security, particularly strengthening the effective protection and management of pathogenic human and animal bacteria, viruses, and toxins.[43]

Due to these activities, it can be argued that China is a proactive and strong partner in international efforts to prevent the proliferation of biological weapons.

Of course, like other developing countries, China is faced with new challenges. Some Western countries have expressed suspicion that China may be developing a biological weapons capability. Such assertions are made in official government documents and elsewhere.[44] However, such groundless, irresponsible speculation has at times made China indignant. Nonetheless, these accusations raise a legitimate issue for China, and indeed, for all BWC members, as to what should be done to promote further trust and confidence among nations to facilitate the true and full implementation of the BWC. Given the size of China's territory and population and the uneven development of the country, the Chinese government also perhaps needs to make greater efforts to prepare domestically to deal with the risks of biological weapons proliferation. These efforts should particularly include, for example, enhancing the awareness of the general public about the possible consequences of a biological attack or a disease disaster, further improvement of China's capabilities in disease surveillance and crisis management, and effective implementation of all the pertinent laws and regulations. China has already made considerable progress in this regard but a lot of additional improvements need to be made.

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[43] For more description of China's efforts to implement the BWC, see "National Report on the Implementation of the BWC," Chinese Government White Paper, Sixth Review Conference on the BWC (Geneva, 9 October 2006). Available at: http://www.fmprc.gov.cn/chn/wjb/zzjg/jksfyywj/t295044.html.

[44] See, for example, page 14, *Proliferation: Threat and Response 2001* (Washington, D.C.: U.S. Department of Defense, 2001). Available at: http://www.defenselink.mil/pubs/ptr20010110.pdf See also, "Chemical and Biological Weapons: Possession and Programs Past and Present," CBW Resource Homepage, Center for Nonproliferation Studies, 4 September 2002. Available at: http://cns.miis.edu/research/cbw/possess.html.

Conclusion

Nonproliferation of biological weapons may be a dream that mankind will never be able to completely fulfill, as science sees no limit in its advancement. From a technical perspective, when governments or sub-national actors find ways to overcome the old challenges to the acquisition of biological weapons, fresh problems will invariably crop up as new discoveries are made. Thus, the progress of science and the spread of the pharmaceutical and biotechnology industry will inevitably generate new uncertainties in the fight against the spread of biological weapons. The march of science and the growth of industry need not pose insurmountable impediments to nonproliferation efforts. Provided there is adequate political trust between states, the proliferation of these deadly weapons can be controlled or managed. In a sense, therefore, biological weapons nonproliferation is essentially a question of whether human beings have the will to control technology or will allow technology to destroy humans. Confronted with such a life-and-death challenge, one must firmly believe that mankind will have enough wisdom to understand fully the common threat and its implications, and to take concerted efforts to curb it before it is too late. The international community cannot afford to fail to do so.