

Amy E. Smithson, Ph.D.

## Introduction

Amy E. Smithson, Ph.D.<sup>1</sup>

China's attitudes towards arms control in general and biological weapons nonproliferation in particular have evolved over the last few decades. *Beijing on Biohazards* provides an informative and intriguing snapshot of current Chinese views on a variety of interlocking topics that fall under the umbrella of biological weapons nonproliferation. To introduce the collection of Chinese essays and the two commentaries on them by U.S. authors, the following paragraphs review China's early outlook on biological and chemical arms control matters, including Chinese concerns about the use of export controls, and summarize the discussion of biological weapons nonproliferation in Chinese defense white papers. The signs of an internal debate about one facet of biological weapons nonproliferation policy are then raised, and some observations are made about the need for more insight into Chinese thinking on biological weapons nonproliferation topics. A synopsis of the essays themselves is then presented.

The Chinese government was a non-participatory critic of arms control when the Biological and Toxin Weapons Convention (BWC) opened in 1972 for the nations of the world to sign it.<sup>2</sup> China first ventured into the multilateral arms control arena in 1980, taking a seat in Geneva at the Chemical Weapons Convention negotiations, where the Chinese delegation successfully advocated adding a ban on use to the treaty's prohibitions on development, production, and stockpiling of poison gas.<sup>3</sup> A few years after China began to participate in the Chemical Weapons Convention talks, China acceded to the BWC in mid-November 1984.

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<sup>1</sup> A Senior Fellow at the James C. Martin Center for Nonproliferation Studies of the Monterey Institute of International Studies, Smithson specializes in biological and chemical weapons nonproliferation issues.

<sup>2</sup> Negotiated by the British, U.S., and Soviet governments, the BWC opened for signature in London, Washington, and Moscow on 10 April 1972 and entered into force on 26 March 1975.

<sup>3</sup> Given China's modest track record in arms control, some were surprised when China signed the Convention at the mid-January 1993 ceremonies in Paris opening the treaty for signature. Prevailing wisdom held that the Chinese saw advantage in the leverage they would have under the Convention's auspices to propel Japan to destroy the chemical weapons that the Imperial Army abandoned on Chinese territory during World War II. China signed on 13 January 1993, ratified the Convention on 25 April 1997, and deposited its instrument of ratification on 29 April 1997, the day the treaty took effect. The dates of China's actions are exactly the same as the U.S. dates for signature, ratification, and deposit. Go to: [www.opcw.org](http://www.opcw.org).

As with the chemical weapons ban, Beijing voiced concerns that the BWC did not forbid bioweapons use. The Chinese government also highlighted the treaty's lack of verification and compliance measures and expressed hope that these faults would be corrected.<sup>4</sup> Because the 1925 Geneva Protocol outlaws the use of biological and chemical weapons, many governments and arms control observers did not share China's worries that not putting a use ban in the BWC would leave a gap in international legal prohibitions against biological weapons.<sup>5</sup> Many countries did, however, agree that a legally binding monitoring protocol would strengthen the BWC, and international negotiations to accomplish that task began in 1995 with China among the participants.

Throughout these talks, China charged that the BWC's more industrialized members were not engaging in full trade and technology exchanges related to biological materials and equipment, even though Article X of the treaty expressly promotes free trade, scientific exchanges, and technical development.<sup>6</sup> The focus of China's concerns was the Australia Group, the export control cooperative that in 1985 began restricting trade in high-proliferation risk chemicals, biological materials, and chemical and biological equipment to suspected proliferators.<sup>7</sup> Several countries, including China, viewed the Australia Group's existence as a fundamental contradiction to the principles of Article X, and campaigned for the elimination of the organization.<sup>8</sup> Other BWC

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<sup>4</sup> "Letter from Chinese Foreign Minister Wu Xueqian to U.S. Secretary of State George Shultz, regarding China's accession to the Biological Weapons Convention (BWC)," *Xinhua*, 16 November 1984. Text of letter in FBIS Special Memorandum, 18 December 1991.

<sup>5</sup> For the exact prohibitions, *Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare* (Geneva: 17 June 1925). Available at: [www.opbw.org](http://www.opbw.org).

<sup>6</sup> To underscore China's disgruntlement, Ambassador Sha Zhukang reportedly called the BWC a "fraud of sham disarmament" in 1997. Quoted in Eric Croddy, "China's Role in the Chemical and Biological Disarmament Regimes," *Nonproliferation Review*, vol. IX, no. 1 (Spring 2002), 34.

<sup>7</sup> For more on the history and activities of the Australia Group, go to: [www.australiagroup.net](http://www.australiagroup.net).

<sup>8</sup> Expressing the view that existence of export controls under the Chemical Weapons Convention and the Australia Group create "two parallel export control mechanisms" that cause "confusion and disputes" in trade, an "imbalance in rights" of treaty members, and other problems for the full and universal participation in the treaty, Sha Zukang, "Next Steps," *OPCW Synthesis* (May 2000), 17. For more on China and the BWC's Article X, see Working Paper BWC/CONF.V/COW/WP.9, submitted by China, Cuba, India, Indonesia, Islamic Republic of Iran, Libyan Arab Jamahiriya, and Pakistan to the Fifth Review Conference (Geneva, 26 November 2001). Available at: [http://www.opbw.org/rev\\_cons/5rc/docs/rev\\_con\\_docs/cow/COW-WP.09.pdf](http://www.opbw.org/rev_cons/5rc/docs/rev_con_docs/cow/COW-WP.09.pdf). Also, Working Paper BWC/CONF.V/COW/WP.25, submitted by China, Cuba, India, Indonesia, Islamic Republic of Iran, Libyan Arab Jamahiriya, Pakistan, and Sri Lanka to the Fifth Review Conference (Geneva, 27 November 2001). Available at: [http://www.opbw.org/rev\\_cons/5rc/docs/rev\\_con\\_docs/cow/COW-WP.25.pdf](http://www.opbw.org/rev_cons/5rc/docs/rev_con_docs/cow/COW-WP.25.pdf). "Specific Measures to Strengthen Implementation of Article X of the BTWC," Working Paper BWC/AD

members, recognizing that Article III of the treaty stipulates that BWC members not provide any assistance whatsoever to another state or organization's acquisition of biological weapons, saw no such contradiction and placed emphasis instead on crafting monitoring and inspection provisions for a protocol.<sup>9</sup> A few months after the introduction of a draft protocol text in 2001, China was among several countries to reject it, stating concerns about discriminatory export control practices.<sup>10</sup> When the talks began to fall apart after the United States rebuffed first the draft protocol and then the negotiating process itself, China reiterated its support for a balanced, effective monitoring protocol as "the best way to enhance the effectiveness of the BWC" and announced its willingness to return to the negotiating table.<sup>11</sup>

More recently, China's objections to the practice of targeted export controls for nonproliferation purposes appear to have softened.<sup>12</sup> In fact, China has taken noteworthy steps to bring its export control policies in line with those employed in export control cooperatives (e.g., licensing, end-user monitoring) and has created control lists that include all the agents, equipment, and technologies covered by the Australia Group.<sup>13</sup> These shifts may make it easier for other governments to find common ground with China on a various policies, practices, and mechanisms that have nonproliferation utility.

Over the years, the Chinese government has released a series of monographs,

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HOC GROUP/WP.135, submitted by China to the Ad Hoc Group (Geneva, 11 March 1997). Available at: <http://www.opbw.org/ahg/docs/06th%20session/wp135.pdf>.

<sup>9</sup> For the treaty's text, *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction* (Washington, D.C.: 10 April 1972). Go to: [www.opbw.org](http://www.opbw.org).

<sup>10</sup> China assessed the draft protocol, introduced in March 2001, as conducive to the discriminatory practice of export controls. Iran, Cuba, Indonesia, and five other countries took a similar stance. "China, Iran Oppose Ban on Biological Weapons," United Press International Newswire, 9 May 2001.

<sup>11</sup> See the section on Chemical and Biological Disarmament, *China's National Defense in 2002*, Information Office of the State Council (Beijing: Government of the Peoples Republic of China, 2002).

<sup>12</sup> According to Vice Foreign Minister Wang Guangya: "Strengthened non-proliferation should not hinder international scientific and technological cooperation, nor should it impede developing countries' peaceful uses of science and technology. . . . We believe that since the proliferation of weapons of mass destruction has its complex causes, non-proliferation efforts should follow the principle of seeking both temporary and permanent solutions, and these solutions should be sought through political and diplomatic means." Wang Guangya, Vice Foreign Minister, "Keep on Improving Non-Proliferation Mechanism and Promote World Peace and Development -- China's Non-Proliferation Policy and Practice," *People's Daily* (Beijing), 16 October 2002.

<sup>13</sup> See Regulations of the People's Republic of China on Export Control of Dual-Use Biological Agents and Related Equipments and Technologies, Decree no. 365 (Beijing: State Council, 14 October 2002). Note that China has taken similar steps with chemical, nuclear, and missile technology controls. Wang, "China's Non-Proliferation Policy and Practice," 16 October 2002.

known generically as white papers, on arms control, disarmament, nonproliferation, and defense issues. These white papers often cover the full scope of classic security topics, including nuclear weaponry and testing, biological and chemical arms, missiles, and weapons in outer space. The 2005 edition, for example, underlined the great suffering of Chinese citizens under the Japanese Imperial Army's biological and chemical weapons attacks in World War II; expressed support for the goals and full implementation of the BWC; and encapsulated China's BWC-related activities, such as its annual filing of confidence-building data declarations since 1988; noted the establishment of biological export control regulations and consultation with the Australia Group on these matters; and stressed China's participation in international meetings associated with the BWC's governance and efforts to strengthen the treaty.<sup>14</sup> The 2003 white paper listed eight laws and regulations pertinent to biological export controls. Briefly describing their purpose, this monograph noted that China had established a licensing and registration system for biological exports as well as criminal penalties for the illegal production, sale, transfer, stockpiling, and use of infectious pathogens.<sup>15</sup> In the 1995 edition, China refrained from discussing specific measures, instead describing the circumstances needed for success in arms control and disarmament (e.g., peaceful resolution of disputes, special leadership burdens of major powers) and stating that the nonproliferation of unconventional weapons was "not in itself the ultimate goal. Only through complete prohibition and thorough destruction of such weapons can proliferation be effectively prevented."<sup>16</sup>

The white papers usually devote just a paragraph or two to the subject of biological weapons. The contents of these paragraphs are restrained to terse statements of overarching principles that are inherently unobjectionable (e.g., pursuit of peace) and mentions of China's domestic actions to implement its BWC obligations. Consequently, these white papers leave a considerable amount unsaid about China's views on many of

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<sup>14</sup> This monograph devotes just one paragraph to the topic of biological weapons nonproliferation. *China's Endeavors for Arms Control, Disarmament and Non-Proliferation*, Information Office of the State Council (Beijing: Government of the Peoples Republic of China, 2005) 26.

<sup>15</sup> See Section IV: Concrete Measures for Non-Proliferation Export Control of *China's Non-Proliferation Policy and Measures* (Beijing: Information Office of the State Council of the People's Republic of China, December 2003).

<sup>16</sup> *China: Arms Control and Disarmament* Information Office of the State Council (Beijing: Information Office of the State Council of the People's Republic of China, November 1995).

the current and pressing issues associated with biological weapons nonproliferation.<sup>17</sup> For example, issues such as the oversight of genetic engineering research involving infectious pathogens and biosecurity measures to prevent the purposeful diversion, theft, or deliberate release of diseases do not appear to have figured prominently in the statements of the Chinese government. Nor are these subjects highlighted in articles by Chinese experts.

Interestingly, some Chinese views have emerged that suggest a debate in underway in Chinese national security circles as to whether a monitoring protocol should be added to the BWC. During the protocol talks Chinese officials reportedly opposed intrusive inspection measures and any requirement to reveal past bioweapons-related activities.<sup>18</sup> Privately, Chinese officials have characterized verification of the BWC as a futile endeavor and referenced the implementation of the Chemical Weapons Convention as a cautionary tale for what could transpire if the BWC had an inspection regime. Chinese officials have complained about the bureaucracy necessary to inform China's chemical companies of the treaty's requirements, prepare declarations on the production and consumption of proliferation-risk chemicals, and host international inspections of pertinent industrial and military facilities.<sup>19</sup> Along those lines, one Chinese expert cautioned against modeling a BWC protocol's provisions on the overly intrusive inspections of the Chemical Weapons Convention. Another Chinese expert concluded that the dual-utility of life sciences equipment, materials, and technology renders it

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<sup>17</sup> Nor do the working papers that China has submitted in the BWC protocol negotiations and intercessional discussions shed much light on these matters. China has made statements supportive of the BWC's objectives, offered lists of China's relevant domestic regulations, and introduced a declaration format and a list of biological agents. See, for example, "A Compiled List of Laws and Regulations of China In Relation to the Implementation of the Biological Weapons Convention," Working Paper BWC/MSP.2003/MX/WP.9, submitted by China to the 2003 Meeting of Experts, Geneva, 15 July 2003, available at [http://www.opbw.org/new\\_process/mx2003/bwc\\_msp.2003\\_mx\\_wp09.pdf](http://www.opbw.org/new_process/mx2003/bwc_msp.2003_mx_wp09.pdf); "Position of principle of the Chinese delegation on the Biological Weapons Convention and its third review conference," Working Paper BWC/CONF.III/18, submitted by China to the Third Review Conference, Geneva, 20 September 1991, available at [http://www.opbw.org/rev\\_cons/3rc/docs/conf/BWC\\_Conf.III\\_18\\_E.pdf](http://www.opbw.org/rev_cons/3rc/docs/conf/BWC_Conf.III_18_E.pdf); "Declaration Formats," Working Paper BWC/AD HOC GROUP/WP.291, submitted by China to the Ad Hoc Group, Geneva, 3 July 1998, available at <http://www.opbw.org/ahg/docs/11th%20session/wp291.pdf>.

<sup>18</sup> Croddy, "China's Role in the Chemical and Biological Disarmament Regimes," 25.

<sup>19</sup> On several occasions, Chinese officials have made statements to this effect to the author. For a brief description of structure of China's bureaucracy to implement the Chemical Weapons Convention, see Croddy, "China's Role in the Chemical and Biological Disarmament Regimes," 33.

impossible to monitor the BWC.<sup>20</sup> In Western and international settings, the public airing of differing opinions is routine, but open debates on security policy are perhaps somewhat new and unexpected for some in China, as well as for China's foreign interlocutors. At the very least, these varying comments raise questions as to whether Beijing would throw its full commitment behind the negotiation of a BWC monitoring protocol should such talks resume.

While a handful of Chinese officials and analysts have spoken out about the merits and disadvantages of attempting inspections under the BWC, Chinese analysts appear to have published few works in Chinese or in English that convey their views on many other topics in the realm of biological weapons nonproliferation.<sup>21</sup> In turn, few Western scholars have written about China's biological weapons arms control and nonproliferation positions and activities.<sup>22</sup> The language barrier no doubt contributes to this dearth of analysis and discussion across borders.

Several reasons make it important for the world at large to have a better understanding of Chinese views on the full scope of biological weapons nonproliferation issues. As a permanent member of the UN Security Council and a global military and economic power, China has considerable leverage to exert, should it choose to do so, in international decisions regarding biological weapons nonproliferation laws, mechanisms, policies, and practices. China's large population, bustling economy, and improving standard of living will continue to invite the international pharmaceutical and biotechnology industry into China. Signs of a pharmaceutical and biotechnology industrial boom already abound, with 1,700 Chinese-foreign pharmaceutical joint ventures underway, approximately \$600 million in Chinese government investment in biotechnology research annually, and the migration of major multinational

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<sup>20</sup> According to Croddy, the first argument appears in Pan Zhenqiang's 1996 Chinese language edited book, *International Disarmament and Arms Control, Guoji Caijun yu Junbei Kongzhi* (Beijing: National Defense University Press, 1996); the second is made by Li Yimin in Liu Huaqiu's 2000 arms control compendium, *Arms Control and Disarmament Handbook* (Beijing: National Defense Industry Press, December 2000). Croddy, "China's Role in the Chemical and Biological Disarmament Regimes," 35.

<sup>21</sup> The topic received some attention in Pan's *International Disarmament and Arms Control* and in Liu Huaqiu's *Arms Control and Disarmament Handbook*.

<sup>22</sup> For example, Croddy, "China's Role in the Chemical and Biological Disarmament Regimes." For an evaluation of China's chemical and biological defense policies and capabilities, see Bates Gill, *Case Study 6: People's Republic of China, The Deterrence Series: Chemical and Biological Weapons and Deterrence* (Alexandria, VA: Chemical and Biological Arms Control Institute, 1998).

pharmaceutical giants to China because of the increased practice of Western research standards and savings in labor costs.<sup>23</sup> Because of the dual-use nature of biological research, development, and manufacturing, the expansion of the biopharmaceutical industry in China brings with it the onus of responsible governance of these activities. The experience gained from that process could also be the springboard for China to take more nuanced and pro-active positions on the global stage, perhaps advocating certain mechanisms or standards that would strengthen the international bioweapons nonproliferation regime.

### **Overview of the Report**

To promote a better understanding of Chinese views on biological weapons nonproliferation, the Carnegie Corporation of New York generously provided grant support to explore the possibility that some Chinese experts and scholars might agree to write about topics associated with biological weapons nonproliferation. The essays in this report were commissioned in conjunction with a trip to Beijing in May 2006, following meetings with numerous Chinese government officials, laboratory scientists, and policy analysts specializing in national and international security issues. The individuals commissioned to prepare contributions to this volume number among China's top security analysts and scientific experts. Their qualifications are encapsulated below, but the annex to this report contains biographies of this prestigious group. The following paragraphs provide an overview of the *Beijing on Biohazards* essays.

While some aspects of a threat assessment are common across all countries, others differ depending on an individual state's military capacity, regional security environment, alliances, defense and foreign policies, and regional and international roles.

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<sup>23</sup> The biotech boom had its origins in the mid-1980s with the participation of a few Chinese research institutes in the Human Genome project. Among the major pharmaceutical multinationals with a presence in China, Pfizer has a \$500 million investment and three manufacturing plants in operation; Eli Lilly has a manufacturing plant about an hour from Shanghai and collaborations underway with three other Chinese firms; and GlaxoSmithKline has four manufacturing facilities; and AstraZeneca has offices in 20 Chinese cities. See Matthew Chernavak, "An Emerging Biotech Giant?" *China Business Review*, May 2005. Available at: [www.chinabusinessreview.com/public/0505/cheravenak.html](http://www.chinabusinessreview.com/public/0505/cheravenak.html). See also, Laura Santini, "Birth of a Biotech Industry Western Drug Makers Outsource R&D to Scientists in Shanghai and Beijing," *Wall Street Journal*, 19 November 2004. Available at: [www.aegis.com/news/wsj/2004/WJ041110.html](http://www.aegis.com/news/wsj/2004/WJ041110.html). Also, Robert Yuan, "Pharmaceutical Operations Expand in China," *Genetic Engineering & Biotechnology News*, 15 April 2007. Available at: [www.genengnews.com/articles/chitem.aspx?aid=2098&chid=4](http://www.genengnews.com/articles/chitem.aspx?aid=2098&chid=4).

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Liu Jianfei, PhD, a professor and research fellow at the Institute of International Strategic Studies at the Central Party School, gauges the biological weapons threat from a technical perspective and the factors in the international security environment that could propel states to acquire these weapons. On the technical side, Liu argues that the phenomenal advances taking place in the life sciences will change the dynamics of bioweapons proliferation for the worse, enabling the development of more dangerous weapons and increasing the chances for proliferation. Liu, who describes biological weapons as having the advantages of both nuclear and chemical weapons, sees non-state actors as more likely than national governments to proliferate biological weapons. He suggests that the most likely route to terrorist acquisition of biological weapons would be from states that decide to try to divert their opposition's attention from them by putting germ weapons in the hands of terrorists. Liu states that because the biological weapons proliferation threat is very high, specific improvements to the biological weapons nonproliferation regime are in order.

The middle trio of essays in the collection contends with topics associated with safe and responsible practice of life sciences activities. These three authors all point to the 2002 outbreak of Severe Acute Respiratory Syndrome as the catalyst that prompted the Chinese government to overhaul its regulatory framework for laboratory research activities between 2003 and 2006. The essay of Dr. Li Jinsong, a professor at the Institute of Microbiology and Epidemiology of the Academy of Military Medical Sciences, concentrates on China's revised biosafety regulations for pathogenic microbiology laboratories. Biosafety technologies and procedures minimize the risk to workers and the public of laboratory research involving highly infectious pathogens. Among other aspects of China's biosafety regulations, Li covers the requirements for the risk classification of pathogens and for the physical containment and biosafety procedures necessary for laboratories to host work with different risk categories of pathogens. Li also describes China's process for the approval of experiments involving highly infectious pathogens and for the oversight of such experiments. This approach, Li acknowledges, was generally patterned on the biosafety practices of the World Health Organization, the United States, and Canada. Li observes that a shortage of biosafety specialists in China will hinder the ability of China to implement these regulations.

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The companion piece to Li's essay, prepared by a team of public health officials led by Dr. Hu Longfei, the director and chief epidemiologist of the Department of Health and Quarantine in the Guangdong Health and Quarantine Bureau, also delves into some aspects of China's new biosafety measures (e.g., requirements for biosafety cabinets), but for the most part discusses China's regulations governing genetic engineering activities and biosecurity. Both China's biosafety and biosecurity regulations are tied to reference lists for high-risk human and animal pathogens created in 2005 and 2006, respectively. Higher physical security precautions (e.g., separate storage and tracking, controlled access) are required for the highest-risk pathogens, and government officials must give additional authorizations before researchers may acquire these pathogens and conduct various experiments with them. Separate approvals are also required for genetic engineering work that involves recombinant DNA, infectious agents, animal or plant pathogens, and human blood or other potentially infectious materials. Scientists' proposals to engage in genetic engineering activities are reviewed at the institutional level. For genetic engineering activities that pose a higher risk, they must also secure approval from officials at the State Council, which is China's highest administrative office, and perhaps the National Genetic Engineering Biosafety Council. The evaluation of these proposals takes many factors into account (e.g., appropriate biosafety level). For experimental and intermediate research, the evaluation criteria include examination of whether the proposed activity would enhance the virulence of the pathogen or increase its transmissibility, change the natural host range of a pathogen, or render a non-pathogen virulent or increase the resistance of a pathogen to antibiotics or antivirals.

Like Dr. Li, Dr. Hu and his colleagues state that China has established civil and criminal penalties for serious noncompliance with its biosafety, biosecurity, and oversight of genetic engineering regulations. These two essays also both underscore the importance of improving the biosafety training of Chinese scientists, technicians, and bureaucrats involved in biosafety management. Li proposes a pair of remedies for the shortage of biosafety specialists in China, and Dr. Hu and his co-authors seek the continual improvement of biosafety training available to China's scientists and technicians, as well as exchanges with scientists and biosafety professionals overseas to facilitate biosafety cooperation and education.

Wang Qian, an official in the biological and chemical division of the Foreign Ministry's Department of Arms Control and Disarmament, examines China's biosafety and biosecurity measures in comparison to the approaches taken in other countries. China, she recognizes, has taken major steps to reinforce its biosafety and biosecurity regulations so as to be among the toughest standards in the world. As would be expected with any complicated regulatory framework in the early stages of implementation, however, she finds some shortcomings. For example, Wang sees problems in China's cumbersome oversight bureaucracy and asks that the various government agencies better define how they divide and share responsibilities in implementing these regulations. Wang also observes that for China's biosafety and biosecurity measures to be comprehensive, they must be applied not only to pathogenic microbiology laboratories but to all facilities in China working with high-risk pathogens, including hospitals, academic laboratories, and commercial facilities. Finally, Wang notes positively that China's academicians have established their own code of conduct but that specific operational codes and universal norms that apply to all life scientists need to be created to encompass all Chinese scientists engaged in this type of work.

The fifth essay, Yang Ruifu's account of his experience as a United Nations Special Commission (UNSCOM) bioweapons inspector in Iraq, directly challenges the views expressed by some of his countrymen as to verifiability of the BWC. UNSCOM, which exposed Iraq's covert bioweapons program, inspected dual-use sites that were actively masking illicit biological weapons activities and those that were engaged in legitimate activities. The inspectors went about their work in conditions that ranged from welcoming to overtly hostile. Yang, a PhD and professor of microbial genomics at the Institute of Microbiology and Epidemiology of the Academy of Military Medical Sciences, posits that the UNSCOM inspections offered considerable proof that experienced inspectors can successfully discern whether a facility is engaged in activities consistent with its stated peaceful purpose(s) or is disguising illicit weapons-related activities. Furthermore, Yang suggests that the UNSCOM experience can be adjusted to the BWC context and that the UNSCOM inspections are a highly valuable source of information about planning, inspector training, operational strategies, tactics, and technologies that could be useful to determine compliance with the BWC. Yang

therefore proposes a systematic examination of the UNSCOM experience, including the inspectors' first-hand accounts and the data from UNSCOM's confidential files, to assist efforts to strengthen the BWC.

The author of the capstone Chinese essay in this collection was asked to address how the international community should grapple with the challenge of biological weapons proliferation and to discuss how China's policy and activities will contribute to that process. First, in his description of the bioweapons threat, retired General Pan Zhenqiang, the vice-president of the Foundation for International Studies and Academic Exchanges, draws attention to a series of U.S. activities that raise concerns about U.S. compliance with the prohibitions of the BWC. The fast pace of discoveries in the life sciences will make the threat of bioweapons proliferation ever more difficult to contend with, so in Pan's view nonproliferation has an important grassroots component in the form of ethics training and codes of conduct for life scientists. Proliferation is at its roots a political problem, according to Pan, so he stresses the need for a cooperative, multilateral approach to nonproliferation since no single state can resolve nonproliferation problems on its own. With regard to strengthening the BWC, Pan is an advocate of greater transparency in biological activities, the addition of a monitoring protocol, a standing BWC inspectorate, universal adherence to the treaty, and assistance to states to improve pertinent domestic legislation and enforcement capabilities. Pan relates eight steps that Beijing is taking domestically to enhance China's own bioweapons nonproliferation efforts, and he identifies three areas where China could improve its activities in that regard.

Two U.S. experts, Drs. Bates Gill and Julie Fischer, provide commentary on the Chinese essays. For Gill, a specialist in East Asian foreign policy and politics, it is quite remarkable that Chinese experts are writing about these topics since not so long ago the Chinese government considered these matters too sensitive for public discussion. While applauding the willingness of Chinese experts to broach the subject of biological weapons nonproliferation, Gill questions the continuing reliance of Chinese security analysts on an approach to nonproliferation that centers on the factors in the international security environment that prompt or compel actors to attempt to acquire unconventional weapons. This "demand-side" approach, Gill suggests, does not pertain to the problem

of terrorist proliferation. He also points out the authors' silence on such matters as the possible proliferation concerns that could accompany China's growing pharmaceutical and biotechnology industry and what, if any, threat China, with its megacities and as host of the 2008 Olympics, might perceive from terrorist acquisition and release of infectious pathogens. Fischer, a microbiologist who works at the intersection of life science and security policy, observes that the Chinese regulatory framework appears to integrate biosafety and biosecurity more closely than is the case in the United States. Both Fischer and Gill agree that thoroughly implementing these regulations in a country of China's size and diversity will be a hefty challenge. Similar to her Chinese counterparts, Fischer emphasizes that the provision of sufficient resources at the institutional level will be essential to success. Absent a significant investment in the plans, resources, and training to implement China's new biosecurity and biosafety regulations, she warns, this strong framework will be only a paper tiger.

With relatively little information available elsewhere regarding China's policies, activities, and priorities pertaining to biological weapons nonproliferation, this collection of essays is first and foremost a reflection of the readiness of Chinese experts to discuss and address these extremely important matters. Second, these essays indicate that Chinese views on bioweapons nonproliferation policies and mechanisms are evolving.<sup>24</sup> Third, these essays provide considerable information for their colleagues in the west to contemplate, to appreciate, to agree with, and to contest. These essays, in other words, are seeds for a dialogue between Chinese and Western policy analysts, scientists, and officials about the nature of the biological weapons threat and the tools that can be applied domestically and internationally to reduce the threat of biological weapons proliferation.

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<sup>24</sup> Pan, for example, acknowledges the existence of a Soviet bioweapons program in his essay. Previous Chinese statements and writings, including by Pan, have made no mention of the Soviet bioweapons program, which even the Russian President Boris Yeltsin conceded existed in mid-1992. R. Jeffrey Smith, "Yeltsin Blames '70 Anthrax on Germ Warfare Efforts," *Washington Post*, 16 June 1992; J. Dahlburg, "Russia Admits It Violated Pact on Biological Weapons," *Los Angeles Times*, 15 September 1992.