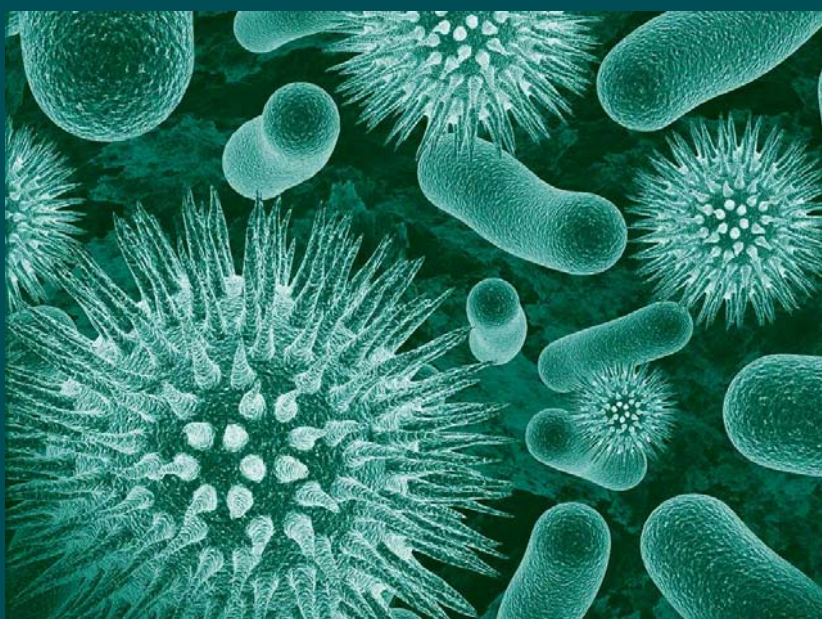




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Beyond the BTWC RevCon

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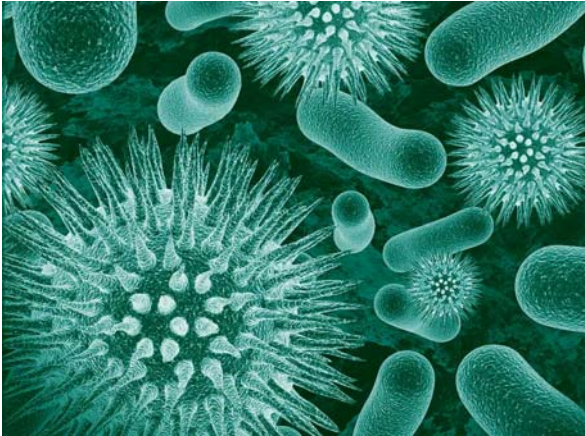
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Beyond the BTWC RevCon

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The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, more commonly known as the Biological and Toxin Weapons Convention (BTWC), entered into force on 26 March 1975. Although it is short—comprising of 15 articles—it opens with a clear message “never in any circumstances to develop, produce, stockpile or otherwise acquire or retain” these kinds of weapons.

Scientific and technological capabilities, together with the needs of society, have changed much over the last 36 years. The BTWC regime has responded to these changes by promoting wider stakeholder involvement and exchange, promoting education and encouraging innovation in the BTWC intersessional process. As the international community prepares for the Seventh BTWC Review Conference later this year, we have invited many of these stakeholders, including representatives from states parties, the convention's Implementation Support Unit, scientists, biological associations and the private sector, to reflect on past and current activities and to voice their views of what could—or should—be done to further strengthen the regime.

Our next issue focuses on nuclear-weapon-free zones (NWFZs). These zones—from the 1967 Treaty of Tlatelolco to the 2006 Treaty of Semipalatinsk—are an important and concrete contribution to the nuclear disarmament regime. Recent agreements, such as the 2009 Treaty of Pelindaba, are in their early days, and new zones, such as in the Arctic or the Middle East, are under consideration. In this issue of *Disarmament Forum*, articles will examine positive contributions of NWFZs to regional and global security, developments on the African continent following the entry into force of its NWFZ, as well as the prospect of an Arctic NWFZ. Contributions will also focus on the potential for a WMD-free zone in the Middle East as the international community turns its attention to the 2012 conference on this issue.

UNIDIR and the Institute for Peace Research and Security Policy (IFSH) at the University of Hamburg co-organized a seminar in February entitled “Russia's tactical nuclear weapons: posture, politics and arms control”. Andrei Zagorski of the Moscow State Institute of International Relations briefed participants on his latest study on Russian tactical nuclear weapons (TNW) postures. Pál Dunay of the Geneva Centre for Security Policy considered the near term possibilities for TNW reductions and Götz Neuneck of IFSH presented the results of a recent study group on NATO's missile defence plans. Copies of the presentations and summaries of the studies are available on our website.

Between December 2010 and July 2011 the UNIDIR project “The Conference on Disarmament: Breaking the Ice” and the Geneva Forum are organizing a series of thematic discussions to examine the myths and realities of the CD—as well as the critical challenges facing it—with the aim to increase understanding of the history, processes and issue areas of this unique

negotiating forum. Thus far, the series has held meetings on: the rules and practices of the CD; the CD and nuclear issues; the CD and civil society; negative security assurances; and the Prevention of an Arms Race in Outer Space (PAROS). For each meeting a background paper has been prepared. These papers, as well as many other UNIDIR resources on fixing the multilateral disarmament machinery, are available on our home page under "Disarmament Machinery".

Finally, we would like to welcome Ross McRae to the *Disarmament Forum* team. Ross shares Valérie's and my commitment to producing the reliable and readable journal that you have come to expect. We look forward to working together.

Why the 2011 BTWC RevCon might not be business as usual

Piers Millett

The Biological and Toxin Weapons Convention (BTWC) was the first international instrument to ban an entire category of weapon. This was a major turning point in international peace and security. The opening for signature of the convention in 1972 did not mean that the threat posed by the hostile use of biology had been resolved—nor was it the end of the story.

The BTWC prohibits the weaponization of diseases and toxins. It sets out a series of common undertakings, shared by the international community, to prevent such weapons from ever being created, let alone used. The BTWC contains a complete ban on these weapons: there is no right to retaliate in kind, no loopholes for domestic use, no provisions for certain states to retain biological weapons, and no provisions for non-lethal use or use for law enforcement. What the BTWC does not contain, however, are the details as to how states parties are to enforce the ban. The negotiation of the BTWC was not even the beginning of the end of the story: much work remains to be done.

Since the BTWC entered into force in 1975, the world has altered significantly. There has been a transformation in both what the convention is expected to achieve and the science it has to deal with. The BTWC has had to adapt to remain relevant, which is where the five-yearly review conferences come in. They provide a mechanism through which states parties assess the operation of the convention, reach additional agreements on how to make it work and set the agenda for work between conferences. The convention's entry into force in 1975 might therefore be more accurately described as the end of the beginning.

The BTWC has been portrayed as “multilateralism as it should be: flexible, responsive, creative and dynamic; and above all, focused on overcoming obstacles and delivering results”.¹ It is still relevant and has been moulded to the contemporary needs of the states parties. There is no reason why the convention should not continue to be modified to keep pace with both political realities and advances in science and technology.

Sitting at the crossroads

The current BTWC is a product of the issues with which it deals. Both the issues and the convention sit at a crossroads of several different worlds. The BTWC bridges science and society, health and security, and national and international levels of action. This is not simply arms control, disarmament or non-proliferation. The delegations that drive the BTWC are no

Piers Millett is Deputy Head of the Biological Weapons Convention Implementation Support Unit. The opinions expressed in this article are the author's own and do not necessarily represent the views of the states parties to the Biological and Toxin Weapons Convention, the Implementation Support Unit or the United Nations.

longer drawn solely from the security community. Today they are just as likely to be from ministries of health, agriculture, education, justice, science or commerce as from defence or foreign affairs.

Between science and society

At its heart, the BTWC is a bargain struck between science and the societies in which science operates. The basic concept of “do no harm”, which is fundamental to the responsible conduct of research, also underpins the BTWC. The convention enshrines the debate on the balance between scientific freedoms (for example, Article X on right to the peaceful use of biology) and the need to prohibit and prevent the use of biology to cause harm (for example, through the Article IV requirements for national implementation).

This is one of the most exciting and challenging aspects of the convention. Not only has the pace of relevant scientific and technological development dramatically increased, but those involved in modern biology have begun to engage as never before, with efforts to minimize the potential for malicious use while maximizing opportunity for benefit.²

Dealing effectively with the overlap between science and society will inevitably require each state to find an appropriate balance between scientific freedom and security. Such efforts should not take place in isolation. States still have work to do collectively. States parties need to pursue efforts to ensure that one of the fundamental operating principles of good science is that it is safe, secure and beneficial.

Between health and security

There is a spectrum of biological risks and threats. The spread or occurrence of diseases and toxins can have entirely natural origins, they can be the result of accidents, and they can also be the result of an intent to cause harm. These risks and threats are interconnected and dealing with them holistically forms the basis of the concept of *health security*.³

Traditionally, international efforts to address health security have been pursued by different organizations. There are many international organizations active in dealing with risks from naturally occurring disease: for example, the Food and Agriculture Organization (FAO), the World Health Organization (WHO) and the World Organisation for Animal Health (OIE). There is also a burgeoning international regime to deal with risks which are accidental in origin. International organizations are supported by other professional organizations, such as the International Federation of Biosafety Associations (IFBA), which are in turn supported by regional affiliates, such as the American Biological Safety Association (ABSA), the European Biosafety Association (EBSA) and the Asia-Pacific Biosafety Association (A-PBA). These bodies are increasingly important partners within the framework of the BTWC.⁴

However, the international regime to deal with the deliberate use of biology to cause harm appears much less developed: the Bioterrorism Prevention Programme run by INTERPOL to build law enforcement capacity; UN Security Council resolution 1540, which supports the efforts of the treaty regimes in place to deal with nuclear, chemical and biological weapons and obliges states parties to legislate against related activities by non-state actors; and the United Nations' mechanism to investigate the alleged use of biological weapons, under the auspices of the Secretary-General.⁵ Each of these efforts has specific aims and purposes. They do not address the wider context of the hostile use of biology. The BTWC remains the only international forum for dealing with broader issues of deliberate biological risk.

The possibility of organizations such as the FAO, WHO and OIE, which deal with naturally occurring disease, being involved in security issues is a sensitive topic. However, victims of a biological agent, irrespective of origin, still require help. Health and security communities therefore have a common interest in providing the necessary resources to deal with disease, and working together for mutual benefit. For example, strengthened disease surveillance capacity is equally important—regardless of whether an outbreak occurred naturally or was caused deliberately or accidentally.

Between international and national dimensions

The BTWC directly covers the actions of states. States parties are not allowed to develop, produce, acquire, transfer, traffic, stockpile or use biological weapons (or help or encourage others to do so). Through these obligations the BTWC addresses biological warfare.

The BTWC contains obligations for states parties to translate these international obligations into national measures to ensure that all those on their territories, or under their control, are also prevented and prohibited from pursuing activities that the states parties have outlawed. Through these measures the BTWC addresses the actions of groups or individuals and therefore deals directly with bioterrorism and biocrimes.

Regimes, organizations and networks

The classic response to international challenges is to negotiate treaties and build international organizations. This is particularly true of the traditional approach to arms control, disarmament and non-proliferation, especially with regard to weapons of mass destruction (nuclear weapons are addressed through the Treaty on the Non-Proliferation of Nuclear Weapons, the International Atomic Energy Agency, the Comprehensive Nuclear-Test-Ban Treaty and its preparatory organization; chemical weapons are addressed through the Chemical Weapons Convention and the Organization for the Prohibition of Chemical Weapons).

Although there is a long-standing convention, a comparable international organization to deal with biological weapons does not exist. It has been argued that this is because of diplomatic

failure, the technical difficulty of verification or because biology is fundamentally unsuited to such an approach. In practice, the reasons for what happened in the past are much less important than putting in place measures to prevent the malicious use of biology in the future.

Any effort to move the biological weapons control regime forward will have to take into account three facts: there are already many organizations and actors active in this field (from the OIE to INTERPOL and from the InterAcademy Panel on International Issues to the IFBA); there are many mechanisms already available (such as efforts by the WHO to build health capacity to deal with biological weapons incidents, or the United Nations' ability to investigate allegations of use); and relevant expertise is found in many places, including international organizations, national governments and departments, non-governmental organizations, the private sector, scientific academies and societies, and professional bodies. How do we mobilize these resources? Should these resources be allocated to somewhere new? If they are not reallocated, how do we avoid efforts being duplicated?

The answers to these questions seem obvious. The response to the current challenges to the biological weapons ban must be network-based, enabling multiple actors with different mandates to invest a small amount of their time and effort to address the biological threats which fall within their area of expertise. It must be decentralized, as it would be more efficient to keep resources where they are, rather than create a single, monumental international organization to house them. Finally, it must be inclusive, finding ways to break down barriers and working with experts regardless of where they are.

The BTWC framework has the potential to provide a forum to facilitate cooperation and coordination among those with a stake in the non-proliferation of biological weapons. The BTWC is also uniquely structured for managing a network of resources: allowing the monitoring of what is available, when and to whom. Through the intersessional work (the work carried out between review conferences) the BTWC has already begun to take on aspects of these tasks. The Seventh Review Conference is a timely opportunity to recognize the direction in which the convention is moving and to take an explicit decision to pursue it.

The Seventh Review Conference

The BTWC has come to the end of the second intersessional process addressing how states parties translate their international obligations into effective national action. From 2007 through 2010 states parties held each year two sets of meetings: one at the expert level to gather knowledge on the topic under consideration, and one at the state party level to identify what can be agreed and what might be done. The topics for the meetings were set by the previous review conference. In 2003 national legislation and regulations as well as biosecurity were the focus. In 2004 it was response to natural and deliberate outbreaks. The following year codes of conduct for scientists were addressed. In 2007 attention returned to national

legislation and regulations as well as regional cooperation. The focus in 2008 was biosafety, biosecurity, oversight, education and awareness-raising. In 2009 building capacity to deal with disease (irrespective of the origin) was addressed. Building capacity was once again examined in 2010, this time for enhancing coordination to respond to allegations of use.

The intersessional meetings were not business as usual

The BTWC regime, through its intersessional processes, has been very successful in staying ahead of trends in international thinking. For example, in 2002 states parties agreed to examine biosecurity issues—even before the term “biosecurity” (in the sense it is used in the convention) had even been coined. The BTWC has also succeeded in addressing commonly overlooked issues, exploring, for example, what terms such as “risk management” mean in the context of the convention, instead of simply settling for reiterating jargon and buzzwords. The BTWC has established itself as a field leader, not a follower.

There has also been a significant step forward in bringing together a community dedicated to ensuring biology is not used to cause harm. There is now a much greater sense of involvement from professional bodies, scientific societies and the private sector. For example, since the last review conference the commercial gene synthesis industry has adopted standards to reduce the risk of their services being used by those seeking to acquire biological weapons.⁶ These are not traditional partners in arms control, disarmament and non-proliferation. These actors now seem to be working together within the BTWC framework toward the same goal. For example, the intersessional processes facilitated the development of codes of conduct for laboratories and organizations in both for-profit and non-profit settings.

Over the last decade BTWC meetings have also adopted working practices new to the field of disarmament and non-proliferation: examples include poster sessions, speed networking, discussion panels and interactive webcasts. These have helped to increase interactivity at meetings and have provided new opportunities for networking. They have added value to participating in the meetings and may go some way to explain the increase in interest. Among biosecurity specialists, the BTWC has become the place to be seen.

Building on the work done so far

In 2011 states parties will be tasked with looking back over the last set of intersessional meetings and deciding on further action to take. In doing this, they will be able to draw upon a range of resources that previous meetings have produced and revealed.

The intersessional processes have proven very successful at gathering together national experiences, best practices and expert insights. The information generated, when collected and collated, will greatly aid in strengthening national capacity. The challenge now is to organize this information into a coherent, useful and accessible resource.

The meetings have also identified a broad range of mutual understanding, and they have established that there is real common ground among national positions, that states parties really do share interests and that there is a firm foundation for future work in these areas. This mutual understanding supplements the binding obligations of the convention and agreements reached at previous review conferences.

Action has also been taken. Much of it has not happened collectively or directly within the BTWC framework, but it has happened because of the BTWC meetings. Contacts made at these events have led to joint efforts (such as cooperative threat reduction activities)⁷ that have made practical contributions to building capacity. There have also been additional benefits—only in travelling to Geneva did members of some government departments have the opportunity to meet their fellow nationals from other ministries.

The review conference will need to look for lessons as to how future work could surpass efforts to date. For example, states parties might consider whether even more could have been achieved had they not set themselves such rigid limits. The scope and scale of the mutual understanding identified in the areas discussed suggest that agreement in additional areas could have been possible had states parties been free to explore a broader range of issues. And while considerable action has been taken on an individual or bilateral basis, very little collective action has been pursued. There is significant work still to be done to identify how states parties will work *together*.

The intersessional processes have relied heavily on experts travelling to Geneva to exchange their knowledge and experiences. This is expensive. Until the very end of the second intersessional process there were few resources to support such participation—and even then, demand outstripped the resources available. This might have skewed the geographic distribution of the expertise present and in turn placed limits on the value of the process for developing countries.

Moving beyond the review conference

Perhaps the recent intersessional processes have gone just about as far as they can with the issues they have explored, and it is time for the BTWC to move in a different direction. Even if it were possible to identify new topics for a third set of meetings, would the current format still be the best use of time and resources? Have levels of trust and working practices developed sufficiently to attempt something more ambitious?

Compliance has not been addressed in any significant way for the last decade, and the issue is coming back to the fore. Is it time once again to talk about it in a forward-looking manner? There are some still seeking closure for old wounds and a return to the past. Their concerns must be taken into account. In the longer term, states parties must be confident that others will live up to their obligations under the treaty: the BTWC regime will have to be able to deal with compliance issues, if not now, then at some time in the foreseeable future.⁸

The Seventh Review Conference represents a significant fork in the road for the BTWC. Will the process continue along well-worn paths or strike out in a new direction? Is the BTWC regime ready to shoulder a greater burden through more direct action? Have rifts between delegations healed sufficiently to address openly how states parties might work together effectively?

The BTWC is in a stronger and healthier position than it has been since the Third Review Conference in 1991. Much of the rancour and bad feeling of the late 1990s and early 2000s has been set aside. Common ground has been found and there is a sense that it is time to take action. The problem may be that no one seems to know exactly what to do. Whatever is to be done, we must set our sights sufficiently high. Now is the time for innovation. The BTWC needs new ideas and approaches. To this extent, we should all hope that the Seventh Review Conference will be anything but business as usual. Here are five principles that might help encourage thinking differently about where the BTWC might go in the future.

Stop thinking about “a process” and start thinking about “processes”

If negotiation efforts have taught us one thing, it is that putting all our eggs in one basket, while politically expedient (arms controllers, disarmament specialists and non-proliferation people love their linkages), raises the stakes of failure. Such a cost might be too great to bear a second time. Can we not pursue multiple objectives through multiple channels at the same time? For example, could we continue to work on improving confidence-building measures through a set of meetings (similar to those created after the Second Review Conference), without having either to agree on the output at a review conference or to tie it to a more general programme of work?

Stop trying to solve the biological weapons threat and start trying to manage it

During the last intersessional process we learned that one of the basic principles of risk management is that risk levels will never be absolutely 0% or 100% as long as there is research in biology. We can, however, attempt to manage it to a level in between. This will require trade-offs. In general, the lower the risk, the more expensive, rigorous and penetrative measures will need to be. The more risk we are prepared to accept, the fewer resources we need to commit, the lower the regulatory burden and the more freedom we can retain. Establishing a basic understanding of what level of risk societies are prepared to accept at the international level would seem to be a sensible starting point for any effort to manage the risk. It might rule out, or rule in, certain tools and measures. It would certainly help to ensure that such a task is approached with the same set of expectations.

Start taking advances in science and technology into account

Since 1992, when the Ad Hoc Group conducted the last systematic review of the technical tools available for monitoring compliance, there has been a dramatic change in science and technology.⁹ Without a full understanding of what is currently possible, how will states parties be fully empowered to set the course for the BTWC over the next decade?

Reviewing science and technology for relevance is not only about identifying ways they could be used to make biological weapons more deadly, develop new types of weapon or circumvent existing proliferation hurdles. There have also been dramatic improvements in capabilities that could benefit the convention, such as detection, diagnosis and decontamination. It is important to focus the BTWC more systematically on how science and technology can help meet the aims and objectives of the convention.

The role of the scientist has also changed over the last decade. In 2001 the scientific establishment made very few direct contributions to the BTWC. Recent years have seen high-level contributions from some of the world's leading scientists. Global scientific organizations have held meetings of their own, prior to the 2006 and 2011 Review Conferences, to identify advances that might be relevant to the BTWC. In addition, other forums have engaged with issues of education, awareness raising and codes of conduct. Leaders of industry have participated in BTWC meetings to provide a private sector perspective. Scientists already play a very different role under the convention, and it is time for this to be more formally recognized and supported.

Developments in biological research happen too quickly to review only at five-year intervals. The basic background reading alone would be a full-time job. For a long time there have been calls for the BTWC to look at advances in science and technology on a more regular basis. There are many different approaches to this, and which is most suitable for the convention is ultimately a question for states parties—but the need to take action has become critical.

It should be noted that there are very few resources to support efforts in these areas. Forging effective links with those involved with the biology the BTWC covers is not something that can be achieved with current resources. States parties might need to consider the advantage of a voluntary fund to support global efforts to examine relevant advances in science and technology.

Stop missing opportunities for consolidation

Are there activities that would benefit from having more emphasis? For example, the 2006 Review Conference saw states parties agree to nominate National Contact Points to aid coordination and communication. Their value (in terms of inter- as well as intranational contact and information flow) has been established beyond doubt. Nonetheless, after five years and

constant reminders, more than half of states parties have still failed to nominate one. Is it time to think about taking on more binding commitments?

Are there any areas identified through the intersessional processes that should be developed further? There seemed to be some topics that enjoyed almost universal support. Are there decisions which could now be taken? In addition, the intersessional process revealed a second set of issues where consensus between states was incomplete, but given different tools and approaches, it might be possible to bridge some of the gaps.

Are there things happening outside the BTWC which might be useful within the framework? For example, has the EU Joint Action in support of the BTWC been able to raise awareness and promote the universality of the convention to such a degree that states parties might consider including such approaches in their own work programmes (such as in-country meetings to build domestic support for ratification or accession)?

Harness the new consensus on the importance of Article X

For much of the convention's history, states parties split largely along North–South lines and engaged in a dispiriting and ultimately fruitless debate on the relative emphasis given to the security objectives of the BTWC (as represented in Articles I and III, sometimes called the “regulatory aspects”) versus the provisions on the peaceful use of biological science and technology (in Article X, sometimes called the “promotional aspects”). Whether in the context of the Ad Hoc Group negotiations, or thrashing out the draft final declaration of a review conference, or even determining the topics for the intersessional process, states parties spent endless hours trying to agree on the appropriate balance of these two aspects, trading one off against the other. The underlying assumption was that of a zero-sum game: more emphasis on Articles I and III meant less emphasis on Article X, and vice versa.

One important effect of the intersessional process has been largely to dissolve this false dichotomy, illustrating that the game is not zero-sum after all. States parties have recognized that efforts to improve the implementation of Article X actually reinforce Articles I and III by building the capacity of states parties in areas such as disease surveillance and response, laboratory capabilities and law enforcement. Conversely, improving the implementation of Articles I and III reinforces Article X by reassuring exporters and donors that technology and resources will not be misused. As Secretary-General Kofi Annan put it at the Sixth Review Conference in 2006:

Building public health capacities can strengthen safeguards against bioterrorism. And being better prepared to deal with terrorism can mean better public health systems overall. Similarly, the availability of training and technology is crucial to improving laboratory safety and security, and making labs safe and secure encourages cooperation and creates opportunities for development.¹⁰

These sentiments were echoed in December 2009 in a statement by US Under Secretary of State for Arms Control and International Security Ellen Tauscher announcing the new US BTWC policy. Tauscher said:

In order to implement our Article X commitments, it is critical that we work together to achieve, sustain and improve international capacity to detect, report and respond to outbreaks of disease, whether deliberate, accidental or natural. ... Greater cooperation and technical assistance are key to achieving and sustaining the capabilities we need to prevent biological weapons use and to combat infectious diseases.¹¹

Such a statement from the US government would have been unthinkable in 2001. However, similar shifts in the opposite direction have been taken by members of the Non-Aligned Movement. The result is fertile, new ground for forging agreements and finding innovative solutions. The opportunity should not be missed.

Notes

1. Remarks by Kofi Annan, Secretary-General of the United Nations, to the Sixth Review Conference of the Biological Weapons Convention, Geneva, 20 November 2006.
2. See the article by K. Berger and N. Davison in this issue of *Disarmament Forum* for more details on how scientists have been working within the BTWC framework.
3. For more on health security see, for example, US Department of Health and Human Services, *National Health Security Strategy of the United States of America*, 2009.
4. Recent years have seen a dramatic growth in regional and national biosafety associations. In addition to the organizations mentioned in the text, other examples include the African Biological Safety Association, the Biosafety Association for Central Asia and the Caucasus, the Moroccan Biosafety Association, the Biosafety Association of Pakistan, and the Georgian Biosafety Association. See the article by G. Burns et al. in this issue of *Disarmament Forum* for more details of these activities.
5. For further information see General Assembly, *Chemical and bacteriological (biological) weapons*, UN document A/RES/44/115, 15 December 1989; and Security Council, UN document S/RES/620 (1988), 26 August 1988. The technical guidelines of procedures for conducting an investigation are contained in General Assembly, *Chemical and bacteriological (biological) weapons*, UN document A/44/561, 4 October 1989. A mandate to update aspects of the mechanism is contained in the Global Counter-Terrorism Strategy adopted through General Assembly, *The United Nations Global Counter-Terrorism Strategy*, UN document A/RES/60/288, 20 September 2006.
6. For further information see the article by G. Burns et al. in this issue of *Disarmament Forum*.
7. Much of this work has been pursued under the auspices of the G8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction.
8. See the article by R. Lennane in this issue of *Disarmament Forum* for a more detailed review of the question of compliance and verification.
9. For further information on the Ad Hoc Group and the VEREX process, see the article by R. Lennane in this issue of *Disarmament Forum*.
10. Remarks by Kofi Annan, Secretary-General of the United Nations, to the Sixth Review Conference of the Biological Weapons Convention, Geneva, 20 November 2006.
11. Address by Ellen Tauscher, Under Secretary of State of the United States of America, to the Annual Meeting of the States Parties to the Biological Weapons Convention, Geneva, 9 December 2009.

Bringing science to security: soft implementation of the BTWC

Kavita M. Berger
Neil Davison

Biotechnology is advancing at a rapid pace, enabling significant innovation in a range of areas that affect national prosperity and well-being. As with developments in the physical and mathematical sciences, advancements in biotechnology may be exploited for harmful purposes.¹ During the 1990s and 2000s, both state and non-state actors expressed continued interest in developing biological weapons. This news, along with warnings from concerned scientists and security experts, increased international interest in strategies to minimize the risk of scientific advances being applied to the development of biological weapons, while maximizing the beneficial research activities necessary for a variety of sectors including public health, agriculture, energy and national security.

The Biological and Toxin Weapons Convention (BTWC) has had to adapt to meet the changing risks and benefits of biological sciences research and emerging biotechnologies. The BTWC, which was opened for signature in 1972, established and codified international norms against the development of biological weapons by prohibiting harmful uses of biology and promoting peaceful uses. To provide tools to assess compliance with the BTWC, the Ad Hoc Group was convened in 1987 after the Second Review Conference to develop a set of confidence-building measures. These measures consist of a list of questions mostly related to the existence of former offensive biological weapons programmes, specialized research and manufacturing facilities and equipment, and any ongoing defensive research programmes. However, there is concern that these categories do not accurately address key aspects of compliance with the BTWC in today's scientific environment.

Because the state of biotechnology is vastly different now than it was when the convention was drafted, and continues to advance very rapidly, the requisite expertise for understanding new developments and their implications for science, health, agriculture and security today resides in the scientific and public health communities. Government scientists can provide help in assessing the potential security impacts of biotechnology advances. However, innovation in biotechnology is not linear and risk–benefit profiles can change with technological developments in the physical, computer, chemical and engineering sciences. Consequently, a small number of scientists would not be able to stay fully abreast of technological developments. Experts from the scientific and health communities, and also those from a more diverse set of scientific disciplines and sectors, need to be actively engaged with the

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BTWC in order to better understand the full spectrum of areas where science and technology could potentially have an impact on the BTWC. This not only includes understanding which technologies may be misused for harmful purposes, but also which provide critical benefits for infectious and chronic disease surveillance and research, and for the development of effective vaccines and drugs.

The challenge within the framework of the convention is how to engage productively with the wider scientific, and human, animal and plant health communities to achieve the primary goal of the BTWC—to prevent the development of biological weapons—while also allowing important scientific activities.

The intersessional process

After the United States withdrew from the negotiation of a legally binding verification protocol in 2001, the BTWC instituted a work programme in 2003 examining the efforts, both domestically and internationally, that could be taken to counter risks. The intersessional process consisted of an annual expert meeting and an annual political meeting of states parties. The first intersessional process, which lasted from 2003 through 2005, covered: (1) national measures necessary to implement the prohibitions set forth in the BTWC and national mechanisms to establish and maintain the security and oversight of pathogenic micro-organisms and toxins; (2) mechanisms for the surveillance, detection, diagnosis and combat of infectious diseases, and capabilities for responding to, investigating and mitigating cases of alleged use of biological weapons or suspicious outbreaks of disease; and (3) the content, promulgation and adoption of codes of conduct for scientists. This first process also introduced the innovation of “guests of the meeting”, invited by the chairman for a given year to address the plenary sessions of the meetings of experts. This opening of the meetings to direct participation by individuals other than members of national delegations provided opportunities for much greater engagement of key stakeholders.

The second intersessional process, from 2007 through 2010, expanded on topics addressed in the first and added additional ones. Meetings covered: (1) enhancing national implementation, including the enforcement of national legislation, strengthening of national institutions and coordination among national law enforcement institutions; (2) regional and subregional cooperation on the implementation of the BTWC; (3) national, regional and international measures to improve biosafety and laboratory biosecurity; (4) oversight, education, awareness-raising and codes of conduct as measures to reduce the risks of misuse of biological sciences and biotechnology research; (5) promoting capacity-building in disease surveillance, detection, diagnosis and containment; and (6) provision of assistance and coordination with relevant organizations in the case of alleged use of biological weapons.

Many of the topics covered during the intersessional processes directly concern the conduct of the scientific and public health communities. The meetings provided an opportunity for

disparate sectors—scientific, public health, security and law enforcement—to engage and address science and security issues critical to the BTWC. Between the guests of the meeting and collaboration with non-governmental experts, delegates had direct access to a variety of experts and experience. This informed their understanding of existing programmes and activities relevant to the meeting topics, and clarified what was required to take these activities further. In turn, experts' understanding of the BTWC also served to raise interest in and awareness of biological security concerns within the scientific and health communities. In anticipation of the 2005 discussions on codes of conduct, for example, the InterAcademy Panel on International Issues (IAP), a global network of science academies, prepared the Statement on Biosecurity, a set of principles representing the fundamental issues that should be taken into account by academies and other scientific bodies when formulating codes of conduct.² After taking part in the 2005 discussions as a guest of the meeting, the president of the International Union of Biochemistry and Molecular Biology (IUBMB) convened a group to produce a code of conduct for the Union.³ The scientific community's involvement in the intersessional processes have also encouraged greater provision of information to national governments on issues related to the BTWC.

Other international legal instruments addressing BTWC-related issues

The BTWC was drafted when state programmes posed the primary biological weapons threat. Many of the measures that have been addressed during the intersessional processes are relevant both to state biological weapons programmes and the more recent threat of bioterrorism. Security Council resolution 1540, adopted in 2004, added a further binding international commitment to discourage non-state actors seeking to acquire weapons of mass destruction or the means of their delivery.⁴ Although an independent instrument, resolution 1540 expands the norms embodied in the BTWC to address potential bioterrorism threats.

The International Health Regulations (IHR 2005)⁵ is a legally binding international agreement among all member states of the World Health Organization (WHO) to identify, report and respond to acute public health risks of international concern. The IHR 2005 requires states to meet core competencies in public health capacity and disease surveillance, and to alert the WHO about any unusual disease outbreak that may constitute a public health emergency of international concern, regardless of origin.⁶ Intentional biological, chemical, radiological or nuclear events that could cross national borders would be considered such an emergency and are reportable under the IHR 2005. The IHR 2005 also grants the WHO the authority to approach states, based on unofficial disease surveillance data, to recommend actions for a public health emergency.⁷ These requirements and authorities are additional to the disease surveillance and public health topics addressed at the intersessional meetings.

Existing activities that address BTWC-related concerns

Education

Beginning in 1986, each review conference has made some endorsement of education about the BTWC and the national legal and regulatory structures that implement the BTWC, usually in the context of its review of Article IV, which relates to national regulation. Codes of conduct (2005 intersessional meetings) and research oversight and education regarding the misuse of biotechnology (2008 intersessional meetings) have raised the profile of educating the scientific community about the security concerns of civilian biological research.

A number of non-governmental organizations and scientific organizations have been actively engaged in education initiatives. The Bradford Disarmament Research Centre in partnership with the Landau Network–Centro Volta, Japan’s National Defense Medical College, as well as others from collaborating universities have expanded awareness at scientific institutions throughout the world of biological research that may raise security concerns.⁸ These activities have also fostered interest in and the development of educational materials for university- and postgraduate-level scientists at academic institutions. The Federation of American Scientists (FAS) has developed web-based modules to educate practising scientists about the BTWC and the potential security risks of microbiological research.⁹ The FAS has translated some of its modules into other languages and is developing modules to address agricultural research that may pose security concerns. In addition, the National Science Advisory Board for Biosecurity, an advisory panel to the US government on the misuse of biological research, has recently released an online video to raise awareness of the biological security risks of active research.¹⁰

The InterAcademy Panel on International Issues and national academies of science

The IAP created the Biosecurity Working Group in 2004 with membership from the national science academies of China, Cuba, the Netherlands (until 2010), Nigeria, Poland (joined in 2010), the United Kingdom and the United States. The Group prepared the Statement on Biosecurity cited above. In cooperation with other international scientific organizations, the Group also organized the International Forum on Biosecurity in 2005 and 2008 to help non-governmental organizations and the international scientific community share experiences and prepare for forthcoming BTWC intersessional meetings.¹¹

Most recently, the report of a National Research Council workshop organized in collaboration with the International Union of Microbiological Societies and the IUBMB, held at the Polish Academy of Sciences in 2009, assessed the current state of educational activities regarding the misuse of biotechnology. The report highlights what is needed to develop and increase the adoption of educational programmes on the misuse of biological research, and identifies committed leadership and accessible educational materials as two crucial components for expanding implementation efforts. The report also states that the Seventh Review Conference,

to be held in 2011, “will provide an obvious opportunity for member states to build on prior work and take affirmative steps in support of education”.¹²

National academies of science have also carried out additional activities. The National Research Council of the US National Academy of Sciences has issued reports about the potential misuse of microbiological research activities and the globalization of biotechnology.¹³ Similar reports were published by the French Academy of Sciences¹⁴ and by a joint project of the Israel Academy of Sciences and Humanities and the Israeli National Security Council.¹⁵ The Royal Netherlands Academy of Arts and Sciences has developed and disseminated a code of conduct on biosecurity at the request of the Dutch government.¹⁶ The Uganda National Academy of Sciences has held two workshops and issued a consensus report on promoting biosafety and biosecurity in the life sciences in Africa.¹⁷ In 2009 the UK Royal Society issued a joint report with the International Council for the Life Sciences exploring new approaches to assessing the full spectrum of biological risks—naturally occurring, unintended and deliberate.¹⁸

Journal efforts

In 2003 editors from several scientific journals and members from the scientific and policy-making communities met under the auspices of the US National Academy of Sciences and the Center for Strategic and International Studies to discuss publication of research that could raise security concerns. Following this meeting, a smaller group came together and agreed upon four statements about the responsibilities of journal editors and authors when dealing with such biological research.¹⁹ The guiding principle is that there may be research (which may not as yet have been identified or conceived) that may pose a greater security risk than benefit and should therefore not be published. Although the first three statements focus on publication in journals, the fourth statement mentions other means for communicating research and advises scientists to consider the information relayed at all stages of research activity, from grant application to scientific conferences to final publication. In 2010 the US National Institutes of Health’s Office of Biotechnology Activities reported that several high-impact journals (for example, *Science*, *Nature* and *Proceedings of the National Academy of Sciences*) had implemented biosecurity policies. Several funding organizations (for example, in the United Kingdom, the Biotechnology and Biological Sciences Research Council, the Medical Research Council and the Wellcome Trust) have also instituted policies for reviewing research proposals for security considerations.²⁰

The American Association for the Advancement of Science activities

The American Association for the Advancement of Science (AAAS) has engaged with members of various scientific (animal, plant and human health), law enforcement, security and policy-making communities on laboratory biosecurity and biosafety, life sciences research that may raise security concerns, infectious disease detection and response (global health security), and

science and security diplomacy. By convening experts from a variety of disciplines and sectors, the AAAS has been able to broaden the discussion of science and security issues related with the BTWC and raise awareness of these issues within the research community.

One of the main initiatives of the AAAS is to advance science²¹ throughout the world to benefit scientific collaboration and progress and national security. Through its interactions with leading scientists and administrators of leading research institutions in the United States and countries in the Middle East and North Africa, the AAAS has been able to identify several examples of successful implementation of education and oversight programmes for biorisk management (biosafety and laboratory biosecurity) and dual-use biological research, as well as challenges to implementation, and has made suggestions on how to promote research and education while addressing critical societal concerns, of which security is one.²² The AAAS has also published reports on educating practising scientists about the misuse of biological research,²³ biosafety training and personnel security,²⁴ workforce development for communities involved in readiness and response to infectious disease threats,²⁵ and educating future biodefence policy experts.²⁶

Laboratory biosafety and biosecurity activities

Biosafety and biosecurity training (including biorisk management) was one of the topics addressed in the 2008 intersessional meetings. Several national, regional and international efforts are underway to address this topic, three of which are described here. The International Council for the Life Sciences (ICLS) has approached the issue by developing national biosafety and biosecurity associations in the Middle East and North Africa and linking them to each other. This network meets annually and is formally called the Biosafety and Biosecurity International Conference. The ICLS has most recently worked with the Pakistan Academy of Sciences to discuss responsible research conduct including bioethics, biosafety and biosecurity.

The International Federation of Biosafety Associations is an organization that includes over 20 associations throughout the world as well as observers from the WHO, the US Centers for Disease Control and Prevention (CDC), and the Global Partnership Program. Its goal is to improve and coordinate biosafety nationally and globally by building networks of key experts, identifying and sharing best practices and supporting applied biosafety research.

A European Committee for Standardization (CEN) workshop is developing guidance for laboratory biorisk management standards through a series of stakeholder consultations. The eventual goal is to develop global standards for successful implementation of biosafety and biosecurity practices at institutions throughout the world.

Infectious disease surveillance efforts

A recurring topic of the intersessional meetings, and one that is critical for identifying an alleged biological incident, is infectious disease surveillance. Several mechanisms—including the WHO’s Global Outbreak Alert and Response Network (GOARN), CDC programmes, Canada’s Global Public Health Intelligence Network, and ProMED-mail from the International Society for Infectious Diseases—exist within the public health arena to monitor infectious disease outbreaks. The IHR 2005 includes a decision instrument to identify and assess infectious disease outbreaks of international concern, and includes several provisions to improve national public health capacity to detect, report and respond to these outbreaks. The Nuclear Threat Initiative’s Global Health and Security Initiative has established regional networks of disease surveillance. These networks are linked to each other to enhance global infectious disease surveillance. Several scientific, health and governmental organizations are involved in developing and implementing infectious disease detection tools, and in integrating unofficial and official reports of disease outbreaks.

Formalizing scientific contributions to the BTWC process

Despite increasing involvement of scientific organizations during the past 10 years in biosecurity issues generally, and the strengthening of the BTWC specifically, these contributions have remained relatively loosely organized. Similarly, contributions from individual states²⁷—and more recently summaries by the Implementation Support Unit (ISU)²⁸—on relevant developments in science and technology, with papers submitted to review conferences, have been dependent on the willingness of a particular state or the capacity of the ISU to provide this additional information. Although not a formalized process, Article XII of the BTWC requires that states parties take account of relevant developments in science and technology and thus periodic assessments have been incorporated into the BTWC process since the First Review Conference, in 1980.

For as long as scientific organizations have been involved in addressing BTWC-related concerns, there have been calls for the formalization of scientific input. Possible mechanisms for incorporating scientific knowledge and perspectives into the BTWC process range from a formal scientific advisory panel to ensuring more systematic engagement with scientific experts and international scientific organizations. The Seventh Review Conference, in 2011, will provide an opportunity for states parties to agree how they will address this issue.

Scientific advisory panel

There are many examples of mechanisms for scientific input into international regulatory regimes.²⁹ The closest in terms of subject matter is the Scientific Advisory Board (SAB) of the Organisation for the Prohibition of Chemical Weapons (OPCW). The 25 SAB members are appointed by the OPCW Director-General through a process of consultation with states parties

and serve in their individual capacities for fixed terms. When a technical question related to the implementation of the Chemical Weapons Convention arises, the SAB may form working groups to bring additional expertise to bear on the problem. For the convention's two review conferences, the SAB has reached out to the International Union of Pure and Applied Chemistry (IUPAC) to convene international workshops intended to tap a wider and more diverse sets of expertise from the scientific community about trends in science and technology relevant to the convention.³⁰

In 2002 the UK government recommended that a scientific advisory panel of non-governmental scientists be established for the BTWC to provide advice more frequently and systematically than the current process of national papers, particularly given the rapid pace of technical development in the life sciences.³¹ Such calls have also come from the scientific community itself. For example, the report of a 2006 meeting co-organized by the Royal Society, IAP and the International Council for Science argued that, "It is essential that processes are explored by which the scientific community can regularly input into the BTWC regime, such as independent scientific advisory panels and regional scientific meetings".³²

The suggestion of a formal process for scientific input was raised by the European Union at the Sixth Review Conference in 2006 but was not taken forward, nor was the topic included as part of the intersessional process from 2007 to 2010.³³ However, the report of the 2008 Meeting of States Parties did call on states to: "Regularly review scientific and technological developments relevant to the Convention, and consider creating an international scientific advisory panel to independently analyze such developments".³⁴ Such a scientific advisory panel could be one means of institutionalizing scientific input to the BTWC.³⁵

Despite these calls, some states and observers do not believe that a formal scientific advisory panel would be the best way to provide objective and accurate advice on developments in science and technology. Such a panel could be susceptible to politicization of discussions and advice, which would counteract its effectiveness. There is also concern about whether any appointed body would have the necessary breadth and experience to reflect accurately or tap into the diverse range of scientific disciplines driving innovation in biotechnology.

A formal interface with the scientific community

Another approach to providing increased scientific input to the BTWC would be to expand upon current methods by formalizing the existing engagement of the scientific community in the intersessional process and review conferences. This mechanism could comprise regular, perhaps annual, reviews of developments in science and technology relevant to the BTWC, as well as ad hoc technical input, reviews or assessments relevant to the topics agreed for the intersessional process.

There could be regular international workshops and reports covering the full range of relevant scientific and technological developments with respect both to potential risks (in terms of

biological weapons) and to potential benefits (mitigating natural, accidental or intentional human, animal or plant infectious disease threats). An informal framework for this already exists in the form of the two workshops convened by the IAP—the first hosted by the UK Royal Society, in 2006³⁶, and the second by the Chinese Academy of Sciences, in November 2010³⁷—to inform the Sixth and Seventh Review Conferences, respectively, of relevant science and technology developments. To ensure independent and objective assessments, scientific organizations would be responsible for the identification and participation of scientific experts and for any outputs or reports from the workshops. The deliberations would provide the basis for more informed collective and national decisions, but any decisions regarding the BTWC can only be made by the states parties.

Ad hoc input would provide an opportunity to address topics in detail that are raised at the intersessional meetings. These might include misuse of research, biosafety and infectious disease surveillance. Given the range of activities that the scientific, health and other relevant communities are currently addressing, this method might be better served by preserving a less formal link to the BTWC process in order to maintain the independence and flexibility of these activities.

A network of scientists

Many topics raised at the intersessional meetings would benefit from having knowledgeable and objective scientists inform delegates about the current state of the science and particular issues and gaps associated with a specific topic to help address the overall goals of the BTWC. A network of scientists from a variety of scientific disciplines, economic sectors, countries and levels of experience could be developed as a resource for the ISU. The ISU could identify appropriate experts to provide periodic evaluations of scientific and technological developments and to be on call to advise on biosafety and biosecurity, confidence-building measures, infectious disease surveillance, health readiness and response, microbial forensics, dual-use biotechnology research, scientific responsibility and other relevant topics.

Practical issues for establishing and maintaining robust scientific input

Resources and support for scientific input

In order to establish an interface with the scientific community, some thought needs to be given to the practicalities and resourcing of such an arrangement. To maximize the benefits of independent scientific advice, a more direct line between the scientific and BTWC discussions needs to be considered. This may be a function of the ISU or perhaps direct interaction with the IAP or international biological sciences unions and organizations. For ad hoc scientific and technical input, the ISU might make specific calls for technical advice to a wider range of national and international scientific academies and organizations.

To ensure continuity, funding would be needed to cover both the international workshops on developments in science and technology and ad hoc activities. Funding for work by scientific organizations feeding into the BTWC process has so far been provided by a mix of foundations, governments and the organizations themselves. However, these sources depend on the priorities of the individual funding organizations; for example, few foundations currently support biological security activities. One way to build long-term funding would be for states parties to contribute to a voluntary fund held by the ISU. It may also be necessary to consider whether to expand the ISU staff to administer such a programme, perhaps setting up a position for a scientific liaison officer.

The role of scientists in external advice to the BTWC process

Establishing a formal mechanism and interface among the scientific, health and security communities would serve multiple purposes. It would enhance non-governmental efforts to address BTWC-related issues and institute a regular review of rapid scientific and technical developments. In addition, directed and strategic engagement with practising scientists (with experience of the technology in question) could provide an invaluable perspective on the risks of the technology and could assess the risk–benefit profile of a technology based on the developments of enabling technologies in related or unrelated scientific areas. However, maintaining the independence and objectivity of the scientific input would be critical, and the role of scientists and security policy experts (governmental and non-governmental) in the BTWC process would need to be clearly articulated and communicated.

Both the scientific and security communities assess possible security risks of biotechnology advances and weigh the potential risks and benefits of those technologies. The scientific community is best placed to describe developments, to evaluate the immediate and long-term benefits of a given technology, and to help develop feasible solutions to minimize the safety and security risks while maximizing the benefits. However, security experts familiar with conducting technology risk assessments could evaluate the potential safety and security risks posed by these developments. Any differences in opinion that may arise during such

assessments should be clarified and where possible resolved through discussion. In addition, science and technology reviews or workshop summaries could be made publicly available to encourage additional comment from the broader scientific, health and security communities (directly to their national governments), and to ensure transparency. In this way, the BTWC process could encourage a more balanced input with regard to how scientific developments relate to national security and prosperity. Such mechanisms for promoting communication and relationship-building among disparate communities may also serve to facilitate local implementation of the norms embodied in the BTWC.

Coordination among scientific organizations on BTWC-related issues

Several governmental and non-governmental organizations are currently engaging with various states on biosafety and biosecurity, preventing the misuse of biotechnologies, infectious disease surveillance and global health security, harmful biological agents, and confidence-building measures. In some cases, uncoordinated efforts (and foreign investment and assistance) are inadvertently creating competition among recipients in a given country rather than encouraging development of complementary and cooperative activities. Better coordination among these activities would maximize limited resources, identify gaps in BTWC-related topics, and promote international networks that promote good laboratory practices and greater transparency. This might also be coordinated via the ISU.

Conclusion

Biotechnology has many beneficial applications for prosperity and health; however, the same tools, techniques and scientific information could be misused to do harm. The BTWC, the first disarmament agreement to ban an entire class of weapons, established the international principle against the use of biotechnology and biological agents for harmful purposes. The twenty-first century biological threat is complex and will require innovation and the active involvement of the scientific and security communities to reinforce the international norms of the BTWC and minimize the risk that biological weapons will be developed, stockpiled and used. Mechanisms for assessing developments in science and technology, BTWC-related topics, and compliance with the convention will have to be flexible and adaptable to the changing global environment of the biological sciences. The scientific community can play a major role in making the BTWC adaptable to changing risks by actively engaging in providing advice to the ISU and national delegations, and by developing and implementing measures or activities to maximize scientific progress while minimizing the security risks. The scientific and security communities need to work together to assess the evolving threat of biological weapons, address the challenge of assessing intent, and fostering the science needed to defend against natural, accidental or intentional infectious disease outbreaks. The Seventh Review Conference will provide an opportunity to support and establish mechanisms by which the scientific community can play a greater part in the BTWC discussion and help to achieve its goals.

Notes

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Biosafety professionals as stakeholders in the BTWC

Gary Burns, Karen Byers, Teck Mean Chua,
Heather Sheeley and Brad Goble

Biosafety, biosecurity and the BTWC

Gary Burns

This article is rather unusual, as it comprises contributions from five authors. It includes articles provided by the American Biological Safety Association (ABSA), the Asia-Pacific Biosafety Association (A-PBA), the European Biosafety Association (EBSA), the International Federation of Biosafety Associations (IFBA) and the private sector. Each author provides content on two areas: first, an introduction of the organization and how it operates, then some thoughts on a specific aspect of how biosafety associations are important stakeholders in the Biological and Toxin Weapons Convention (BTWC). The President of ABSA, Karen Byers, focuses on the role played by biosafety associations. Teck Mean Chua, President of the A-PBA, addresses how the views of biological associations and the roles they play differ around the world. The relationship between EBSA and the security sector is the focus of Heather Sheeley, who was President of EBSA from 2008 to 2009. Brad Goble, Senior Project Manager for the IFBA, examines the benefits of strengthening the working relationship between the two communities of biosafety and the BTWC. The remaining text linking these contributions together and providing an additional perspective from the private sector is from Gary Burns, Global Biosafety and Biosecurity Manager at AstraZeneca.

A sensible place to start is to examine the terms that appear throughout this article. Several terms have meanings that vary depending on the context. For example, both the terms biosafety and biosecurity have different meaning in different settings. In the context of the BTWC:

Biosafety refers to principles, technologies, practices and measures implemented to prevent the accidental release of, or unintentional exposure to, biological agents and toxins, and *biosecurity* refers to the protection, control and accountability measures implemented to prevent the loss, theft, misuse, diversion or intentional release of biological agents and toxins and related resources as well as unauthorized access to, retention or transfer of such material.¹

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The procedures and practices used for biosafety and biosecurity both seek to contain biological agents to fixed locations. However, they differ in that biosafety seeks to protect humans and the environment from biological agents, whilst biosecurity seeks to protect biological agents from those seeking to use them to cause harm. The associated risks are collectively referred to as “biorisk”. Without effective biosafety measures, it would be virtually impossible to implement effective biosecurity provisions. In many respects, effective biosecurity is a natural progression from good biosafety practices. For the remainder of the article, a reference made to biosafety also refers to biosecurity.

Biosafety professionals work to ensure that biological agents are not accidentally released or diverted from their intended purposes. Since the security sector and biosafety professionals share a goal in preventing the accidental or deliberate release of biological agents, how do they work together in pursuit of their joint objectives? Representatives of the security sector and biosafety professionals cooperate in a broad range of activities. They contribute to each other’s literature—this article is but one example. Articles on the BTWC have been published in the journals of biosafety associations. Members of both communities have also taken part in each other’s meetings and appeared together on panels.

The role of biosafety associations

Biosafety professionals are found in both the public and private sector and play an important role in biotechnology, from research and development through to production and manufacturing, and in transportation, disposal and decontamination. Many of these individuals are members of professional associations which represent their interests and play an important role in the development of their discipline. This section explores what these associations do and how they operate alongside the convention.

There has been a rapid increase in the number of biosafety associations in recent years. What were once comparatively small groups of individuals from a few developed states are now international bodies that span the world. Such a dramatic increase in the number and coverage of biosafety associations demonstrates the growing importance of biosafety. There is now an active global community of experts with technical knowledge of direct relevance to the BTWC. This community could be an invaluable resource for work related to the convention. States parties and biosafety professionals both share an interest in ensuring that biological agents are not accidentally or deliberately released. Members of biosafety associations span the gap between those who manage facilities and those who work in them. Furthermore, associations are found in countries which are not active participants in the BTWC. These shared interests would seem to provide fertile ground for a mutually beneficial relationship.

So what do biosafety associations do? They play a distinct role in community building, facilitate the exchange of experiences and best practices, help to build professional practice, publish important information and represent the views of their members. How biosafety professionals

currently work alongside the convention, and how they could work in the future, is now explored in more depth.

The American Biological Safety Association

Karen Byers

Founded in 1984 as a non-profit organization, ABSA supports activities within the framework of the BTWC to promote biosafety as a scientific discipline, and to serve the needs of the growing US and international biosafety community by providing a forum for the exchange of biosafety information.

ABSA has been engaged in many key international activities of particular relevance to the BTWC. We have participated in Asia-Pacific, African, European and IFBA biosafety conferences, and in 2008 we participated in the BTWC Meeting of Experts. In addition, we have sponsored workshops on the laboratory biorisk management standard² and on biosafety professional competence.³ We have provided testimony to various government committees⁴ and contributed to the development of technical standards.⁵ The 1500 members of ABSA include not only international members but also members in the United States. ABSA has also formed alliances with organizations and agencies that share a commitment to biosafety and biosecurity.⁶

In 2010 ABSA hosted a seminar designed to share biosafety association management skills.⁷ In addition to presentations, discussions gave participants the opportunity to share their successes and challenges—all of which were broadcasted on the Internet. In the same year we co-sponsored a seminar on developing a plan for appropriate medical responses to laboratory biosafety issues.⁸ Twice a year ABSA offers a five-day interactive “Principles and Practices of Biosafety” course for new practitioners. ABSA also offers a seminar series and a certification review course for advanced training, as well as around 30 topic-specific courses.

The annual ABSA conference is a leading international event where experts in biosafety, biosecurity and related sciences can exchange information, best practices and develop working relationships. Past conferences have included participants from all over the world, and in response to a growing need, ABSA held an additional conference in 2003 entitled “Biosecurity: Challenges and Applied Solutions for Our Future Needs”. In 2011 ABSA will present, in partnership with the Agricultural Research Service, the research arm of the US Department of Agriculture, the first conference dedicated to animal (livestock, aquaculture and wildlife) health issues associated with agricultural research, diagnostics and response.

ABSA provides a range of accredited courses, at all levels, on biosafety and biosecurity. We offer accreditation as either a “Registered Biosafety Professional” or as a “Certified Biosafety

Professional". We are authorized by the International Association for Continuing Education and Training to provide continuing education credits. Our programme is a sign of our commitment to continuing education and community service. In 2010 ABSA appointed a task force to review the ABSA credentialing process for international members.

Among our publications is a multi-volume series *Anthology of Biosafety*, and the journal *Applied Biosafety*. Many articles in *Applied Biosafety* support the general goals contained in the BTWC, and are publicly available on the Internet two years after publication. However, some articles have a specific focus on the convention.⁹

Views and opinions often differ around the world. The role, views, motivations and activities of biosafety associations vary between regions and countries. What may be accomplished in a highly developed country is different to what may be possible in a developing country. The following contribution from the A-PBA provides a different regional perspective, one more attuned to the views of developing countries.

Gary Burns

The Asia-Pacific Biosafety Association

Teck Mean Chua

The A-PBA was founded in 2005 with the objective of promoting biosafety and biosecurity in the Asia-Pacific region. It is a not-for-profit professional organization that aims to provide a forum for biosafety professionals in the region to share their experiences and knowledge in biosafety and biosecurity. A key goal of the A-PBA is to foster the growth of a regional biosafety community to share a collective responsibility towards improved biosafety and biosecurity, as no single state can be effective in its response to an outbreak of disease if neighbouring states are ill prepared. The A-PBA sees biosafety and biosecurity as addressing a collective risk. Given that all states confront the same risk, we all share a responsibility to manage it effectively. This requires working together to prevent accidents and incidents. The A-PBA was established to foster such collective action in the Asia-Pacific region.

As the regional forum for biosafety and biosecurity, the A-PBA works with and draws upon the efforts of national associations. For example, the A-PBA has had a long-standing history of cooperation with the Japanese Biosafety Association and the Korean Biological Safety Association. Recent years have seen the formation of several new associations in our region.¹⁰ It is clear that our efforts to foster recognition of biological safety as a distinct scientific discipline are proving successful, and that there is growing interest and demand in the region for a forum for the dissemination and continued exchange of information on biosafety and biosecurity.

Promoting the safe and secure management of biological resources and processes

The A-PBA uses a range of approaches and activities to further its objectives. However, the centrepiece of the A-PBA's efforts is the regional biosafety conference. It provides a focal point for ongoing activities, gathers expertise from the region and provides a unique setting to share experiences. The conferences are held in different countries in the region to encourage cooperation. They also help to build capacity as any money left over after the conference is used as a seed fund to assist the host state in developing its own national biosafety association.

The most recent conference took place in Seoul, the Republic of Korea, in May 2010 and focused on advancing biosafety technology and national legislation in the Asia-Pacific region. Both the private and public sector participated, and the conference was attended by members of regional and national biosafety associations from around the world. Topics of the conference included: national regulations and legislation in the region; advances in biocontainment technology; international and regional partnership and collaboration; biorisk management and accreditation; dual-use research; and applied biosafety.

Together with topic-specific training courses, such as a course on biosafety management in January 2011,¹¹ the A-PBA also supports online training and distance learning, such as the interactive online training courses on the packaging and shipping of biological agents. A quarterly newsletter helps build a greater sense of community and keeps our members informed of news and events. It also provides a valuable medium to share technical information on approaches and practices.

On the global stage the A-PBA represents the views and expertise of biosafety specialists from the Asia-Pacific region, and has been an active participant in workshops to set international standards for biorisk management and biosafety practices.¹² In 2008 the A-PBA participated in the Meeting of Experts, within the framework of the BTWC, and recommended a "common platform for training, networking and promotion of biosafety and biosecurity".¹³

If we look around the world today, we see that the issues of biosafety and biosecurity have evolved differently in different countries and regions. In developed countries biosafety and biosecurity are sufficiently well established that concerns have shifted from a focus on the day-to-day operational aspects to a debate on the possible need for regulation and controls of scientific activities that have the potential for abuse or misuse.

In developing countries the focus remains primarily on the fundamentals of biosafety and biosecurity—how to safely and securely manage micro-organisms and the products of biological processes. Shortcomings in capacity, equipment and human resources can pose a weak link in that chain of control against the misuse and abuse of infectious agents. Informing those who work with biological agents and processes about the core concepts and procedures is a significant challenge. The A-PBA is working hard to build human capacity. We help raise

awareness, share experiences and best practice and conduct training. The Implementation Support Unit (ISU), together with meetings and publications within the framework of the BTWC, can make a direct contribution to raising awareness. Even more importantly, the framework of the convention can encourage states parties to foster national and regional biosafety associations and through them help to ensure that those who work in biological facilities around the world do so safely and securely.

Many of the facilities handling infectious agents in developing countries were built more than 10 years ago, with little or limited provision for biosafety and biosecurity in terms of both design and practice. The conditions found in the majority of these facilities are far below the standard of laboratories in developed countries. Efforts need to be made to improve the quality of facilities in which our members work. The framework of the BTWC could play an important role in building such capacity.

There is uncertainty in many of the communities which have just started to develop a more structured approach when it comes to biosafety and biosecurity. They often receive conflicting advice, which sometimes can lead to confusion. A great deal of work needs to be done to harmonize and simplify messages. Over the last five years there have been excellent papers and data on biosafety and biosecurity which support programmes to promote biosafety and biosecurity. The challenge now is to implement these programmes in a systematic and sustainable fashion when faced with limited resources and infrastructure. The next step forward is to identify and establish partners and channels that can assist in the implementation of these programmes. The framework of the BTWC can play a role here too.

The A-PBA regards itself as a partner in all these initiatives. A-PBA stands ready to support the activities of the World Health Organization (WHO) and other the organizations within the framework of the BTWC, and enhance biosafety and biosecurity in the Asia-Pacific region as well as around the world.

The A-PBA utilizes a range of resources to promote biosafety and biosecurity in the Asia-Pacific region. The organization is not alone in its efforts. The following contribution examines the methods of the European Biosafety Association and includes examples of relevant activities.

Gary Burns

How the European Biosafety Association contributes to the BTWC

Heather Sheeley

EBSA was founded in 1996 and aims to provide a forum for discussion and knowledge exchange for a diverse range of people in the life sciences in academia, research, veterinary, health, and supporting technologies and services. EBSA, which has over 370 members from academia, governments and private organizations from 32 states, has attended meetings within the framework of the BTWC to actively promote excellence in biosafety and biosecurity and the responsible conduct of science.

The EBSA council and its members have supported the initiatives of other biosafety associations by giving presentations, running training sessions and attending meetings that cover biosafety and biosecurity, including bioethics and dual-use. EBSA has attended meetings within the framework of the BTWC, participating both as a Guest of the Meeting and as an observer. Members of the association have been participants at both intersessional and informal meetings. In addition, members have participated on panels with members of the ISU to raise awareness of the importance of biosafety and biosecurity. Similarly, guest speakers have also attended and presented at EBSA conferences and to national biosafety groups allied to EBSA.

EBSA initiated and has been the driving force behind a workshop to write and approve a consensus document on biosafety professional competence.¹⁴ The document was made available in December 2010 and following a 60-day public comment period, it will be approved in May 2011. The aim is to set a benchmark for competent advice on issues of biosafety and biosecurity.

Within the European Committee for Standardization (CEN) framework, EBSA has also been a main contributor to a document on laboratory biorisk management.¹⁵ The document sets the standard for effective biorisk management programmes and has been used to assess the adequacy of arrangements in several countries. In January 2011 the document was made available for the 60-day comment period, and a final meeting is planned in May 2011.

EBSA also coordinates biosafety efforts in Europe by holding meetings and providing an electronic platform for sharing information. EBSA has been supporting and sponsoring activities in Eastern Europe, with the goal to foster and strengthen biosafety in the region. In addition, EBSA members provide direct input on biosafety in these states. Within the European Union, EBSA is involved in the consultation process of documents relating to security and preparedness, and its members continue to participate in biosafety relevant initiatives, EBSA members also participate with international organizations such as the WHO, the IFBA, the European Centre for Disease Prevention and Control, and the Organization for Economic Cooperation and Development—across a broad range of issues related to chemical, biological, radiological and nuclear weapons.

It is clear that both biosafety professionals and those directly involved with and active in the BTWC are already engaged in a wide range of joint activities. There is clear support for closer cooperation—demand for joint activities outstrips supply. Are the joint interests of these communities close enough to warrant further efforts to strengthen working ties? The following article on the IFBA examines this question and provides an unequivocal answer.

Gary Burns

International Federation of Biosafety Associations

Brad Goble

Laboratory diagnostic and surveillance capacity are central to the global fight against outbreaks of infectious disease, whether naturally occurring or deliberately caused. However, many laboratories lack the capacity to safely and securely handle dangerous biological agents. These challenges are not unique to the global health community, and there is growing recognition that the global health and security communities must come together to address the full spectrum of biological risks.

Founded in 2001, the IFBA has actively promoted dialogue and collaboration among the global community of scientists, laboratory personnel, architects, engineers, academics and policymakers—all of whom share our common goal of advancing biosafety and biosecurity practices through increased collaboration among national and regional biosafety organizations. Together with our partnerships with biosafety associations, non-governmental organizations, governments and international agencies, the IFBA is uniquely positioned to assist states worldwide and deliver sustainable biosafety capacity building programmes where they are needed most.

The IFBA encourages and supports local, practical and sustainable biosafety capacity building around the world by reinforcing and promoting biosafety and biosecurity awareness, sharing best practices and expertise, and building strategies to strengthen biosafety programmes. Our emphasis is on delivering sustainable capacity-building programmes where they are needed most—and we do so within the broader context of strengthening global public health and security.

Looking to the future, the IFBA and more than 50 of its member states recognize the unique opportunity we have in strengthening our engagement and collaboration with BTWC stakeholders as an important partner in achieving our complementary goals across the world. Our task is to help ensure that all states have the biosafety, biosecurity and biological non-proliferation knowledge and tools they require. Collaboration with international, regional and national biosafety associations provides a direct channel with those who actually run the

facilities that conduct biological research. Ours is a community with expertise in safety and security issues specific to biological agents and toxins.

There is also a growing recognition of the synergies between our two missions. Biosafety associations are focused on strengthening the profession of biosafety, while the convention aims at preventing disease from being used to deliberately cause harm. In the age of biorisk management there is an increased need to harmonize efforts to achieve our common goals. However, with resource constraints being a constant challenge for all, working together not only makes sense, it is critical for future success.

The IFBA and the Elizabeth R. Griffin Research Foundation¹⁶ have chosen 2011 to be “the year of growing international biosafety communities”. With its first international conference,¹⁷ in Thailand, in February 2011, the IFBA is well positioned to help identify and address key areas of biosafety and biosecurity concern.

However, there are still many ways in which to improve relations between biosafety professionals and the BTWC:

1. The biosafety community should work with states parties on practical projects to build biosafety and biosecurity capacity in developing countries—with a particular focus on raising awareness among biosafety professionals about the convention and dual-use issues.
2. The biosafety community can act as a useful bridge between governments and the private sector, and become an influential partner in generating greater buy-in and encouraging closer engagement within the framework of the convention.
3. States parties should establish a structured mechanism to incorporate the contributions and expertise offered by the biosafety community.
4. States parties should provide the resources necessary to support the work of biosafety associations, including a central archive of biosafety and biosecurity best practices and standards.
5. States parties and biosafety professionals should work together to provide the ISU with the support and resources necessary to expand its role in engaging with the biosafety community.

The upcoming Seventh Review Conference can be used as a setting for cooperation and action. The combination of the IFBA's partnership with front-line biological research and leading expertise and ISU's engagement with states parties can help to better tackle the issues of biosafety and biosecurity within the framework of the BTWC.

Perspectives from the private sector

Gary Burns

Many companies in the pharmaceutical and biotechnology sector carry out work involving biological agents. A significant number are involved in research to discover new medicines to prevent or treat infectious diseases, such as malaria and tuberculosis, which are a particular problem in the developing world. As is the case for life science research, some work may be categorized as dual-use according to criteria established by the US National Science Advisory Board for Biosecurity. The work may involve organisms which pose a security concern under national legislation, such as the US select agents list or UK anti-terrorism laws.¹⁸

There is a clear link between dual-use research and the BTWC for companies involved in vaccine production. As part of the confidence-building measures within the framework of the BTWC, states parties are required to provide information on all national vaccine manufacturing facilities. Many states parties, including the United States and the United Kingdom, have placed this information in the public domain and have posted it on both the publicly accessible pages of the ISU Internet site and also on its restricted access pages.

Companies that work with biological agents have strict biosafety and biosecurity programmes to address associated risks, and depending on the size and complexity of the organization, employ biosafety professionals to support those programmes. Compliance with national and international legislation is a strict requirement, but many large multi-national organizations within the sector often go beyond this and apply global minimum standards.

Biosafety professionals from leading pharmaceutical companies are generally members of national biosafety organizations, but they are also represented on the Pharmaceutical Biosafety Group (PBG), an industry group with a strong emphasis on cross-sector benchmarking and sharing of best practice. Like the biosafety associations that have contributed to this article, the PBG is also a member of the IFBA.

There have been many calls for the private sector to engage further in biosafety and biosecurity. A publication by the US National Security Council stated that the US private sector would be encouraged to undertake the following:

- Conducting organizational assessments regarding potential vulnerabilities that could give aid to those seeking to develop or use biological weapons and taking all reasonable measures to reduce their risk of exploitation;

- Ensuring that all reasonable measures are taken to promote the safety and security of high-risk pathogens and toxins within their possession;

- Establishing and supporting robust participation in fora where sector colleagues and other stakeholders can discuss risks, raise awareness, and

explore community-based approaches and best practices for risk management;
and

Maintaining productive working relationships with local, State, and Federal law enforcement agencies and reporting suspicious/illicit activities to appropriate authorities.¹⁹

Much of the private sector is already actively engaged in all these areas as individual organizations or through industry associations. A good example of such engagement is provided by two organizations which represent the main specialist genes synthesis companies. The International Association Synthetic Biology has adopted a code of conduct of best practices in gene synthesis, and the International Gene Synthesis Consortium has adopted a similar harmonised screening protocol for gene sequence and customer screening. Both of these measures go beyond current guidelines²⁰ and have been formally supported by at least one commercial organization in the pharmaceutical sector. The private sector has also provided a direct response to the consultation exercise on the Federal guidelines, for example through the Biotechnology Industry Organization.

While the private sector is clearly doing much to support the aims in the BTWC, the ISU has made clear to industry representatives that it would welcome further engagement aimed at raising awareness and understanding among governments of the perspectives, concerns and contributions of the pharmaceutical industry; exploring the potential for integrating industry activities with similar efforts in other sectors; and developing partnerships for practical action on reducing biological risks worldwide. In addition, there is a call for the development and implementation of standards on biosafety and biosecurity; education and awareness-raising for life scientists on the risks of misuse of biology; and capacity-building activities, particularly in developing countries.

Thoughts for the Seventh Review Conference

The various contributions in this article clearly lay out the synergies between the biosafety and BTWC communities. They seem to have much in common, and it is clear that much progress has been made in how they work together. The contributions highlight opportunities to improve this relationship and these may be of value to take forward at the Seventh Review Conference.

Notes

1. Meeting 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, *Report of the Meeting of States Parties*, document BWC/MSP/2008/5, 12 December 2008.
2. European Committee for Standardization (CEN), "Laboratory Biorisk Management Standard", CEN Workshop Agreement 15793, 2008.

3. European Committee for Standardization (CEN), "Biosafety Professional Competence", CEN Workshop 53, 2010.
4. Public Consultation Meeting of the Trans-Federal Task Force on Optimizing Biosafety and Biocontainment Oversight, 8–9 December, 2008; National Science Advisory Board for Biosecurity Public Consultation on Guidance for Enhancing Personnel Reliability and Strengthening the Culture of Responsibility at the Local Level, 5 January 2011; ABSA also gave testimony in 2010 and provided expert participants to serve on the US Federal Experts Security Advisory Panel.
5. We have provided representation on the American National Standards Institute Board for the development of containment laboratory standards, and also on the Association of Public Health Laboratories for the development of biosafety competencies for laboratory staff. We have participated with the Blue Ribbon Panel of the Centers for Disease Control and Prevention on clinical laboratory standards.
6. Some of which include: the American Association for Laboratory Animal Science; the American Public Health Association; the Campus Safety, Health, and Environmental Management Association; the Environmental Protection Agency; the US Occupational Safety and Health Administration; the Sandia National Laboratories' International Biological Threat Reduction Program; and the World Health Organization. The E.F. Griffin Foundation is an ABSA Principal Partner.
7. ABSA, "Affiliate and Biosafety Association Management Workshop", workshop, Denver, 7 October 2010.
8. Eagleson Institute et al., "Preventing and Treating Biological Exposures: a Colloquium for Occupational Medicine, Infectious Disease and Emergency Medicine Professionals", conference, Cambridge, 14–15 June 2010.
9. J. Domingo, "The Biological Weapons Convention (BWC) and Biosafety Diplomacy", *Applied Biosafety*, vol. 13, no. 2, 2008, pp. 86–88; P. Millett, "The Biological Weapons Convention: From International Obligations to Effective National Action", *Applied Biosafety*, vol. 15, no. 3, 2010, pp. 113–8.
10. For example, the Biosafety and Biosecurity Network (Thailand) was founded in early 2008 following an A-PBA conference in Bangkok. The A-PBA has been in communication with the Biological Safety Association of Pakistan and the Philippine Biosafety and Biosecurity Association. The A-PBA has also worked closely with the Biosafety Association for Central Asia and the Caucasus.
11. A-PBA, "Biosafety Management Course", training course, Singapore, 6–14 January 2011.
12. European Committee for Standardization (CEN), "Laboratory Biorisk Management Standard", CEN Workshop Agreement 15793, 2008; European Committee for Standardization (CEN), "Biosafety Professional Competence", CEN Workshop 53, 2010.
13. Meeting 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, *Report of the Meeting of Experts*, document BWC/MSP/2008/MX/3, 8 September 2008, p. 14.
14. European Committee for Standardization (CEN), "Biosafety Professional Competence", CEN Workshop 53, 2010.
15. European Committee for Standardization (CEN), "Laboratory Biorisk Management Standard", CEN Workshop Agreement 15793, 2008.
16. The Foundation promotes safe research practices in the area of zoonotic disease.
17. IFBA, "Global Biosafety and Biosecurity: Taking Action", conference, Bangkok, 15–17 February 2011.
18. For further information see National Select Agent Registry, "HHS and USDA Select Agents and Toxins", 2008; and the United Kingdom, "Anti-terrorism, Crime and Security Act 2001, Part 7 Security of Pathogens and Toxins".
19. National Security Council, *National Strategy for Countering Biological Threats*, 2009, p. 22.
20. US Department of Health and Human Services, *Screening Framework Guidance for Providers of Synthetic Double-Stranded DNA*, no date.

Verification for the BTWC: if not the protocol, then what?

Richard Lennane

The flightless bird

The ostrich is a flightless bird. The Biological and Toxin Weapons Convention (BTWC) has no verification mechanism. On these two facts, everyone agrees. Beyond this, opinions diverge sharply—and have done for decades. Does it matter that the ostrich cannot fly? Would it be a good idea to attach bigger wings? Or would the laws of physics render such an exercise futile? What shape and size would the wings need to be, what would they cost, and just how would they be attached? Ostriches, I am reliably informed, have yet to reach a consensus on these issues.

Similarly, states parties to the BTWC continue an interminable debate on whether the lack of a verification mechanism for the convention is a problem and, if so, what should be done about it. And just as the ostrich debate has become fixated on wings, the debate among states parties has become fixated on the draft protocol negotiated by the Ad Hoc Group—until the effort collapsed in 2001. Any discussion on verification seems to revert to this: whether or not to revive the negotiations on a legally binding verification protocol to the convention. Some say yes; others say, quite plainly, no. And that is pretty much the extent of the debate.

Whether or not sticking bigger wings on the ostrich would actually be a good idea, it is clear that no political consensus exists to make an attempt, at least at the Seventh Review Conference and for the foreseeable future. So rather than continuing the same old debate, with heads in the sand, perhaps it is time to look at some alternative approaches to improving the ostrich.

Draining the semantic swamp

A fundamental problem in any discussion on verification within the BTWC framework is what is meant by *verification*. The term is used to mean different things. Terms such as *verification*, *compliance mechanism*, *protocol* and *a multilaterally negotiated, legally binding instrument to strengthen the convention* are frequently used more or less interchangeably. Although using such terminology so loosely is understandable in a field with a long history of negotiation and argument bogged down with diplomatic and technical circumlocution, it also muddles a number of distinct issues which need to be untangled and separated if we are to make a clear assessment of where progress might be possible.

Richard Lennane is Head of the Biological Weapons Convention Implementation Support Unit. The opinions expressed in this article are the author's own and do not necessarily represent the views of the states parties to the Biological and Toxin Weapons Convention, the Implementation Support Unit or the United Nations.

The first consideration is that although the draft instrument negotiated by the Ad Hoc Group was—and still is—often referred to as a *verification protocol* for the BTWC, it involved much more than verification. The mandate of the Ad Hoc Group was “to consider appropriate measures, including possible verification measures, and draft proposals to strengthen the convention, to be included, as appropriate, in a legally binding instrument, to be submitted for the consideration of the States Parties”.¹ The mandate identified four particular areas: definitions of terms and objective criteria; the incorporation of existing and further enhanced confidence-building measures; a system of measures to promote compliance with the convention, including the measures considered by the Ad Hoc Group of Governmental Experts to Identify and Examine Potential Verification Measures from a Scientific and Technical Standpoint (VEREX); and specific measures designed to ensure effective and full implementation of Article X of the BTWC, which deals with the protection and promotion of the peaceful uses of biological science and technology. Although it was not explicitly required by the mandate, the draft protocol also provided for an international organization, similar in scope and concept to the Organisation for the Prohibition of Chemical Weapons (OPCW), that would not only operate the verification system but would carry out the Article X measures, assist with national implementation, and generally support and manage the operation of the BTWC.

So the *verification protocol* was actually a package of measures, only part of which involved verification. The fact that the protocol as a package is dead does not necessarily mean that all the constituent parts, including verification, are also dead. It is true that the package was a carefully negotiated balance of competing interests, and for many years after the collapse of the Ad Hoc Group negotiations, there was a taboo on “cherry-picking” or taking certain parts of the package for separate development. But the existence of the taboo says nothing about the actual technical or political feasibility of the individual components of the package. And interestingly, the taboo was broken in 2009 by the Group of the Non-Aligned Movement and Other States, with a proposal for a mechanism to strengthen the implementation of Article X.² If there can be a mechanism to implement Article X, can there also be a mechanism to (attempt to) verify compliance?

The second consideration is the nature of verification and compliance, as far as the BTWC is concerned. With verification it has long been accepted that this is a qualitatively different and more difficult matter for the BTWC than for other regimes. It was never going to be a clear-cut case of counting warheads, measuring mass balances, monitoring the destruction of chemical agents, or cutting up a certain number of submarines or strategic bombers and leaving the pieces out to be photographed by satellites. The dual-use nature of biology is pervasive: unless you actually catch someone adding anthrax to a missile warhead, how can you be sure the anthrax is not being used for peaceful purposes (producing vaccine, for example)? The VEREX process, which thoroughly dealt with the matter in 1992 through 1993, concluded that no single measure could determine whether or not a state party was in breach of the convention. The VEREX report states, rather tentatively, that several measures in combination “could be useful to varying degrees in enhancing confidence, through increased transparency, that

States Parties were fulfilling their obligations under the BWC".³ But is enhancing confidence in compliance the same as verification? Is that what we mean by verification for the BTWC?

And then what do we mean by compliance? As I see it, there are two aspects to compliance:

1. compliance with the prohibitions of the convention, i.e. not engaging in activities that are prohibited; and
2. compliance with the positive obligations of the convention, i.e. effectively and thoroughly implementing the necessary measures to reduce the risk of prohibited activities taking place. (Incidentally, I would include Article X activities as being among the "necessary measures".)

It can be important to distinguish between these two aspects because they require different approaches—especially when responding to non-compliance. Non-compliance of the first aspect traditionally requires some kind of investigation, and if substantiated, sanction or punishment (in theory, at least). Non-compliance of the second aspect, in contrast, would seem to call for incentives, assistance and greater cooperation (although there may also be a need for some degree of persuasion or pressure). When I use the term compliance here, I intentionally include and refer to both aspects.

Let me set out what I mean by verification in the rest of this article. I will use the term to mean:

A structured and systematic means of

- a. providing an increased level of assurance that states parties are complying with the prohibitions and obligations of the convention; and*
- b. promptly, effectively and impartially investigating cases of alleged or apparent non-compliance with the prohibitions of the convention.*

That is what I think is the best that *verification* could be in the BTWC. Now let us examine what such a "structured and systematic means" might consist of within the prevailing technical, financial and political constraints.

Picking over the carcass

Since a large amount of time, thought and expertise was devoted to the Ad Hoc Group negotiations from 1995 through 2001, we might start with a look at the verification-related components of the draft protocol.⁴ There were four main elements: declarations of relevant facilities; visits to these facilities (and possibly to facilities that "should have been declared"); consultation and clarification procedures; and investigations of alleged violations of the BTWC. All of which would have been operated by a dedicated international organization analogous to the OPCW.

Declarations

The aim of the declaration provisions was essentially to build a global picture of where relevant biological capacity existed, so that it could be monitored to a greater or lesser extent. Naturally, determining what exactly was relevant was the crux of the matter, and proved to be both technically challenging and politically difficult. Some categories were easy: there was little question that biodefence facilities and maximum biological containment facilities (biosafety level (BSL) 4 or equivalent) should be declared. Such facilities are relatively few in number, and are likely to be working with the most dangerous pathogens and toxins.

In contrast, specifying other relevant facilities, such as those with high containment (BSL 3), or those producing vaccines or working with certain biological agents was far more difficult. There are many more such facilities, and keeping the numbers manageable for any workable regime meant using selection criteria that were more or less arbitrary—providing little confidence that the most relevant facilities would be covered. This problem has only become worse since 2001, as rapid advances in biological science and technology have greatly increased the number and broadened the geographic distribution of potentially relevant biological facilities.

Visits

The visits provisions of the draft protocol were originally based on the routine inspections of the Chemical Weapons Convention (CWC). The idea was to carry out some kind of routine on-site monitoring of declared facilities, but arguments raged fiercely over the precise scope and purpose of the visits, as well as the details of how the visits would be conducted. The numbers of declared facilities likely to be involved meant that visiting each of them, even only once every five years, would be impossible, and some kind of random selection would be required.

While opinions in the Ad Hoc Group differed widely on the verification goals that visits would supposedly meet, perhaps the most pragmatic objective was simply to provide some kind of incentive for states parties to take their declarations seriously. The argument was that, as is the case with the tax systems of many countries, the prospect of receiving a random audit motivates thoroughness and accuracy in the initial declaration.

Consultation and clarification

The draft protocol included procedures for clarifying doubts and consultation in the case of suspicion or allegation. There was little to these provisions beyond offering a structure for dialogue, and providing an option to do something short of launching a full investigation.

Investigations of alleged violations

The investigation provisions of the draft protocol were detailed and comprehensive, and arguably the most potent component of actual verification. Investigations were divided into field investigations, essentially of alleged use of a biological or toxin weapon, and facility investigations of alleged violations of the prohibitions in Article I of the convention (development, production, stockpiling, or other acquisition or retention of a biological weapon). Both types of investigation involved a relatively timely dispatch of professional investigators to conduct an on-site investigation according to detailed procedures.

So what could be salvaged?

Any attempt to extract useful components from the draft protocol needs to restrict itself to those items that could conceivably operate (at least initially) without a legally binding framework and without the support of an OPCW-style organization. With this in mind, it is worth noting the similarities of two of the protocol components—declarations and investigations—to two mechanisms that currently exist: the BTWC confidence-building measures (CBMs) and the UN Secretary-General's Mechanism for Investigation of Alleged Use of Chemical and Biological Weapons.⁵ These are two obvious starting points for our construction of a system of verification.

The consultation and clarification provisions of the draft protocol, for what they are worth, are easy enough to reproduce independently, and indeed already exist to some extent in the form of the procedures agreed at the Second and Third Review Conferences of the BTWC for consultations under Article V of the convention. I will not consider them further here.

That leaves the issue of visits, or more generally, of regular on-site monitoring or inspection measures not triggered by a particular accusation or event. Political differences aside, on a purely logistical level such activities are difficult to imagine without the support of a suitable international organization and legal framework. And the problem of determining and specifying a relevant set of facilities to visit, and visiting them often enough to have any effect, has only become more intractable with the explosive growth in the number of facilities worldwide that—thanks to cheaper, smaller, faster and better technology—are in some sense potentially capable of producing a biological weapon. Given these formidable challenges, the only role I can see for visits of the kind envisaged in the draft protocol is in a limited, ad hoc programme focusing only on biodefence facilities. This is examined in greater depth below.

From CBMs to a declaration regime?

The CBMs are in some sense already a kind of declaration regime, in that states parties declare information about certain aspects of their biotechnology capacity (such as maximum containment laboratories and vaccine production facilities) and relevant activities (such as

biodefence programmes). The CBMs also contain a very rudimentary form of declaration of national implementation measures. Various states parties and academic observers have talked for many years of the need to develop, improve or expand the CBMs, and indeed work is now underway in various quarters to develop proposals for CBM reform at the Seventh Review Conference. While getting agreement on details is always difficult, it is relatively easy to envisage a revised CBM regime comprising clearer requirements for providing information on relevant biotechnological capabilities and activities and a substantially expanded section on national implementation measures. This would constitute the basis of a reasonably serviceable “declaration regime” in practice, even if it was not described as such.

But there is more to an effective declaration regime than the actual declarations. First, there is the matter of participation. As various supporters of the CBMs have pointed out, the CBMs are a politically binding measure in which all states parties have agreed to participate—they are not voluntary. But participating in the CBMs is not a legally binding obligation on states parties, and participation is low—only around one third of states parties regularly submit CBMs to the Implementation Support Unit (ISU).

Second, there is also the question of what is done with the submitted information. A traditional declaration regime generally involves some kind of analysis and assessment of the declarations, and perhaps a cycle of feedback, modification and reassessment. Otherwise, some would argue, what is the point? There is currently no analysis or assessment of CBM submissions (beyond the very basic statistics compiled by the ISU). The submissions are simply made available to all states parties, who may make of the information what they will.

While it would certainly be good to increase participation in the CBMs and to make better use of the information provided, I am not convinced that either of these shortcomings means that CBMs cannot form the basis of a reasonably effective declaration regime. Both problems can be addressed over time as the system is developed and refined. As the experience of the CWC has shown, even having a legally binding regime supported by a well-resourced and active international organization is no guarantee that states parties will submit declarations, or that the declarations will be accurate and comprehensive. One advantage of not having a legally binding regime is that it is much easier to adapt and develop, both to encourage participation and to improve the effectiveness of the system in increasing confidence in compliance.

There is also a kind of conceptual objection that is sometimes put forward as a reason not to develop the CBMs into a declaration regime. This is that they are a “transparency measure” and not a compliance measure. That transparency and compliance are qualitatively distinct goals that should not be muddled together is entirely false. Transparency is simply a means of increasing the likelihood of compliance: if people can see what you are doing, you are less likely to cheat, and people are less likely to suspect you of cheating. A transparency measure, as long as it genuinely increases transparency, is also a compliance measure. The original stated purpose of the CBMs was “to prevent or reduce the occurrence of ambiguities, doubts

and suspicions”,⁶ which is rather close to my purpose here of providing increased assurance of compliance.

Investigations: adapting the available tools

The Secretary-General’s Mechanism for Investigation is perhaps the most potent piece of BTWC compliance machinery on the international scene, but ironically it is not part of the convention and has no formal connection to it. The mechanism is intended to investigate alleged use of chemical or biological weapons, with the chemical part now obsolete following the advent of the CWC and OPCW. It is therefore roughly equivalent to the field investigations provisions of the draft protocol, and it does not really cover the kinds of situations that the facility investigations were conceived to deal with. So it is at best only a partial answer to our need for a means of promptly, effectively and impartially investigating cases of alleged or apparent non-compliance. The lack of a clear link with the convention and the lack of clear procedures for invoking the mechanism are also potentially serious operational shortcomings. Nevertheless, the mechanism has a well-developed and recently updated set of operational procedures for actually carrying out an investigation and an extensive roster of experts and laboratories—and it operates without a supporting organization or standing logistics capacity.

What could be done about the shortcomings? One approach would be to bring the mechanism into the BTWC regime, or at least to establish formal links and procedures by which the mechanism could be invoked by the BTWC states parties. Bringing the mechanism inside the convention would probably require a General Assembly resolution coupled with a Review Conference decision. Responsibility for the administration of the mechanism (maintaining the roster of experts, organizing training exercises, etc.) would then pass to the ISU or its successor, with perhaps some role for a future intersessional process as a kind of supervisory board, and forum for discussion of any revisions to the mechanism—in particular to deal with alleged violations other than the use of biological weapons.

The investigation mechanism itself would need to be appropriately set within an array of agreed procedures for raising an allegation, initiating an international response and investigation, coordinating the provision of any assistance, and coordinating with any public health, veterinary or humanitarian responses. These in turn would need to be integrated with the existing procedures, agreed at previous review conferences, for clarifying and dealing with wider non-compliance concerns.

The question of what to do about the lack of facility investigations (investigations of violations of Article I of the BTWC, other than use of a biological weapon) is more difficult. If the Secretary-General’s Mechanism for Investigation were to be brought inside the BTWC, it would conceivably be possible to adapt it by adding procedures to investigate allegations of development or possession of biological weapons. But this would raise the spectre both of long, complex negotiations and of a two-tiered situation in which everyone accepted the

current scope and mandate of the mechanism, but only some states parties accepted an extended scope covering investigations of development or possession.

Biodefence: one area worth visiting

Biodefence is the area where the line between permitted and prohibited activities is finest and where there is most potential for legal activities to be converted to illegal ones literally overnight. For all the concern and attention given over the last decade to the risks posed by bioterrorism, biodefence is one area where concerns and suspicions are still directed solely at governments. Biodefence work will often have to be classified to some extent, and so there is generally little information available from open sources. A good case can therefore be made for a higher level of scrutiny, and higher standards of transparency and communication, including some level of on-site access by external monitors.

Because only a relatively small number of states parties have biodefence programmes, and because such programmes, in most cases, involve only a small number of facilities, a programme of on-site visits would be both technically feasible and not prohibitively expensive. The question is, of course, how to do it in the absence of a legal framework and an independent monitoring organization. The most immediately tractable approach would probably be an informal (essentially voluntary) arrangement of peer review among states parties with declared biodefence programmes. These governments could take turns to visit each others' biodefence facilities, in accordance with a mutually agreed schedule and procedures, and compare what they see and hear with what has been declared. The results of such visits could be shared only among the participating countries (which would create an incentive to participate), or with all states parties (which would do much more to build confidence in compliance), or with those states parties that engaged at least in some form of verification activity (such as submitting a CBM or declaration, or participating in the other approaches described below).

Veteran readers may see a similarity between this idea and the "trilateral" inspections undertaken by the Russian Federation, the United Kingdom and the United States in the early 1990s, and which are generally regarded as a failure. Times have certainly changed, but any attempt to devise a system along the lines I have described would do well to look at some of the problems that were encountered in the trilateral process and to consider how best to overcome them.

Other approaches

Having salvaged we could from the protocol, we come to the question of whether there are any other means of verification for the BTWC that might be worth pursuing, or at least investigating. Our salvage operation has revealed potential tools to deal with monitoring highly relevant facilities and with investigations of alleged violations of the BTWC. The challenge now is to find possible measures that might help to provide an increased level of assurance

that states parties are complying with the prohibitions and obligations of the convention in the vast and rapidly growing area of routine biological science and technology around the world. This is not something that can be monitored by a central organization in the traditional disarmament and non-proliferation model embodied, for example, by the CWC and OPCW.

Instead, we need to look at some kind of network-based monitoring, linking the efforts of several actors into what the Secretary-General Ban Ki-moon termed a “cohesive, coordinated network of activities and resources”,⁷ and weaving what the International Committee of the Red Cross once aptly described as a “web of prevention”.⁸ BTWC implementation activities (and reporting) by governments will be a key component, but the effort will also have to involve significant roles for non-government entities, such as the scientific community, professional bodies, industry and academia.

There are several conceivable ways of approaching this objective, but the most promising is through developing standards and evaluating adherence and performance against those standards, perhaps through a formal certification process. This is perhaps best explained by looking at an example from a field outside disarmament and non-proliferation, but one still connected to international security. The Financial Action Task Force on Money Laundering (FATF) is an example of such an organization and describes itself as “an inter-governmental body whose purpose is the development and promotion of national and international policies to combat money laundering and terrorist financing”. The FATF currently has 34 members, but through a network of regional bodies essentially covers 180 jurisdictions. It sets international standards for implementing effective measures against money laundering and terrorist financing, and monitors its members’ implementation of these standards through a process of mutual evaluation. This process of mutual evaluation is carried out by an assessment team according to a detailed methodology, and involves both the analysis of written materials (questionnaires, etc.) and on-site visits of up to 10 days. The assessment team is drawn from national experts provided by FATF members and representatives of the small FATF Secretariat, which is housed at the Organisation for Economic Co-operation and Development (OECD) in Paris (although the FATF is not part of the OECD itself). Evaluations may also be done jointly with a regional body, in which case the assessment team includes experts from members and the secretariat of that regional body.

The mutual evaluation report is prepared in consultation with the evaluated government, and any differences of opinion or other sensitive issues are reviewed by an expert group before the report is considered, discussed and ultimately adopted by the FATF plenary and published on the FATF website. The reports do not pull punches—here is an excerpt from the executive summary of the mutual evaluation report on Argentina with the South American Financial Task Force on Money Laundering:

Since the last evaluation, finalized in June 2004, Argentina has not made adequate progress in addressing a number of deficiencies identified at that time, and the legal and preventive [anti-money laundering and combating the financing of terrorism] measures that are in place lack effectiveness. This is complicated by a lack of adequate coordination, overlapping jurisdictions of a number of domestic agencies, and varied and inconsistent requirements vertically through the levels of applicable regulatory texts for each financial sector and horizontally across the various financial sectors.⁹

Such frankness would turn most disarmament diplomats' hair white: many of them spend their entire careers trying to ensure their governments are never exposed to such criticism. And yet the member governments of the FATF willingly subject themselves to this kind of scrutiny, without any legal obligation to do so—the FATF is not a treaty-based body and is run purely on the basis of political commitment. The process works, presumably because the member governments find it valuable and useful in building their capacity to combat money laundering and terrorist financing.

Could such an approach work for the BTWC? Certainly it would require a change of mindset in many governments. But standards do not necessarily have to be set by governments, and while government cooperation is obviously desirable, there is a lot that could be done while governments are pondering the issue. Indeed, relevant standards are already being developed, driven largely by the professional biosafety associations and interested scientific bodies. These include the laboratory biorisk management standard and a forthcoming one on biosafety professional competence.¹⁰ Others could be added in areas such as legislation and law enforcement (similar to the FATF), biosecurity, dual-use education, export controls and so on. Monitoring and evaluating adherence to standards need not be confined to governments, although government involvement and cooperation would again clearly be desirable. The appeal of a standards-based approach is flexibility. It can and ideally should involve all the relevant actors, but does not have to, at least at the outset. Governments and other actors can observe standards and evaluation activities in action before deciding to subscribe to them. There is no need for the all-or-nothing consensus-based approach that is the usual mode of operation in multilateral disarmament treaties.

Building a structure

My definition of verification began with “a structured and systematic means”. I have so far discussed a range of possible measures and approaches—some old, some new, some state-based, and some relying on other entities—without considering how they might work together. How could they be integrated into a structured and systematic means?

An approach to avoid is the one tried by the Ad Hoc Group: spending years negotiating an elaborate paper edifice that was never agreed, much less tested or implemented. Much better would be what is sometimes called the “bottom up” approach: developing and implementing individual components on a small scale, refining and improving them in operation, gradually expanding participation and scope, and then—once everyone knows what is involved and is confident the measures work in practice—perhaps bringing them together into a legally binding instrument.

Most of the measures I have discussed could be developed and put into operation by interested states parties, or other entities, even without a decision at the Review Conference. While there is widespread expectation, for example, that the Review Conference will revise and improve the CBMs to some degree, there is nothing to stop a group of interested and motivated states parties going further and implementing an expanded CBM or national declaration system among themselves. Similarly, a programme of on-site visits to biodefence facilities could start as soon as interested states parties decide and hash out some basic procedures. Development of standards relevant to BTWC implementation is already underway, and similar efforts could easily be started. Even measures such as the Mechanism for Investigation, which at first glance appear to be securely welded to the rusting multilateral security apparatus, offer some scope for innovation. A group of interested states parties could, for example, declare that they will agree to host on their territory an investigation of any allegation of a violation of Article I of the BTWC (and not just the use of biological weapons).

Institutional support for all these measures would certainly help, but is not strictly necessary. The ISU or its successor may be able to play a useful role in coordinating and facilitating the activities of states parties and others, and perhaps in managing the associated resources. Again, operational experience could be used to refine and improve the role of the ISU, and if and when the various measures were to be codified in a legally binding instrument, the associated institutional requirements—and costs—would be clearly understood.

Conclusion

In the end, states parties need to decide how important verification is, and if they really want to pursue it. If it is important, then it deserves more than the futile protocol-or-no-protocol debate. There are practical steps that can be taken now towards building a working verification capacity. Instead of constantly and impotently invoking the holy talisman of a multilaterally negotiated, non-discriminatory, legally binding instrument to strengthen the convention, states parties might consider taking their heads out of the sand and getting on with building verification tools that actually work.

Notes

1. Special 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 report*, document BWC/SPCONF/1, part II, 19–30 September 1994, p. 10.
2. Meeting 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, *The establishment of a mechanism for the full implementation of Article X of the convention*, document BWC/MSP/2009/MX/WP.24, 25 August 2009.
3. *Ad Hoc Group of governmental experts to identify and examine potential verification measures from a scientific and technical standpoint*, document BWC/CONF.III/VEREX/9, 24 September 1993, p. 8.
4. *Protocol to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction*, document BWC/AD HOC GROUP/CRP.8, 3 April 2001.
5. The mechanism is set out in General Assembly, *Chemical and bacteriological (biological) weapons*, UN document A/44/561, 4 October 1989, and was endorsed in General Assembly, *Chemical and bacteriological (biological) weapons*, UN document A/RES/45/57, 4 December 1990.
6. Second Review Conference of the 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*, document BWC/CONF.II/13/II, 30 September 1986, p. 6.
7. Department of Public Information, *Secretary-General highlights crucial work to be done to strengthen barriers against biological weapons, terrorism, in message to Geneva meeting*, UN document SG/SM/11971, 1 December 2008.
8. International Committee of the Red Cross, *Report on "Biotechnology, Weapons and Humanity"*, 2003.
9. FATF and the South American Financial Action Task Force on Money Laundering, *Mutual Evaluation Report. Anti-Money Laundering and Combating the Financing of Terrorism: Argentina*, 2010, p. 6.
10. European Committee for Standardization (CEN), "Laboratory Biorisk Management Standard", CEN Workshop Agreement 15793, 2008; European Committee for Standardization (CEN), "Biosafety Professional Competence", CEN Workshop 53, 2010.

The 2007–2010 intersessional process and the future of the BTWC

**Masood Khan, Georgi Avramchev,
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The 2007–2010 intersessional process was a major outcome of the Sixth Review Conference of the Biological and Toxin Weapons Convention, in 2006. States parties agreed to hold a series of annual meetings to discuss and promote common understanding and effective action on a range of topics to strengthen the implementation of the convention. The meetings covered:

1. Ways and means to enhance national implementation
2. Regional and sub-regional cooperation on implementation of the convention
3. National, regional and international measures to improve biosafety and biosecurity
4. Oversight, education, awareness-raising, and adoption and development of codes of conduct
5. Promoting capacity building in the fields of disease surveillance, detection, diagnosis and containment of infectious diseases
6. Provision of assistance and coordination with relevant organizations in the case of alleged use of biological or toxin weapons

Each year states parties addressed one or two of these topics: topics 1 and 2 in 2007; topics 3 and 4 in 2008; topic 5 in 2009; and topic 6 in 2010.

Two meetings were held each year. In August a Meeting of Experts brought together a wide range of expertise from states parties, international and regional organizations, and relevant professional, scientific and civil society bodies. The material, ideas and proposals raised and discussed at the Meeting of Experts were then distilled and refined by the Chair, and developed into a more politically oriented set of conclusions at the Meeting of States Parties held in December.

Each set of annual meetings had a single Chair—a role which rotated through the regional groups of BTWC states parties. As President of the Sixth Review Conference, Ambassador Masood Khan of Pakistan was elected chair of the 2007 meetings. For the Eastern European Group, Ambassador Georgi Avramchev of the former Yugoslav Republic of Macedonia chaired the 2008 meetings. Ambassador Marius Grinius of Canada chaired the 2009 meetings, on behalf of the Western Group. For the Group of the Non-Aligned Movement and Other States, Ambassador Pedro Oyarce of Chile chaired the 2010 meetings. This paper is authored by the successive chairs of the 2007–2010 intersessional process. It reflects on what went well, what

Ambassador Masood Khan of Pakistan was Chairman of the 2007 intersessional meetings. Ambassador Georgi Avramchev of the former Yugoslav Republic of Macedonia was Chairman of the 2008 intersessional meetings. Ambassador Marius Grinius of Canada was Chairman of the 2009 meetings. Ambassador Pedro Oyarce of Chile was Chairman the 2010 intersessional meetings. The opinions expressed in this article are the authors' own and do not necessarily represent the views of the states parties to the Biological and Toxin Weapons Convention or the United Nations.

did not, which opportunities were seized and those that were missed. These reflections, it is hoped, will assist the Seventh Review Conference in its deliberations on the next intersessional work programme.

The work of the BTWC in 2007

Ambassador Masood Khan

As the first Chairman after the Review Conference, it was my belief that we should transmit the atmosphere of goodwill and cooperation that prevailed in 2006 to the intersessional meetings, maintain the spirit of consensus in decision-making, and consolidate the gains made during the Review Conference. We also were keen to explore space for new ground. The Intersessional Chair had also been given the responsibility to engage states not party to promote universalization. Besides, we wanted to set a template of the intersessional meetings resembling closely the first cycle of intersessional meetings from 2003 through 2005. We made some progress in all these areas.

In 2007 states parties were tasked with examining two issues:

- Ways and means to enhance national implementation, including enforcement of national legislation, strengthening of national institutions and coordination among national law enforcement institutions
- Regional and sub-regional cooperation on implementation of the convention

Our yardstick for success in taking up these issues was: “Will this output of our work be a useful, practical tool for governments wanting to improve their implementation of the BTWC?”. In this regard, we realized at that point that the weakest area was synergy within the UN system, regional and sub-regional mechanisms, and within states parties. That is why I proposed the overarching theme—from adjacency to synergy—which was readily embraced by states parties.

The 2007 Meeting of Experts

The Meeting of Experts, held from 20–24 August, enjoyed a high level of participation from a wide range of actors. Experts from 93 states parties attended the meeting. International and regional organizations, including the Organisation for the Prohibition of Chemical Weapons (OPCW) and INTERPOL, as well as the African Union, the League of Arab States and the European Union, contributed to the deliberations. The individuals who made up the delegations from these countries, organizations and bodies came from different departments and agencies. This allowed the meeting to draw upon a large number of skills and enhanced possibilities for sharing information and experiences. The meeting developed synergies

both within and across delegations. I believe that participants returned to their capitals with a broader perspective, new ideas and greater confidence, which would have helped to move the BTWC higher on national agendas and to provide a renewed impetus for national implementation and regional cooperation activities in many states parties.

The 2007 Meeting of States Parties

The Meeting of States Parties, held from 10–14 December, picked up where the Meeting of Experts left off. It too was well attended, with representatives from 95 states parties, six signatory states, two states not party, two branches of the United Nations, six international organizations, two regional organizations, as well as 20 non-governmental organizations (NGOs), research institutes and industry representatives. The heads of three international organizations participated in the meeting: the Director-General of the World Organisation for Animal Health (OIE), Bernard Vallat; the Secretary General of INTERPOL, Ronald Noble; and the Director-General of the OPCW, Rogelio Pfirter. The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) participated at the Assistant Director-General level. Having such high-level participation illustrated how seriously the issues addressed by the convention are taken around the world.

I think the meeting was very productive: we heard substantive, constructive and highly focused contributions from states parties. The atmosphere of collaboration, creativity, quiet determination, and mutual support and respect was most impressive. This atmosphere was reflected in the report we adopted: it was a useful, practical tool for governments and a substantive outcome. The report recorded in concise and accessible terms the measures and actions which states parties considered important for effective national implementation and regional cooperation (see Tables 1 and 2 for a summary of the common understandings reached¹).

I was particularly satisfied by the extent to which we were able to draw upon expertise from outside national governments. Our colleagues in international organizations played a critical role in our success. We also had innovative and interactive discussions with civil society and industry representatives. The feedback I received indicates that states parties found these interactions highly relevant and useful. This is something on which the BTWC might usefully build in the future.

Table 1. Common understandings on national implementation reached at the 2007 BTWC Meeting of States Parties

Components	Mechanisms
<p>Sufficient penal legislation for prosecuting prohibited activities</p> <p>Prohibition of assisting, encouraging or inducing others to conduct prohibited activities</p> <p>Strengthening national capacity (including human and technological resources)</p> <p>Effective export and import controls</p> <p>Avoid hampering peaceful use of biological sciences</p>	<p>Promoting cooperation and coordination among government agencies</p> <p>Defining roles of different agencies and bodies</p> <p>Raising awareness of BTWC among relevant stakeholders</p> <p>Improving dialogue and communication among relevant stakeholders</p> <p>Establishing a central body or lead organization</p> <p>Creating a national implementation action plan</p>
Enforcement capacity	Ongoing activities
<p>Building capacity to collect evidence</p> <p>Developing early warning systems</p> <p>Enhancing coordination between relevant agencies</p> <p>Training law enforcement personnel</p> <p>Providing enforcement agencies with necessary scientific and technological support</p>	<p>Regular reviews of adopted measures</p> <p>Ensuring continued relevance of national measures in light of scientific and technological development</p> <p>Updating lists of agents and equipment</p> <p>Implementing additional measures as required</p>

Table 2. Common understandings on regional and sub-regional cooperation reached at the 2007 BTWC Meeting of States Parties

Approaches	Provision of resources
<p>Develop common approaches to implementation</p> <p>Provide relevant assistance and support</p> <p>Building upon shared languages and legal traditions</p> <p>Engage pre-existing regional resources</p> <p>Include implementation of BTWC on agenda of regional meetings and activities</p>	<p>States parties in a position to do so should provide technical assistance and support to requesting states parties</p> <p>Use Implementation Support Unit (ISU) as a clearing house</p> <p>Make full use of resources and expertise in other states parties and in international and regional organizations</p>
Information sharing	
<p>Nominate a national point of contact</p> <p>Inform ISU of national measures and any updates or changes to them</p> <p>Inform ISU of any relevant regional or sub-regional activities</p>	

Reflections on national implementation and regional/sub-regional cooperation

The work of the BTWC in 2007 highlighted four critical areas for collective efforts: synergy, inclusiveness, transparency and universalization.

Synergy

Several international organizations continued to work on issues impinging directly or indirectly on the BTWC regime. Most of them were working in silos. We made an effort to bring them to an open, shared space. In the past, these organizations had not always communicated with each other sufficiently and at the right level. The participation in the Meeting of States Parties of such high-level representation from the OPCW, OIE, INTERPOL, WHO and FAO was therefore a very positive sign. There is recognition by the international community of the gravity of the threat posed by biological weapons and the need to coordinate with each other for a calibrated response. More can, and should, be done to improve how these organizations interact with one another. The BTWC should play the primary role of a catalyst in facilitating exchanges of relevant information throughout all sectors of the international community.

Inclusiveness

We helped bring NGOs from the margins to the mainstream in the states parties and expert meetings. I made several initiatives to pare back perceived alienation between states parties and NGOs. A number of academic and research institutions as well as NGOs have been following the BTWC processes most faithfully and productively. Their representatives have been making statements at the BTWC meetings, supporting our efforts, and increasingly providing assistance to states parties in meeting their obligations under the convention. In this regard, I wish to acknowledge the excellent work being done by the Verification Research, Training and Information Centre (VERTIC) in assisting states to review and strengthen their national legislative and regulatory frameworks. I would also like to recognize the consistent efforts made by the University of Bradford to support the BTWC regime and its processes. These are just two examples. Many more have been doing so much for the BTWC. As these organizations evolve from simply observing to participating in our efforts under the BTWC, we should find ways to recognize our new partnerships in how we organize and run our meetings.

Transparency

We broke new ground in associating industry a bit more closely with the BTWC meetings. Commercial industry is enjoying exponential growth in the areas of biotechnology. There has been an explosion of biological capacity outside of the governmental and public sectors.

BTWC states parties have been busy developing the normative and operational framework for dealing with the deliberate use of biosciences for hostile purposes. Many of our efforts have not been directly focused on the private sector. It is important that states parties and industry have more open communication and dialogue to prevent the development, acquisition or use of biological weapons. This is not the time to look askance or shy away. This is a time for engagement and sharing information. That is why I organized a discussion panel with industry representatives at the Meeting of States Parties. I hoped that this would be a beginning of a new positive relationship between the BTWC and the private sector. There have been positive signs that this relationship has developed.² I think there is much more that we can and must do in the future.

Universalization

Chairmen of the intersessional meetings can play a very important role in promoting universalization and showing concrete results. In 2006 and 2007 I used four basic modes to reach out to states not party: letters to foreign ministers; one-on-one meetings with the permanent representatives in Geneva and New York; luncheons for the permanent representatives and visiting officials in Geneva; and strong advocacy in the BTWC meetings and BTWC-related seminars. These actions were supplemented by ISU, as well as an EU Joint Action regional seminar in Dakar.³ In 2007 alone the number of states parties increased by 4 to 159. The fifth succession was on the anvil. The Chair of the intersessional meetings had the mandate and authority to pursue universalization. The Chair's hands should be strengthened to use the full potential of his/her office, which is in my view only partially utilized.

The work of the BTWC in 2008

Ambassador Georgi Avramchev

In 2008 the BTWC was tasked with addressing:

- National, regional and international measures to improve biosafety and biosecurity, including laboratory safety and security of pathogens and toxins
- Oversight, education, awareness-raising, and adoption and development of codes of conduct, with the aim of preventing misuse in the context of advances in bioscience and biotechnology research with the potential of use for purposes prohibited by the convention

At the start of the year I asserted that our work was an opportunity to “Bring Biologists on Board” and I think we managed that. Our meetings generated a great deal of relevant information, much of it coming directly from biologists. Perhaps more importantly, our efforts also sparked a great deal of interest amongst the scientific communities themselves.⁴ I think we took a giant leap forwards in building bridges between these two communities.

The 2008 Meeting of Experts

The Meeting of Experts, held from 18–22 August, assembled a very impressive array of expertise from a wide range of national and international actors, and produced a wealth of highly relevant material. Participation in the meeting was impressively broad: 96 states parties were represented, and just under 500 delegates participated in the meeting. Of these, around 180 were experts who had travelled from capitals. Importantly, participation from developing countries increased in 2008: 53% of the participating states were developing countries, up from 51% in 2007 and 48% in 2005.

The 2008 Meeting of States Parties

The Meeting of States Parties, held from 1–5 December, succeeded in refining and structuring the material gathered by the Meeting of Experts into a package that clearly and concisely records our common understandings (see Tables 3 and 4 for a summary⁵). Delegations from across the geographic and political spectrum worked together to focus on practical measures and to strengthen partnerships. The synthesis document prepared for this meeting⁶ proved especially useful. It was adopted by “in-the-field experts” and used as the basis of assistance programmes to strengthen national biosafety and biosecurity frameworks.

Reflections on biosafety, biosecurity, oversight of science, education, awareness-raising and codes of conduct

One personal highlight of our work in 2008 was the degree of involvement of the scientific community. As Chairman, I was privileged to have had the opportunity to collaborate with scientific and professional organizations right from the start of my Chairmanship—when I participated in the Second International Forum on Biosecurity⁷ in Budapest in March—until the very end, when I travelled to Beijing immediately following the Meeting of States Parties to participate in a conference organized by the Chinese Academy of Sciences.⁸ In between, I participated in a range of scientific and academic conferences, in Wilton Park, in Bethesda, in Jakarta, in Como and in Geneva. I met a wide range of scientists and professionals from many countries, and I am delighted with the highly positive contribution they made to our work. I am also grateful for the support and helpful advice they gave.

Table 3. Common understandings on biosafety and biosecurity reached at the 2008 BTWC Meeting of States Parties

Components	Tools
Developing national biosafety and biosecurity frameworks Defining the role of different national agencies and bodies Building national, regional and international networks of relevant stakeholders Taking better advantage of assistance already available Improving bilateral, regional and international cooperation Cooperation and assistance to build relevant capacity Enhancing the role played by the ISU	Accreditation Certification Audit or licensing for facilities, organizations or individuals Training requirements for staff members Mechanisms to check qualifications, expertise and training National criteria for relevant activities National lists of relevant agents, equipment and other resources
Characteristics	Assistance needed
Measures should: <ul style="list-style-type: none"> – be practical – be sustainable – be enforceable – be readily understood – be developed with stakeholders – avoid unduly restricting peaceful use – be adapted for local needs – be appropriate for agents being handled – be suitable for work being undertaken – make use of risk assessment, management and communication approaches 	To enact and improve relevant legislation To strengthen laboratory infrastructure, technology, security and management To conduct courses and provide training To help incorporate biosafety and biosecurity into existing efforts to address disease

Our work provided important opportunities for networking, collaboration and community building. If the rhetoric of creating a shared solution to a common problem is to have meaning, we must have a sense of community among those of us working on these issues. Perhaps the most important contributions we made to the work of BTWC were in this sense of community. My experiences have convinced me that a real community does exist and that it is vibrant, enthusiastic and must be an integral part of any solution to managing the risks biological weapons pose to global security.

Table 4. Common understandings on oversight, education, awareness-raising and codes of conduct reached at the 2008 BTWC Meeting of States Parties

Oversight characteristics	Education and awareness-raising components
Develop national oversight frameworks: <ul style="list-style-type: none"> – to prevent agents and toxins being used as weapons – to oversee relevant people, materials, knowledge and information – to oversee the entire scientific life cycle – to cover private and public sectors: – that are proportional to risk – that avoid unnecessary burdens – that are practical and usable – that do not unduly restrict permitted activities – with the involvement of stakeholders in all stages of design and implementation – that can be harmonized regionally and internationally 	Formal requirements for seminars, modules or courses in relevant scientific education and training programmes and continuing professional education that: <ul style="list-style-type: none"> – explain the risks associated with the malign use of biology – cover moral and ethical obligations – provide guidance on the types of activities which could be prohibited – are supported by accessible teaching materials, train-the-trainer programmes, seminars, workshops, publications and audio-visual materials – address leading scientists and managers as well as future generations of scientists – can be integrated into existing national, regional and international efforts
Next steps for codes of conduct	
Complement national legislative, regulatory and oversight frameworks Help guide science so it is not used for prohibited purposes Further develop strategies to encourage voluntary adoption of codes	

Early in the year I outlined what I hoped we would be able to achieve in 2008. I was very pleased with our results. I suggested we should:

- Forge new relationships between the BTWC and the scientific community. We changed the way we work in Geneva to increase access for scientists and succeeded in drawing in record levels of expertise.
- Improve our engagement with industry and the private sector to make it more representative of the status of global biotechnology. We held dedicated events for members of the private sector and saw participation rise from developing countries. There is still room to do much better and this should be a focus for the future.
- Make space for contributions from international and regional organizations, as well as professional and scientific societies and academia. We had dedicated working sessions, side events, panel discussions and poster sessions, all to provide opportunities for input from stakeholder communities.

- Explore what we can do with risk management. In August we held a panel discussion dedicated to this topic, and it formed a core element of the work of the BTWC in 2008.
- Produce authoritative sets of information on each of the topics under consideration. Our background papers present a comprehensive overview of the topics we focused on. The papers and presentations made during the meeting detail relevant activities being undertaken in different countries, and our compendiums provide an easy way to access this unique dataset.
- Develop new tools to improve the way we work and share information. The inclusion of poster sessions in our timetable was universally appreciated. Efforts to create new online tools, such as the Compendiums of National Approaches, have added depth to our meetings. We continued to evolve interactive elements, such as the panel discussion, to make the most use of the expertise present at our meetings.
- Identify useful components for developing or revising national regimes for biosafety and biosecurity, oversight, education and raising awareness. The breadth and depth of the common understandings found in the report⁹ of the Meeting of States Parties more than met my expectations what we could achieve and is testimony to the dedicated and constructive efforts of the states parties.

The work of the BTWC in 2009

Ambassador Marius Grinius

The topic for 2009 was with a view to enhancing international cooperation, assistance and exchange in biological sciences and technology for peaceful purposes, promoting capacity building in the fields of disease surveillance, detection, diagnosis and containment of infectious diseases:

- For states parties in need of assistance, identifying requirements and requests for capacity enhancement
- From states parties in a position to do so, and international organizations, opportunities for providing assistance related to these fields

On this topic our work illustrated that states parties take all of their responsibilities under this convention seriously and that a treaty that deals with biological weapons can contribute to our efforts to deal with disease. It highlighted practical ways in which all states parties can work together to their collective benefit. It also demonstrated that security and development aspects of the convention do not have to be diametrically opposed but can be mutually reinforcing. It showed that when the BTWC states parties do find common understandings, there is very little that we cannot achieve.

The 2009 Meeting of Experts

I was keen to ensure our discussions were accessible to the greatest number of experts possible. Around 500 participants from over 100 countries took part. Almost 200 technical experts provided input in Geneva. Three arms of the United Nations, six international organizations and specialized agencies, and 10 Guests of the Meetings also contributed to our work. My pleas to help get experts to the meeting were acted upon: around 20 experts from 10 countries were sponsored to take part—a first for a BTWC meeting. We also webcast, live, a large portion of the meeting (another first) helping to ensure that experts unable to travel to our meeting were still able to benefit from our discussions.

We heard about the resources available, assistance extended, cooperation undertaken and opportunities waiting. Just as importantly, we heard about needs and challenges, shortfalls in capacity and resources, and obstacles and difficulties in coordination, cooperation and development. Many delegations highlighted the global dimension of the topic, noting that, as the delegation of Georgia put it: “infectious diseases know no geographic boundaries, neither should we on combating them”.¹⁰ Many participants also spoke of the need to better coordinate assistance, cooperation and capacity building activities.

The 2009 Meeting of States Parties

Participating at the December meeting were representatives from 100 state parties, six signatory states, two states not party, three branches of the United Nations, four international organizations, and 14 NGOs, research institutes and industry representatives. I was particularly pleased with the output of the Meeting of States Parties. It reflects the discussions we had at both BTWC meetings in 2009. I am sure that the report of the meeting will act as a useful bridge to the Seventh Review Conference. I think it captures where the common understandings lie between states parties on these issues (see Tables 5 and 6 for a summary¹¹).

I was keen to make sure that our outputs from 2009 were broader than just a final report. I wanted to ensure we had action-based outcomes. We published a paper¹² listing the contact details of sources of assistance—making it easier to get in touch with those able to provide needed resources. We also published details of national experiences which can provide insights into approaches that worked and those that did not.

Table 5. Common understandings on pillars for building capacity to deal with disease, as reached at the 2009 BTWC Meeting of States Parties

Infrastructure components	Developing human resources
Disease surveillance systems which continuously collect and analyse data from multiple sources Capacity for rapid detection and identification of pathogens Primary health-care, veterinary and phytosanitary services Emergency and epidemiological response capabilities Communications capabilities Appropriate national regulatory framework to provide command structure and necessary resources Treatment capabilities, including diagnostics, vaccines and medicines	Make use of national, regional and international workshops Ensure training materials are available in local languages Take advantage of both computer-based and hands-on training Foster a more interdisciplinary approach to dealing with disease Engage all relevant sectors Identify ways to reduce “brain-drain” Need for political leadership Provide sponsorship for training, exchange visits and travel to the Meetings of Experts
Implementing shared practices	
Use standard operating procedures to enhance sustainability, improve trust, build confidence, contribute to quality control and foster the highest standards of professional performance Develop and use best practice for surveillance, management, laboratory practice, manufacturing, safety, security, diagnostics and trade Work with all relevant ministries to develop legislation, standards and guidelines Strengthen international protocols for the rapid sharing of information Make use of existing case studies to improve existing practices and procedures	

Reflections on dealing with disease

Although we heard a great number of perspectives during the year, there were four common themes that ran through many of the presentations and working papers:

- The need for sustainability. If we are to build enduring capacity, we need to do more than just provide resources and equipment
- The need for an integrated approach to human, animal and plant diseases, pooling information and resources, and coordinating efforts and institutions
- The need to coordinate assistance, cooperation and capacity building activities—nationally, regionally and internationally
- The benefits of identifying specific national and regional needs and challenges to building capacity—to enable a tailored response

Table 6. Common understandings on cross-cutting themes for building capacity to deal with disease, as reached at the 2009 BTWC Meeting of States Parties

Sustainability	Improving integration
Pool resources Make funding processes longer-term and more predictable Ensure ownership by the receiving country Address needs for day-to-day maintenance Tailor activities to meet differing circumstances of each recipient state Take full advantage of existing resources Utilize twinning programmes Use collaborative projects	Ensure effective communication and coordination among human, animal and plant health sectors Use an inter-disciplinary, all-hazards approach Improve how government departments and agencies work with the private sector, academia and non-governmental experts Make use of public-private partnerships
Enhancing coordination	Overcoming challenges
Take advantage of all appropriate routes for assistance—bilateral, regional, international and multilateral Forge North-South, South-South and North-North partnerships Improve coordination and information sharing among: <ul style="list-style-type: none"> – assistance providers – states parties and international efforts to tackle disease – national institutions, departments, agencies and other stakeholders 	Mobilize resources, including financial resources, to facilitate the widest possible exchange of equipment, material and scientific and technological information States parties seeking to build capacity should identify specific needs and requirements and seek partnership States parties in a position to do so should provide assistance and support Make use of the ISU to facilitate communication and partnerships, and act as a clearing-house for information and sources of cooperation

These themes should underpin our preparations for the Seventh Review Conference, especially with regards to how we might further our efforts to deal with disease in the future. I noted in my closing remarks at the end of the year that I had not seen as many examples of brokering of assistance as I had hoped to do. I am still convinced there are opportunities here that we are not taking. I think we need to reflect on what more we can do to find opportunities to work together—and just as importantly, to share the details of what we have done and are doing together. I think the databases, common formats and mechanisms that were proposed throughout the course of 2009 might fruitfully be revisited in the lead up to the Seventh Review Conference.

The work of the BTWC in 2010

Ambassador Pedro Oyarce

In 2010 the BTWC looked at the provision of assistance and coordination with relevant organizations upon request by any state party in the case of alleged use of biological or toxin weapons, including improving national capabilities for disease surveillance, detection and diagnosis and public health systems. This is an important topic that goes to the heart of key obligations in Article VII of the BTWC to provide assistance to states parties which are exposed to danger as a result of violations of the convention. To focus our efforts, I encouraged states parties to consider the practical question: “If a biological weapon were to be used tomorrow, how would we, the states parties, individually and collectively respond?”

Approaching this topic in this manner highlighted some important considerations: who are the relevant actors at the national, regional and international levels; what are the operational considerations; what is already being done in the field of emergency assistance, both nationally and internationally; and which areas require further development and coordination?

The 2010 Meeting of Experts

There was a significant level of participation at the Meeting of Experts from the broader international community. It was attended by 89 states parties, four signatories, two states not party, three arms of the United Nations, eight international organizations, two independent experts (as Guests of the Meeting), and 16 non-governmental and research institutions. This range of participants provided substantive technical contributions that were essential to the examination of the 2010 topic of the Meeting of State Parties, as well as to the identification of the main challenges that the Seventh Review Conference needs to address. We produced a vast array of valuable, compelling material on every aspect of responding to alleged use of biological and toxin weapons. We heard authoritative and deeply informative perspectives from developed and developing countries, from international and regional organizations, from health experts, agricultural experts and security experts.

In my opinion, it would be essential to continue providing assistance for a broad participation of experts from different regions, particularly from the developing and least developed countries. This inclusiveness is a key element to the promotion and implementation of the convention, and important for the universalization of the treaty.

The 2010 Meeting of States Parties

The Meeting of States Parties reviewed the material produced by the Meeting of Experts, and also considered some additional perspectives. From what I observed at the meeting, states parties are very well aware of the threat biological weapons pose to international security. There was clear recognition that our work laid the foundations for future elaboration on this important issue. I am convinced that our discussions in 2010 were an important step in highlighting the challenges that the international community faces in responding effectively to the alleged use of biological weapons, and in finding ways to overcome these challenges. The outcome of our efforts will act as a useful bridge to the Seventh Review Conference.

Table 7. Common understandings on responding to an alleged use of a biological weapon, as reached at the 2010 BTWC Meeting of States Parties

Approaches	Health components
Effective cooperation and sustainable partnerships Ensuring efficiency irrespective of the cause of an outbreak Covering diseases and toxins that harm humans, animals, plants or the environment Putting capabilities in place before they are required Making use of appropriate experts and laboratories Taking into account developments in science and technology	Access to: <ul style="list-style-type: none"> - a relevant diagnostic capacity - sampling and epidemiology tools - diagnostic and detection techniques, tools and equipment - adequate technical expertise - international, regional and national laboratory networks - standards, standard operating procedures and best practices - research and development of vaccines and diagnostic reagents
Security components	Building capacity
A coordinated government approach in emergency management Addressing the full range of possible implications Establishing clear channels of communication and command Mechanisms for accessing expert advice Regular training and exercises A comprehensive communication strategy Cross-sector coordination Sufficient financing	Working together to: <ul style="list-style-type: none"> - ensure access to the necessary components - promote and facilitate the generation, transfer and acquisition of new knowledge and technologies - strengthen human resources - identify opportunities for collaborative research and sharing advances in science and technology - share biorisk standards and best practices

The common understandings we reached (see Tables 7 and 8 for a summary¹³), highlighted the importance of pursuing relevant initiatives through effective cooperation and sustainable partnerships. They also recognized the relationship between national preparedness and international capabilities. We also identified a number of practical ways we can work together to build specific national capacities. In addition, we highlighted the importance of sharing best practices, of improving communication and information management and of strengthening the coordination between relevant national and international organizations, within their mandates, for an effective preparedness and response. I was keen we reach an action-oriented product, and I am pleased with what we accomplished.

Table 8. Common understandings on roles of various actors when responding to an alleged use of a biological weapon, as reached at the 2010 BTWC Meeting of States Parties

Role of the convention	Role of states parties
<p>The convention is an appropriate and capable instrument for:</p> <ul style="list-style-type: none"> - bilateral, regional or multilateral consultations for the provision of assistance - developing clearer and more detailed procedures for submitting requests for assistance - developing clearer and more detailed procedures for providing assistance - developing a dataset on sources of assistance - developing a mechanism to request assistance 	<p>Providing timely emergency assistance pending a decision by the UN Security Council</p> <p>Ensuring relevant efforts are in accordance with national laws and regulations</p> <p>Working to build their national capacities according to their specific needs and circumstances</p> <p>Working to improve effective cooperation between the health and security sectors by:</p> <ul style="list-style-type: none"> - fostering mutual awareness - improving information exchange - undertaking joint training activities
Role of international parties	Outstanding challenges
<p>Encouraging relevant organizations to:</p> <ul style="list-style-type: none"> - work together more closely - address specific relevant aspects of the threats posed by alleged use - assist states parties to build their national capacities 	<p>A need for clear procedures for submitting requests for assistance</p> <p>A need for clear procedures for responding to a case of alleged use</p> <p>A need for additional resources in the human and animal health fields, and especially for plant health</p> <p>Overcoming the sensitivities of working at the interface between public health and security</p> <p>Fully addressing the public health and humanitarian imperatives of a prompt and timely response</p>

Reflections on responding to alleged use

The 2010 topic is particularly important (and interesting to those who seek to bridge the gaps between regional groups), as it unites the so-called “regulatory” and “promotional” aspects of the BTWC. Improving national capabilities to respond to alleged use of biological weapons directly supports the security objectives of the convention. It also directly supports the implementation of Article X of the convention, promoting the development of the peaceful applications of biological science and technology. It therefore provides a very fruitful area for developed and developing countries to work together. Combining security and development objectives in this way is the key to making further progress in multilateral disarmament.

It was important to me that our efforts in 2010 were tailored towards taking genuinely effective and coordinated action to provide assistance and to build national capabilities for responding to disease outbreaks. To this end, I was pleased with our progress in filling in some of the blanks with which we started the year:

- Which are the relevant actors at the national, regional and international levels? Through the information submitted to our meetings and the activities of all the participants, we succeeded in identifying many of the most relevant players and engaging them in our work.
- What are the operational considerations? The output of our efforts, including the common understandings we reached, described in some detail the roles, responsibilities and needs of the convention itself, of states parties, international organizations and other relevant actors. We think that that it is necessary to foster partnerships among different actors for better implementation of the convention.
- What is already being done in the field of emergency assistance, both nationally and internationally? Our background materials, the statements and presentations made, as well as the resulting Compendium of National Approaches all help to paint a comprehensive picture of what capacity exists, where and with whom.
- Which areas require further development and coordination? The common understandings reached at the Meeting of States Parties include a specific list of outstanding challenges that can be used as a roadmap for future work under the BTWC.

If the work of the BTWC in 2010 provided answers, it also generated new questions. Which steps might the Review Conference take to deal with the prospect of use of biological or toxin weapons? Are new mechanisms required? What might these be? States parties should think boldly and must be prepared to consider and discuss new ideas, without preconceptions. This is an issue that must be given serious consideration at the review conference—not only as part of the examination of the results of the intersessional process, but also through the article-by-article review of the convention. We must overcome the divisions of the past and work together as we move into the future. It is of vital importance that we do know how states

parties would, individually and collectively, respond to an alleged use of a biological weapon. In short, what are the concrete conditions we have to deal with in view of achieving full compliance with the convention? This is crucial both for prevention purposes and for response to alleged use. It is a matter of technical, but foremost of political definitions.

Towards the Seventh Review Conference

Both the current intersessional process and its predecessor resulted in steady progress in improving the effective implementation of the BTWC. The processes have enabled states to focus on how they translate the aims and objective of an international instrument into effective national action. They have helped to build bridges and have resulted in a regime that has gathered both momentum and pace. But by themselves they will not solve the problem of biological weapons. Much more remains to be done. We believe that the 2011 Review Conference provides an opportunity to move up a gear and for the states parties to focus on how they can work together more effectively.

Through the intersessional processes, the BTWC has become one of the most positive areas of multilateral disarmament activity. The processes have proven to be a constructive, collegial endeavour where states parties have put aside political differences in order to work together in a practical manner. This has built trust and a sense of common purpose. It is an example that shows how multilateral approaches can deliver concrete goals. It is important that when considering future programmes of work, BTWC states parties do not abandon the approaches and practices that are yielding these results. Rather they should ensure that they evolve them to continue to meet their needs. It may be necessary to start thinking in parallel: one process to foster exchanges of information under existing commitments (for which the format of the last two intersessional processes has proven particularly suitable) and a second, different track, if it becomes desirable to negotiate new commitments.

Compared with many other disarmament forums, BTWC meetings are striking for their positive atmosphere. Despite the differences in political outlook, in national priorities, in resources and capabilities, discussions among states parties have been overwhelmingly constructive and mutually supportive. This is a precious quality, one that we must work to preserve and to develop. It is the key to finding effective solutions to many of the challenges that confront the BTWC. As the delegation of Pakistan said at the 2010 Meeting of States Parties: “We should not treat this issue as part of the North versus South divide. Rather this should be pursued as a joint venture to ensure global safety and security”.¹⁴ We need to deliberately tailor our efforts after the next review conference to continue this joint venture, and to encourage this approach across a broader range of activities under the BTWC.

Finally, one great resource on which the intersessional process has been able to draw was the inclusion of actors beyond the traditional arms control and disarmament community. Realizing that biological risks form an interconnected spectrum—from naturally-occurring

disease, through unintended consequences, accidents and negligence, to bioterrorism and biological warfare—states parties have decided that an integrated response is required. Such a response requires the coordinated efforts of the traditional disarmament community (foreign and defence ministries), public health, veterinary and agricultural authorities, academia and the education sector, the international scientific community, professional associations, and commercial industry. As we start to think about what format our work should take after the Seventh Review Conference, it will be important to continue to provide a way to bring all these disparate actors together to share information and experiences, coordinate their activities and to contribute to the ongoing work of the convention.

Notes

1. Tables 1 and 2 summarize Meeting 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, *Report of the 2007 Meeting of States Parties*, document BWC/MSP/2007/5, 7 January 2008, paragraphs 19–26.
2. See for example the article by G. Burns et al. in this issue of *Disarmament Forum*.
3. EU Joint Action in Support of the Biological and Toxin Weapons Convention, “Regional Seminar for West and Central Africa”, Dakar, Senegal, 17–18 April 2007.
4. See for example the article by K. Berger and N. Davison in this issue of *Disarmament Forum*.
5. Tables 3 and 4 summarize Meeting 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, *Report of the Meeting of States Parties*, document BWC/MSP/2008/5, 12 December 2008, paragraphs 19–28.
6. Meeting 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, *Synthesis of considerations, lessons, perspectives, recommendations, conclusions and proposals drawn from the presentations, statements, working papers and interventions on the topics under discussion at the Meeting of Experts*, document BWC/MSP/2008/L.1, 31 October 2008.
7. InterAcademy Panel et al., “Second International Forum on Biosecurity”, Budapest, Hungary, 30 March–2 April 2008.
8. Chinese Academy of Sciences et al., “Workshop on Biosecurity”, Beijing, China, 7–9 December 2008.
9. Meeting 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, *Synthesis of considerations, lessons, perspectives, recommendations, conclusions and proposals drawn from representatives, statements, working papers and interventions on the topics under discussion at the Meeting of Experts*, document BWC/MSP/2008/L.1, 31 October 2008.
10. Meeting 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, *Considerations, lessons, perspectives, recommendations, conclusions and proposals drawn from the presentations, statements, working papers and interventions on the topics under discussion at the Meeting*, document BWC/MSP/2009/MX/CRP.1, 27 August 2009.
11. Tables 5 and 6 summarize Meeting 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, *Report of the Meeting of States Parties*, document BWC/MSP/2009/5, 16 December 2009, paragraphs 23–31.

12. Meeting 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, *Contact details for organisations building capacity in the fields of disease surveillance, detection, diagnosis, and containment*, BWC/MSP/2009/INF.3, 11 December 2009.
13. Tables 7 and 8 summarize Meeting 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, *Report of the Meeting of States Parties*, document BWC/MSP/2010/6, 17 December 2010, paragraphs 19–30.
14. Statement by Ambassador Zamir Akram, “General debate at 2009 BWC States Parties Meeting”, Geneva, 7 December 2009.

New resources on explosive weapons

The use of explosive weapons in populated areas poses a distinct humanitarian problem for civilian protection—one recognized by the UN Secretary-General in his 2009 and 2010 reports on the protection of civilians in armed conflict (UN documents S/2009/277 and S/2010/579). Explosive weapons are understood to be artillery shells, missile and rocket warheads, various kinds of bombs, cluster munitions, landmines, grenades and improvised explosive devices.

In accordance with the Secretary-General's 2009 recommendation, UNIDIR launched the Discourse on Explosive Weapons (DEW) project in early 2010, which organized several symposiums—bringing together practitioners and policymakers to stimulate discussions on explosive weapons issues and explore ways of addressing the humanitarian challenges involved. The DEW project disseminated explosive-weapons-related information via its website and published several briefing papers and summary reports, including:

Explosive weapons: framing the problem

Use of explosive weapons in populated areas: some questions and answers

Addressing civilian harm from explosive weapons use in populated areas: activities underway

Full copies of these papers, together with the symposium summary reports and additional resources such as podcasts, can be found at <www.explosiveweapons.info>.

UNIDIR intends to continue its work in accordance with further recommendations made by the Secretary-General in November 2010 towards enhancing civilian protection from explosive weapons use. These recommendations call for “more systematic data collection and analysis of the human costs” and increased cooperation by states in terms of collecting and making available information on civilian harm and of issuing policy statements that outline the conditions under which they would or would not use explosive weapons in populated areas.

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New project

Perspectives on Cyber War:

Legal Frameworks and Transparency and Confidence Building

There has been much discussion at national and multilateral levels about protecting information networks from cyber crime and attacks. Many states have already set up “cyber commands” for both defensive and potential offensive options.

However, there has been much less discussion about the potential uses of cyber attacks during conflict and war, and the effects on the economy, civilian infrastructure and human security. Nor has a collective understanding been forged on how to apply standing international laws and norms to cyber warfare. Most militaries are well-versed in the application of the Geneva Conventions and international humanitarian law in conventional warfare. However, there is no international understanding about how to apply these to the cyber realm—or why doing so is important for the future. What is a proportional response to a cyber attack? What level of cyber disruption constitutes “unacceptable harm” to civilians? And even more fundamentally, what constitutes *casus belli* in the cyber domain?

The Perspectives on Cyber War project will raise awareness among diplomats and policymakers of some of the critical legal questions concerning cyber war. The aim is to begin multilateral discussions on existing or potential frameworks to prevent and restrain such conflicts—discussions which might lead to future confidence-building measures, constraint regimes and treaties.

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