

**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**

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Item 8 of the agenda

Standing agenda item:

**review of developments in the field of science
and technology related to the Convention**

**Addressing Modern Threats in the Biological Weapons
Convention: A food for thought paper**

**Submitted by Australia, Canada, Chile, Colombia, Czech Republic,
Finland, Ghana, Lithuania, Netherlands, Nigeria, Republic of Korea
and Sweden**

I. Introduction

1. The Biological Weapons Convention (BWC) has always faced a unique challenge in that, unlike nuclear weapons for example, it seeks to eliminate the deliberate misuse of something that is naturally occurring. We cannot ban disease, nor can we demand of nature that it cease to produce new diseases, nor can we ask mankind not to seek to continue developing means to advance the beneficial uses of biology and combat disease. Indeed, the past decade has seen remarkable developments in the life sciences, which have the potential to contribute significantly to healthcare, agriculture, industry, and a number of other areas. However, these same developments and advances, if used malevolently, could pose significant new threats regarding the development, production, stockpiling, acquisition, retention, and proliferation of biological weapons. In order to ensure that this does not occur, members of the BWC must understand scientific and technical developments in the life sciences and consider carefully their implications for the Convention. We must ensure that our implementation of the Convention addresses these threats while also ensuring that States can benefit from the important peaceful application of new biological developments. This paper will explore some of the recent developments that are changing the nature of the threats facing the BWC, and offer recommendations to address these concerns.

II. Proliferation of technology

2. As indicated by the Implementation Support Unit (ISU) in their reports on science and technology at the Seventh Review Conference and at the 2012 and 2013 Meetings of

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Experts (as well as by experts in States Parties' governments, international organizations, non-governmental organizations, academia, and industry), new scientific discoveries are being made and new technologies are being developed every year. Biotechnologies that did not exist fifteen years ago can now be found in hundreds of laboratories around the world. Consider that it took thirteen years and almost four billion US dollars to sequence the first human genome; companies around the world can now do the same in weeks or days for members of the general public.

3. This new technology represents important developments for the well-being of mankind. With the sequencing of the human genome has come the ability to develop diagnostic tests, identify individuals who may experience an adverse drug reaction, and implement early medical intervention measures. Other examples of benefits of new life science technology include production of cost-effective therapeutics, rapid detection of pathogens, and development of biosensors.

4. With the increasing availability of these technologies, however, are the attendant risks for the proliferation of biological weapons. Individuals possessing or having access to new types of equipment and the knowledge to use them may seek to develop weapons for acts of biological warfare or terrorism.

5. Equipment for synthetic biology is a useful example. Until recently found only in the most advanced laboratories, DNA synthesis equipment can now be acquired inexpensively from vendors in many countries. Research has been published in scientific journals on how to synthesize a variety of viruses, including the causative agents of poliomyelitis and 1918 pandemic influenza. Genomes for thousands of viruses are readily available and accessible to anyone over the internet. The increased availability and affordability of DNA synthesis equipment has increased the ability of many states, including developing states, to benefit from this technology and improve public health. The increase in published genomes and research has helped fuel further research that has and will continue to increase our ability to counter diseases that kill millions of people.

6. Yet these developments also incur greater risk in the proliferation of the knowledge and ability to create biological weapons. Theoretically, an individual working in a small laboratory, such as in a university or even out of his or her own home, could produce a functional virus from synthetic genetic material and release it into the world. These viruses could be extant or extinct, or could be modified in such a way that a population's immune system is not prepared to handle the infection or therapeutic measures are not available or effective, resulting in higher transmission and greater morbidity and mortality.

7. Compounding this problem is the fact that the BWC is not universal; twenty-six countries have not ratified or acceded to the Convention. Existing States Parties may face challenges in the development of domestic legislation as well as in the implementation and modernization of existing legislation to address these new challenges. Indeed, unless national legislation encompasses all possible routes of biological weapons proliferation and is reviewed to ensure it addresses new scientific and technical developments, it could be theoretically possible that it would be legal to develop and proliferate biological weapons material in some fashion in a Member States' territories, despite their governments' genuine commitment to ban them. This fact, combined with a potential prevalence of technologies that can be applied with malicious intent, can increase the risk of biological weapons proliferation and bio-terrorism.

8. The convergence between biology and chemistry poses new challenges for the BWC, as well as for the Chemical Weapons Convention (CWC). The converging of the science underpinning these two disciplines is accelerating. For example, it is now possible to create microorganisms by chemical synthesis, as well as to use biological synthesis (through, for example, bacteria or yeast) for the production of chemicals and drugs. These

developments offer great promise for mankind but also new risks for misuse. Ongoing information exchange between the BWC and CWC scientific communities is important to ensure both opportunities and threats are considered. A critical aspect of the convergence of biology and chemistry is that it creates potential loopholes between the BWC and the CWC, though new agents and methods of synthesis are reachable.

9. Australia, Canada, Chile, Colombia, Czech Republic, Finland, Ghana, Lithuania, Netherlands, Nigeria, Republic of Korea, and Sweden agree that it is important to support and encourage the development of new technologies and research. At the same time, it is essential that States Parties take affirmative steps to implement all of the BWC's provisions, encompassing all possible routes of biological weapons proliferation, including a legal ban on biological weapons development, production, and stockpiling, developing appropriate national oversight measures for biosafety and biosecurity in laboratories, as well as strong export and import controls on pathogens. Australia, Canada, Chile, Colombia, Czech Republic, Finland, Ghana, Lithuania, Netherlands, Nigeria, Republic of Korea, and Sweden support and encourage the development of new technologies and academic research, while recognizing the need to establish a framework for effective oversight, guidance and/or training to ensure that these pursuits are conducted in a safe and secure manner. The increasing availability of goods and technologies of concern to academia, industry, and the general public need to be recognized, and opportunities to raise awareness on dual-use research and technologies should be pursued in an effort to foster educated decision-making processes and inform safe knowledge transfer. Legislation to address BWC provisions must be effectively implemented and compliance to this legislation must be assured. This is particularly relevant for regions where participation in the BWC has been less active. For assistance in putting in place new legislation, we encourage States Parties to consult the ISU's Article X database and/or to contact relevant non-governmental organizations, such as the Verification Research, Training and Information Centre (VERTIC).

III. Emerging Infectious Diseases

10. Another growing threat to States Parties of relevance to the BWC is the emergence of new infectious diseases or new strains/new virulence in existing diseases. As the Director-General of the World Health Organization (WHO), Dr. Chan, has said: "the future looks bright for microbes". New diseases, such as Severe Acute Respiratory Syndrome (SARS) and Middle-East respiratory syndrome coronavirus (MERS-CoV), as well as new strains of influenza viruses, including avian influenza (H5N1 and H7N9) and swine influenza (H1N1), have resulted in numerous casualties around the world in recent years. In addition, these new public health threats have resulted in significant collateral impacts including disruptions in trade and travel, heavy economic costs, societal disruption and protracted burdens on public health capacity and infrastructure. Marked changes in human population growth, habitats and habits over the past century, perhaps most dramatically in recent decades, have all contributed to the continued emergence of diseases affecting humans. These changes, including rapid population growth, encroachment of societies into new ecological territory, increasing urbanization, and expansion of trade and travel are but some of the many factors that have contributed to the emergence and spread of diseases. Added to this, the speed and accessibility of air travel has facilitated the rapid and wide geographic spread of a single focus outbreak to multi-focal outbreaks in countries across the globe in a manner of weeks or months, as was witnessed during the SARS outbreak of 2003. These tragic economic and human costs make only too clear the catastrophic, widespread and indiscriminate consequences that would follow any deliberate use of disease as a weapon.

11. The public health and safety challenges of such disease outbreaks are well understood. Their implications for the BWC, however, may not yet have been fully examined. These consequences include the need to improve biosecurity and to address the implications of the essential dual use research that must be conducted in order to counter such disease. Perhaps a lesser concern, but nevertheless of relevance to the BWC is the need to address how to determine the origin of new natural disease outbreaks vis-à-vis deliberate outbreaks.

12. From a biosecurity and biosafety perspective, it is notable that not all parts of the world where these diseases arise have adequate infrastructure, resources or capacity to support disease surveillance, detection, diagnosis, and rapid response for prevention and control. Furthermore, laboratories in these affected countries often do not have adequate or effective biosafety measures in place, increasing the risk of laboratory-acquired infections and/or accidental release of pathogens into the community or environment. If disease events cannot be rapidly and safely identified, single events could lead to disease clusters and/or community outbreaks that would have the opportunity to persist and spread before appropriate action could be taken for control. It is important to enhance States Parties' capacities in biovigilance, in order to support them in regulation and monitoring of compliance with biosafety and biosecurity provisions. Assistance and cooperation will be essential to build up the capabilities of these states in order to allow them to better counter, contain, and eventually eliminate such outbreaks of disease.

13. Countering such diseases will also include necessary research into their causes, development and possible means to eliminate them. This research, however, may raise questions of dual use research of concern (DURC), novel research which, while having positive benefits for public health, could result in the proliferation of biological weapons despite a States Parties' best efforts to combat them. States Parties need to carefully examine, without delaying diagnostics, the dual-use aspects of novel research and ensure they have a strong framework for effective oversight, guidance and/or training to ensure that these pursuits are conducted in a safe and secure manner. Further discussion amongst BWC member states to share experience and promote lessons learned will be critical to help all member states address this challenge. Further dialogue, between researchers, public health agencies and security officials, such as that undertaken by the WHO earlier this year, will also be important.

14. Finally, while both man-made and natural disease outbreaks can be initiated and spread in similar fashions, it may be difficult to distinguish one from the other. This means that effective public health event monitoring and disease surveillance systems are equally capable of early detection and rapid response to events whether due to a biological attack or natural emerging infectious disease outbreak. Indeed, as one can only determine unusual or unexpected outbreaks by understanding what is usual and expected, accurate background data on disease patterns typical for a specific geographical area or season is essential. If a disease outbreak is judged intentional, microbial forensic analyses may be used for inclusion or exclusion of suspects in the investigation, ultimately with the aim to attribute the outbreak to a perpetrator. Further engagement between the BWC and WHO, the World Organization for Animal Health (OIE) and the Food and Agriculture Organization (FAO) can help create a global picture that could help determine if disease has been caused by biological weapons and support microbial forensic investigations.

15. Australia, Canada, Chile, Colombia, Czech Republic, Finland, Ghana, Lithuania, Netherlands, Nigeria, Republic of Korea, and Sweden agree that the best way to effectively combat the emergence and spread of novel diseases, whether due to naturally occurring infectious agents or biological weapons, is through the development and maintenance of event monitoring, disease surveillance and rapid detection, diagnosis, containment, and response systems. We encourage BWC States Parties to work together and with relevant

international organizations, such as the WHO, the OIE, and the FAO to build and enhance disease surveillance networks, and put in place mechanisms to respond to outbreaks when they are detected. We also encourage States Parties to put in place biosafety and biosecurity measures to protect laboratory staff working to detect and diagnose novel disease agents and prevent accidental release of these pathogens from laboratories, and best practices on dual use research of concern, to avoid biological weapons proliferation via the unintended consequences of life sciences research.

IV. Way Forward

16. Australia, Canada, Chile, Colombia, Czech Republic, Finland, Ghana, Lithuania, Netherlands, Nigeria, Republic of Korea, and Sweden agree that BWC States Parties must continue to engage in constructive discussions with a goal of promoting effective actions on the implementation and enforcement of all aspects of the BWC. Provisions requiring particular attention include measures to promote biosafety and biosecurity, for addressing dual-use research and exports of concern, and for ensuring that all States Parties have the capability to effectively detect and respond to disease outbreaks. These discussions should include all relevant organisations with expertise in fields of interest, including in particular WHO, OIE, FAO, the International Plant Protection Convention (IPPC), the Organisation for the Prohibition of Chemical Weapons (OPCW), the International Criminal Police Organisation (INTERPOL), and the World Customs Organization (WCO). They should also seek to draw in BWC member states in regions where participation in the BWC has been less active. Discussions and actions should build towards positive and constructive outcomes on issues discussed earlier in this paper, including the importance of frameworks for biosafety, biosecurity, oversight, and training in laboratories and effective disease detection and monitoring systems, at the Eighth Review Conference, with the aim of having a stronger BWC capable of addressing these recent developments and emerging threats. To this end, we recommend that States Parties seek to develop clear understandings and recommendations on such issues in the reports of the Meetings of States Parties from 2013 to 2015.
