2023 Biorisks, Biosecurity and Biological Disarmament Conference Report

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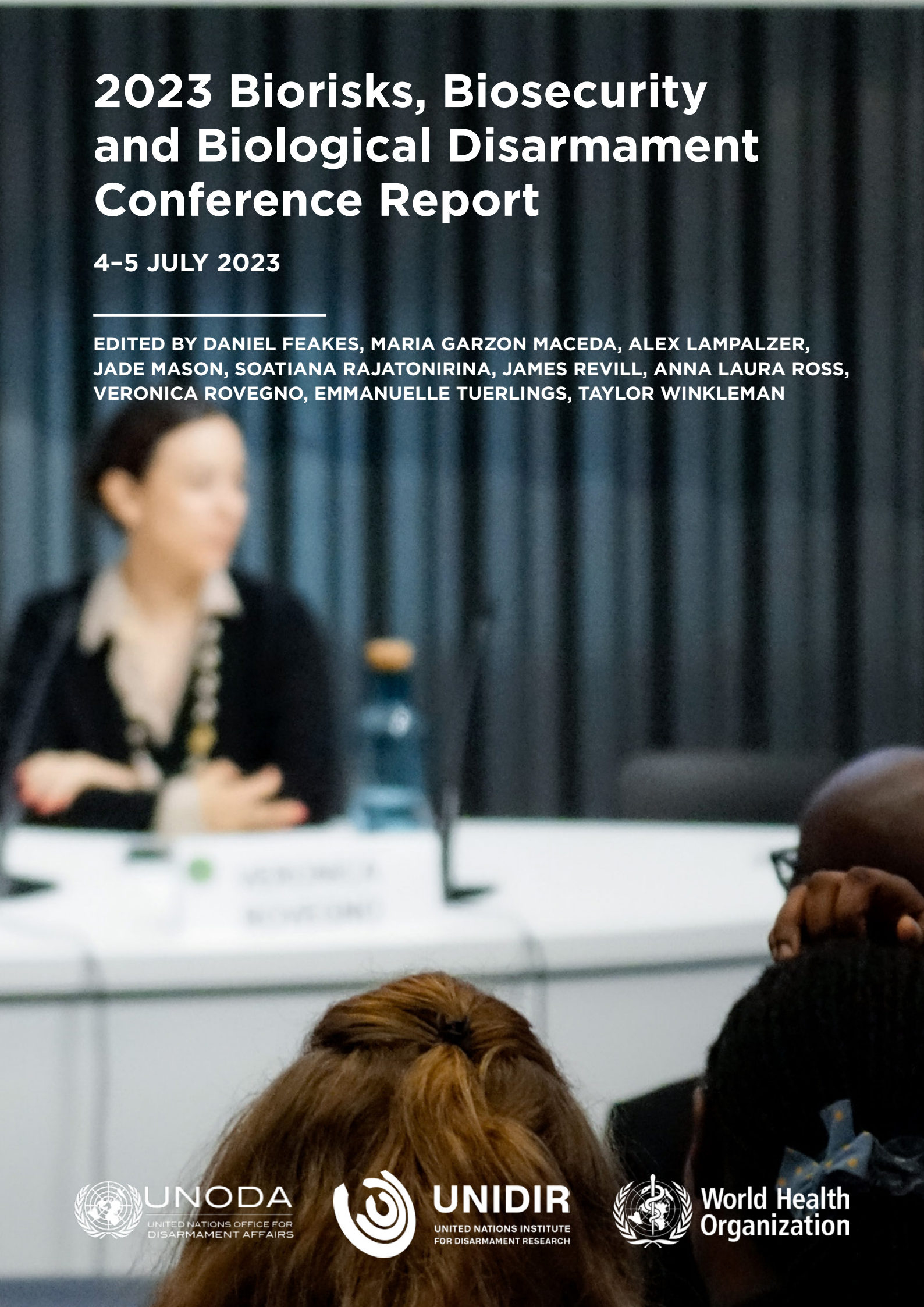

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We would like to dedicate this report to Jade Michelle Mason, who sadly passed away in July 2024.

Jade was the driving force behind this WHO-UNODA-UNIDIR event and organized the discussion with dedication, commitment, insight, and good humour.

She will be greatly missed by us all.

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ABOUT UNODA

The United Nations Office for Disarmament Affairs (UNODA) supports multilateral efforts aimed at achieving the ultimate goal of general and complete disarmament under strict and effective international control. UNODA provides substantive and organizational support for norm-setting in the area of disarmament through the work of the General Assembly and its First Committee, the Disarmament Commission, the Conference on Disarmament and other bodies. It fosters disarmament measures through dialogue, transparency and confidence-building on military matters, and encourages regional disarmament efforts. It also provides objective, impartial and up-to-date information on multilateral disarmament issues and activities.

ABOUT WHO

Founded in 1948, WHO is the United Nations agency that connects nations, partners and people to promote health, keep the world safe and serve the vulnerable – so everyone, everywhere can attain the highest level of health. WHO leads global efforts to expand universal health coverage; directs and coordinates the world's response to health emergencies and promotes healthier lives for all based on the best scientific evidence. WHO is an organization of 194 Member States and WHO's Secretariat includes experts, staff and field workers at the Geneva-based headquarters, six Regional Offices and other stations located in 150+ countries around the world.

ABOUT UNIDIR

The United Nations Institute for Disarmament Research (UNIDIR) is a voluntarily funded, autonomous institute within the United Nations. One of the few policy institutes worldwide focusing on disarmament, UNIDIR generates knowledge and promotes dialogue and action on disarmament and security. Based in Geneva, UNIDIR assists the international community to develop the practical, innovative ideas needed to find solutions to critical security problems.

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List of acronyms

BWC	Biological and Toxin Weapons Convention
ISU	Implementation Support Unit
UNIDIR	United Nations Institute for Disarmament Research
UNODA	United Nations Office for Disarmament Affairs
WHO	World Health Organization
WOAH	World Organisation for Animal Health

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Introduction

Advancements in science and technology are occurring at an unprecedented rate, offering crucial solutions and vital contributions to major societal challenges. However, these transformative developments across various fields can also present risks to society. Therefore, it has become increasingly important to monitor both the opportunities and the risks that emerging science and technology pose to the biosecurity regime. This cannot be undertaken by a single entity; it necessitates the collaborative efforts of States, civil society, academia, industry and other key actors.

To facilitate multi-stakeholder engagement around biological risks, biological security and biological disarmament, the United Nations Institute for Disarmament Research (UNIDIR), the United Nations Office for Disarmament Affairs (UNODA) and the World Health Organization (WHO) co-organized a stakeholder conference designed to bring together actors from civil society, academia and industry, as well as diplomats, to stimulate the exchange of ideas and thinking around how to build biosecurity and bolster biological disarmament. The Biorisks, Biosecurity and Biological Disarmament Conference took place in Geneva, Switzerland, on 4–5 July 2023. The event provided an opportunity to discuss ongoing diplomatic processes and current and upcoming issues in the areas of biorisk, biosecurity and biological disarmament.

More than 80 individuals from 30 countries, representing 60 institutions, participated in the discussion in person, and a further 334 individuals joined the discussion virtually from around the world. The participants included diplomats, public health professionals, security experts and scientists from a wide range of organizations.

The Conference consisted of seven substantive panels, which explored a range of topics, centred on advances in science and technology and their related risks and benefits, biosecurity implementation, dual-use governance, disease response, international cooperation, and verification technologies. The discussions that took place during all seven panels are summarized in this conference report.

Opening remarks

Opening remarks were delivered by Mélanie Régimbal (Chief of the Geneva Branch, UNODA), John Reeder (Director, Research for Health Department, Science Division, WHO) and Robin Geiss (Director, UNIDIR).

MÉLANIE RÉGIMBAL
Chief of the Geneva Branch, UNODA

On behalf of UNODA, opening remarks were delivered by Ms. C. Mélanie Régimbal, Chief of the Geneva Branch. Ms. Régimbal started her remarks by expressing gratitude to UNIDIR and WHO, co-organizers of the Conference, and commented on their valuable contribution towards the biological and health security domains, as well as biological disarmament. She later noted that the event was taking place at the Maison de la Paix – the House of Peace – in Geneva, Switzerland, a venue designed to foster synergies in search of innovative and effective solutions for the promotion of peace, human security and sustainable development. These values and goals are still relevant nowadays, amid multiple and interconnected global challenges such biorisks, whether of a natural, accidental or deliberate nature.

Ms. Régimbal remarked that the COVID-19 pandemic had clearly highlighted the vulnerabilities of modern societies to bio-events. She stressed that the international community must therefore cooperate and seek expertise from a broad range of perspectives through a whole-of-society approach. At the same time, Ms. Régimbal noted that the dramatic advances in life sciences, along with emerging trends in artificial intelligence, have the potential to bring great benefits to humankind and opportunities for international cooperation while shaping global ethical, safety and security concerns.

Ms. Régimbal also acknowledged the important contribution of the Conference in addressing the issue of future biological risks in a comprehensive manner, bringing in disarmament and health security-related angles and ensuring multi-stakeholder participation. Furthermore, she noted that the event was taking place at a timely moment for the Biological and Toxin Weapons Convention (BWC), namely a month before the second session of the Working Group on the Strengthening of the Convention.

Taking note of the Conference's themes and the diverse audience representing multiple States, numerous regional and international organizations, the biotech industry, non-governmental organizations, and civil society, Ms. Régimbal expressed her confidence that the event would provide valuable food for thought for discussions at the Working Group's future meetings. Ms. Régimbal concluded her opening statement by wishing all participants a successful discussion that would lead to tangible and forward-looking recommendations.

JOHN REEDER
Director, Research for Health Department, Science Division, WHO

Professor John Reeder, Director, Research for Health Department, WHO Science Division, thanked UNIDIR and UNODA for co-organizing this stakeholder conference with WHO and for their continued collaboration in these areas of work and welcomed the participants.

Professor Reeder started by underlining that advances in science and technologies are occurring at an unprecedented rate. These developments hold great promise for improving global health, supporting healthier populations worldwide, addressing global challenges and achieving the health-related Sustainable Development Goals. New scientific information and techniques are crucial for responding to public health emergencies, but scientific knowledge and technologies can also pose risks to society, including safety and security risks.

As this conference acknowledges, addressing these risks cannot be done by any one actor alone. Rather, it will require actors to come together, with collaborative efforts by Member States; the United Nations; partners and stakeholders from civil society, academia and industry; and other actors to facilitate multi-stakeholder engagement around biorisks, biological security and biological disarmament. Professor Reeder emphasized the need to leverage our collective strengths to address these risks.

In the area of biorisk mitigation, WHO is supporting Member States in several areas. The WHO Science Division aims to harness the power of science and innovation and to ensure that WHO gets ahead of the curve in terms of the latest scientific developments. The objective is not only to have a reactive approach to new scientific developments and technologies but to proactively engage and provide governance tools that help Member States respond to scientific developments in a timely manner to optimize their benefits and mitigate the risks. WHO also engages with other United Nations and non-United Nations entities in the areas of biorisks through the United Nations Biorisk Working Group, co-chaired with UNODA.

Professor Reeder concluded by underlining the need to act together. Preventing and mitigating these risks is a shared responsibility and involves many stakeholders with different capacities. International collaboration and coordinated actions across sectors, disciplines and actors at different levels should be fostered to support and strengthen countries and stakeholders' capacities in biorisk mitigation. This is essential to promote trust, to proactively address challenges to global health and to keep us safe from the global health threats of the future. Altogether, these efforts will contribute to leveraging the many opportunities that the life sciences can offer to improve our health and to keep our world safe.

ROBIN GEISS
Director, UNIDIR

Dr. Robin Geiss, Director of UNIDIR, began by outlining the wider context, pointing out that the event was taking place at a challenging time in which we were witnessing the ratcheting up of geostrategic tension to a level not seen since the Cold War. This has generated considerable pressure on multilateral institutions, including the international arms control and disarmament architecture.

Dr. Geiss noted that in parallel, biology was advancing, converging and diffusing at an unprecedented rate, creating opportunities to address major societal challenges related to health, hunger and sustainable development. However, he indicated that these changes in biology present challenges to efforts to build a global biosecurity regime and advance biological disarmament. He further added that all this takes place in the wake of a global pandemic, which has demonstrated the power of biology to cause death, incapacitation and socioeconomic disruption on a staggering scale and exposed some of the challenges of dealing with disease outbreaks.

In his remarks, Dr. Geiss indicated that, fortunately, States and stakeholders are working to address these challenges through several strands of activity. He noted that earlier in 2023 WHO Member States had begun negotiations on a global accord on pandemic prevention, preparedness and response; that States were in the process of updating the International Health Regulations to better prepare for, and respond to, disease outbreaks and other public health incidents; and that, following the success of the Ninth Review Conference of the Biological Weapons Convention,[1] States had begun preparations for substantive work in the newly established Working Group on the strengthening of the Convention, which will meet in Geneva next month.

1 Referred to hereafter in this report as the Ninth BWC Review Conference.

Dr. Geiss suggested that all these activities are important, so much so that they cannot be left to any one actor, nor could they be dealt with in silos. Rather, there is a need to continue to foster collaborative work between States and stakeholders. For these reasons, events such as the Biorisks, Biosecurity and Biological Disarmament Conference are particularly important as they provide an informal space in which different communities of practice – scientists, diplomats, public health experts, safety and security officers, and industry actors – can be brought together to take stock of various activities, share lessons learned and good practices, build common understandings around risks and responses to such risks, and better understand one another.

Dr. Geiss concluded by thanking colleagues in UNODA and WHO for their cooperation and collaboration in putting this event together.

Panel I: Advances in science and technology: assessing the risks and opportunities

Rapporteurs: Mayra Ameneiros and Yorgo El Moubayed

The first panel of the Conference discussed the various risks and opportunities of advances in science and technology. The discussion was augmented by several online tools, including an online survey of participants to gauge their perceptions of risks and opportunities.

Panellists recognized that advances in the life sciences can have both positive and negative implications for biosecurity and biological weapons disarmament. In terms of positive implications, the panellists highlighted the immense potential of the life sciences to provide opportunities in addressing global health, sustainability and security challenges. These opportunities occur at the convergence of emerging technologies and ground breaking discoveries in diverse scientific fields. Innovative technological advances are facilitating the eradication of infectious diseases, the resilience and sustainability of the global food chain and the verification of adherence to global norms. Gene drives and synthetic biology can combat vector-borne diseases such as malaria. This can be achieved by using genetic control technologies directly on mosquitoes to introduce a pathogen-blocking bacteria or modify their genome and then release them back into the environment. Vaccines and medical diagnostics offer exciting possibilities for improving global health and combating both new and endemic diseases. In addition, the applications of these technologies extend to various sectors beyond health care, including agriculture and environmental conservation. They enable the development of sustainable products, improve food security and increase nutritious crops, thereby contributing to a more resilient and prosperous future. In security and confidence-building sectors, machine learning tools could be applied to contribute to the development of a verification system for the BWC.

Notwithstanding the positive developments and implications of scientific and technological advances, the panellists raised serious concerns and identified biorisks across multiple domains, such as (i) the potential misuse of gene-editing techniques that could lead to the creation of novel pathogens, the enhancement of specific characteristics (like host susceptibility and transmissibility) or even the reconstitution of eradicated or extinguished pathogens; (ii) the implications of the convergence of artificial intelligence and machine learning with the life sciences; and (iii) the lowered barrier of entry for new actors to access and use technologies that can produce or modify pathogens, risking exploitation for hostile purposes.

Assessing risk and opportunities

The panel stressed the importance of regularly monitoring technological developments and analysing their risks and benefits. The range of possible risks – including that of malicious use, health inequities and access – poses a challenge in assessing them. Panellists noted that one mitigation method is to incorporate a diverse range of perspectives in risk assessments, a step that can contribute to identifying a range of concerns. Another factor to keep under consideration is the complexity and unpredictability of life science research, which complicates risk assessments. Such complexity can present an important barrier to the hostile use of advanced biology.

The panellists discussed different approaches to assess risks and opportunities arising from the advancement of the life sciences in a more efficient manner. WHO and several United Nations entities, for example, have implemented notable mechanisms – including horizon scanning and foresight exercises – to identify potential future scenarios, assess techno-

logical risks and shape optimal developments from innovations.[2] Such exercises are of considerable value, especially when these tools involve a geographically representative and intersectoral set of participants who bring a diversity of perspectives to be considered in assessing risks and opportunities. One panellist stressed that tools like foresight are not about accurately predicting the future, but rather about using tools and methods to analyse trends, anticipate developments and mobilize timely actions to shape optimal outcomes.

Scientific advisory mechanisms

The role of scientific advisory mechanisms was highlighted as a way of bringing together diverse perspectives and viewpoints to address potential biases and ensure effective decision-making. These mechanisms can help create a trustful environment, facilitate dialogue and increase credibility and visibility among stakeholders. However, one participant noted that there are limitations to scientific advisory mechanisms and distinguished between "policy for science"–which adressed the process of scientific oversight–and providing "science advice to inform policy", for example through facilitating treaty implementation.

Governance

The panellists further discussed the need for responsible governance, noting there was a need for effective regulations, guidelines and transparency in research, especially in regions where national regulations may be lacking. Panellists identified tools that could contribute to governance, including education, awareness campaigns, incentives, regulations, ethical frameworks and codes (such as the Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists and The Hague Ethical Guidelines). These tools can help promote responsible behaviour and align incentives and motivations to mitigate risks arising from human actions and decision-making. Improved scientific communication was also identified as important in facilitating the active engagement of wider stakeholders, including the public, in wider scientific discussions and decision-making processes.

2 WHO (2021), *Emerging Technologies and Dual-Use Concerns: A Horizon Scan for Global Public Health, World Health Organization*, Geneva, https://www.who.int/publications/i/item/9789240036161.

Panel II: Transparency and national implementation: lessons learned and good practices

Rapporteurs: Judith Okolo and Alex Kyabarongo

The second session focused on transparency and national implementation of measures related to biosecurity. In this session, panellists were invited to share their experiences around the approaches, challenges and strategies for effective implementation and transparency. Several ongoing initiatives related to transparency and national implementation were identified, as summarized in Table 1.

Table 1. Example initiatives designed to support transparency and national implementation.

ORGANIZATION	INITIATIVE	DESCRIPTION
United Nations Office for Disarmament Affairs	Supporting Universalization and Effective Implementation of the Biological Weapons Convention in Africa (2022–2026)	This initiative involves, inter alia, promoting the universalization and effective implementation of the Biological and Toxin Weapons Convention (BWC) in Africa, supporting the preparation of confidence-building measures submissions, and facilitating the designation and effective functioning of national contact points.[3]
St Petersburg University	Strategic and Arms Control Studies	This master's programme bridges the gap between social science and life science students through the introduction of the former to the scale and speed of biotechnologies as well as to the significance of a science and technology review process, while improving the latter's understanding of the social and political dimensions of scientific progress.[4]
European Union and United Nations Interregional Crime and Justice Research Institute	EU CBRN Risk Mitigation Centres of Excellence	This initiative supports, inter alia, countries in completing their CBRN national action plans through a series of workshops and tabletop exercises to identify the priorities, challenges, gaps and needs in the context of responding to biological threats and biological incidents.[5]
United Nations Institute for Disarmament Research and VERTIC	BWC National Implementation Measures Database	Intended to strengthen implementation of the BWC, the database builds an understanding of what has previously been done and allows stakeholders to better understand different approaches to national implementation from around the world.[6]
United Nations Office on Drugs and Crime	Global Initiative on Strengthening Strategic Trade and Export Control Infrastructure to Prevent Proliferation and Terrorism while enhancing Regional Strategic Trade Enforcement Capacities	The project was designed to support selected United Nations Member States in building national legislative and enforcement capacity to prevent the acquisition of CBRN materials essential to the proliferation of weapons of mass destruction. The project is focused on assisting operational entities to identify strategic commodities, including dangerous biological pathogens, and enhancing and strengthening national surveillance systems to aid the threat reduction process.

3 UNODA, "Global Partnership Support," accessed November 2023, https://disarmament.unoda.org/global-partnership-support.
4 St Petersburg University, "Strategic and Arms Control Studies Master's Degree," accessed November 2023, https://english.spbu.ru/admission/programms/graduate/strategic-and-arms-control-studies.
5 EU, "Chemical, Biological, Radiological and Nuclear Risk Mitigation," accessed November 2023, https://cbrn-risk-mitigation.network.europa.eu/eu-cbrn-centres-excellence_en.
6 UNIDIR, "Soft Launch of the Biological Weapons Convention National Implementation Measures Database," accessed November 2023, https://unidir.org/events/soft-launch-biological-weapons-convention-national-implementation-measures-database.

At the outset of the session, it was noted that the national implementation of the BWC depends on several contextual factors, including the legal system, the state of development of its bio-industry or trade and the type of bio-activities the State carries out. It was also noted that effective national implementation facilitates the development of peaceful activities, including biological research. One panellist observed that resources are often limited, and those bodies tasked with implementing biosecurity measures are often responsible for dealing with multiple issues and have many competing priorities.

Thematic challenges

Several thematic challenges emerged during the discussion. First, panellists indicated that there was no one-size-fits-all approach to national implementation. Rather, approaches to national implementation vary, in part because different countries are addressing different risks. Therefore, States need to adopt tailored approaches that take into consideration different national priorities and risks and that tie national implementation of the BWC to real and practical scenarios. The tailoring of measures should extend to cooperation and assistance activities that support national implementation, with one panellist noting that such activities should be "needs based" and be aligned with national plans.

Second, panellists's views largely converged on the importance of a comprehensive integrated–One Health approach–to ensuring global health security. Related to this point, panellists indicated that the complexity of biorisks was such that an interdisciplinary approach to implementation was often critical to the effectiveness of measures.

Third, the panellists stressed the importance of coordination at the national level through interministerial collaboration and the establishment of a functional network of focal points. Panellists also opined that activities should not be treated in silos and underlined the benefits of a bottom-up approach that engages all relevant stakeholders.

Finally, panellists stressed the importance of legislation as providing a fundamental basis for implementing the BWC. It was proposed that undertaking legislation gap analysis could be an important first step in efforts to facilitate national implementation. This would identify critical pieces of law required for national implementation.

Panellist further identified specific challenges that hinder national implementation and transparency. These included (i) the difficulties arising from competing priorities, on which panellists acknowledged that national administrators have many competing priorities given the multiple issues they deal with; (ii) the tendency to emphasize biosafety rather than biosecurity, in part because actors are less familiar with dealing with deliberate issues; (iii) a lack of communication between the science community and policymakers, requiring further efforts in strengthening cross-sectional dialogue between life sciences and diplomacy; and (iv) the potentially length and arduous process of passing legislation, which requires cross-ministerial efforts.

Key takeaways and recommendations

The following key points and recommendations, based on the experience of the panellists, were identified during the discussion. First, national implementation and international cooperation and assistance are closely connected. As such, further efforts should be made to foster the full implementation of Article X of the BWC. Interregional cooperation and the encouragement of partnerships between countries can assist in these efforts.

Second, for effective implementation, identifying and engaging with local champions is critical. In addition, providing opportunities for showcasing good practices and sharing information can be an effective way to make progress in national implementation.

Third, panellists underlined the importance of engaging youth in the national implementation process through early awareness raising, outreach and disarmament education. Several

concrete initiatives in this area were noted, including the Youth for Biosecurity Initiative.[7]

Fourth, panellists recognized the important role that academia and the educational sector could play in national implementation, and it was proposed that there is a need for a platform to regularly exchange best practices among educators. The significance of private sector engagement was also stressed.

Finally, the panel discussions underlined the importance of a continual review of efforts made at the national level to strengthen regulations and fully and effectively implement the BWC.

7 UNODA, "The Youth for Biosecurity Initiative," accessed November 2023, https://disarmament.unoda.org/biological-weapons/eu-support-to-the-bwc/youth-for-biosecurity-initiative.

Panel III: Dual-use governance: taking stock and looking forward

Rapporteurs: Fatima Aziz, Ryan Teo, José Garza Martínez and Felix Moronta-Barrios

The third panel explored governance initiatives related to the life sciences, drawing from key initiatives including the World Organisation for Animal Health (WOAH) Guidelines for Responsible Conduct in Veterinary Research (2019);[8] the Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists (2021);[9] and the WHO Global Guidance Framework for the Responsible Use of the Life Sciences: Mitigating Biorisks and Governing Dual-Use Research (2022).[10]

Panellists recognized that rapid advances in the life sciences and associated technologies hold great promise for global health but could also raise biorisks. These biorisks include biosafety and biosecurity risks with the potential of causing harm–accidentally, unintentionally or deliberately–to humans, animals, plants and the environment. In addition, panellists noted there were gaps in the governance of and a lack of awareness of biorisks and dual-use research.

This panel was divided into two sessions: the first was aimed at setting the scene, with three presentations on key governance initiatives; the second was a dialogue on the operationalization of the different governance initiatives at regional, national and institutional levels.

Tianjin Biosecurity Guidelines

In the first session, one of the initiatives outlined were the Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists. These guidelines comprise 10 principles and standards designed to promote responsible science practices and strengthen biosecurity governance at national and institutional levels. Developed collaboratively between scientists and stakeholders at Tianjin University (China) and the Johns Hopkins Center for Health Security (United States of America), and endorsed by the Interacademy Partnership, the guidelines aim to provide a set of principles and a standard of conduct, to raise awareness of biorisks among the general public, to educate young scientists in biosciences and to facilitate the implementation of the BWC.

WOAH Guidelines for Responsible Conduct in Veterinary Research

The WOAH Guidelines for Responsible conduct in Veterinary Research were discussed by panellists as another notable recent initiative. The guidelines were published in 2019 and were the product of a working group composed of experts from the veterinary and security spheres. The guidelines promote the use of a risk analysis approach throughout the scientific research life cycle. This approach entails the engagement of a range of stakeholders, including individual researchers, host institutions, research funders and the host national government. In addition, the WOAH guidelines promote the integration of the concerned researcher into existing review processes, thereby increasing the awareness of other risks (including those of animal welfare and health) and incorporating dual-use concerns. These in turn would strengthen established review processes.

8 WOAH (2019), *Guidelines for Responsible Conduct in Veterinary Research*, World Organisation for Animal Health, Paris, https://www.woah.org/app/uploads/2021/03/a-guidelines-veterinary-research.pdf.

9 Johns Hopkins Center for Health Security, Tianjin University Center for Biosafety Research and Strategy, and the Interacademy Partnership, *The Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists*, https://www.interacademies.org/sites/default/files/2021-07/Tianjin-Guidelines_210707.pdf.

10 WHO (2022), *Global Guidance Framework for the Responsible Use of the Life Sciences: Mitigating Biorisks and Governing Dual-Use Research*, Geneva, https://www.who.int/publications/i/item/9789240056107.

WHO Global Guidance Framework for the Responsible Use of the Life Sciences

The WHO Global Guidance Framework was the next initiative presented, and its key elements were outlined. The framework consists of a set of tools and mechanisms for biorisk governance, as well as checklists, scenarios and case studies designed to achieve diverse goals and engage different stakeholders. These governance tools include laws and regulations, standards, guidelines, best practices, codes of ethics, research review processes, awareness-raising activities, training and education. The framework also outlines nine values and principles, and their associated commitments, that underpin the framework and should guide the development and implementation of effective biorisk management policies by Member States and the actions of relevant stakeholders. The framework also considers foresight approaches to mitigating biorisks and managing research, as well as balancing risk and benefits, something that is difficult given the inherent uncertainty in some aspects of life science research and the increasingly complex, valuable and populated life science research landscape.

Operationalization of the different governance initiatives

In the second session, the panel turned to a discussion on ways of addressing the challenges and gaps in dual-use governance and the operationalization of the different governance initiatives from various stakeholders' perspectives. Panellists indicated that mitigating biorisks and governing dual-use research is a global issue that impacts all countries; however, countries often have different needs and priorities and are starting from different points. Moreover, context matters, and differences in social, cultural and religious beliefs and ethical values means that there are no one-size-fits-all approaches to governance.

Accordingly, collaboration among different actors and sectors needs to be encouraged from the global to local levels to share good practices. However, activities need to be tailored to specific needs and contexts. Panellists generally agreed that capacity-building was required to enhance knowledge and strengthen skills, along with greater engagement with stakeholders to bolster legal and regulatory frameworks related to dual-use technologies.

Looking forward

The panel generated several ideas for moving forward with dual-use governance. One panellist emphasized the value of using scenario- and case-based approaches to illustrate the challenges and priority actions in the governance of biorisks and dual-use research. Others suggested there was a need to develop monitoring and evaluation processes by establishing a baseline from which to gauge the efficacy of education and training programmes designed to ensure scientists are equipped with the latest knowledge and best practices. The convergence of different disciplines such as nanotechnology, chemistry and artificial intelligence with the life sciences was also emphasized. This expanding scope of dual-use highlights the need for a broad governance perspective.

The importance of integrating risk assessment and risk management strategies into dual-use research planning and execution was stressed as a means to minimize potential hazards. While again recognizing there is no one-size-fits-all approach to dual-use governance, panellists largely agreed on the value of collaboration at the local, national, regional and global levels to support a One Health approach to dual-use governance and to promote a multisectoral response to biorisks at the human, animals and ecosystems interface.

Further engagement, including public engagement and awareness campaigns as well as early education, was recognized as important in fostering a culture of responsibility and accountability in research.

Remarks by IZUMI NAKAMITSU
Under-Secretary-General and High Representative for Disarmament Affairs, UNODA

The Biorisks, Biosecurity and Biological Disarmament Conference is an important initiative enabling us to discuss the mounting challenges associated with biological risks and explore potential solutions.

We are observing a dramatic evolution in biological risks, with security challenges posed by biological threats becoming increasingly complex. The COVID pandemic added prominence to issues relating to biological risks and demonstrated the catastrophic impact that infectious disease has on the global scale. The pandemic also demonstrated the disruption that could be caused if biological agents were to be used in a deliberate manner, as weapons of war or terror. For these reasons, the pandemic brought into stark relief the importance of the BWC and the need for it to be fully operationalized, properly institutionalized and fit for purpose.

It is worth recalling that the BWC was the first international treaty to effectively prohibit an entire class of weapons of mass destruction. It is not only a pillar of disarmament and international security but also contributes to strengthening global health security. The effective implementation of the BWC can strengthen the attainment of the Sustainable Development Goals, as strong public health systems are a necessity to prevent and combat naturally occurring diseases. However, for this, the BWC needs to be strengthened and its institutional weaknesses addressed. The Convention does not have an international verification regime nor its own separate international organization to facilitate the full and effective implementation of the Convention. The Convention operates on annual budget of around 2.1 million USD, and is serviced by a small, four-person Implementation Support Unit within UNODA. These institutional weaknesses need to be urgently addressed, if we are to be able to deal effectively with the mounting challenges posed by biorisks. This way, we can ensure that the norm against the misuse of biology remains strong and ensure that the opportunities provided by rapid advancements in science and technology are used only for good.

The Convention's Ninth Review Conference last year set out a new approach to strengthening the BWC, and discussions in Geneva have begun with a positive tone. Now is the time to work towards taking effective action on the topics agreed under the Working Group on the Strengthening of the Convention.

While the BWC is a necessary and pivotal pillar of biosecurity, it is by no means, on its own and by itself, sufficient. We also need to consider the BWC within the wider framework of the international architecture to address and combat biological risks.

One added value of the Biorisks, Biosecurity and Biological Disarmament Conference is its convening of experts dealing with multiple aspects of biorisks and the international response to them, presenting an opportunity to connect the dots in our thinking on threats to global health security. It is therefore opportune that this conference is taking place in Geneva, where the health and disarmament communities can have more regular interactions. I hope that this event can help link the two communities better.

While naturally occurring diseases will continue to present the main challenge, intentional use of disease as a weapon should not be ignored in these discussions. Distinguished participants, I am a strong believer in the need for comprehensive and cross-cutting approaches to global challenges, and in the unique role that the United Nations and relevant multilateral organizations can and should play. When confronting global challenges therefore, we cannot limit ourselves to our traditional and comfortable bureaucratic silos. In the case of biological risks and global health security, our discussions should address all potential sources of risk, whether natural, inadvertent or intentional.

For its part, the United Nations system has been trying to address these issues holistically through the establishment of a United Nations Biorisk Working Group, which Dr. Michael Ryan from WHO and myself co-chair. The group is an example of the kind of cross-cutting approach we need to effectively face such challenges. During last year's informal thematic consultations organized by the president of the General Assembly on Our Common Agenda, the United Nations was invited to develop a New Agenda for Peace, in close consultation with Member States and in collaboration with relevant partners as part of the preparations for the summit of the future. Since then, I have had several rounds of consultations to seek views from a broad range of stakeholders. Improving global preparedness to address biorisks has been a frequent matter of discussion and raised as a priority for many. I am hopeful that the New Agenda for Peace – which should be issued soon – will be able to include a new ambitious vision and pragmatic solutions for biosecurity.

Dear participants, it is my firm belief that addressing biorisks is a collective and global responsibility, responding to multiple factors and requiring a multiplicity of actors, many of whom are present in this conference.

As I conclude my remarks, therefore, I remain confident that the deliberations will be fruitful and will take us closer to our collective goal of biosecurity. Thank you.

Panel IV: High-level roundtable

Rapporteurs: Mariia Koroleva and Yorgo El Moubayed

The discussion during the fourth session featured senior representatives from BWC States Parties and civil society and revolved around experiences of the Ninth BWC Review Conference and the contribution of perspectives for the work of the Working Group on the Strengthening of the Convention.

Ninth BWC Review Conference

Panellists agreed that, despite the challenging geostrategic climate, the short time available for preparations for the Review Conference and the wider challenges in the arms control and disarmament landscape, the Ninth BWC Review Conference was able to reach tangible outcomes and adopt a substantive final document. The final document included the establishment of the Working Group on the Strengthening the Convention and agreement on a mandate for a new intersessional programme.

Gender and youth aspects were introduced into the discussions for the first time, which was also considered a positive step. The cooperation, commitment and engagement shown by all States Parties was also seen as a crucial factor leading to the adoption of the final document. The significant role of cross-regional cooperation, which transcended the traditional groupings, was identified as contributing to the Review Conference's successful outcome.

However, panellists regretted that no agreement was reached on a number of ambitious proposals, despite considerable cross-regional support. Panellists also expressed disappointment that the Review Conference was unable to agree on the traditional article-by-article review of the operation of the Convention to be included in the final document.

Working Group on the Strengthening of the Convention

The Working Group on the Strengthening of the Convention has the mandate to identify, examine and develop several specific measures, including possible legally binding measures, and to make recommendations to strengthen and institutionalize the BWC in all its aspects.[11] Of particular note, for the first time in two decades, States Parties will formally address the topic of compliance and verification. Panellists stressed the importance of making the most of the opportunity presented by the Working Group, particularly given the rapid development in science and technology related to the BWC.

Panellists' expectations for the Working Group were cautiously optimistic. It was noted that the 100-year anniversary of the adoption of the Geneva Protocol and the 50-year anniversary of the BWC's entry into force–both in 2025–provides a unique opportunity to harvest some early accomplishments from the Working Group, most notably with respect to mechanisms on Article X and the review of scientific and technological developments. Panellists further suggested that successfully discussing these topics will influence progress in other topics. The panellists regarded the establishment of the Working Group as a symbol of commitment to the further strengthening of the BWC by all States Parties.

Various positions were expressed in the discussion about the factors required for a successful outcome of the Working Group. Some panellists stated that progress must be made on the first set of issues to be discussed at the Working Group's second session in August 2023 to sustain momentum, particularly

11 Final Document of the Ninth Review Conference," BWC/CONF.IX/9, 22 December 2022, https://undocs.org/BWC/CONF.IX/9.

as more controversial topics–such as compliance and verification – will be addressed during the third session in December 2023.

It was pointed out that underlying financial and organizational issues must be taken into account when discussing various topics in relation to strengthening the BWC. According to one panellist, for the Working Group to succeed, existing approaches to verification need to be reviewed and adapted to the realities of the twenty-first century. The panellists unanimously agreed that creating a positive atmosphere at the outset of the Working Group and engaging in constructive discussions would be vital for the success of subsequent meetings.

Discussions also addressed the topic of international cooperation and assistance under Article X of the BWC. One panellist highlighted different approaches by States Parties to the role of Article X, which were sometimes at odds and impeded consensus around international cooperation. In this regard, the importance of recognizing the nexus between arms control and disarmament on the one hand and sustainable development on the other was pointed out. Such recognition would allow States to approach the BWC as a part of wider multilateral global governance aimed at sustainable development. To ensure the success of the Working Group, reconciling the different approaches to assistance and cooperation and ensuring multi-stakeholder cooperation on the matter will be important.

Multi-stakeholder approaches and holistic collaboration

Throughout the discussions, panellists drew attention to the need for cross-regional and multi-stakeholder collaborations to enable the BWC to achieve tangible results in addressing current challenges. One panellist also emphasized that in the case of biorisks and global health security, discussions should address all potential sources of risk, whether natural, inadvertent or intentional.

It was observed that there is no single, unified non-governmental organization's vision within the BWC community and that non-governmental organizations are diverse, with each entity driven by its own agenda and objectives. It was noted that the BWC has imposed a comprehensive ban on biological weapons and, as such, civil society involvement in the BWC is focused more on community-building activities than on advocacy campaigns.

Panel V: Detection, surveillance and reporting of disease outbreaks

Rapporteurs: Felix Moronta-Barrios and Fatima Aziz

The experience with COVID-19 led to significant advances in technologies related to detecting, monitoring and reporting disease outbreaks. This panel explored these technologies and mapped out how they could support biosafety, biosecurity and biological disarmament. The panel further discussed the important role of understanding the policies that should exist around these technologies and how best to protect human, animal and ecosystem health.

To facilitate this objective, the panel session employed a scenario-based discussion format, which envisioned a hypothetical spillover zoonosis in the year 2026. The scenario was broken into three parts, focusing respectively on detection, surveillance and reporting. Each part was guided by a specific question, and a policy-centred discussion followed the completion of the scenario.

Over the course of the session, the panellists were presented with six questions, and their responses–coupled with the participation of the audience–shed light on the key considerations in combating such outbreaks effectively.

Detection

The first question examined the geographical areas where we should direct our attention. The panel emphasized the significance of the following: (i) extreme densities of human–animal populations, (ii) deforestation, (iii) small island States or States with limited capacity, (iv) water supply and reservoirs, (v) wet markets, (vi) historical precedence of spillovers, and (vii) tropical areas due to the threat of climate change. These locations pose a higher risk, and it was argued that it is vital to focus efforts on proactive surveillance and prevention in these areas.

The second question delved into the criteria used to identify the disease. The panel underscored the importance of considering factors such as the type of pathogen, its propensity for weaponization, transmission modes (e.g. airborne), integration of animal health surveillance data, high transmissibility, and the existence of medical countermeasures.

The next question examined the methods employed in disease detection. The panel stressed the need for integrated animal and human health surveillance and reporting platforms, open-source public health intelligence, omics technology, chemical and toxin identification enabled by artificial intelligence, drones for sampling, blockchain for surveillance, and clinical diagnostics. These tools could play a vital role in our ability to swiftly identify and monitor disease outbreaks.

Surveillance

In the hypothetical scenario, the disease had subsequently spread to two additional countries. The fourth question, therefore, examined the new surveillance tools that would become available. The panel highlighted the importance of wastewater surveillance, use of non-traditional sources for information, remote sensing technologies, in situ genomic sequencing, monitoring of airborne diseases and leveraging of artificial intelligence. These innovations enhance our ability to track the spread of the disease and respond effectively.

Reporting

To aid in this critical mission, the fifth question explored the technologies that can support reporting efforts. The panel identified automated reporting systems and well-positioned reference laboratories for timely diagnosis as crucial components of an efficient response.

Disease outbreak policies

The final question asked the panel to examine the policies that would be instrumental in addressing disease outbreaks. The panellists emphasized the importance of improving biosafety standards, increasing education and outreach initiatives, standardizing and streamlining digital surveillance systems, enhancing mobile connectivity, encouraging collaborative surveillance efforts, improving equitable access to technologies, mitigating the economic impacts of pandemic reporting, and funding for the development of broad-spectrum medical countermeasures. These policies form the backbone of a robust and coordinated response to outbreaks.

In summary, the panel underscored the importance of engaging in cross-sectoral collaborations, raising awareness within the veterinary sector, and implementing sub-national initiatives to enhance surveillance capabilities. The panellists emphasized that although technology plays a critical role in the detection, surveillance and reporting of disease outbreaks, the way the technology is used is equally vital. The need to adapt to new scenarios and address the inequities brought to light during the COVID-19 pandemic were highlighted. By doing so, it is possible to bolster preparedness for future outbreaks and ensure a more equitable and effective response.

Panel VI: International cooperation in biorisks, biosecurity and biological disarmament

Rapporteurs: Shizuka Kuramitsu and Mayra Ameneiros

The sixth panel of the Conference delved into the complexities of international cooperation in the realms of biorisks, biosecurity and biological disarmament. Comprising four experts, the panel unfolded through a dynamic format that interspersed moderated questions with real-time audience feedback collected via a semistructured survey. This interactive approach not only enriched the discussion with diverse viewpoints but also encouraged a two-way dialogue, eliciting a comprehensive discourse on the strategic enhancement of global cooperative mechanisms in these critical domains.

Panellists unanimously acknowledged the pressing need to cultivate international cooperation in addressing biorisks, biosecurity and biological disarmament, emphasizing the profound implications for global peace and security. The discussion, enriched by a spectrum of perspectives from both the panel and the audience, highlighted diverse strategies and identified key areas demanding concerted efforts to bolster collaboration. The ultimate consensus of the room was that achieving substantive progress in international cooperation is both crucial and complex, necessitating a multifaceted approach to navigate the various challenges presented.

Imperatives for strengthening international cooperation

The panellists and audience members pinpointed several critical areas where international cooperation must be enhanced, as well as what would help improve it.

Upholding international norms:
There was broad agreement on the imperative of supporting and maintaining international norms to prevent the development and use of biological weapons, including the effective implementation of the BWC at global, regional and national levels. Effective national implementation of instruments such as the BWC is crucial and can support and facilitate compliance with other international and regional obligations.

Fostering innovation and collaboration:
To stimulate critically needed innovation and broad-based engagement, it is essential to facilitate multidisciplinary collaboration and include diverse stakeholders, including the private sector. Enhanced intersectoral communication is crucial in this regard.

Contextual understanding for effective communication:
Cooperation should also take into account economic and political factors. A comprehensive understanding of these elements, as well as the historical context of biosecurity issues, is key to developing effective communication strategies. The example of varying levels of capacity in national vaccine development programs throughout history underscores the influence of scientific and technological progress in responding to and controlling infectious disease outbreaks, revealing a complex interplay between research, innovation and global health security policies.

Overcoming barriers to cooperation

The panel identified four major obstacles that interfere with the promotion of international cooperation:

Figure 1. Perceived barriers to international cooperation. Audience feedback collected via a semistructured survey.

1. Funding challenges:
The issue of securing sufficient funding was a recurring concern. Long-term investments, essential for sustained biosecurity initiatives, often require governmental support. However, government systems, particularly in democracies, may lack the foresight or mechanisms for such investments. The post-anthrax attack scenario in the United States of America illustrated this dilemma, where the quest for new antibiotics drove private firms to bankruptcy, underscoring the need for effective stewardship in resource allocation and access.

2. Communication gaps:
Bridging communication divides between various sectors is vital to minimize miscommunication, which can escalate tensions and impede efficient collaboration – a reality starkly highlighted during the COVID-19 pandemic. The panel emphasized the necessity of mutual understanding and of making sure the language used is clear and direct, given the distinct interests and terminologies across different sectors.

3. Transparency issues:
Panellists largely agreed that to overcome the challenges of biorisks, biosecurity and biological disarmament, increased transparency is critical. When it comes to the BWC, the national reports of States Parties help build confidence in their compliance. In general, creating a culture around transparency (based on dialogue and trust) is a necessity. This is key not only in the disarmament context with the BWC but also in the context of the International Health Regulations from WHO as well as other international norms and standards.

4. Export control measures:
The discussion touched on the role of export controls and their influence on international cooperation. Panellists highlighted that there are diverse opinions on the impact of these measures. One panellist suggested adopting a systematic approach in examining possible solutions to the challenges posed by export controls, emphasizing that this could offer fresh perspectives on how to potentially ease these limitations.

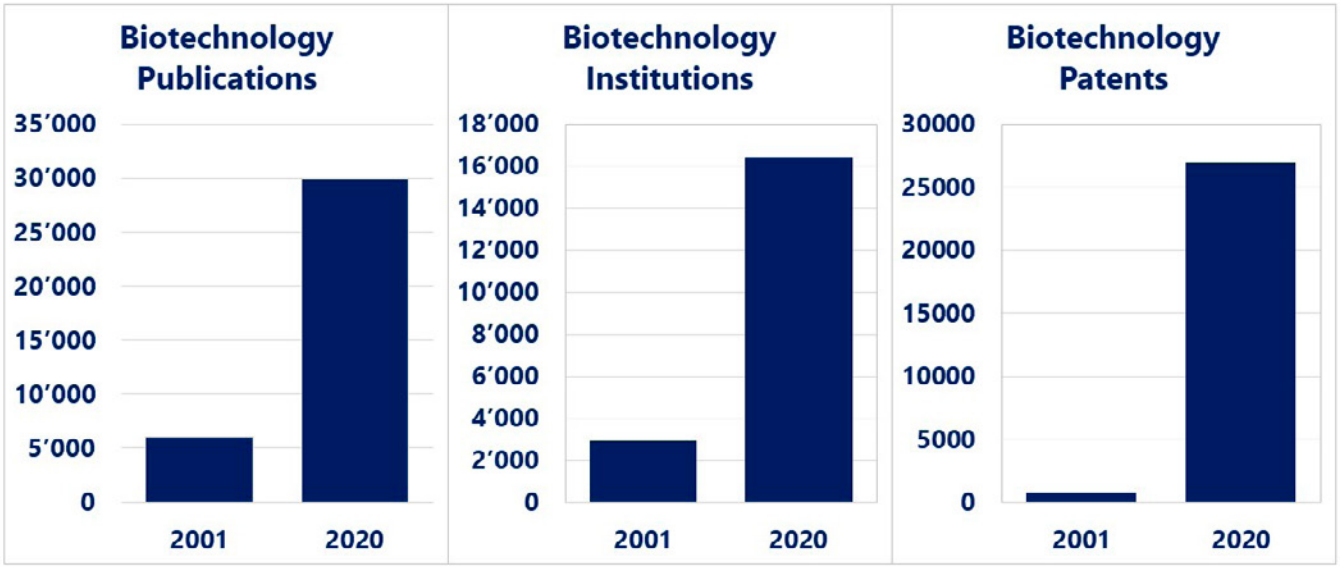
Panel VII: Monitoring and verification of the BWC

Rapporteurs: José Garza Martínez and Judith Okolo

This final panel, on monitoring and verification of the BWC, began by noting the lack of an agreed understanding of what constituted verification of the BWC and the different expectations of what verification could achieve. Nonetheless, panellists presented elements of a working definition for BWC verification, suggesting the following: "Verification is an agreed process of collecting and analysing data with a view to informing judgments on a State's compliance with its obligations under the BWC."[12] It was suggested that verification was, in part, a technical process of collecting and analysing data but often involved a political judgment.

Panellists touched on the history of the BWC and presented challenges in compliance and verification, highlighting some of the limitations with the current tools available in building confidence in compliance, such as the confidence-building measures. Panellists stressed the need to improve the existing BWC regime, including through institutional strengthening and exploration of the opportunities presented by new (and established) technologies to build a layered approach to verification and compliance.

Figure 2. Growth in biotechnology institutions, patents and publications.



12 James Revill (2023) "Verifying the BWC: A Primer", UNIDIR, Geneva, Switzerland. https://doi.org/10.37559/WMD/23/Bio.verification.primer1.

Technological opportunities (and limits)

The panel touched on the potential of several emerging technologies to enhance BWC verification, including artificial intelligence, bioforensics and open-source information. It was suggested that these tools could help in collecting information to develop, inter alia, a baseline of data around States' activities or to investigate suspicious disease outbreaks. There is much that can be learned from technological tools used in verification and monitoring in other regimes; however, there are also limits on the transferability of approaches in regimes dealing with chemical and nuclear weapons.

While such technologies are important in any discussion on verification, technological opportunities need to be discussed in the broader social and political context. There are also limitations with technologies, which need to be considered by States Parties. It was noted that technology is not a solution unless embedded in the system with agreed, acceptable and reliable techniques and procedures. Moreover, many old technologies and existing processes (e.g. confidence-building measures), or tools used elsewhere including declarations, would still have considerable value in efforts to build confidence in compliance.

Changing nature of the life sciences

Panellists recognized that understanding of verification would also need to consider changes in the life sciences and wider research landscape that could have a bearing on efforts to verify the BWC. It was noted that over the past 20 years there has been a dramatic increase in the number of researchers, institutes and patents related to technology (see Figure 2). Biological weapons can take many forms and serve different purposes and can therefore be pursued in facilities with very different "footprints". As such, efforts to verify the BWC will also need to consider what a biological weapons programme might look like.

After detection, what?

One panellist highlighted the importance of disarmament verification as a cooperative endeavour and acknowledged that challenges will emerge in circumstances where cooperation in investigations may not be forthcoming. Related to this point was the issue of how to address non-compliance and put in place suitable and effective sanctions. To move verification forward, it was stressed that States Parties need to carefully consider what to do in non-routine situations.

Expectations for the Working Group on the Strengthening of the Convention

The Working Group on the Strengthening of the Convention was recognized as the beginning of a new process that opened a window of opportunity for States Parties to advance work around monitoring and compliance. However, panellists recognized that the broad mandate coupled with the limited time available to the Working Group meant it would not be able to resolve everything in the monitoring and compliance sphere of the BWC. It was noted that there are numerous ways in which confidence in compliance could be taken forward, not all of which necessarily required a legally binding or multilateral route. As one panellist remarked, there are several existing ways a State Party can demonstrate compliance.

Panellists presented several suggestions for what can be expected from the Working Group. It was suggested that through the Working Group, States Parties could generate a road map for advancing the BWC and begin to generate sustained high-level attention on the BWC. Engagement with wider expertise in civil society was also important; though, as one panellist noted, outreach may be required to bring new sets of expertise into the discussion. Panellists generally agreed that achieving progress requires States Parties and stakeholders to prepare for meetings and showcase willingness to work towards compromises on monitoring and verification issues, as there remain various–sometimes starkly contrasting perspectives on what can and should be established and accomplished within the BWC.

Annex: Conference programme

Biorisks, Biosecurity and Biological Disarmament Conference
4 and 5 July 2023, Geneva and Online

DAY 1: 4 JULY 2023

09.30-10.00: Registration and morning refreshments (30 min)

10.00-10.30: Welcoming remarks (30 min)

The conference will start with welcome addresses from WHO, UNODA and UNIDIR representatives.

Speakers:
- Melanie Regimbal, Chief of the Geneva Branch, UNODA
- John Reeder, Director, Research for Health Department, Science Division, WHO
- Robin Geiss, Director, UNIDIR

10.30-12.30: Panel 1 – Advances in science and technology: assessing the risks and opportunities (2 hours)

This panel will explore key advances in the biological sciences and their positive and negative implications for biosecurity and biological disarmament. The panel will include a discussion around foresight and will be followed by a survey of participants on their perceptions of key risks and opportunities.

Speakers:
- Beyza Unal, Head of Science & Technology Unit, UNODA (virtual)
- Sandra Matinyi, Project Officer, SynBio Africa
- Marion Laumonier, Technical Officer, Emerging Technologies, Research Prioritisation and Support, Research for Health Department, Science Division, WHO
- Jonathan Forman, Science and Technology Advisor, Pacific Northwest National Laboratory, Seattle Washington, USA

Moderator: James Revill, Head of Weapons of Mass Destruction Programme, UNIDIR

12.30-13.30: Lunch Break (1 hour)

13.30-15.00: Panel 2 – Transparency and national implementation: lessons learned and good practices (1.5 hours)

This panel will discuss best practices and lessons learned related to building transparency, implementing biosecurity measures at the national level, and identifying gaps that need to be addressed.

Speakers:
- Sonia Drobysz, Co-programme Director for National Implementation, VERTIC
- Alexander Hamilton, CBRN CoE Regional Coordinator for Southeast Asia, UNICRI
- Peter Ahabwe Babigumira, Technical Advisor, Uganda Ministry of Health (virtual)
- O'Neil Hamilton, Expert on Non-Proliferation, Strategic Trade Management and Export Control Development, UNODC, and the Proliferation Prevention Program, Stimson Center
- Yvette Issar, Political Affairs Officer, UNODA
- Anastasia Malygina, Associate Professor, St Petersburg University (virtual)

Moderator: Alex Lampalzer, Deputy Chief of the BWC Implementation Support Unit, UNODA

15.00-15.30: Coffee break (30 min)

15.30-17.00: Panel 3 – Dual-use governance: taking stock and looking forward (1.5 hours)

This panel will explore governance initiatives related to the life sciences, drawing from ongoing initiatives such as the WOAH's Guidelines for responsible conduct in veterinary research (2019), the Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists (2021) and the WHO Global guidance framework for the responsible use of the life sciences: mitigating biorisks and governing dual-use research (2022).

Part 1: Presentations – Setting the scene (40 min)

Speakers:
- Leifan Wang, Assistant Professor, Tianjin University (virtual)
- Keith Hamilton, Head Preparedness and Resilience Department, WOAH
- Filippa Lentzos, Associate Professor, King's College London

Moderator: Soatiana Rajatonirina, Technical Officer, Emerging Technologies, Research Prioritisation and Support, Research for Health Department, Science Division, WHO

Part 2: Panel discussion – Dialogue on operationalization of the different initiatives (50 min)

Speakers:
- Halima Benbouza, Professor, Director, National Council of Scientific Research and Technologies of Algeria
- Maria Espona, Professor, Director, ArgIQ, Argentina
- Irma Makalinao, Professor, University of the Philippines (virtual)
- Emmanuel Turyatunga, Office of the Prime Minister of Uganda

Moderator: Emmanuelle Tuerlings, Technical Officer, Emerging Technologies, Research Prioritisation and Support, Research for Health Department, Science Division, WHO

DAY 2: 5 JULY 2023

09.00-10.00: Panel 4 – High-level roundtable (1 hour)

This panel will focus on the Biological Weapons Convention by taking stock of lessons identified from the Ninth BWC Review Conference, as well as sharing forward-looking perspectives on the recently established Working Group on the Strengthening of the Convention.

Speakers:
- Izumi Nakamitsu, Under-Secretary-General and High Representative for Disarmament Affairs, UNODA (virtual message)
- Flavio Damico, Ambassador, Special Representative of Brazil to the Conference on Disarmament
- Leonardo Bencini, Ambassador, Special Representative of Italy to the Conference on Disarmament
- Jonelle John S. Domingo, Second Secretary, Permanent Mission of the Philippines to the UN
- Filippa Lentzos, Associate Professor, King's College London

Moderator: Simon Cleobury, Head of Arms Control and Disarmament, GCSP

10.00-11.30: Panel 5 – Detection, surveillance and reporting of disease outbreaks (1.5 hours)

The experience with COVID-19 has led to significant advances in technologies related to detecting, monitoring and reporting disease outbreaks. This panel will explore these technologies and map out how they could support biosecurity and biological disarmament.

Speakers:
- Tomoko Steen, Director of the Biomedical Science Policy and Advocacy program, Georgetown University (virtual)
- O'Neil Hamilton, Expert on Non-Proliferation, Strategic Trade Management and Export Control Development, UNODC, and the Proliferation Prevention Program, Stimson Center
- Karl Schenkel, Unit Head for Strategy and Guidelines at Health Emergencies Programme, WHO

Moderator: Taylor Winkleman, Consultant, WHO

11.30-12.00: Working coffee break (30 min)

12.00-13.30: Panel 6 – International cooperation in biorisks, biosecurity and biological disarmament (1.5 hours)

This panel will discuss challenges and opportunities for international cooperation in biorisks, biosecurity and biological disarmament. Panellists will discuss cooperation to date and what steps could be taken to foster collaboration and cooperation in the future.

Speakers:
- Andrew Nerlinger, Executive Director, Global Health Security Fund
- Kirk Douglas, Director of the Centre for Biosecurity Studies, University of the West Indies
- Maria Garzon Maceda, Associate Researcher for the WMD Programme, UNIDIR
- Nadya Wells, Senior Research Adviser, Global Health Centre, Geneva Graduate Institute

Moderator: Veronica Rovegno, Technical Officer of the Health Emergencies Preparedness and Response Unit, WHO

13.30-14.30: Lunch Break (1 hour)

14.30-16.00: Panel 7 – Monitoring and verification of the BWC (1.5 hours)

This final panel will focus on technological opportunities to contribute to investigating suspicious disease outbreaks and verifying compliance with the BWC.

Speakers:
- James Revill, Head of the WMD Programme, UNIDIR
- Melanie Reddiar, Head of Secretariat, South African Council for the Non-Proliferation of WMD
- Ryan Teo, Research Assistant, University of Birmingham
- Jez Littlewood, Independent expert (virtual)

Moderator: Una Jakob, Senior Researcher, Peace Research Institute Frankfurt (PRIF)

16.00-16.30: Taking Stock (30 min)

To take stock of the conference, rapporteurs will provide short remarks of each panel's main take-aways.

Speakers:
- Panel 1: Mayra Ameneiros
- Panel 2: Judith Okolo
- Panel 3: Fatima Aziz
- Panel 4: Mariia Koroleva
- Panel 5: Felix Moronta Barrios
- Panel 6: Shizuka Kuramitsu
- Panel 7: José Garza Martínez

16.30-16.45: Closing Remarks (15 min)

- James Revill, Head of the WMD Programme, UNIDIR
- Alex Lampalzer, Deputy Chief of the BWC Implementation Support Unit, UNODA
- Veronica Rovegno, Technical Officer, Office of the Executive Director, Health Emergencies Programme, World Health Organization

16.45-17.00: Farewell coffee (15 min)

2023 Biorisks, Biosecurity and Biological Disarmament Conference Report

4–5 JULY 2023

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