Task Force 6
Accelerating SDGs: Exploring New Pathways to the 2030 Agenda

BWC SCIENTIFIC EXPERTS GROUP TO COMBAT BIOLOGICAL THREATS

June 2023

Saurabh Todi, Research Analyst, The Takshashila Institution, India
Shambhavi Naik, Head of Research, The Takshashila Institution, India

वसुधैव कुटुम्बकम्
ONE EARTH • ONE FAMILY • ONE FUTURE

Abstract

The technological landscape in the field of biotechnology has evolved rapidly over last decade. The availability of cutting-edge technologies has made it easier to manipulate microorganisms, disease vectors, and living cells. However, existing biological threat assessment systems have been unable to assess the potential biosecurity risks of such technologies. The COVID-19 experience has been instructive in showing the potential for economic and public health harm that a bioweapon with similar characteristics can unleash. This Policy Brief proposes to institutionalise a Scientific Expert Group (SEG) within the ambit of the Biological Weapons Convention (BWC), similar to the Scientific Advisory Board of the Organisation for the Prohibition of Chemical Weapons. This board will assess the biosecurity risks of new technologies, monitor the emergence and evolution of biological threats, both natural and man-made, and recommend countermeasures.

The Challenge

1

The controversy around the origin and response to the COVID-19 pandemic has highlighted the gaps in current global biological threat assessment systems. The major international organisations, namely, the World Health Organisation (WHO) and the Biological Weapons Convention (BWC), failed in their respective mandates to adequately prepare and respond to the risk of the emergence of such a biological threat. The current structures of both the WHO and the BWC are inadequate for addressing such challenges in future.

The BWC is an international treaty established in 1975 to prohibit the development, production, and stockpiling of biological weapons.[1] The treaty further aims to prevent the use of biological weapons in warfare and to ensure that biological research is used only for peaceful purposes. The BWC seeks to promote international peace and security by eliminating the threat of biological weapons, which can cause widespread harm and potentially destabilise regions and nations. The treaty provides a framework for member states to cooperate on peaceful uses of biotechnology while also working to prevent the misuse of such technology for military purposes. The BWC helps promote disarmament and prevent the proliferation of weapons of mass destruction. Therefore, it is an important component of the international legal framework designed to maintain global security.

The mandate of the WHO, on the other hand, is more comprehensive and more public-health focused. WHO is a specialised agency of the United Nations (UN) that is responsible for promoting and coordinating international health policies, programs, and responses. The purpose of the WHO is to provide leadership on global health matters, shape health research agenda, set norms and standards, provide technical support to countries, and monitor and assess health trends.

The mandate of the WHO is based on its constitution, which was adopted in 1948. The primary objectives of the WHO are to promote health, prevent disease, and address health inequities. It is also responsible for responding to global health emergencies such as pandemics and outbreaks of infectious diseases. Thus, the WHO's role in global health governance is critical for addressing

the complex and interconnected health challenges facing the world today.

However, these mandates leave grey areas in research, particularly pertaining to the use of dual-use biotechnologies. This is especially true for the BWC, which is supposed to track emerging biological threats and promote cooperation on peaceful uses of biotechnology. However, it has failed to take significant pre-emptive steps to monitor these threats. There are significant issues with the BWC which reduce its ability to carry out its mandate, and there is an urgent need to reform the BWC for several reasons.

First, rapid advances in biotechnology have made it easier and cheaper to develop and produce biological weapons. Gene-editing technologies such as CRISPR-Cas9 have revolutionised the field and made it easier to carry out advanced biological research in a cost-effective and expedited manner.[2] One such significant research in recent years is gain-of-function (GoF) research,[3] which refers to experiments that involve deliberately modifying the genetic or biochemical makeup of an organism to enhance its capabilities or create new functions. This type of research is conducted in various fields, including microbiology, virology, and genetics. In the context of virology, GoF research involves manipulating viruses to increase their ability to infect humans or animals or to enhance their transmissibility or pathogenicity. Although the goal of this research is to better understand the mechanisms by which viruses evolve and spread and to develop treatments or vaccines to combat them, GoF research can also pose significant risks,[4] as it may create new or more dangerous pathogens that could be accidentally released into the environment or used for bioterrorism.[5]

Advancements in other technologies such as high-throughput gene sequencing, artificial gene synthesis, and synthetic biology all contribute to this trend. The BWC needs to be updated to take into account these technological developments and ensure that the treaty remains effective in preventing the creation and use of biological weapons.

Second, the COVID-19 pandemic highlighted the potential for emerging infectious diseases to cause widespread physical, mental, and economic harm. The BWC needs to be reformed to

address the threat posed by emerging infectious diseases and ensure that the international community is better prepared to respond to outbreaks. This involves being able to monitor certain types of research, such as artificially synthesising and editing the genomes of highly infectious microorganisms (e.g., respiratory viruses) or microbes that have been eradicated (e.g., smallpox) as well as conducting GoF research.

Third, the BWC lacks effective verification measures, which makes it difficult to detect violations of the treaty. The lack of verification measures undermines the credibility of the BWC[6] and makes it easier for countries to develop biological weapons in secret or conduct research on adjacent technologies that could have direct implications on how easily biological weapons are developed. The absence of a verification mechanism behoves the need for more stringent preventive action by the BWC.

Fourth, the threat of biological weapons is not limited to states; non-state actors such as terrorist groups could use biological weapons to cause widespread harm. As highlighted above, with advancements in biotechnology, it has become easier for non-state actors to develop biological weapons. The BWC needs to be updated to understand the threat posed by non-state actors.

The role of emerging technologies such as gene drives, CRISPR-Cas9, artificial gene synthesis, and GoF necessitates intervention from both the BWC and the WHO through examining the intersection between biosecurity and public health.

Institutionalising a Scientific Expert Group (SEG) can address several of the shortcomings in the BWC. This body can be modelled along the lines of the Scientific Advisory Board (SAB) of the Organisation for the Prohibition of Chemical Weapons (OPCW). The SAB is a group of independent experts who provide scientific and technical advice to the OPCW.[7] It consists of 25 members with expertise in chemistry, biology, physics, and related fields.[8] Their main responsibilities include reviewing scientific and technical issues related to the Chemical Weapons Convention (CWC), advising on the safety and security of OPCW activities, and promoting cooperation between the OPCW and the scientific community. The SAB also plays a key role in investigating the alleged use

of chemical weapons and verifying the destruction of chemical weapons stockpiles.[9]

Unlike the CWC, the BWC lacks a permanent scientific board that can keep track of the most recent developments and advancements in the field of microbiology, virology, pathology, molecular genetics, and genetic engineering, among others. The proposed SEG can help bridge this gap. It can further recommend operational standards for using these technologies and periodically publish reports on any incidents and threats associated with emerging technologies. The establishment of a permanent, independent scientific board under the BWC is crucial to carry out this mandate.

The G20's Role

2

The G20 is a forum of the world's largest economies, which together represent around 80 percent of the global GDP and 60 percent of the world's population.[10] The G20 plays a significant role in the global balance of power by providing a platform for major economies to address shared challenges and opportunities such as climate change, global health crises, and security threats. By working together, the G20 members can leverage their collective resources and expertise to tackle complex global problems that no single country can address alone. The G20 has become an important forum for shaping global agenda and norms. Through its communique and declarations, the G20 can influence the policies and priorities of other international organisations and forums and shape the expectations of other countries and stakeholders.

It is therefore imperative for the G20 to focus on strengthening the BWC as part of its commitment to achieving the Sustainable Development Goals (SDGs). An effective BWC will be critical to achieving the following SDGs:

- **Goal 1.5:** "By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters"[11] by strengthening health security systems.

- **Goal 2.4:** "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality"[12] by protecting agricultural supply chains, including food crops and food processing facilities, from bioterrorism.

- **Goal 3.d:** "Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks" by providing a common framework to assess biosecurity risks and sharing knowledge on emerging threats.

- **Goal 16:** "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels"[13] by

incorporating scientists from around the world to create an inclusive Board.

- **Goal 16.8:** "Broaden and strengthen the participation of developing countries in the institutions of global governance"[14] by providing an opportunity for countries to raise concerns at the level of the Board.

- **Goal 17.6:** "Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism"[15] by setting up a platform for knowledge sharing.

At a broader level, the maintenance of biosecurity will be key to achieving all the SDGs. As shown by the global experience with COVID-19, a pandemic has the potential to reverse progress on SDGs, particularly to those linked with poverty alleviation, health and vaccinations, and education. Thus, strengthening the BWC to prevent misuse of new technologies will be a key enabler for achieving the SDGs.

Recommendations to the G20

3

The BWC in its current form does not provide for the establishment of an SEG. However, it is extremely important to institutionalise a mechanism under the BWC to monitor and respond to biological threats.

The proposed SEG should consist of scientists and clinicians from signatory countries as well as representatives from the WHO and the Global Health Security Agenda (GHSA). Members could be experts from across domains, including, but not limited to, biosecurity, microbiology, virology, pathology, molecular genetics, genetic engineering, public health, and epidemiology. The SEG should have the freedom to invite representatives from other governmental and non-governmental organisations to investigate outbreak events or leakage incidents in signatory and non-signatory countries.

It is also crucial to have a permanent representation of domain experts from organisations such as the World Organisation for Animal Health and the Food and Agriculture Organisation. This is because biosecurity sits at the intersection of human health, animal health, and agriculture. Any of these domains can be the starting point for a potential biosecurity threat. The 'One Health'[16] approach to public health should be extended to biosecurity threats as well; One Health is an emergent approach to public health that recognises the interconnectedness of human, animal, and environmental health.[17] It acknowledges that the health of humans, animals, and the environment are closely linked and that interventions that consider all three domains are essential for promoting and protecting the health of all.

The SEG will carry out multiple responsibilities to fulfil its mandate:[18]

a. Periodically publish reports on any incidents and threats associated with emerging technologies.

b. Establish and maintain a list of sensitive technology applications and agents based on their amenability to manipulation, ease of use, and possible threat to human and environmental health. For example, gene editing is the underlying technology in both somatic gene editing and gene-drive studies. However, the use of a malicious gene drive can cause much greater damage than the malicious use of somatic gene editing. Thus,

a prioritisation of technologies would help create regulations to govern such technologies accordingly. This list would be regularly updated and SEG can cooperate with multilateral export control organisations such as the Australia Group and the Wassenaar Arrangement to promote synergy and reduce chances of duplication of work.

c. Devise a common minimum standard and training program for laboratories using such technologies and agents. The training program could include courses on ethics, material management practices, personal protection practices, and safe disposal practices. The responsibility for ensuring compliance and reporting non-compliance would lie with the research institution. Recent safety incidents in the US[19] and Russia's[20] facilities housing biological agents have revealed the inability of existing measures to reduce the possibility of accidental release. It is important to note that the lab leak theory of SARS-CoV-2 also hinges on the research on a pathogen being carried out in a inadequately equipped laboratory facility.

The WHO is also in the process of negotiating a global pandemic treaty that includes several provisions that call for coordination and cooperation to reduce the risk of pandemics.[21] Thus, there is significant scope for cooperation between the WHO and the proposed SEG under the BWC.

Conclusion

4

Advancements in biotechnology and the resulting ease of access allow for more targeted and sophisticated use of bioweapons. Subverting traditional understanding of mass attacks, biological weapons can be used in assassinations, civil wars, and mass-casualty attacks by non-state actors, as well as activities such as targeting ethnic groups. The BWC is currently ill-equipped to deal with these threats. A robust regulatory and monitoring mechanism is therefore the need of the hour. The SEG provides a mechanism to evaluate potential threats emanating from emerging technologies, cooperate with other multilateral organisations, and recommend suitable countermeasures.

Attribution: Saurabh Todi and Shambhavi Naik, "BWC Scientific Experts Group to Combat Biological Threats," *T20 Policy Briefs*, June 2023.

Endnotes

1 "Biological Weapons Convention," United Nations, accessed April 3, 2023, https://www.un.org/disarmament/biological-weapons/.

2 John Van der Oost and Constantinos Patinios. "The Genome Editing Revolution," *Trends in Biotechnology* 41, no. 3 (2023): 396-409. https://doi.org/10.1016/j.tibtech.2022.12.022.

3 National Research Council. *Potential Risks and Benefits of Gain-of-Function Research: Summary of a Workshop* (National Academies Press, 2015), https://www.ncbi.nlm.nih.gov/books/NBK285579/.

4 Michael J. Imperiale and Arturo Casadevall, "Rethinking Gain-of-Function Experiments in the Context of the COVID-19 Pandemic," *Mbio* 11, no. 4 (2020): e01868-20, https://doi.org/10.1128/mbio.01868-20

5 Michael J. Selgelid, "Gain-of-Function Research: Ethical Analysis," *Science and Engineering Ethics* 22 (2016): 923-64. 10.1007/s11948-016-9810-1.

6 J. Revill, J. Borrie, and R. Lennane, "Back to the Future for Verification in the Biological Disarmament Regime?," UNIDIR, 2022, https://doi.org/10.37559/WMD/22/BWC/02.

7 OPCW, "Scientific Advisory Board," March 28, 2022, https://www.opcw.org/about/subsidiary-bodies/scientific-advisory-board.

8 OPCW, "Scientific Advisory Board"

9 OPCW, "Scientific Advisory Board"

10 James McBride, Anshu Siripurapu, and Noah Berman, "What does G20 Do?," Council of Foreign Relations, last modified December 15, 2022, https://www.cfr.org/backgrounder/what-does-g20-do.

11 General Assembly Resolution 71/313, "Work of the Statistical Commission Pertaining to the 2030 Agenda for Sustainable Development," A/RES/71/313, July 10, 2017, https://undocs.org/en/A/RES/71/313

12 General Assembly Resolution 71/313, "Work of the Statistical Commission Pertaining to the 2030 Agenda for Sustainable Development"

13 General Assembly Resolution 71/313, "Work of the Statistical Commission Pertaining to the 2030 Agenda for Sustainable Development"

14 General Assembly Resolution 71/313, "Work of the Statistical Commission Pertaining to the 2030 Agenda for Sustainable Development"

15 General Assembly Resolution 71/313, "Work of the Statistical Commission Pertaining to the 2030 Agenda for Sustainable Development"

16 John S. Mackenzie and Martyn Jeggo, "The One Health Approach—Why is it So Important?," *Tropical Medicine and Infectious Disease* 4, no. 2 (2019): 88, https://doi.org/10.3390/tropicalmed4020088.

17 Wiku B. Adisasmito et al., "One Health: A New Definition for a Sustainable and Healthy Future," *PLoS Pathogens* 18, no. 6 (2022): e1010537, https://doi.org/10.1371/journal.ppat.1010537.

18 Shambhavi Naik and Aditya Ramanathan, "The New Bioweapons Peril: A Case to Revisit the Biological Weapons Convention," *Indian Public Policy Review* 3, no. 1 (Jan-Feb) (January 14, 2022): 59–76, https://doi.org/10.55763/ippr.2022.03.01.004.

19 Alison Young and Nick Penzenstadler, "Inside America's Secretive Biolabs," *USA Today*, accessed April 3, 2023, https://www.usatoday.com/story/news/2015/05/28/biolabs-pathogens-location-incidents/26587505/.

20 Matt Field, "What Happened after an Explosion at a Russian Disease Research Lab Called VECTOR?," *Bulletin of the Atomic Scientists*, November 27, 2019, https://thebulletin.org/2019/11/what-happened-after-an-explosion-at-a-russian-disease-research-lab-called-vector/.

21 World Health Organisation, "Countries Begin Negotiations on Global Agreement to Protect World from Future Pandemic Emergencies," accessed May 31, 2023. https://www.who.int/news/item/03-03-2023-countries-begin-negotiations-on-global-agreement-to-protect-world-from-future-pandemic-emergencies.

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE