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CBW Magazine

Journal on Chemical and Biological Weapons

Volume 17 Number 1-2 Jan-Jun 2024

ISSN: 0974-0619

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Editorial

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Even though the Chemical Weapons Convention (CWC) and the Biological Weapons Convention (BWC) are not currently facing severe crises, challenging developments continue to trouble the international community. On one hand, the West and Russia accuse each other of violating the principles of both conventions, while on the other, concerns persist about China and its bio-labs.

The international community remains unsatisfied with the responses from the Chinese government and parts of the scientific community. A think tank focused on biological weapons highlighted ongoing activities in labs associated with the Chinese People's Liberation Army in its report, which was based on open-source information.

Non-state actors and new scientific advancements are also causing concern globally. The potential use of Artificial Intelligence for bioterrorism has sparked a worldwide debate. The scientific and security communities are divided on this issue, but the role of AI in creating deepfakes and sowing confusion and panic, especially in democratic societies, has garnered significant interest in the literature.

In their paper, Kathryn Millett, Malcolm Dando, and Lijun Shang examine the framework, methodology, and insights from the International Nuclear Security Education Network and the activities of the Advisory Board on Education and Outreach of the Organisation for the Prohibition of Chemical Weapons. They propose a similar framework for creating an International Biological Security Education Network that could be adopted for biosecurity education by civil society and incorporated into the Biological and Toxin Weapons Convention.

Vivek Verma, S. Kulshreshtha, and W. Selvamurthy emphasize that synthetic biology is revolutionizing the redesign of organisms using computing power. Emerging trends in bio-design and generative design are set to transform health, agriculture, and energy sectors, introducing innovative ideas that may have unintended consequences and increase asymmetric threats. They also stress that India needs to protect its national security by implementing a comprehensive biosecurity policy.

Kathryn Millett, Malcolm Dando, and Lijun Shang, in another paper, reiterate the need for sustained education and awareness-raising about dual-use research issues. They discuss previous efforts in educating scientists and summarize further strategies for progress. Abhishek Yadav reports that the Investigation and Identification Team (IIT) led by the Organization for the

Prohibition of Chemical Weapons (OPCW) has determined, after a thorough investigation of munitions remnants, samples, testimonies, and documentation, that there are reasonable grounds to conclude that the Islamic State in Iraq and the Levant (ISIL) used sulphur mustard, a banned chemical warfare agent, in attacks on Marea, Syria on September 1, 2015, using modified artillery projectiles.

This issue of the CBW Magazine also comprises other features like ChemicalBiological News. With our readers' feedback, we wish to publish issues in the future that focuses on a subject of particular concern. Kindly address contributions and feedback to: cbwmagazineeditor@gmail.com.

Towards a International Biosecurity Education Network (IBSEN)

**Kathryn Millett, Malcolm Dando,
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Summary

The importance of a globally relevant and continually evolving biological security education is a crucial component of improving biosecurity, and the need for systematic and sustained education for life scientists has been recognised in the past. In this article, we have specifically analysed the structure, approach and lessons learned from the International Nuclear Security Education Network (INSEN) and work of the Advisory Board on Education and Outreach (ABEO) of the Organisation for the Prohibition of Chemical Weapons (OPCW), and propose a similar structure for an International Biological Security Education Network that could be applied to the establishment of a comparable network for biosecurity education for civil society and the Biological and Toxin Weapons Convention (BTWC) to adopt.

Introduction

Although great efforts have been made to promote biological security awareness and education from State Parties and civil society, the progress is still very slow and without an effective and agreed implementation plan. However, State Parties to the Biological and Toxin Weapons Convention (BTWC) have reached a consensus agreement that a radical change in how science and technology is dealt with under the Convention must be a major decision during the current inter-sessional period up to the 10th Review Conference. One such effort is a repeated focus on scientific and technological developments relevant to the Convention and the setting up of a science and technology review mechanism for the Convention. The scientific community has helped to facilitate the negotiation and development of the BTWC for many years and could play a further important role in this effort.^{1,2} A recent workshop organised by the Biosecurity Research Centre, London Metropolitan University, brought together experts from civil society and officials from Geneva to discuss how to move forward in the new inter-sessional process, i.e., presenting as Guests of the Meeting, participating in Side Events and making specific Statements.³ Yet, it was also clear that the international scientific community needs to coordinate more effectively to help clarify important issues such as effective methods of oversight of potential dual-use research, codes of conduct for scientists under the Convention and effective biosecurity education for life scientists. This article, analyses the security education frameworks employed in the nuclear and chemical fields and lay out the case for establishing an International Biological Security Education Network

(IBSEN) as a key element in efforts to cultivate a robust culture of responsibility among life scientists.

Comparable approaches implemented in analogous frameworks in the nuclear and chemistry fields

Building a culture of responsibility within the life sciences with education as its foundational base is a complex, but necessary undertaking, requiring sustained commitment and active participation across a broad array of stakeholders, including, but not limited to, national governments, scientific and technological communities, academia, research institutions, educators, professional scientific organisations and associations, funding bodies, industry, and civil society. It is also clear that developing appropriate and effective educational materials that can apply across many life science disciplines - and embedding them as much as possible within the multitude of educational institutions worldwide - is a daunting task. However, as Novossiolova and Pearson noted in 2011, looking to analogous educational frameworks already successfully in place in similar fields is a useful starting point.⁴ The work of the International Nuclear Security Education Network (INSEN) of the International Atomic Energy Agency (IAEA) and of the Advisory Board on Education and Outreach (ABEO) under the Organisation for the Prohibition of Chemical Weapons (OPCW), provides useful models and lessons for consideration in building a similar framework for biosecurity education.

IAEA Nuclear Security Culture and the International Nuclear Security Education Network (INSEN)

The IAEA has long recognised the importance of a robust security culture in which education and training programmes

play an integral part in creating an overall safety and security culture across the nuclear field.⁶ A nuclear security culture is defined as "[T]he assembly of characteristics, attitudes and behaviour of individuals, organizations and institutions which serves as a means to support and enhance nuclear security"⁷ and emphasises the fundamental role played by training and education in its establishment and sustainability.⁸

Instilling the correct beliefs and attitudes throughout facilities lies at the core of a universal and sustained nuclear security culture - a key problem that still besets biosecurity efforts within the life sciences communities.⁹ This involves making sure that all relevant parties understand that i) a credible threat exists and ii) nuclear security is important in preventing that threat from emerging.¹⁰

Following its first articulation of the importance of a security culture in 2000,¹¹ the IAEA has since instituted a continuously updated series of documents since 2006, entitled *the IAEA Nuclear Security Series*, which provides "international consensus guidance" on all aspects of nuclear security.¹² Under this Series, the Agency has published several documents related to developing educational courses to build nuclear security culture.¹³ Having noted in 2008 that "a systematic approach to training and qualification [is needed]... for an effective nuclear security culture",¹⁴ the IAEA first published technical guidance in 2010 on a university-level model educational programme, which has since been updated in 2021.¹⁵ The model curriculum was created in consultation with academic experts and aimed at Master's degree level or an academic certificate programme, for use by university curriculum developers and others, in their educational institutions.¹⁶

Strengthening education and awareness-raising as the prime factor in establishing a flourishing nuclear security culture was further reinforced in 2010, with the establishment of the International Nuclear Security Education Network (INSEN).¹⁷ The INSEN is a partnership between the IAEA and universities, research institutions and other stakeholders, "to promote sustainable nuclear security education."¹⁸ Established during an IAEA workshop on nuclear security education to discuss how better to assist States in this area, the network aims "to enhance global nuclear security by developing, sharing and promoting excellence in nuclear security education" in support of which, the network collaboratively develops and shares educational and professional development materials for students and faculty.¹⁹ To date, their activities have included, inter alia, the development of, and quality assurance on, peer-reviewed textbooks and computer-based teaching tools, the establishment of faculty and student exchange programmes, surveys on the effectiveness of nuclear security education, and the development and implementation of specialised degree programmes and courses, in addition to sponsorship of professional development courses.²⁰

In terms of structure, the membership of the network is informal and open to any educational and research institution or competent authority interested in, involved in, or planning, future nuclear security education, and currently counts 198 members from 66 countries and international organisations.^{21,22} The network currently comprises three working groups that meet annually and focus on "exchange of information and development of teaching materials for nuclear security education" (Working Group 1), "Faculty development and cooperation among universities" (Working Group 2), and "promotion of

nuclear security education" (Working Group 3). In addition to the Working Groups, *Ad Hoc* Groups are convened when necessary to address issues on nuclear security education that transcend the mandate of INSEN Working Groups. During annual meetings, members review the activities of the Working Groups, discuss and identify issues to be addressed, and collectively task Working Groups to create actions plans accordingly. The Chairperson of the meeting is elected for a year.

The IAEA supports INSEN by convening the annual meetings, compiling subjects for discussion in consultation with INSEN members, and reporting on the implementation of activities. The IAEA also hosts and maintains the INSEN online hub on its restricted Nuclear Security Information Portal (NUSEC), which provides INSEN with the infrastructure for promoting, managing, disseminating, and preserving nuclear security; for communication and exchange of information; and for storing information and establishing databases with relevant materials. The IAEA also organizes meetings for its Working Groups and provides a crucial role in promoting and disseminating the work of the Network to its member states.

Chemical Weapons Convention and the Advisory Board on Education and Outreach (ABEO)

Almost since its inception, the Organisation for the Prohibition of Chemical Weapons (OPCW) has recognised and promoted the role of education and outreach as essential for the future implementation of the Chemical Weapons Convention (CWC) and in preventing the re-emergence of chemical weapons. The OPCW's efforts began in 2001 with the launch of the Ethics Project that aimed to increase awareness of the OPCW and its objectives among relevant professions

and in higher education. It has since expanded and evolved due to the establishment firstly, of the Temporary Working Group (TWG) on Education and Outreach under the Scientific Advisory Board (SAB)²³ in 2011, and secondly, the Advisory Board on Education and Outreach (ABEO) in 2015.^{24, 25}

In its Final Report in 2014, the SAB Temporary Working Group emphasised that education and outreach are integral components of preventing the re-emergence of chemical weapons, and made two key recommendations:²⁶ 1) Education and outreach with respect to the responsible use of science, particularly as it is relevant to the Convention, should remain a core activity of the OPCW, so as to achieve and maintain a world free of chemical weapons; and 2) An ongoing expert advisory group on education and outreach with respect to the responsible use of science, particularly as it is relevant to the Convention, should be established to help the OPCW fulfil its mandate for education and outreach, and to ensure that activities and practices are grounded in science education and communication research findings and effective practices.

Accordingly, in 2015, States Parties decided to establish the ABEO with a mandate to advise the Director-General or States Parties on matters of education, outreach and awareness-raising, and public diplomacy concerning the Chemical Weapons Convention (CWC) and its international and domestic implementation in relation to States Parties and key stakeholder communities.²⁷ The Board comprises a gender- and geographically-balanced membership of 15 individuals drawn from CWC States Parties with appropriate expertise in subjects such as education, science communication, the chemical industry, dual/multiple-use issues related to chemistry and the life sciences, and ethics and the Chemical Weapons

Convention. Each member serves as an independent expert.

The Board operates at very low cost, meeting twice a year in person at The Hague with funding provided under the annual OPCW general budget for flights, hotels and per diems. Additional external funding for specific projects can also be sought. To facilitate communication between Board members between meetings, the OPCW hosts an electronic discussion platform which also allows for hosting sub-groups in which ABEO Members, as well as observers, can develop ideas and discuss working papers on topics decided at preceding meetings.²⁸

In line with its Strategic Plan, the ABEO has focused on activities that meet its key education and outreach (E&O) goals, namely: (a) Provide advice on E&O activities to the Director-General, and to States Parties and other stakeholders that is effective, sustainable, cost-effective, and benefits from the latest advances in E&O theory or best practice; (b) Develop a portfolio of E&O activities and projects that benefits the broadest range of stakeholders; (c) Increase awareness of the work of the OPCW among key target audiences, particularly non-specialised audiences; and (d) Improve the reach of the OPCW's activities, also through e-learning, both at the national and regional levels, including through the systematic translation of materials into the OPCW's official languages.²⁹

Among its first activities, the ABEO produced a number of recommendations on activities to be undertaken by the OPCW such as the publishing of a dedicated webpage for the CWC's 20th Anniversary Year along with a series of commemorative events, and youth outreach and engagement of civil society during sessions of the Conference of the States Parties. Working Groups were established to a) consider how

to assist National Authorities with carrying out education and outreach activities; and b) engage specific stakeholder communities such as scientific associations, industry, and professional organisations; as well as ways to engage with other international organisations in promoting peace and disarmament education and youth outreach. Currently, the Board will also continue to focus on the following: e learning, raising awareness of the OPCW's mission worldwide, providing assistance to National Authorities upon their request, and connecting with the chemical industry, academia, and professional associations.³⁰

While mainly an advisory body and often called upon to provide advice on specific issues by the Director-General of the OPCW Technical Secretariat, such as developing a portfolio of specific E&O activities and projects that the Organisation, States Parties, that the ABEO and its individual members should pursue as a matter of priority, the ABEO has initiated and produced, or provided substantive input to shape a wide range of educational and outreach enterprises at the OPCW including, *inter alia*, factsheets, educational videos, course modules and materials, OPCW display materials at its Visitor Centre and for events such as commemorating the centenary of the first large-scale use of chemical weapons at Ieper in Belgium.

Key lessons from the INSEN and ABEO for an international biosecurity educational network (IBSEN)

As pointed out by Perkins *et al* in 2019:³¹ “to improve the culture of biosafety, biosecurity, and responsible conduct, the life sciences will have to pay more attention to lessons learned in other fields and to adapt those tools and frameworks to the life sciences context.” Experiences from the INSEN and ABEO demonstrate the utility

of creating bodies that focus on the creation and rolling evolution of educational and awareness-raising materials, and especially the impact of international networks that collaborate and share materials in close collaboration with treaty regimes.

An examination of the activities and set-up of INSEN and the ABEO provides a number of key lessons that should inform considerations on the establishment of an international biosecurity education network (IBSEN). It is worth noting that a number of these lessons overlap with the lessons from past biosecurity education and awareness-raising activities identified in the *WHO Global Guidance Framework (2022)*³².

Key components of the success of the INSEN are the IAEA and States' full appreciation that nuclear security is first and foremost a national responsibility, and that human resource development and a robust nuclear security culture are key factors in preventing the misuse of nuclear and radiological materials and knowledge.

The IAEA has consistently incorporated support for nuclear security education within its Strategic Plans as one of its core activities.^{33, 34} Similarly, while slower to fully link education and awareness-raising efforts to the success of chemical security, the OPCW has recognized that “public engagement, education, and awareness-raising” must become “an integral part of OPCW activities”³⁵ and over time has developed a number of resources including e-learning modules (that are currently under revision with the input of the ABEO), the FIRES Documentary Video Project, and the Multiple Uses of Chemistry website of resources for students and educators.³⁶

Without sustainable financial support, education and outreach efforts cannot provide necessary up-to-date educational

and training materials, hold valuable workshops and training events, and achieve maximum reach and effectiveness. The IAEA has integrated financial support for the INSEN into its General Budget and provides in-kind support such as hosting and organizing INSEN meetings. In 2023, the planned budget line for the sub-programme on "education and training programmes for human resource development", which includes support for INSEN as well as the funding for the development of materials, totalled •454,524.³⁷

The OPCW also financially supports the work of the ABEO, but its lack of direct financial support beyond funding in-person ABEO meetings has hindered the development of new materials and broader engagement with relevant stakeholders, such as industry and educational establishments. A report by the ABEO in 2021 stressed a significant weakness affecting the work of the Board was the lack of secure funding for activities which contributed to 'a sense of inability to perform serious long-term tasks that require human, financial and institutional expenditure' and a "barrier to undertaking E&O activities".³⁸ Indeed, it was pointed out that certain costs related to ABEO work were borne by ABEO members themselves, which is somewhat shocking when taking into consideration that the OPCW's overall budget totalled •75,988,858 for 2023.³⁹ Lacking a dedicated budget line for active projects, the ABEO has relied on external funding sources for some projects. For example, the EU Council Decision 2019/538 is providing funding for "a tailored programme for education and outreach on chemical safety and security management for youth/students in schools/universities in the context of the peaceful uses of chemistry" and support for ABEO advice on the design and execution of new e-learning modules.⁴⁰

The development and implementation of a comprehensive strategic plan with clear goals and priorities, focused energy and resources, and set responsibilities and pathways for communication between relevant stakeholders is essential to provide direction and put effective education, awareness-raising, and outreach activities into practice.

The INSEN meets annually to set priorities, review, and provide updates on activities, and organise future work of its Working Groups, in light of the needs identified by network members and in support of the IAEA Nuclear Security Plan. In this way, INSEN is able to fluidly adjust and redirect its resources to where they are most needed and continues to ensure that all stakeholders are working towards a common goal.

The ABEO, however, as an Advisory body, is more reactive in that it is able only to respond to *ad hoc* requests from the OPCW Director-General, Technical Secretariat and States Parties. This lack of a clear strategy and its detrimental effect has also been noted within the OPCW itself with regard to its education projects:⁴¹ "the development of the Organisation's external e-learning offering had occurred in an ad hoc way, with relevant units required to independently identify needs and funding for new modules. This resulted in an external e-learning offering that lacked a certain overall coherence and was aimed at a limited range of external stakeholders. The fact that the Organisation had no internal expertise on e-learning compounded this issue."

In addition, without clear, regular lines of communication, defined responsibilities and mechanisms for engagement between all the relevant stakeholders within networks and the treaty regime it supports, any initiatives undertaken risk being hampered.⁴²

Part of the INSEN's success has been due its extensive and broad membership. As an open network, the network has expanded year on year to its current membership of almost 200 institutions across all geographical regions, with more than 80 per cent providing nuclear security education at their home institutions. The 2022 INSEN annual meeting featured presentations from over 20 INSEN members from different countries and its annual rotation of Chairs and Vice-Chairs of the Network and Working Groups ensures continued geographically-diverse engagement. The appointment of Regional Group Representatives helps highlight regional perspectives and priorities, while meetings of the regional groups provide opportunities for regional collaboration. The openness of the Network to any relevant institution that implements or plans to implement nuclear security education ensures that the nuclear education field as a whole is kept apprised of efforts worldwide and encourages innovation and new approaches from across the world.

Equally important is the ability to engage with a wide variety of stakeholders from target audiences such as students, teaching faculty and National Authorities to liaison with States, media, research councils, relevant science and technology communities, industry, civil society, professional societies and associations and others.⁴³ The flexibility and ability to liaise with stakeholders is especially important in relation to a biological security education network due to the breadth of disciplines within the life sciences and the dynamic pace of advances.

The INSEN meetings and ABEO members' presentations at OPCW meetings demonstrate that these meetings present an opportunity for educators to share knowledge and discuss best practices

amongst each other as well as with international organizations and agencies. They discuss, compare, and learn from each other, and establish links and collaborations. They also serve to keep each other apprised of key issues in the nuclear and chemical security fields, such as developments in science and technology that affect the security environments, and bring support to bear on important issues such as the promotion of gender and diversity. They share information on curricula, teaching methodologies and exchange, identify priority topics both internationally and regionally. Together, the IAEA and INSEN have spearheaded efforts to encourage gender parity through initiatives such as the Women in Nuclear Security Initiative (WINSI) and the Marie Skłodowska Curie Fellowship Programme since 2016.

Discussion and Conclusion

The decision at the 2022 Biological Weapons Convention Ninth Review Conference to establish a new "Working Group on the strengthening of the Convention" with a mandate to address issues including "Measures on national implementation of the Convention", presents a renewed opportunity to take decisive action to pioneer new biosecurity education and awareness-raising initiatives. Founding and sustainably funding an International Biosecurity Education Network-a concept already supported by a number of experts-would be a significant step forward in heightening biological security and ensuring that life scientists have the tools and knowledge to realise their obligations to prevent and mitigate the misuse of biology.⁴⁴ Last but not least, the continuous and creative collective inputs from civil society would enhance biological security education and eventually catch up with the rapid advancements in science and technology.

Endnotes:

- ¹ Shang L, Dando M. (2023) Rethinking biosecurity in the 21st century: An enhanced role for civil society. *Journal of Biosafety and Biosecurity*, **5**(3):100-106
- ² Shang L, Sheff L and Dando M. (2023) A key role for scientists in strengthening the Biological Weapons Convention. *Front. Polit. Sci.* **5**:1265008. doi: 10.3389/fpos.2023.1265008
- ³ Magne I, et al. (2024) Toward a collaborative, collective and integrative international CBRN security education. London Policy Workshop. London Metropolitan University. 16 March, 2024
- ⁴ Novossiiova, T. and Pearson, G. S. (2011), *Biosecurity Education for the Life Sciences: Nuclear Security Education Experience as a model*, Bradford Briefing Paper No. 5 (University of Bradford). https://opbw.org/sbtwc/3_BP_5.pdf. (Page 4).
- ⁵ Similarly to the biological field, recognition of the human factor in causing incidents was a primary motivator in efforts to establish a safety culture within the nuclear field. The nuclear accidents at Three Mile Island (1979) and Chernobyl (1986) found human error in both design and operation to be key causal factors behind both incidents, which in turn led to a more concerted effort to establish a 'safety culture' at nuclear facilities. It was not until the 1990s that this concept began to be used in relation to nuclear security and took until 2008 until it was explicitly recognized that 'a human factor is generally a contributor to all nuclear-security related incidents' (see: International Atomic Energy Agency (2008), *Nuclear Security Culture: Implementing Guide*, IAEA Nuclear Security Series No.7. International Atomic Energy Agency, Vienna. ISBN 978-92-0-107808-7 (electronic version). https://www-pub.iaea.org/MTCD/publications/PDF/Pub1347_web.pdf. (Page 5).
- ⁶ International Atomic Energy Agency (2008), *op. cit.* (Page 1).
- ⁷ The IAEA framework for nuclear security culture contains 37 characteristics separated into beliefs and attitudes, principles for guiding decisions and behaviour, management systems, personnel behaviour and leadership behaviour. These are linked to over 200 associated performance indicators, which provide guidance for organisations looking to practically cultivate an effective security culture.
- ⁸ International Atomic Energy Agency (2021), *Technical Guidance: Model academic curriculum in nuclear security*, IAEA Nuclear Security Series No. 12-T (Rev.1). International Atomic Energy Agency, Vienna. ISBN 978-92-0-132820-5. https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1930_web.pdf. (Page 1).
- ⁹ International Atomic Energy Agency (2008), *op. cit.* (Page 19).
- ¹⁰ Ibid.
- ¹¹ *Ibid.* For a short history of the evolution of the IAEA's recognition, definition and endorsement of a nuclear security culture, see: International Atomic Energy Agency (2008), *op. cit.* (Pages 1-2).
- ¹² The IAEA issues four types of documents within its Nuclear Security Series: *Nuclear Security Fundamentals* (objectives, concepts and principles of nuclear security and providing the basis for security recommendations); *Recommendations* (best practices that should be adopted by States in the application of the Nuclear Security Fundamentals); *Implementing Guides* (further elaboration of the Recommendations in broad areas and suggested measures for their implementation; and *Technical Guidance* (Reference Manuals, with detailed measures and/or guidance on how to apply the Implementing Guides in specific fields or activities) as well as Training Guides that cover the syllabus and/or manuals of Agency training courses. See IAEA, Nuclear Security Series, <https://www.iaea.org/resources/nuclear-security-series>.
- ¹³ The IAEA's impetus to create a model academic programme was first embedded in its *Nuclear Security Plan 2006-2009* which emphasised "the importance of human resource development to assist States in building capacity to establish and maintain appropriate nuclear security to prevent, detect and respond to malicious acts involving nuclear and other radioactive material..." International Atomic Energy Agency (2006), *Implementation of the IAEA Nuclear Security Plan 2006-2009*. International Atomic Energy Agency, Vienna. <https://www.iaea.org/sites/default/files/nsplan0911.pdf>. Successive Nuclear Security Plans have continued to support educational and training activities.

- ¹⁴ International Atomic Energy Agency (2008), *op. cit.* (Page 1).
- ¹⁵ The IAEA's 2010 *Educational Programme in Nuclear Security* Technical Guidance (<https://www.iaea.org/publications/8363/educational-programme-in-nuclear-security>) was superseded by the 2021 *Model Academic Curriculum in Nuclear Security*. (International Atomic Energy Agency (2021), *Model Academic Curriculum in Nuclear Security*, Technical Guidance, IAEA Nuclear Security Series No. 12-T (rev.1), International Atomic Energy Agency, Vienna. ISBN 978-92-0-132720-8. <https://www.iaea.org/publications/13608/model-academic-curriculum-in-nuclear-security>). Other key publications on education include: *Safety Culture in Nuclear Installations: Guidance for Use in the Enhancement of Safety Culture*, IAEA-TECDOC-1329, IAEA, Vienna (2002); *Nuclear Security Culture*, IAEA Nuclear Security Series No. 7 (2008); *Objective and Essential Elements of a State's Nuclear Security Regime*, IAEA Nuclear Security Series No. 20 (2013); and, *Building Capacity for Nuclear Security*, IAEA Nuclear Safety Series No. 31-G (2018). There are also a number of training guides focused on developing professional capacities within specific nuclear areas. These can all be accessed at: <https://www.iaea.org/resources/nuclear-security-series>.
- ¹⁶ International Atomic Energy Agency (2021), *op. cit.* (Page 2).
- ¹⁷ The importance of collaborative networks in nuclear security education has enjoyed high levels of support for over 10 years as evidenced by the IAEA Ministerial Declarations from the 2013, 2016 and 2020 International Conferences on Nuclear Security. See, for example, the *Ministerial Declaration from the 2020 Conference*: <https://www.iaea.org/sites/default/files/20/02/cn-278-ministerial-declaration.pdf>.
- ¹⁸ International Atomic Energy Agency, International Security Education Network: <https://www.iaea.org/services/networks/insen>.
- ¹⁹ *Ibid.*
- ²⁰ *Ibid.*
- ²¹ See https://inis.iaea.org/collection/NCLCollectionStore/_Public/45/070/45070873.pdf?r=1
- ²² International Atomic Energy Agency and International Nuclear Security Education Network, *Chair's Report*, Annual Meeting of the International Nuclear Security Education Network. International Atomic Energy Agency, Vienna. 18-22 July 2022. <https://www.iaea.org/sites/default/files/22/11/insen-chair-report-2022.pdf>.
- ²³ Organisation for the Prohibition of Chemical Weapons (2014), *Education and Engagement: Promoting a Culture of Responsible Chemistry*, Final Report of the Scientific Advisory Board's Temporary Working Group. https://www.opcw.org/sites/default/files/documents/SAB/en/Education_and_Engagement-v2.pdf. (Page 6).
- ²⁴ Organisation for the Prohibition of Chemical Weapons (2015), *Establishment of an Advisory Board on Education and Outreach*, C-20/DEC.9. https://www.opcw.org/sites/default/files/documents/CSP/C-20/en/c20dec09_e_.pdf.
- ²⁵ For a full account of the history of education and outreach activities conducted by the OPCW since its establishment in 1997-2012, see: Organisation for the Prohibition of Chemical Weapons (2014), *Education and Engagement: Promoting a Culture of Responsible Chemistry*, Final Report of the Scientific Advisory Board's Temporary Working Group. https://www.opcw.org/sites/default/files/documents/SAB/en/Education_and_Engagement-v2.pdf.
- ²⁶ *Ibid.* (Page 7).
- ²⁷ Chemical Weapons Convention (2015), *op. cit.*
- ²⁸ See: Organisation for the Prohibition of Chemical Weapons, Advisory Board on Education and Outreach, *Statement by Dr Jean Pascal Zanders, Chairperson of the OPCW Advisory Board on Education and Outreach, to the 21st Conference of the States Parties to the Chemical Weapons Convention*, The Hague, 1 December 2016. https://www.opcw.org/sites/default/files/documents/CSP/C-21/en/20161201_opcw_csp21_abeo_statement_website.pdf.
- ²⁹ Organisation for the Prohibition of Chemical Weapons, Advisory Board on Education and Outreach, *Report of the Tenth Session of the Advisory Board on Education and Outreach*, Annex 2. ABEO-10/1. 10 February 2021. <https://www.opcw.org/sites/default/files/documents/2021/03/abeo-10-01%28e%29.pdf>

- ³⁰ Organisation for the Prohibition of Chemical Weapons, Advisory Board on Education and Outreach, *Report of the Fourteenth Session of the Advisory Board on Education and Outreach*, ABEO-14/1. 9 February 2023. <https://www.opcw.org/sites/default/files/documents/2023/04/abeo-14-01%28e%29.pdf>.
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Managing Emerging Disruptive Threats of Synthetic Biology

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Summary

Biology is the most powerful designing and manufacturing technology on the planet. A new stream of science called Synthetic Biology is further revolutionising it by redesigning organisms using the power of computing. Emerging trends in bio-design and generative design are set to alter the health, agriculture and energy space based on innovative ideas with unintended consequences and enhanced asymmetric threats. The 21st century will not be about programming computers but biology. The uncertainties surrounding the development of this dual-use technology have the potential to put humanity at risk. This fact is acknowledged by the Annual Threat Assessment Report 2024 published by the US Department of Defense (DoD) in February 2024. The era of Moore's Law is ending, but biology's exponentials are just beginning.

Destabilising Effects of Disruptive Technology

The 2024 Annual Threat Assessment (ATA) of the *US Intelligence Community Report* published by the US Department of Defense (DoD) in February 2024 talks about a robust intelligence response, including a near-term focus on managing the challenges posed by the new technologies in the fields of AI and biotechnology¹. The Report highlights the unintended consequences of Generative AI to both leaders and followers as it enters the industrial age. The new designs and discoveries could lead to rapid development in asymmetric threats. The world is moving fast, and we sit astride the most pervasive penetrative platforms of the planet being created out of the combination of ubiquitous connectivity of computing power and biotechnology. Crafting stability out of technological innovation in a fiercely competitive world seems elusive. The world, which is enduring endless conflict, is now besieged with destabilising prospects in the absence of a legal framework to arrest the unethical use of new-generation technology.

The idea of replacing brain power with machine power makes the future seem scary as it tries to unravel the neural network and genome modelling as part of a human augmentation project. It creates yet another vulnerability to the human existence of a "hackable human". The COVID-19 contagion has shown the world how a biomaterial, if not handled well and with no monitoring mechanism, can spoil a century of economic development in months. Toby Ord, in his book *The Precipice*, has quantified the probability of existential risks from future technologies as being roughly 100 times larger than the natural risk² (refer to Table 1).

Table 1: Existential Risk Landscape and Probabilities³

Natural Risk	Probability in the Next 100 Years	Manmade Risk	Probability in the Next 100 Years
Climate Change	1 in 1000	Nuclear War	1 in 1000
Naturally arising Pandemic	1 in 10,000	Engineered Pandemic	1 in 30
Environmental Damage	1 in 1,000	Unaligned AI.	1 in 10
Super Volcanic Eruptions	1 in 10,000	Unforeseen Anthropogenic Risks	1 in 30

Understanding Synthetic Biology

In 1952, the first X-ray picture of double helix DNA captured by Rosalind Franklin showed it as a twisted ladder of paired “letters” made up of molecular code in terms of A’s, T’s, C’s, and G’s, unlike the binary computer code of 0’s and 1’s. It implied that someday, it would be possible to read and write these codes.⁴ In 1971, Paul Berg’s breakthrough gene-splicing experiment was followed by the development of recombinant-DNA (rDNA) technology in 1973 by Herbert W. Boyer and Stanley N. Cohen. This technology aimed at artificially introducing genetic material from one organism into the genome of another and then replicating it. Despite the controversy surrounding the public fear of cloning, it prompted the mushrooming of commercial startups to capitalise on Boyer and Cohen’s new rDNA technology. It was at this time that the IT companies were also emerging. Bill Gates and Steve Jobs, revolutionised information technology by packing greater computing power with every new product launch. From bits to qubits, the advent of quantum computing has exponentially added wings to the tools for DNA writing. The physical-to-digital-to-physical (PDP) loop based on high-performance computing, natural language processing and analytics, cognitive technologies, advanced materials, and augmented reality have enabled the simulated testing of predictive models. It is

redefining the physical and digital technologies.

Steve Jobs, while undergoing treatment for pancreatic cancer, once remarked that the biggest innovations of the 21st century lie at the intersection of biology and technology.⁵ Synthetic biology came into being as a multidisciplinary field at the dawn of the 21st century. The combination of principles from biology, engineering, and computer sciences is used to design and manufacture new biological systems or redesign existing ones for specific purposes or with new abilities.

Key techniques in synthetic biology include the synthesis of artificial genetic pathways called DNA synthesis, targeted genome editing (e.g., CRISPR-Cas9), DNA printing that allows long pieces of DNA to be written from scratch and metabolic engineering. However, this field is evolving at a frantic pace, and challenges remain in creating a web of registries of different bio-labs, standardised rules and models to understand the root structure. The software standards are also different. The complex nature of data interpretation needs a different type of software code rather than following the simple data table design. More importantly, it requires better visualisation tools and the ability to debug and redesign.

As synthetic biology has applications across various fields, including medicine, it holds the

potential to address pressing challenges related to sustainable development. The ecosystem requirement to support this niche bio-technological field is humungous and needs large capital investment and governmental support. The cost of reading DNA has fallen more than a million-fold since the completion of the Human Genome Project twenty years ago. An interesting thing being talked about is that the 21st century will not be about programming computers but biology. A new law like the Moore’s Law is under scripting as the exponential explosion in quantum computing and the bio-engineering world is set to revolutionise life processes.

Threats from Synthetic Biology

The design-build-test simulation models are maturing to such an extent that the artificially rearranged genetic elements built

from DNA based on molecular code can be introduced into a living organism. These recreated micro-organisms can, in theory, do many of the same things that industrial processes can do, i.e., to convert sets of human needs into a physical object that fulfils those needs. These new DNA act as an additional “programme” that can harness the machinery in the micro-organisms like bacteria to make new fuels, therapeutics, biodegradable materials, or even biosensors. While it may take some time for these products and processes to be commercially available, an entire ecosystem of companies in the leading nations across the globe is working to revolutionise the material world.

A NATO report about the Bio and Human Enhancement Technologies (BHET) horizon 2023-2043, provides a glimpse of how synthetic biology and associated technology will impact humanity (refer to Table 2).

Table 2: Bio and Human Enhancement Technologies (BHET) 2023-2043

Emerging & Disruptive Technology	Technology Focus Areas	Impact	Technology Readiness Level	Horizon
BioTech	Bio-engineering & Genetics	High	5-6	2030-2035
	Bio-informatics	High	7-8	2025-2030
	Bio-manufacturing	High	3-4	2030-2035
	Bio-sensors & Bio-electronics	High	3-4	2030-2035
	Cognitive Enhancement	Revolutionary	3-4	2035 or (+)
	Human-Machine Symbiosis	Revolutionary	3-4	2035 or (+)
	Physical Enhancement	High	5-6	2030-2035
	Social Enhancement	High	5-6	2030-2035

Hence, the following risks against the potential benefits of this powerful technology need examination:

- **Accidental or Deliberate Release:** Accidental or intentional release of engineered harmful or disruptive organisms from labs or production facilities poses risks to human health, agriculture, and ecosystems.
- **Environmental Impact:** The unintended environmental consequences of engineered organisms can disrupt natural ecosystems through horizontal gene transfer (where genes

are exchanged between organisms), or they can become invasive species.

- **New Arms Race:** Strategic stability is related to arms control agreements. The proliferation of nuclear and chemical weapon systems was controlled largely due to the inspection and verification model instituted in them. However, the COVID-19 threat has exposed biosecurity and highlighted the failure of Biological Warfare Conventions (BWC) in regulating biomaterials, which pose a grave threat to humanity. Similarly, nation-states, to draw a first-mover advantage, are reluctant to promote control regimes.
- **Proliferation Risks:** The dual-use system developed by State and private enterprises is fraught with the risk of proliferation. The “dark web” has emerged as an unregulated space where biological resources can be accessed and used for illegal purposes. *The Economist* article published on 25 April 2020 titled “Spore Wars”, highlighted the concern that bioweapons similar to COVID-19 or toxicants like ricin could be procured through the dark web.⁶
- **Unregulated Development:** In 2024, the Berkeley-based startup Profluent trained an AI to imagine new, never-before-seen CRISPR proteins — opening the door to gene editors with capabilities beyond what we have found in the wild. They are also making a brand new CRISPR system open source, so any scientist can now start leveraging an AI-designed gene editor to advance their research.⁷ Profluent’s new platform resembles ChatGPT for genetic technology.
- **Unethical Use:** The world worries that synthetic biology could be used for

unethical purposes in the hands of non-state actors or lone wolves by creating or proliferating harmful engineered life.

- **Lack of Knowledge:** Synthetic biology is a relatively new field, and predictive modelling is not yet mature enough to fully understand the potential risks of engineering organisms. This lack of knowledge makes it difficult to assess and mitigate risks.

The dual-use nature of Synthetic Biology innovations has brought together individuals, companies, and institutions of governance in a collaborative and competitive mode. The participation of State and non-State groups has added a new security threat that has the prospect of altering the balance of power. The probability of incentivising risk-taking by State or non-State groups due to strategic instability needs to be factored-in while formulating an international security framework. Countries like the US, China and Russia are trying to increase the strategic space of the contest. Biomaterials are being developed as a non-nuclear deterrent as it is being perceived as the new strategic high ground by these countries. COVID-19 has demonstrated a threat to governments when societal cohesion is put at risk. China, as a consummate practitioner of grey zone contest, has already made deep inroads in this technology.

Brief Analysis of Biosecurity Regulations of Leading Countries

How to balance the healthy development of biotechnology and biosafety issues has become a challenge not only for the UN Biological Weapons Convention (BWC) but also for advanced countries that are heavily invested in synthetic biology. All leading countries around the world have attached significant priority to biosecurity issues, primarily after COVID-19. A brief look at the

biosecurity regulations of leading countries like China, the US, NATO and Russia shows the importance and priorities being given to the field of biotechnology.

China

- In October 2019, China wanted to bring legislation on biosecurity, but COVID-19 delayed it.⁸ In February 2020, during the onset of COVID-19, Xi Jinping called for strengthening the system and capacity building of epidemic prevention and control and scientific research on public health. He emphasised concentrating nationwide resources to double down on key and core technology research and urged breakthroughs in developing high-end medical equipment to accelerate fixing the country's "weak link" in this sector.⁹ Finally, on 21 April 2021, the Act was passed by the 22nd Session of the Standing Committee of the 13th National People's Congress of China.
- The Biosecurity Law is divided into ten chapters, giving general requirements and specific management requirements for different biosecurity issues like the security of biotechnology laboratories, human genetic and biological resources, biosecurity capacity building, prevention of bio-terrorism and threats and legal liabilities with punitive measures. It lists 11 basic systems to be employed by the State Council and military based on the charter. These are: (a) establishing a National Biosecurity Work Coordination Mechanism (NBWCM) for biosecurity coordination, (2) NBWCM will be staffed by departments of health, agriculture and rural affairs, science and technology, and foreign affairs of the State Council, and relevant military organs, (3) biosecurity catalogue and list system, (4) biosecurity standard system, (5) biosecurity information release and

media reporting mechanism, (6) emergency reform system, (7) information and source tracing system, (8) national access system to screen first-time entry of animals, plants and high-risk biological agents, (9) response system for major overseas biosecurity incidents, (10) biosecurity supervision and inspection by professionals and (11) conduct biosecurity risk investigations and assessments.¹⁰ For Xi and the PLA, this is an idea of strengthening the defence in depth and creating a non-nuclear deterrent.

The US and NATO

The US Departments of Homeland Security (DHS) and Commerce work with the White House Office of Science & Technology (S&T) Policy to deploy countermeasures equipment for the protection of life, health, property, and commerce. It released the *National Strategy for Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) Standards*, incorporating the federal vision and goals for the coordination, prioritisation, establishment, and implementation of CBRNE equipment standards by 2020¹¹. The US S&T Directorate's focus areas in biotechnology remain two-fold: firstly, to monitor the worldwide biotechnological developments in life sciences and understand new opportunities that the US adversaries may misappropriate for offensive use and how the US can harvest them for defensive use. Secondly, to strengthen Homeland Security and Department of Commerce capabilities for quick detection and identification of hazardous biomaterials.¹²

The *2023 Biodefense Posture Review* by the US Department of Defense (DoD) lays out the strategic approach to counter biological threats and improve preparedness for bio-incidents. It assesses the biothreat landscape

through 2035. It clarifies biodefence missions, priorities, roles, responsibilities, authorities, and the capabilities needed to enable biodefence and how the DoD is addressing future biothreats by aligning its doctrine, role, structure, research and development and acquisition with the US 2022 National Biodefence Strategy (NBS). The Review acknowledges the threats posed

by China, Russia, North Korea, Iran, and violent extremist organisations. Accidental and deliberate biological threats have been compounded by the advances in synthetic biology and peptide synthesis, which have made the development and use of biological agents as weapons easier and difficult to detect. It also lists measures to mitigate the threats (refer to Figure 1).

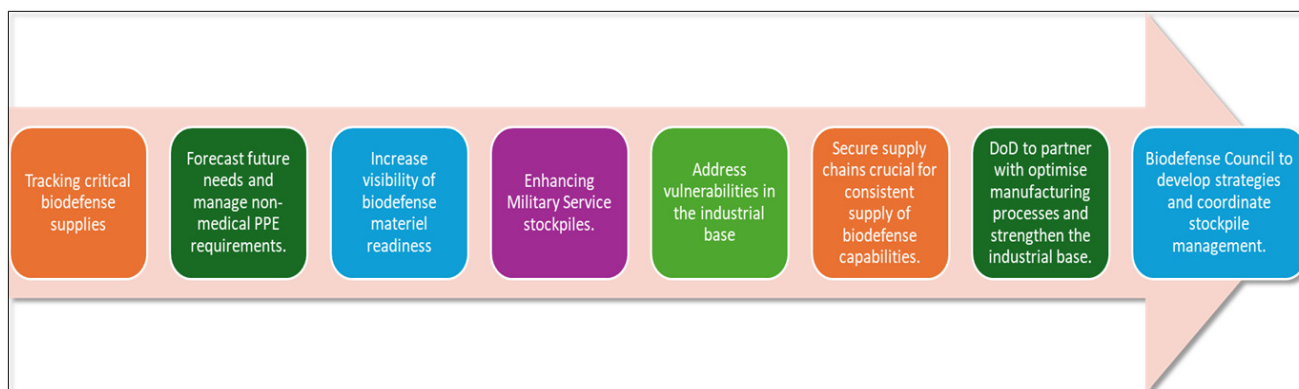


Figure 1: Measures to Mitigate Threats¹³

- The capabilities and threats that the field of synthetic biology poses are not trivial. According to NATO, the strategies and implementation of biotechnology and human enhancement technologies over the next few years will be the most challenging. The Pentagon and NATO are exploring the pattern of development of the new environment surrounding synthetic biology and other CBRNE issues.
- NATO's Allied Command Transformation is using a vast network of military and civil expertise in defence and academia to transform NATO's defensive capabilities for current and future security environments in the use of dual-use biotechnologies.¹⁴
- The US has established a National Biodefense Analysis and Countermeasures Center (NBACC) with fully accredited, state-of-the-art biosafety levels (BSL) 2, 3, and 4 lab

facilities, spread across a 160,000 square-foot facility and 51,927 square feet of lab space. It houses two centres, the National Bioforensic Analysis Center (NBFAC), for technical analyses to support law enforcement investigations and the National Biological Threat Characterization Center that undertakes experiments and studies to examine biological vulnerabilities and hazards. Together, these Centres act as a national resource for risk mitigation against the malicious use of pathogens while supporting investigations, prosecutions and preventing biocrimes and bioterrorism. The BSL-4 accreditation allows NBACC to perform R&D on pathogens for which there are no vaccines or treatments available.

Russia

- The 2021 Russian Security Strategy signed by President Putin gives special

impetus to the development of scientific and technological prowess of the Russian Federation. Out of 24 objectives laid out, three deal with efforts to increase scientific research in the field of biological, radiation and chemical safety. Placing Russia at leading positions in chemical, biological, medical, and pharmaceutical fields remains the focus. It also lists out high technologies like medical, biological, genetic engineering, artificial intelligence, big data processing, creation of new materials, cognitive technologies and supercomputer systems, to improve the Russian biodefence mechanism.¹⁵ On the foreign affairs front, it lists the need for strategic stability by preventing non-proliferation mechanisms for weapons of mass destruction and calls for responsible behaviour mechanisms in the creation and use of biotechnology.¹⁶

- On 30 December 2020, Federal Law 492 on the Biological Safety of the Russian Federation was signed by President Putin to prevent biological threats due to the lack of monitoring of biological processes in microbiological laboratories while working with any infected material. The Law regulates the legal aspects surrounding biosafety issues. It lists measures to mitigate risks related to the spread of infections due to accidents, bioterrorist acts and sabotage. There are 17 stipulations in the Federal Law related to ensuring biosafety, biosafety activities, powers within the State's organs and local self-government organs in biosafety. The Law also covers the collection and preservation activities involving pathogenic micro-organisms and viruses, preventive measures at the laboratories and other intentional biological risks caused due to uncontrolled hazardous technical activities or terrorist acts. It lays out the

government's information system about biosafety, the legal framework for violations, and the procedures for enforcement.¹⁷

India's Biotechnology Strategy

The Department of Biotechnology (DBT) is the nodal department under the Ministry of Science and Technology that deals with biotechnology in India, and is headed by a secretary-level officer. The department came into being in 1986. Initially, it had to encounter challenges related to research publication quality, lack of industry collaboration and problems in procuring equipment and reagents for the labs¹⁸. The DBT's mandate is ten-fold. Most of it relates to the development of business through R&D and academia-industry-international collaborations. It is also assigned the task of formulating Bio-Safety Guidelines related to the manufacture of cell-based vaccines.¹⁹

Over the past two decades, the DBT has brought in three Strategy Papers to invigorate the biotechnological ecosystem in India. The third Strategy Paper was to guide India post the COVID-19 pandemic between 2021 to 2025. It has been bullish on India's strength of a large scientific and engineering pool, a vibrant pharmaceutical industry with highest USFDA-approved cost-effective manufacturing outside the US, a large number of national research laboratories, centres of academic excellence in biosciences, biotechnology parks, a rich human gene pool, and growing numbers of biotech startups. However, it has listed certain areas that need to be addressed and regulated. These include contract research and clinical trials, the building of strong research partnerships, a requirement of large venture capital for high-risk sciences and quality assurance based on international standards.²⁰ The standards in this field are constantly evolving, but the vision document has failed to guide R&D

institutions in collaborating and creating critical standards and software essential to aggregate repository data.

The Strategy Paper also talks about developing a sustainable Indian model for biotechnologies to spur knowledge-based bioeconomy growth to the next level. It aims to place India among the top five global biomanufacturing hubs by 2025, with an aim to achieve a growth of US\$ 150 billion.²¹

What has India done

India's proactive battle to combat COVID-19 was successfully spearheaded by the DBT and implemented through a dedicated Mission Implementation Unit at the Biotechnology Industry Research Assistance Council (BIRAC). It was complemented by the National Bio-Pharma Mission (NBM) and Ind-CEPI Mission, which facilitated the COVID-19 Vaccine Development Mission diagnostics and therapeutics efforts, enabling seven vaccine candidates by industry, eight candidates by academia and nine COVID-19 testing Hubs by creating biorepositories with more than 40,000 samples available to researchers and industry, development of therapeutics from natural products in partnership with Ministry of AYUSH supporting nearly 50 startups.²²

India has taken baby steps to reinvigorate its research and innovation base. The 2023 National Research Foundation (NRF) Bill has sown the seed to promote and foster this culture in India's universities, colleges, research institutions, and R&D laboratories. The NRF is required to give high-level strategic direction to scientific research in the country by forging collaborations among the research institutions, industry, government departments, and academia, by creating interface mechanisms amongst participating industries and state governments besides

the scientific and line ministries. The policy framework and regulatory processes have been created to encourage collaboration and increased spending by the industry on R&D.²³ The Prime Minister as the ex-officio President, and the two Union Ministers of Science and Technology and Education as the ex-officio Vice-Presidents, provide the requisite policy push to the wide-ranging scope of the NRF, as its Governing Board consists of eminent researchers and professionals across disciplines.

The NRF is the apex body under the Department of Science and Technology (DST). It is set up at a total estimated cost of Rs. 50,000 crores during five years (2023-28). For the DST, it is a big shot in the arm as its annual revised budgetary allocation has been only Rs 4,892 crores in FY 2023-24, which has been revised to around Rs 8,029 crores for FY 2024-25, a whopping 40 per cent increase. R&D, innovation, technology development and deployment have been the key concerns of the government. A sizable amount of Rs 596 crores was allocated for R&D and Rs 536 crores for innovation. However, Rs 200 crores each has only been utilised as per FY 2023-24 revised estimates (RE), pointing to a gap in policy implementation. In FY 2024-25, the R&D budget has been scaled down to Rs 291 crores while that for innovations and technology development has remained unchanged at Rs 536 crores. Out of the Rs 50,000 crores outlay for the NRF from 2023 to 2028, only Rs 2000 crores has been earmarked for FY 2024-25, and Rs 258 crores out of the allocated Rs 2000 crores, could be spent in FY 2023-24. However, it is encouraging to see that the National Mission on Interdisciplinary Cyber-Physical Systems has been given an impetus in the FY 2024-25 budget with an allocation of Rs 614 crores as against FY 2023-24 RE of Rs

435 crores, and the National Quantum Mission (NQM) has been granted Rs 477 crores as against Rs 5 crores in 2023-24.²⁴

The DST initiated a focused programme, ‘Cognitive Science Research Initiative (CSRI)’, in 2008 to catalyse research in highly interdisciplinary areas of Cognitive Science and identified specific thrust areas in Cognitive Science, which include Foundations of Cognition Language and Cognition Computational Intelligence, Cognitive Psychology, Cognitive Neuroscience, and others. The CSRI encourages young and senior researchers to submit proposals in upcoming thrust areas of Cognitive Science.²⁵ However, no budgetary allocation has been made for this niche technology area. Though the Strategy Paper is more focused on evolving bioeconomy, it is silent on biosecurity.

India has done well by scaling up efforts. However, the scale and magnitude of research are getting exponentially vast and growing rapidly. The US and Chinese are moving fast to secure the areas related to standards and software architecture. In the coming decade, countries such as the US and China will lead a trillion-dollar Synthetic Biology industry that is set to disrupt energy, environment, health, agri-based, chemicals, and the food industry. The transformation is set to impact the production and supply chain, too, thus impacting the entire economy. BCG Henderson Institute analysis estimates that Synthetic Biology could affect almost 30 per cent of the global GDP, amounting to US\$ 28 trillion by 2030.²⁶ The reported market value of this industry is more than US\$ 17 billion, with an annual growth rate of 30 per cent.

What India Needs to Do

Geopolitical change, technological advancement, and concerns about the

potential emergence of globally catastrophic biothreats have spurred a need to better understand future threats and collaboratively address them. The COVID-19 pandemic has elevated the value of advancing biosecurity. India needs to partner with countries like the US to capitalise on lessons learned to spur better government-to-government collaboration and continue focusing on investing in innovative technologies and strategies to improve national biosecurity.

The Government of India’s support to the signing of the Biological Weapons Convention (BWC) was on the condition that the exemption related to biological agents or toxins was permitted for prophylactic, protective or other peaceful purposes only if it did not create a loophole regarding the production or retention of biological and toxin weapons.²⁷ The Indian Head of Mission during the 6th BWC Review Conference drew the attention of the world community to the advances in biotechnology, genetic engineering and life sciences. It was pointed out that the dual-use nature and easier access to these technologies have increased the danger of proliferation and hostile use.²⁸ India needs to relentlessly pursue the agenda for the inspection of BSL-3 and 4 laboratories through independent regulators to check on the production of new pathogens.

India needs to bring in biotechnology regulation to provide clarity and efficiency within industry, academia, research institutions, the Commerce Ministry and security agencies, while dealing with the complexities surrounding biotechnology products and their potential usage. Regulatory roles and responsibilities for oversight should be clearly spelt out by hosting a unified website. It will allow developers and researchers to work on compliance. A periodic review should be

undertaken to align the research landscape with industrial production.

For India to secure and protect its bioeconomy, it needs to promote standards, establish metrics and network the repositories by building required privacy and safety protocols against threats of digital intrusion, manipulation and exfiltration. India will need to fortify its technological innovation and intellectual property rights.

Biotechnology funding remains crucial for this high-risk scientific mission. The public-private participation (PPP) model will provide space for research funding. However, to boost the bioeconomic environment, the DBT will need to publish periodic reports on biotechnology and biomanufacturers to further social goals related to health, agriculture, energy, and supply chain innovation. It must highlight areas where breakthrough is required to reduce the burden of disease and carbon footprint, improve nutrition among the masses and help in addressing food and energy security by supply chain management.

Data centres should be established to obtain inputs regarding biomass being generated from hospitals and monitoring the discharge of effluents. The national statistical records will help in better surveillance and data analysis for predictive preventive actions.

Biosecurity involves preventing and controlling major emerging infectious diseases and epidemics among animals and plants.²⁹ The Nuclear Threat Initiative (NTI) has correctly pointed out that countries and international institutions do not give biosecurity policies enough financial priority. India has paid the price for its negligence in implementing biosecurity and bio-surveillance. A cogent biosecurity policy

must be evolved. The People's Liberation Army (PLA) of China has already vectored biological warfare in its concept of a non-nuclear deterrent programme. It called biotechnology 'the new strategic high ground for national defence', which will be driven by biomaterials and brain control weapons.³⁰ It is important that the office of the National Security Advisor be made the nodal office to coordinate this important national security situation.

Conclusion

The two dual-use sectors of biotechnology and communications have outpaced the regulations and increased the likelihood of health and economic surprise. The doctrinal precepts of security have been altered as the operating environment is borderless with seamless participation of State, non-State groups and individuals. The masking of biological weapons programmes inside a genuine legal vaccine-production facility or pharmaceutical plant is feasible. The industrial production and new supply chains of genomics aided by artificial intelligence (AI), supercomputers and civil-military fusion are going to make matters worse. The countries developing at the niche end of biotechnology may be looking for wealth generation using health emergency as an alibi. However, technology, even for peaceful purposes poses a grave risk to humanity if not monitored. The collapse of the barrier between digital and physical, synthetic and organic, is visible. In the absence of an intrusive inspection, monitoring and reporting system, India will need to firewall its biodefence system, as citizens' health remains a prime cause of concern for central, state and local governments.

The balance of power syndrome is still guiding the global economy. Strategic

autonomy as part of India's foreign policy demands that the country be prepared to defend itself. The *Science Technology Vision 2035* published in 2015 by the DST lamented that India paid the price for its strategic autonomy by encountering global technology denial regimes. Technology sovereignty assumes importance as multinational corporations and patent offices will now play the future geopolitical game. Policies or strategies must be formulated to guide the contest.

India will need to strengthen the new BHET environment and capabilities in the areas of biowarfare and health, genetics and microbiology, bioengineering, bioinformatics, cognitive enhancement technologies and human-machine symbiosis in areas related to individual sensory and motor augmentation and social network predictive modelling, related to cognitive warfare campaigns. All these will need to be put through commercial considerations and the necessity of testing protocols and ELM (ethical, legal and moral) considerations. India will need to evolve proper frameworks to comprehend emerging opportunities and threats to establish a strategic edge.

The full potential of Synthetic Biology might not be realised immediately, but its gradual integration into various fields will be as transformative as the shift from vacuum tubes to transistors. The transistor created in 1947 by Bell Labs revolutionised technology gradually through a series of smaller developments that revealed its vast potential. The transistor was initially seen as an object of technical curiosity but soon it replaced vacuum tubes in radios, computers and a host of other electronic devices. Similarly, Synthetic Biology, through persistent experimentation, refinement and

integration into existing technologies, will reshape the world economy. Wealth aggregation in the new millennium is mainly attributed to technology companies, and their competition will shape the future geopolitical contest. India needs a comprehensive national biosecurity policy to prevent disruptions to its economic growth. The Second World War ended with a nuclear explosion, and the next war will end with implosion. Armed Forces will need to carefully examine the fallout of the development of synthetic biology and plan the strategy and future force plan and structures accordingly. Structures follow strategy, and the window for its implementation is shortening with every passing day. The security threats posed by synthetic biology need a whole-of-a-nation approach.

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Biological Security Education Needs Constant and Systematic Promotion

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Summary

A key component of effective management of biological risks is a sustained, flexible, and well-supported approach to the biosecurity education of life scientists. Biological security education is adaptable to particular circumstances and communities worldwide, and diverse actors and stakeholders have increasingly created opportunities to educate life scientists on biosecurity issues. However, such efforts have so far been fragmented, with initiatives varying widely in focus, format, content and scope, and overall biosecurity and dual-use awareness levels remain low among life and associated scientists.

Introduction

Strengthening the Biological and Toxin Weapons Convention (BTWC) has been difficult to achieve during the last two decades following the failure to agree a verification protocol in 2001. However, there may be the opportunity to achieve progress after the COVID-19 pandemic as, the pandemic has pushed the question of biological security up the political agenda in a way that is rarely possible. There is bound to be a reassessment of the dangers of natural, accidental, and deliberate diseases and this must include finding ways to minimise the possibility that the beneficial advances being made in the life sciences are not misused by States, sub-State groups, or even individuals, for hostile purposes. So, this is the time for action to deal with this question which clearly includes protecting society from hostile misuse of the benignly intended revolution in the life sciences. The rate of change in this revolution and the increased capabilities it is placing in more and more hands, can hardly be overstated. Yet, those involved in the science and technology revolution often do not grasp the dangers of hostile misuse. The opportunity to close this gap in their appreciation of the dangers to society and to engage them in its defence, may not come again for a long time.

Over the last two decades, States Parties have expended considerable efforts at meetings in 2005, 2008 and particularly since 2015, in investigating and discussing what might be done to close this gap in the overall web of preventive policies. We have described this in a recent collection of papers related to the impact of the COVID-19 pandemic.¹ Academics and policy makers have been warning of the potential threats that human error or even the deliberate misuse of the life sciences and technologies

could bring to human, animal, and plant life, and have noted that dual-use research can create biosafety and biosecurity risks comparable in magnitude to global pandemics.²

Educating scientists and practitioners in life sciences and fostering responsible research practices and scientific integrity are among the most effective strategies to anticipate and prevent misuse of life science research – not least because they are on the frontlines of driving innovation and new knowledge. However, life scientists often do not consciously consider that their work could be misused. To better address this and prevent misuse, cultivating a strong and global culture of responsible science through the promotion of codes of conduct and sustained educational programmes, is essential.

The rationale and a culture of responsibility in the life sciences

Biologists stand at the vanguard of advances in the life sciences and, as such, are key to ensuring that biology is not misused to cause harm. Formal biosecurity educational programmes teach audiences in the life sciences how to recognize dual-use and ethical issues that might arise in their work, discuss why dual-use issues constitute a real risk, and build competencies and knowledge on how to take appropriate steps to mitigate bio risks.

Security and disarmament civil-academic society has long recognized the central role played by life scientists in preventing the misuse of biology, and the promise of education and codes of conduct in creating a culture of responsibility. For example, in 2007, the US National Science Advisory Board for Biosecurity (NSABB) stated:³ “...one of the best ways to address concerns regarding dual use research is to raise awareness of dual use research issues and

strengthen the culture of responsibility within the scientific community.”

Equally, national governments at an international level have come appreciate the role that education and creating a culture of responsibility can play. Article IV of the BTWC requires its States Parties to “take any necessary measures to prohibit and prevent the development, production, stockpiling, acquisition, or retention of the agents, toxins, weapons, equipment and means of delivery...” This is further supported by the World Health Organization (WHO) which has also emphasized the role education, training and awareness-raising among life scientists can play in managing biological risks in its *Global Guidance Framework (2022)* for responsible use of the life sciences.⁴

Past efforts in educating life scientists and establishing a culture of responsibility

Since the early 2000s, a wide range of educational activities have been undertaken, and numerous codes of conduct have been developed by entities such as the American Society for Microbiology, the Royal Netherlands Academy of Arts and Sciences, the Organization for Economic Cooperation and Development and the DIYBio community.

Education and awareness-raising efforts picked up pace in the mid-2000s pioneered by a series of biosecurity seminars conducted by Rappert and Dando under the University of Exeter and the University of Bradford, UK during which ninety seminars were initially held across 13 countries in 2005. Experts from the University of Bradford then developed the first online biosecurity course (Biosecurity Education Module Resource) in 2006 that provided a background on biosecurity issues and the BTWC, a train-

the-trainers course in 2011, and a national series of short biosecurity educational courses that were rolled out in the former Soviet States and the Middle East. This was followed in 2015, by the publication of two seminal biosecurity educational textbooks, *Preventing Biological Threats, What You can Do: A Guide to Biological Security Issues and How to Address Them*, and an accompanying *Biosecurity Education Handbook*, designed for both undergraduate students and educators.⁵

More recently, educational and outreach initiatives have become more innovative and diverse in both format and purpose, ranging from a series of podcasts, pop-up lectures and exhibits at museums and science festivals, free webinars, the publication of graphic novels and cartoons, development of paper-based escape games, and mobile apps.⁶

More formally, leadership/fellowship programmes have been established, such as *the Emerging Leaders in Biosecurity Fellowship (ELBI)* at the Johns Hopkins Center for Health Security and *the Fellowship for Ending Bioweapons* hosted by the Council on Strategic Risks, both of which provides instruction and networking for those in established biosecurity-related careers, while *The Youth for Biosecurity Initiative* hosted by the BTWC Implementation Support Unit, provides an interactive training and awareness-raising programme for young scientists in the early stages of their careers.⁷ NTI's *Next Generation for Biosecurity Initiative* organizes an annual Essay competition on specific biosecurity issues that provides an opportunity for winners to publish their work and attend biosecurity and global health-related international meetings.⁸

The International Federation of Biosafety Associations (IFBA) has developed a set of

seven individual international professional certifications in areas of bio risk management, including a specific certification for Biosecurity and Cyber biosecurity, predominantly aimed at early career professionals. The IFBA also runs a number of awareness-raising activities such as its *Biosafety Heroes Programme*, while its *Global Mentorship Programme* is designed to encourage existing professionals to help others in the field and create new pathways for young scientists to forge careers in the bio risk management field.⁹ The IFBA has also partnered with Masinde Muliro University of Science and Technology (MMUST) in Kenya to launch a pilot undergraduate Bachelor of Science in Biosafety and Biosecurity with a view to rolling out the degree course at further universities worldwide.¹⁰ In 2018, the first massive open online course (MOOC) on biosecurity and dual-use issues was published by the University of Bath and Biosecure Ltd entitled *Next Generation Biosecurity: Responding to 21st Century Biorisks*.¹¹ The course incorporates the teaching of University of Bradford's *Preventing Biological Threats, What You Can Do: A Guide to Biological Security Issues and How to Address Them* as well as the IFBA Bio risk Management professional certification to educate learners to achieve a baseline of knowledge that could be translated into a professional certification. The course is regularly updated with new modules, case studies and educational materials to take into account developments in the biosecurity field. As of early 2024, this free online course has been taken by over 6000 learners worldwide.

Another significant programme is that of the annual International Genetically Engineered Machine (iGEM) competition which incorporates biosecurity themes into the competition itself. The iGEM Competition is aimed at high school and university students,

where multidisciplinary—and often cross-border—teams compete to design, build and test synthetic biology projects geared towards real world issues.¹² Integral to the competition is the stipulation that all teams work safely and responsibly. To that end, iGEM has instituted a comprehensive and wide-ranging *Responsibility Programme* under which is housed a robust *Safety and Security Programme* to ensure all teams avoid harming themselves or others during their work. It also actively promotes responsible science both within and without its community beyond the Competition itself through its *After iGEM Programme* that brings young synthetic biologists into contact with the meetings of the BTWC and other related health security fora.

The above initiatives provide a small snapshot of known biosecurity-related education and awareness-raising activities currently underway. Myriad more training and education is also undertaken by States, professional associations, international and regional organizations and others. The US Departments of Health and Human Services and Agriculture co-chair the International Working Group on Strengthening the Culture of Biosafety, Biosecurity, and Responsible Conduct in the Life Sciences (IWG) which serves as a forum “for collaboration and community of practice... to develop guiding principles and educational/training resources to support and promote a culture of biosafety, biosecurity, ethical, and responsible conduct in the life sciences”. The IWG produces an annual *Guide to Training and Information Resources on the Culture of Biosafety, Biosecurity, and Responsible Conduct in the Life Sciences*.¹³ This Guide lists 22 courses, credentialing, and repositories of training and educational resources offered or produced by professional associations, governments, international organizations, and non-governmental organizations.

Challenges faced by biosecurity education and awareness-raising

Despite the burgeoning number of educational, outreach and awareness-raising initiatives that currently exist, fundamental challenges remain that hamper their overall and lasting effectiveness and undermine efforts to promote a global culture of responsible conduct.

Firstly, there is a *continuing lack of awareness* among life scientists of the possibility of dual-use aspects emerging from their research and the potential for misuse of biology. Similarly to conclusions reported following a series of dual use and biosecurity seminars in 2005, a survey of current biosecurity education projects in 2022 also concluded that “... there has *not* been a significant improvement in the knowledge of the problems of dual use and biological security in general amongst the life science community” and that “it has proven very difficult to shift the culture of the life science community.”¹⁴ Another survey on biosecurity education programmes that same year used iGEM as a case study and further concluded that overall, the “educational machinery [has] so far failed to integrate teaching about dual-use research issues” with only 41 per cent respondents understanding the meaning of the term ‘dual-use’, and over half reporting that they are not taught dual-use issues at their university.¹⁵ The WHO reiterated this challenge in its 2022 *Global Guidance Framework*, stating:¹⁶ “A chronic and fundamental challenge in bio risk management is a widespread lack of awareness that work in the area of the life sciences could be conducted or misused in ways that result in health and security risks to the public. The lack of awareness is unsurprising, given that bio risks are often overlooked or underemphasized in both educational curricula and on-the-job

training. If they are unaware of the potential for misuse and potential malicious application, stakeholders cannot accurately weigh the risks and benefits of proposed research or order...”

When considering the promulgation of codes of conduct in particular, the simple action of creating codes of conduct cannot translate into a broader culture of responsibility without effective measures to educate target audiences about their existence and importance. A number of studies have identified continuing issues faced by educators in incorporating biosecurity and dual-use issues into curricula including: an absence of space in existing curricula; the absence of time and resources available to develop new curricula; an absence of expertise and available literature on biosecurity education; and general doubt and scepticism about the need for biosecurity education from some educators and scientists.¹⁷ This lack of dual-use education has a knock-on effect in devaluing biosecurity and dual-use considerations as a fundamental component of life science education. Nevertheless, over half the students from the iGEM survey were concerned over the misuse of biology and were keen to learn more. Another challenge to creating a holistic culture of responsibility is that education and awareness-raising efforts so far have been *fragmented and can vary in quality and content*. Although there are many educational and outreach initiatives underway, and that many of them are highly innovative and seek to make use of varied means of teaching core principles, it is difficult to know to what extent these materials and messaging are consistent. In addition, there are scattered localized, small-scale and short-term educational activities being undertaken worldwide for which it is difficult to assess the quality and impact of these efforts – or even be aware of them – as there is no central body that collates and

shares this information, let alone to reflect lessons learned to be shared.¹⁸ Added to this, is that ‘biosecurity’ as a term means different things in different languages and different contexts. With no central guidance on what makes impactful biosecurity education, it is likely that each initiative has varying success and impact and teaches at different standards.

This leads us to a further common problem: *low government priorities and sustainable funding*. The fragmentation of efforts and their short-termism is a consequence of the relative low priority with which most national governments assign promoting a culture of responsibility. Without broader recognition and government buy-in, it is difficult to secure the sustained funds needed to ensure that continuous multi-generational efforts are implemented. Further, while a number of countries have committed to improving bio risk management both domestically and internationally, there is a notable disparity between focus on biosafety competency-building and education and awareness-raising on dual-use issues. For example, biological security projects and programmes under the *Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (GP)* predominantly prioritise biosafety training within professional laboratory settings *versus* broader education and awareness-raising activities relating to dual-use issues and the responsible use of the life sciences at the student and young professional level. In the period 2017-2022, spending on biological security-related activities totalled 311 distinct projects by 20 GP partners valued at over US \$1.6 billion.¹⁹ Of these, the author identified over 80 projects that provided laboratory-level biosafety and biosecurity training compared to 30 projects that included elements of education and awareness-raising on dual-use issues and building a culture of responsibility in the life

sciences. Of the latter, only seven specifically declared a main focus on educating students or young professionals totalling less than US\$ 4million . All this translates to the fact that we are simply not doing enough, and we cannot do more without sustained support and a more strategic approach that is worldwide in its scope and enjoys the support of a wide range of stakeholders.

Conclusion

There is increasing interest in the life sciences as a career prospect following the COVID-19 pandemic and continuing developments in biotechnology. Investment in the life sciences continues to experience rapid growth and there has been a significant expansion in the number of new biological facilities worldwide. A rapidly expanding global workforce in the biological sciences ensures that those embarking on a career in the life sciences are taught from the earliest stages, how best to identify, prevent, and mitigate issues relating to the potential misuse of the biological sciences.

Strengthening biosafety, biosecurity and responsible conduct of the life sciences relies on cultivating and sustainably embedding a culture of responsibility which ensures that people follow safety and security procedures in new or unfamiliar scenarios. Appropriate education, training, and the promulgation of codes of conduct are key to achieving this in the biological arena. However, so far educational and awareness-raising initiatives have been sporadic and fragmented, of variable quality and content, and the overall and lasting impact has been difficult to assess. As argued by Australia in 2011,²⁰ “the frequent lack of awareness of aspects related to biosecurity and the obligation of the Convention among life scientists has to be addressed more urgently, strategically, and comprehensively.”

Much more must be done to achieve consistency and cohesiveness in the quality and scope of biosecurity education and awareness-raising, ensure that efforts are sustained and sustainable, and to develop, promote and embed codes of conduct (that ideally incorporate elements of the Tianjin Biosecurity Guidelines). There is much hard and sustainable work to be done.

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OPCW Probe Implicates ISIL in 2015 Chemical Attack on Syria's Marea

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Summary

The Organization for the Prohibition of Chemical Weapons (OPCW)-led Investigation and Identification Team (IIT) has concluded, based on an extensive inquiry examining munitions remnants, samples, testimony, and documentation, that there are reasonable grounds to determine that the Islamic State in Iraq and the Levant (ISIL) deployed sulphur mustard, a banned chemical warfare agent, during strikes targeting Marea, Syria on 1 September 2015, via modified artillery projectiles. The IIT's technical analyses linked the sulphur mustard's characteristics to production methods consistent with ISIL's chemical weapons programme. This investigation, directly implicating ISIL in a chemical attack for the first time, underscores the threat posed by terrorist groups developing chemical munitions, prompting calls for accountability and prevention efforts.

Introduction

Sulphur mustard, a synthetic chemical warfare agent, induces blisters in the skin and mucous membranes upon contact, classifying it as a vesicant or blistering agent. Commonly referred to as “mustard gas” or “mustard agent,” sulphur mustard exposure poses severe health risks, with no known antidote currently available.¹ The Fourth Report of the Organization for the Prohibition of Chemical Weapons (OPCW)'s Investigation and Identification Team (IIT), published in February 2024, provides definitive evidence of the use of sulphur mustard by the Islamic State in Iraq and the Levant (ISIL) in Marea, north-western Syria, in September 2015.² It is a significant development as, for the first time, the OPCW has directly attributed a chemical weapons attack in Syria to a non-State actor, specifically ISIL.



Source: <https://www.bbc.com/news/world-middle-east-34743311> (Accessed on 3 May 2024)

The comprehensive investigation examined a wide range of evidence (20,492 files), including munitions remnants, 30 samples, 29 witness testimonies, and documentation related to ISIL's organisational structure

and weapons manufacturing capabilities. Applying the standard of “reasonable grounds” used by international fact-finding bodies, the IIT’s report lays out how ISIL forces likely deployed the chemical agent during artillery strikes as part of their offensive to capture the strategically located town.

Investigation and Identification Team

The IIT was formed by the Director-General of the OPCW Technical Secretariat in accordance with the Resolution passed by the Conference of the States Parties titled “Addressing the Threat from Chemical Weapons Use” on 27 June 2018.³ The IIT commenced its work in June 2019, focusing on certain incidents in the Syrian Arab Republic for which the OPCW Fact-Finding Mission (FFM) had determined that the use or likely use of chemical weapons occurred and for which the OPCW-United Nations Joint Investigative Mechanism had not reached a final conclusion. The mandate of the IIT was to establish the facts and identify the perpetrators of the use of chemical weapons in Syria. In fulfilling its mandate, the IIT applies the standard of proof of “reasonable grounds”, which is consistently adopted by international fact-finding bodies and commissions of inquiry. IIT investigated for chemical attack in Marea from January 2023 to February 2024.

Findings on the Marea Attack

Based on a comprehensive analysis of all available information, IIT concluded that there are reasonable grounds to believe that on 1 September 2015, the ISIL deployed sulphur mustard in an attack on the town of Marea in Syria’s Aleppo Governorate. This chemical weapons attack occurred between 09:00 and 12:00 local time (UTC+3) as part of ISIL’s sustained military campaign to

capture the town. The IIT’s investigation indicates that ISIL units utilised one or more artillery guns to deliver the sulphur mustard agent. This method of deployment suggests a level of tactical sophistication and intentionality in the use of chemical weapons.

IIT determined that during the incident, the Syrian Arab Republic did not exercise territorial control over the specific area from which the artillery shells containing sulphur mustard were discharged. This area continues to remain beyond the jurisdiction of the Syrian Arab Republic. The IIT identified several impact locations across Marea, with no discernible targeting pattern. The remnants and munitions observed at these sites were conventional 122-mm calibre artillery projectiles modified to disperse a liquid payload. At least six projectiles leaked a black, viscous substance with a “pungent” and “garlic-like” smell upon impact. Furthermore, at least 11 individuals who came into contact with this liquid substance experienced symptoms consistent with exposure to sulphur mustard.⁴



Source: <https://www.opcw.org/sites/default/files/documents/2024/02/s-2255-2024%28e%29.pdf> (Accessed on 1 May 2024)

Munitions and Delivery

The IIT’s technical assessment determined that the munitions used in the Marea attack were 122-mm High-Explosive (HE) or High-

Explosive Fragmentation (HE-FRAG) artillery projectiles that had been modified to accommodate a liquid chemical fill instead of their original explosive payload. Crucially, the lack of fusing systems, explosive damage patterns, or explosive material residue on the projectile remnants indicated they did not contain any explosive components. Simulations by ballistics experts further corroborated that the projectiles were manually filled with a non-explosive liquid compound after removing the explosive filler. On the basis of a comprehensive analysis of the impact locations, firing directions, and operational range of the 122-mm artillery system, the IIT concluded that the projectiles were fired from within a 15-km radius of the impact sites, in areas that were under ISIL's territorial control at the time. The use of sulphur mustard delivered by artillery was part of ISIL's sustained offensive to capture the strategic town of Marea.⁵

Origin of the Chemical Agent

The IIT's analysis of the chemical composition and impurities present in the sulphur mustard used in Marea indicates that it was produced via an improvised "Levinstein" method, rather than industrial-scale manufacturing. This production route allowed the IIT to discount the possibility that the chemical agent originated from the declared stockpiles of the Syrian Arab Republic or the former chemical weapons programme of Iraq, both of which utilised the different "Meyer" synthesis route for their sulphur mustard production. Furthermore, the IIT established linkages between the characteristics of the sulphur mustard used in Marea and other confirmed instances of mustard use by ISIL forces in the region between 2015 and 2017, notably the attacks in Taza (Iraq) on 8 March 2016 and Um-Housh (Syria) on 16 September 2016. The strong similarities in composition

and impurities point to a common improvised production method employed by ISIL across these attacks.⁶

ISI Command and Chemical Weapons Programme

Based on a comprehensive review of documentation and sources, the IIT concluded that the deployment of sulphur mustard in Marea would have occurred pursuant to orders from ISIL's highest executive bodies and leadership. Specifically, the Delegated Committee operated directly under the self-proclaimed "Caliph" who oversaw ISIL's strategic decision-making at the time. The IIT further identified key ISIL members and organisational structures involved in the group's chemical weapons programme, including the Diwan Al-Jund (Department of Soldierly) and the Committee for Military Development and Manufacturing (CMDM), which received funds from Bayt Al-Mal (ISIL's treasury), were the primary drivers of the programme.⁷

Global Concerns and Reactions

Ambassador Fernando Arias, Director General OPCW, stated that OPCW has efficiently delivered on the mandate assigned to it for identifying perpetrators of chemical weapon use in Marea and expected the international community to take further action.⁸ The United States has found the findings of the OPCW in consonance with its own assessment of the incident. The US praised the IIT's impartial work and stressed the importance of maintaining its investigative capabilities to uphold the global ban on chemical weapons. It urged enhanced international collaboration to prevent terrorist access to chemical weapons and ensure accountability for their use.⁹

The UK's Minister of State for the Middle East, South Asia, UN, and the Prime

Minister's Special Representative on Preventing Sexual Violence in Conflict, Lord (Tariq) Ahmad of Wimbledon, strongly denounced the utilisation of chemical weapons by ISIL in Syria. He urged the international community to regard with utmost gravity the potential for non-State actors to develop, procure, and deploy chemical weapons and specified that it is imperative for all States Parties to the Chemical Weapons Convention to collaborate in its due implementation.¹⁰ France asserted its resolute dedication to holding accountable those responsible for all instances of chemical weapons attacks in Syria. It maintained its steadfast commitment to ensuring a fitting response to such egregious actions in terms of punishment.¹¹

Conclusion

The OPCW's specific findings about the Islamic State's use of sulphur mustard in Marea underscore the persistent threat posed by non-State actors seeking to develop and use chemical weapons. While the investigation could not definitively pinpoint the specific chain of command behind the attack orders, it illustrated ISIL's organisational capability to manufacture and integrate chemical munitions into military operations. The findings emphasised Syria's obligations under the Chemical Weapons Convention to investigate and prosecute these violations by adopting appropriate criminal legislation and holding perpetrators accountable, even when committed by non-State actors like ISIL operating in areas outside government control. As called for by the OPCW Conference of States Parties (policy-making organ), the damning evidence compiled in the findings will now be shared with the United Nations and relevant investigative bodies to support broader efforts at accountability and preventing the re-emergence of chemical weapons.

Endnotes:

- ¹ "Sulfur Mustard (Mustard Gas): Exposure, Decontamination, Treatment", Centers for Disease Control and Prevention (CDC), 7 February 2023, at <https://www.cdc.gov/chemicalemergencies/factsheets/sulfur-mustard-mustard-gas.html> (Accessed on 3 May 2024).
- ² "OPCW identifies ISIL as perpetrators of 2015 chemical attack in Marea, Syria", Organisation for the Prohibition of Chemical Weapons (OPCW), 22 February 2024 at <https://www.opcw.org/media-centre/news/2024/02/opcw-identifies-isil-perpetrators-2015-chemical-attack-marea-syria> (Accessed on 1 May 2024).
- ³ "Addressing the Threat from Chemical Weapons Use", Organisation for the Prohibition of Chemical Weapons (OPCW), 27 June 2018 at https://www.opcw.org/sites/default/files/documents/CSP/C-SS-4/en/css4dec3_e_.doc.pdf (Accessed on 30 April 2024).
- ⁴ "OPCW identifies ISIL as perpetrators of 2015 chemical attack in Marea, Syria", Organisation for the Prohibition of Chemical Weapons (OPCW), 22 February 2024 at <https://www.opcw.org/media-centre/news/2024/02/opcw-identifies-isil-perpetrators-2015-chemical-attack-marea-syria> (Accessed on 1 May 2024).
- ⁵ "Fourth Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-Ss-4/Dec.3 "Addressing the Threat from Chemical Weapons Use" Marea (Syrian Arab Republic) – 1 September 2015", 22 February 2024 at <https://www.opcw.org/sites/default/files/documents/2024/02/s-2255-2024%28e%29.pdf> (Accessed on 2 May 2024).
- ⁶ Ibid.
- ⁷ Ibid.
- ⁸ "OPCW identifies ISIL as perpetrators of 2015 chemical attack in Marea, Syria", Organisation for the Prohibition of Chemical Weapons (OPCW), 22 February 2024 at <https://www.opcw.org/media-centre/news/2024/02/opcw-identifies-isil-perpetrators-2015-chemical-attack-marea-syria> (Accessed on 1 May 2024).

⁹ “The Investigation and Identification Team (IIT) of the Organization for the Prohibition of Chemical Weapons (OPCW) Marea Report Release”, Press Release, Office of the Spokesperson, US Department of State, 23 February 2024 at <https://www.state.gov/the-investigation-and-identification-team-iit-of-the-organization-for-the-prohibition-of-chemical-weapons-opcw-marea-report-release/> (Accessed on 3 May 2024).

¹⁰ “UK condemns confirmed Daesh use of chemical weapons in Syria”, Press Release, Foreign, Commonwealth & Development Office, UK Government, 26 February 2024, at <https://www.gov.uk/government/news/uk-condemns-confirmed-daesh-use-of-chemical-weapons-in-syria> (Accessed on 6 May 2024).

¹¹ “Syria – Report by the organization for the prohibition of chemical weapons on the use of chemical weapons in Marea”, Ministry of Europe and Foreign Affairs, Government of France, 24 February 2024 at <https://www.diplomatie.gouv.fr/en/country-files/syria/news/article/syria-report-by-the-organization-for-the-prohibition-of-chemical-weapons-on-the> (Accessed on 6 May 2024)

Chemical and Biological News

Russian MPs to appeal to UN over ‘US biolabs’ in Africa

June 27, 2024

The continent should not be used as “a testing ground” by Washington, lawmaker Aleksandr Babakov has stated. The Russian State Duma is preparing an appeal to the UN regarding the alleged activity of US military biolaboratories in Africa, Deputy Chairman Aleksandr Babakov has said. In an interview with Russian media on Wednesday, Babakov stated that Africa should not be used as a “testing ground” by Washington. According to the MP, the US is continuing “racist colonial policies towards the people of Africa.” Political elites in Washington lecture the world on democracy, while simultaneously deploying troops in sovereign states and instigating color revolutions, Babakov claimed.

He asserted that these actions have now escalated to conducting experiments on humans and creating biolaboratories as the US military seeks to engineer new weapons. “This issue needs to be addressed at the UN Security Council, and we are currently preparing an appropriate appeal to the UN,” the Russian lawmaker stated. Babakov also mentioned plans to reach out to the parliaments of African countries, to provide them with evidence of bioresearch conducted by the US.

On Tuesday, the head of Russia’s Nuclear, Chemical and Biological Protection Forces, Lieutenant General Igor Kirillov, claimed that Washington is expanding its biological military presence across Africa. He highlighted Africa as a new zone of interest for the US Defense Department and related agencies. “Because Russia has managed to halt the implementation of biological warfare

programs in Ukraine’s liberated territories, the Pentagon is forced to transfer incomplete research under Ukrainian projects to other regions,” Kirillov alleged.

Russia has documents confirming the rapid expansion of the US biological warfare presence in Africa, the general added. At the end of last year, Kirillov said Russia had obtained documents proving that the US had conducted research on bioweapon components and highly dangerous pathogens in Ukraine.

<https://www.rt.com/africa/600098-africa-us-un-biolaboratories/>

Closing Chemical Agent Destruction Facilities June 27, 2024

Two sites are currently in the closure process:

- Blue Grass Chemical Agent-Destruction Pilot Plant, Richmond, Kentucky
- Pueblo Chemical Agent-Destruction Pilot Plant, Pueblo, Colorado

Seven sites have been closed:

- Aberdeen Chemical Agent Disposal Facility, Aberdeen Proving Ground, Maryland
- Anniston Chemical Agent Disposal Facility, Anniston, Alabama
- Johnston Atoll Chemical Agent Destruction System, Johnston Atoll
- Newport Chemical Agent Disposal Facility, Newport, Indiana
- Pine Bluff Chemical Agent Disposal Facility, Pine Bluff, Arkansas

- Tooele Chemical Agent Disposal Facility, Tooele, Utah

<https://www.cdc.gov/chemical-weapons-elimination/closing-facilities/index.html>

A Maryland Housing Development Is Going Up Beside Army Land Polluted by Bio-Weapon Testing

June 26, 2024

A new housing development is going up near Fort Detrick, Maryland, and the Army is considering a series of engineering efforts to protect the homeowners after it contaminated adjacent land throughout much of the 20th century by testing biological weapons. Many of the homes next to what is known as the Area B section of the base are already built — some of them for sale — and single-family properties are selling for about \$640,000, which is roughly the median price for the area. That nearby 399-acre section of Fort Detrick was once a proving ground for the Army's biological warfare program and used as a disposal site for chemical, medical and radiological waste, according to the Environmental Protection Agency.

Decades ago, the Army was frequently testing biological weapons on the outskirts of the Washington, D.C., area, and those grounds are still heavily contaminated. Fort Detrick served as the center of the Pentagon's bio-weapon development, until those weapons were outlawed by President Richard Nixon. Today, much of the surrounding area in that part of Frederick, Maryland, has contaminated groundwater, among other environmental concerns. Area B is on the EPA's National Priorities List for Superfund sites, meaning it ranks a top concern for known releases of hazardous substances, contaminants or pollutants, according to the agency.

The upcoming home development on potentially poisoned lands was first reported in the Frederick News-Post. The news outlet reported that new groundwater sampling in May showed “high concentrations of contamination along the southwest fence line of Area B and a nearby residential development that could potentially impact dozens of planned homes.”

<https://www.military.com/daily-news/2024/06/26/maryland-housing-development-going-beside-army-land-polluted-bio-weapon-testing.html>

France court upholds warrant for Syria's Assad over chemical weapons

June 26, 2024

An arrest warrant issued for Syrian President, Bashar Al-Assad, over the use of banned chemical weapons against civilians was upheld by a Paris court on Wednesday, one of the lawyers who lodged the initial case said, Reuters reports. The warrant issued by French judges in November 2023 refers to charges of complicity in crimes against humanity and complicity in war crimes, followed a French investigation into chemical attacks in Douma and the district of Eastern Ghouta in August 2013, attacks which killed more than 1,000 people.

Prosecutors, who would be responsible for asking the police to enact the warrant, had challenged its validity, arguing that, as a sitting head of state, Assad was immune from trial and prosecution in France. “Today is a very special day and this is a historic victory, not only for the Syrian victims, but for all the victims around the world,” said Mazen Darwish, head of the Syrian Centre for Media & Freedom of the Press.

“The court's decision confirms what we have always said — that when the issue concerns crimes against humanity, war crimes, and the

use of chemical weapons, immunity should never be relied upon.” Assad’s government has denied using chemical weapons against its opponents in the civil war, which broke out in March 2011. Syrian authorities did not immediately reply to a request for comment on Wednesday’s Court of Appeal ruling.

Arrest warrants for sitting heads of state are rare because they generally have immunity from prosecution. However, international law has exceptions to that immunity when a head of state is accused of war crimes and crimes against humanity or genocide. France is among the countries that allows the filing of crimes against humanity cases in its courts. “This decision makes clear that international rules on immunity cannot be synonymous with impunity, particularly for the most serious international crimes,” Steve Kostas, senior legal officer at Open Society Justice initiative, said in reaction to the verdict.

<https://www.middleeastmonitor.com/20240626-france-court-upholds-warrant-for-syrias-assad-over-chemical-weapons/>

Sweden contributes Two Million Krona to support OPCW missions in Syria

June 24, 2024

The Government of the Kingdom of Sweden has voluntarily contributed SEK 2,000,000 (approximately •180,000) to the Trust Fund for Syria Missions of the Organisation for the Prohibition of Chemical Weapons (OPCW). The contribution was formalised on 20 June 2024 in a signing ceremony held between the OPCW Director-General, Ambassador Fernando Arias, and the Permanent Representative of the Kingdom of Sweden to the OPCW, H.E. Mr Johannes Oljelund, at the OPCW’s Headquarters in The Hague.

The contribution will support the full elimination of the Syrian Chemical Weapons Programme, as well as to establish facts surrounding the alleged use of chemical weapons in Syria, in accordance with the Chemical Weapons Convention, relevant decisions of the policy-making organs of the OPCW and resolutions of the United Nations Security Council. Ambassador Oljelund stated: “Our contribution is to support the OPCW in revealing the truth. The OPCW’s work in relation to Syria is essential to establish facts and to eliminate chemical weapons in Syria.”

The Director-General thanked Sweden for its unwavering support to the full implementation of the Chemical Weapons Convention and stated: “I express my deep appreciation to Sweden for its financial and political support to the OPCW’s mission to permanently eradicate chemical weapons. This contribution will help the OPCW to continue its critical work in Syria.”

<https://www.opcw.org/media-centre/news/2024/06/sweden-contributes-two-million-krona-support-opcw-missions-syria>

Qatar provides •20,000 to support OPCW Conference on role of AI in Chemical Weapons Convention implementation

June 24, 2024

The Organisation for the Prohibition of Chemical Weapons (OPCW) welcomes Qatar’s voluntary contributions of •20,000 to support the OPCW’s upcoming Global Conference on the Role of Artificial Intelligence (AI) in advancing the implementation of the Chemical Weapons Convention (CWC). The conference aims to holistically examine the implications of AI technology within the framework of the CWC.

The contribution was formalised on 20 June 2024 in a signing ceremony held between the Ambassador, Permanent Representative of the State of Qatar to the OPCW, H.E. Dr. Mutlaq bin Majed Al Qahtani, and the OPCW Director-General, Ambassador Fernando Arias, at the OPCW's Headquarters in The Hague./

The conference, to be hosted by Morocco and co-organised by the Technical Secretariat of the OPCW from 22 to 24 October 2024 in Rabat, will bring together leading global experts from the fields of science, industry, and government, and facilitate a comprehensive understanding and appreciation of the role of AI in CWC implementation.

The conference will explore three focus areas:

- The role and impact of AI in Chemistry from the lens of evolving science and policy discourse;
- Impact and challenges of AI on the chemical industry at-large; and
- challenges presented by AI in counterterrorism and implementation of CWC.

<https://www.opcw.org/media-centre/news/2024/06/qatar-provides-eu20000-support-opcw-conference-role-ai-chemical-weapons>

National workshop on the Biological Weapons Convention and its Confidence Building Measures in Bolivia

June 21, 2024

From 28 to 29 May 2024, in La Paz, Plurinational State of Bolivia, the United Nations Office for Disarmament Affairs

(UNODA) organized a national workshop on the implementation of the Biological Weapons Convention (BWC) and the preparation of Confidence Building Measures (CBM) reports. The workshop was organized with the support of the European Union and in cooperation with the Ministries of Foreign Affairs and Defence of Bolivia. The workshop was attended by around 50 national participants from several national entities. Opening remarks were provided by Mr. Augusto Antonio Garcia Lara, Vice-Minister of Defence, Ms. Marissa Castro Magnani, Vice-Minister of Foreign Affairs a.i., Mr. Andreas Perez Fransius, Head of the Political Section at the EU Delegation to Bolivia and Mr. Rémi Bacouillard, Political Affairs Officer at the UNODA Geneva Branch.

On the first day of the workshop, presentations were given by UNODA on the BWC and key aspects of its national implementation, the role and responsibilities of BWC National Contact Points (NCP) as well as the importance of CBM reports. Ms. Sonia Fernandez, Project Coordinator at UNODA's Regional Centre for Peace, Disarmament and Development in Latin America and the Caribbean (UNLIREC), made a presentation remotely on BWC national implementing legislation. Best practices on national implementation of the Convention and the preparation of CBM reports in Colombia were shared with participants by Ms. Yasmine Helena Urrutia Sanabria, First Secretary, from the Ministry of Foreign Affairs in Colombia.

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Caribbean (UNLIREC), made a presentation remotely on BWC national implementing legislation. Best practices on national implementation of the Convention and the preparation of CBM reports in Colombia were shared with participants by Ms. Yasmine Helena Urrutia Sanabria, First Secretary, from the Ministry of Foreign Affairs in Colombia. The national workshop provided a valuable opportunity to national stakeholders to engage on ways to further strengthen the implementation of the Convention at the national level and to map additional assistance needs and opportunities.

<https://disarmament.unoda.org/update/national-workshop-on-the-biological-weapons-convention-and-its-confidence-building-measures-in-bolivia/>

Chemical weapons are not a historic problem in Syria, they are a present reality: UK statement at the UN Security Council

June 11, 2024

The United Kingdom would like nothing more than for this Council not to hold any more meetings on chemical weapons. As this would mean that chemical weapons were no longer being produced, stored or used anywhere in the world, and the perpetrators of chemical weapons' attacks had been held to account. Sadly, that is not the case. Chemical weapons are not a historic problem in Syria. They are a present reality.

The Assad regime continues to possess chemical weapons today. Thousands of munitions and hundreds of tonnes of chemical agent remain unaccounted for. Analysis of samples collected at two sites in April 2023 indicates further undeclared

processing and production activity in Syria. We are gravely concerned by these developments and we join your call, High Representative, for greater cooperation by Syria with the OPCW technical secretariat. The UN-OPCW Joint Investigative Mechanism and the OPCW's Investigation and Identification Team found that the Assad regime used chemical weapons, including sarin and chlorine, against its own people nine times after acceding to the Chemical Weapons Convention in 2013.

Syria has failed to make a complete and accurate declaration of its stockpiles, despite the best and repeated efforts of the OPCW secretariat. Nor has Syria met its obligations under this Council's resolution 2118. Independent international investigations have also now attributed a total of four uses of chemical weapons to Daesh. President, failure to hold Syria to account would undermine the international non-proliferation architecture.

The UK will continue to pursue accountability for the use of chemical weapons by state and non-state actors. We fully support the work of the OPCW's Syria missions, and the International, Impartial and Independent Mechanism for Syria, which assists in the investigation and prosecution of international crimes committed in Syria. We applaud OPCW's impartial and patient work. Until Syria fully declares and destroys its chemical weapons, this Council should remain focused on this ongoing threat to international peace and security.

<https://www.gov.uk/government/speeches/chemical-weapons-are-not-a-historic-problem-in-syria-they-are-a-present-reality-uk-statement-at-the-un-security-council>

Why North Korea Launched Another Salvo of Trash Balloons Toward the South

June 9, 2024

The unusual offensive, across the world's most heavily fortified border, is a revival of a Cold War-era tactic. The South is responding by blasting K-pop. Cold War-era tactics are in vogue again at the world's most heavily armed border. In recent days, North Korea has sent roughly 1,300 balloon carrying plastic bags full of cigarette butts, scraps of used paper and cloth, and other trash toward the Demilitarized Zone that separates it from South Korea. Many have crossed into South Korean airspace, where their timers released their filthy payload.

But there was an ominous undertone when South Korea urged people not to touch the balloons and to report them to the authorities immediately. North Korea is known to hold large stockpiles of biological and chemical weapons, which its agents once used to assassinate Mr. Kim's estranged half brother, Kim Jong-nam. Photos and video footage released by the South Korean military showed officers clad in biohazard and bomb-disposal gear inspecting the trash piles.

<https://www.nytimes.com/article/north-korea-trash-balloons.html?searchResultPosition=20>

Why the Pandemic Probably Started in a Lab, in 5 Key Points

June 3, 2024

Dr. Anthony Fauci returned to the halls of Congress and testified before the House subcommittee investigating the Covid-19 pandemic. He was questioned about several topics related to the government's handling

of Covid-19, including how the National Institute of Allergy and Infectious Diseases, which he directed until retiring in 2022, supported risky virus work at a Chinese institute whose research may have caused the pandemic.

For more than four years, reflexive partisan politics have derailed the search for the truth about a catastrophe that has touched us all. It has been estimated that at least 25 million people around the world have died because of Covid-19, with over a million of those deaths in the United States.

Although how the pandemic started has been hotly debated, a growing volume of evidence — gleaned from public records released under the Freedom of Information Act, digital sleuthing through online databases, scientific papers analyzing the virus and its spread, and leaks from within the U.S. government — suggests that the pandemic most likely occurred because a virus escaped from a research lab in Wuhan, China. If so, it would be the most costly accident in the history of science.

1. The SARS-like virus that caused the pandemic emerged in Wuhan, the city where the world's foremost research lab for SARS-like viruses is located.

At the Wuhan Institute of Virology, a team of scientists had been hunting for SARS-like viruses for over a decade, led by Shi Zhengli.

2. The year before the outbreak, the Wuhan institute, working with U.S. partners, had proposed creating viruses with SARS CoV 2's defining feature.
3. The Wuhan lab pursued this type of work under low biosafety conditions that could not have contained an airborne virus as infectious as SARS CoV 2

4. The hypothesis that Covid-19 came from an animal at the Huanan Seafood Market in Wuhan is not supported by strong evidence.
5. Key evidence that would be expected if the virus had emerged from the wildlife trade is still missing.

<https://www.nytimes.com/interactive/2024/06/03/opinion/covid-lab-leak.html>

Violations of international legislation prohibiting biological weapons: what can they lead to?

May 31, 2024

Over the past year, the Ministry of Defence of the Russian Federation has analyzed in detail US military biological activities in Ukraine and other countries. According to the Head of the Radiation, Chemical and Biological Protection Troops of the Armed Forces of the Russian Federation, Lieutenant General Igor Kirillov, right under our noses in a number of countries a network of American biological laboratories has been deployed, where work is in full swing to create powerful weapons.

The Ministry of Defence of the Russian Federation gives a forecast: further deterioration of the epidemic situation with “the possible formation of artificial foci of diseases and an uncontrolled expansion of the range of vectors.” General Kirillov stated this during a briefing. According to the Radiation, Chemical and Biological Protection Troops of the Armed Forces of the Russian Federation, over two years in Central and Southern Europe the number of Asian tiger mosquitoes, which are not typical for this region, has noticeably increased. For example, in Germany, populations of the species formed in five regions. And another type of mosquito – a carrier of West Nile fever – was found in Finland and Sweden.

Also in Europe, the incidence of infections transmitted by blood-sucking insects has increased. In just one year, more people were infected with dengue fever than in the previous ten years. There is also a peak in the incidence of West Nile fever – out of a thousand, 92 cases were fatal. American military specialists are intensively experimenting with viruses pathogenic to humans. For example, monkey pox virus is being investigated as a potentially damaging bio agent.

It is known that the US Army Research Institute of Infectious Diseases conducted experiments with two strains of the smallpox virus. General Kirillov presented a document proving this during the briefing. Meanwhile, work with this virus is allowed only in two institutions in the world: in the USA at the Center for Disease Control and at the Vector state scientific center in Russia. Such work can provoke a global epidemic emergency, since a significant part of the population has become susceptible to smallpox as a result of the loss of population immunity. Over the past 10 years, we have already had to deal with a monkeypox pandemic and an increase in the incidence of cowpox virus. Are there people next in line?

<https://www.financialexpress.com/business/defence-violations-of-international-legislation-prohibiting-biological-weapons-what-can-they-lead-to-3508128/>

Bioweapons Field Guide for Recovered Munitions to Fill Knowledge Gap

May 30, 2024

The U.S. Army Combat Capabilities Development Command Chemical Biological Center (DEVCOM CBC) Chemical Biological Applications and Risk Reduction business unit, known as CBARR, provides field

response for recovered chemical munitions all over the country and around the world. Sometimes bioweapons munitions turn up, too. Robert Malone, the CBARR Plans and Assessments Branch chief, has a plan for that, he is writing a field reference guide for recovered bioweapons. “We’ve had a field reference guide for chemical weapons since the mid-1990s,” Malone said. “It’s called the U.S. Chemical Weapons and Related Material Reference Guide. But there’s not one for biological weapons and related material, and that has always surprised me, so I decided to do something about it.”

What brought this need home for Malone is what happened at a field operations site at Holloman Air Force Base in New Mexico. Recovery team members encountered E-61 bomblets. “The CBARR project manager for this field operation, George Noya, came to me because he knew that I had done some extensive research on bioweapons some years back,” Malone said. “That provided me with some good background, but I also got help from a true CBC expert in this area, Chris Whalley, a Center subject matter expert in biological weapons.” Malone and Noya went to Whalley’s office. Whalley was able to tell them what the item was, its delivery system, its potential agent fills, and he even had an unfilled example of one sitting in his office that they could hold and examine.

“That was enormously helpful to us, but then two things occurred to me,” Malone recalled. “First, why don’t we have this kind of detailed knowledge for the broad range of bioweapons in a form that can be shared? Second, Chris will retire soon, so how can we preserve that knowledge?” DEVCOM CBC’s mission is to provide innovative chemical, biological, radiological, nuclear, and explosive (CBRNE) defense capabilities to enable the joint warfighters’ dominance on the battlefield and interagency defense of the homeland. It has programs with sources of

seed money available to fund good ideas. Through the ‘Quick Empowerment leads to Successful Tomorrows’ program, or QUEST for short, projects of any size from \$5,000 to \$100,000 tied to the Center’s mission are considered. Applicants get ten minutes to pitch their ideas before the Center’s Innovation Council members, followed by five minutes for questions.

https://www.army.mil/article/276799/bioweapons_field_guide_for_recovered_munitions_to_fill_knowledge_gap

Healthier, cleaner, greener: a NATO strategy for the coming bio-revolution

May 30 2024

At their February 2024 meeting, Allied Defence Ministers formally adopted NATO’s Biotechnology and Human Enhancement Technologies Strategy. Current NATO staff driving the development and delivery of this Strategy outline one of its main features: the first-ever set of Principles of Responsible Use for Biotechnology and Human Enhancement technologies in defence and security.

Biotechnology and human enhancement (BHE) technologies are by no means new, but the unprecedented pace of emerging BHE innovation is disruptive. Fuelled by a convergence with artificial intelligence (AI), new developments in BHE have led to an emerging bio-revolution, one that will transform our society – from healthcare and public health, to industrial process manufacturing, to security and defence. Breakthroughs in BHE have the potential to address some of the Alliance’s toughest medical, environmental and resilience challenges. Picture a world where bio-manufacturing and synthetic biology offer greener, alternative ways to lessen our supply chain dependencies; where bio-sensing methods provide more accurate,

scalable ways to detect novel pathogens and other chemical and biological threats; and where green DNA storage methods replace the energy-draining data storage approaches upon which we currently rely.

As with any emerging and disruptive technology, BHE technologies also pose new risks to the Alliance, particularly when used by malicious actors. The same genetic engineering methods that underpin medical breakthroughs can be used to create novel, more lethal or targeted pathogens. The dual proliferation of gene-editing systems and AI-enabled search methods means that cost and skill barriers to access and create chemical and biological threats have been lowered. In February 2024, Allied Defence Ministers endorsed NATO's BHE Strategy: the first international agreement governing emerging biotechnology in defence and security. The strategy is guided, first and foremost, by the world's first Principles of Responsible Use for BHE technologies in defence and security, and reaffirms the Alliance's unwavering commitment to the Biological Weapons Convention. In implementing this new strategy, the Alliance has opportunities to advance the development and use of BHE technologies for defensive and peaceful purposes while also protecting against the proliferating risks posed by these technologies.

<https://www.nato.int/docu/review/articles/2024/05/30/healthier-cleaner-greener-a-nato-strategy-for-the-coming-bio-revolution/index.html>

Once a Sheriff's Deputy in Florida, Now a Source of Disinformation From Russia

May 29, 2024

In 2016, Russia used an army of trolls to interfere in the U.S. presidential election. This year, an American given asylum in

Moscow may be accomplishing much the same thing all by himself. A dozen years ago, John Mark Dougan, a former deputy sheriff in Palm Beach County, Fla., sent voters an email posing as a county commissioner, urging them to oppose the re-election of the county's sheriff. He later masqueraded online as a Russian tech worker with a pseudonym, BadVolf, to leak confidential information in violation of state law, fooling officials in Florida who thought they were dealing with a foreigner. He also posed as a fictional New York City heiress he called Jessica, tricking an adviser to the Palm Beach County Sheriff's Office into divulging improper conduct by the department.

In 2021, as Mr. Putin began mobilizing the military forces that would invade Ukraine, Mr. Dougan posted a video that the Kremlin would cite as one justification for its attack. In it, he claimed that the United States operated biological weapons factories in Ukraine, an accusation that Russia and its allies have pushed without ever providing evidence. Once the war started, Mr. Dougan recounted in his written responses to questions, he traveled to Ukraine 14 times to report from the Russian side of the front lines. He appeared in Russian government hearings purporting to expose Ukraine's transgressions, indicating some level of cooperation with the government authorities. He has faced criticism for the reports, including in a profile in *The Daily Beast*, that he posted on YouTube and other platforms. Mr. Dougan has portrayed the war much as Russia's propaganda has: as a righteous battle against neo-Nazis backed by a decadent West, led by the United States and NATO.

<https://www.nytimes.com/2024/05/29/business/mark-dougan-russia-disinformation.html?searchResultPosition=24>

False Russian claims hijacked the biological weapons treaty. Here's how to reclaim it

May 27, 2024

In 2022, a Russian disinformation campaign threatened the integrity and efficacy of the Biological Weapons Convention (BWC), a critical international treaty banning biological and toxin weapons. Russian officials accused the United States and Ukraine of conducting illicit biological weapons research on Ukrainian territory, in direct violation of their treaty obligations—allegations that have been largely dismissed as false by other BWC member states and independent observers. The lack of factual evidence did not stop Russian representatives from raising their claims at UN Security Council meetings in March 2022 and reiterating them in October of the same year. Russia also requested a formal consultative meeting under Article V of the BWC, only the second such request in the treaty's 50-year-long history. This article commits the treaty's member states to cooperate in solving any issues related to the treaty's objectives or its implementation.

Russia misused the consultation procedure to spread its unfounded allegations and continued to do so after the procedure's conclusion, which undermined the consultation mechanism and hampered progress on other issues. This misuse highlighted a need to reassess the Article V procedure and its capacity to safeguard the functioning of the treaty, which is crucial in today's evolving biothreat landscape. To prevent future misuse from happening and hampering treaty proceedings, treaty members need to agree on a pragmatic redefinition of the consultative process.

Invoking Article V. Unlike other arms control agreements, such as the Nuclear

Non-Proliferation Treaty, the BWC lacks a robust verification regime. In the absence of such a regime, the consultation procedure under Article V of the treaty is pivotal in ensuring and evaluating compliance with the treaty's obligations.

Only two states have made use of Article V thus far: Cuba in 1997 and Russia in 2022. Each instance led to the convening of a formal consultative meeting in Geneva to address the allegations raised. Cuba's 1997 invocation targeted the United States, accusing it of violating the BWC by releasing a crop pest agent over Cuban territory. In the 1997 case, the Cuban government chose not to escalate the allegations further, even without substantial agreement during the consultations. In contrast, in the 2022 case, Russia continued to raise its claims following an inconclusive formal consultation. Both cases are marked by acute political antagonism between the BWC members involved and raise claims on which finding common ground seems impossible. These instances reveal a stark reality: The mechanism has been deployed not as a bridge toward understanding or compromise, but rather in contexts where achieving consensus appears daunting, if not outright unattainable.

<https://thebulletin.org/2024/05/false-russian-claims-hijacked-the-biological-weapons-treaty-heres-how-to-reclaim-it/>

New forensic research reveals chemical weapons 'fingerprint'

May 22, 2024

Until recently, forensic investigation of chemical weapons was in its infancy. Encouraging research into new and better ways of conducting forensic investigation in this field is one of the aims of the Organisation for the Prohibition of Chemical Weapons

(OPCW). In the international research field, TNO is one of the laboratories the OPCW works with. TNO forensic researcher Mirjam de Bruin-Hoegée will soon defend her thesis entitled 'Revealing the origin of chemical weapons'. She explains: "In the event of an attack with a chemical weapon, an investigation is carried out to find out what substance was used. This is important in particular to quickly get people to safety, take protective measures, and provide appropriate medical assistance. But immediately after that comes the question: "who did it?" This is the question I focused on in my research.

For the FACING (Forensic Attribution for CWA INtelliGence) partnership, I developed several new methods that help identify the origin of chemical weapons. Collecting more different types of evidence and linking them makes it more likely that this will enable judicial identification of the perpetrator." "To find out which party deployed the chemical weapons, we're looking for a kind of fingerprint that is unique to each weapon. We create that 'fingerprint' by combining different research methods," says De Bruin-Hoegée. "First, we examine the chemical substance used in the weapon. For example, the chemical consists of 90% poison and 10% by-product such as pollution or a surplus of one of the original raw materials. Analysing that 10% can give us a lot of information about, for example, where and how the poison was made and how long it was stored.

If you have a jerry can full of the stuff, then analysis is comparatively easy. However, in real life you don't have that luxury. In a chemical weapons attack, the chemical is spread over a large area. Moreover, time passes before investigators are on site. The major challenge in the investigation lies in the fact that the substances are found on site in extremely low concentrations and are also highly reactive, degrade rapidly in the

environment, or metabolise in the human body. This makes unambiguous identification very complicated.

With newly developed, highly sensitive analytical techniques, this can now be done. Even with especially small concentrations found in human blood samples and plants exposed to the chemical in our laboratory, we can now establish the necessary data from that 10% of by-product and determine the 'fingerprint'."

<https://www.tno.nl/en/newsroom/insights/2024/05/forensic-research-chemical-weapons/>

Statement on Ukraine from the OPCW Spokesperson

May 7, 2024

The Secretariat of the Organisation for the Prohibition of Chemical Weapons (OPCW) has been monitoring the situation on the territory of Ukraine since the start of the war in February 2022 in relation to allegations of use of toxic chemicals as weapons. Both the Russian Federation and Ukraine have accused one another and reported allegations of use of chemical weapons to the Organisation.

A compendium of all official correspondence by States Parties on such allegations and accusations has been made available on the OPCW public website and is regularly updated. The information provided to the Organisation so far by both sides, together with the information available to the Secretariat, is insufficiently substantiated. Still, the situation remains volatile and extremely concerning regarding the possible re-emergence of use of toxic chemicals as weapons.

The destruction of all declared chemical weapons stockpiles in the world was achieved

in July 2023 under strict verification of the OPCW Secretariat. This does not mean that chemical weapons do not exist anymore. Under the Chemical Weapons Convention, any toxic chemical, used for its toxic properties with the purpose to cause harm or death is considered a chemical weapon. This includes the diversion of dual-use toxic chemicals produced worldwide by the chemical industry from their declared non-prohibited purposes.

Additionally, under the Convention, States Parties have the obligation to declare all toxic chemical agents they hold for riot control purposes. It is against the Convention to use riot control agents at war on the battlefield. If used as a method of warfare, these agents are considered chemical weapons and, hence, are prohibited under the Convention. Moreover, under Article II, paragraph 7 of the Convention, a Riot Control Agent is defined as any chemical not listed in a Schedule, which can produce rapidly in humans sensory irritation or disabling effects which disappear within a short time following termination of exposure.

Accordingly, any use, as a Riot Control Agent, of a toxic chemical belonging to one of the three Schedules listed in the Annex to the Convention on Chemicals would be contrary to the Convention. On 1 May, the United States of America announced that it had imposed new measures on the Russian Federation for its full-scale war and use of chemical weapons against Ukraine, including for its use of chloropicrin, a chemical belonging to Schedule 3 of the Convention, as well as riot control agents as a method of warfare.

For its part, the Russian Federation has denied making use of such weapons. It is recalled that, to conduct any activities pertaining to allegations of use of toxic chemicals as weapons, the Secretariat of the

OPCW would need to be formally seized of a request to conduct such activity by States Parties. So far, the Secretariat has not received any such request for action. In the meantime, the OPCW will continue to provide support to Ukraine, upon its request, in the field of assistance and protection against chemical weapons under Article X of the Convention.

In this framework, the Secretariat has been working on delivering training courses on emergency response, and the provision of protective, detection, and identification equipment, together with the relevant training. All 193 OPCW Member States, thus including the Russian Federation and Ukraine, have committed never to develop, produce, acquire, stockpile, transfer or use chemical weapons. States Parties to the Chemical Weapons Convention have declared that any use of chemical weapons is totally unacceptable and would violate the legal norms and standards of the international community.

<https://www.opcw.org/media-centre/news/2024/05/statement-ukraine-opcw-spokesperson>

Putin cannot be allowed to use chemical weapons in Ukraine with impunity

May 7, 2024

After years of Ukrainians sounding the alarm over Russia's alleged use of chemical weapons, the US Department of State has now substantiated these claims and has announced new sanctions on Russian actors for their role in enabling the country's chemical and biological weapons programs. In an official statement, the United States charged Russia with using "the chemical weapon chloropicrin against Ukrainian forces in violation of the Chemical

Weapons Convention.” Why does this matter, and what comes next?

Chloropicrin, a chemical agent frequently used for riot control, is banned for use in a warfare setting under the Chemical Weapons Convention, which Russia has been a signatory to since its inception. Over the past two years, Ukraine has reported some 1,400 cases of chemical weapons use, but these claims had not been confirmed by third parties until the May 1 statement released by the US State Department.

If Putin has no qualms about using banned weapons, why choose chloropicrin? As far as chemical weapons go, chloropicrin is less lethal than other weapons suspected to be in Russia’s arsenal. By using a weaker agent, Putin’s goal does not seem to be maximum death and destruction in this case. Rather, he may be testing the waters to gauge the international response and determine just how far he can go. A strong reaction from the international community is therefore vital to make clear that widespread use of chemical weapons is completely unacceptable and will not be tolerated.

<https://www.atlanticcouncil.org/blogs/ukrainealert/putin-cannot-be-allowed-to-use-of-chemical-weapons-in-ukraine-with-impunity/>

U.S. Tightens Rules on Risky Virus Research

May 7, 2024

A long-awaited new policy broadens the type of regulated viruses, bacteria, fungi and toxins, including those that could threaten crops and livestock. The White House has unveiled tighter rules for research on potentially dangerous microbes and toxins, in an effort to stave off laboratory accidents that could unleash a pandemic. The new policy, published Monday evening, arrives

after years of deliberations by an expert panel and a charged public debate over whether Covid arose from an animal market or a laboratory in China.

A number of researchers worried that the government had been too lax about lab safety in the past, with some even calling for the creation of an independent agency to make decisions about risky experiments that could allow viruses, bacteria or fungi to spread quickly between people or become more deadly. But others warned against creating restrictive rules that would stifle valuable research without making people safer. Dr. Evans also noted that the new rules emphasize the risk that lab research can have on plants and animals. In the 20th century, the United States and Russia both carried out extensive research on crop-destroying pathogens such as wheat-killing fungi as part of their biological weapons programs. “It’s significant as a signal the White House is sending,” Dr. Evans said.

<https://www.nytimes.com/2024/05/07/science/covid-lab-leak-biosafety-rules-virus-research.html?searchResultPosition=15>

OPCW workshop on Chemical Weapons Convention and peaceful uses of chemistry encourages youth to take up careers in chemistry and chemical non-proliferation

MAY 6, 2024

The Organisation for the Prohibition of Chemical Weapons (OPCW), in collaboration with the Brazilian National Authority for the Chemical Weapons Convention (CWC) and with financial support from the European Union, organised a training programme for young individuals aged 18 to 24, from countries with developing or transitioning economies, to inspire them to take up careers in chemistry and chemical non-proliferation.

The programme took place from 8 to 11 April 2024 in Rio de Janeiro, Brazil. It focused on various topics related to the peaceful uses of chemistry, including chemical safety and security management, green chemistry, and ethics in chemical research. Participants were primarily university students enrolled in courses related to chemistry, chemical engineering, and other scientific fields.

The programme included lectures from experts working in national laboratories, academia, and international organisations; tabletop exercises, and a visit to an industry-leading petrochemical plant and the Fire and Civil Defence Centre in Rio de Janeiro. During the visits, participants learned about risk mitigation related to the potential misuse of toxic chemicals and saw a practical demonstration of chemical risk and incident management and response preparedness. Officials from Ministry of Science, Technology and Innovation of Brazil, the Office of the Ministry of Foreign Affairs in Rio de Janeiro, as well as from the Brazilian National Authority for CWC implementation attended the event.

<https://www.opcw.org/media-centre/news/2024/05/opcw-workshop-chemical-weapons-convention-and-peaceful-uses-chemistry>

Russia using chemical choking agents in Ukraine, US says

May 2, 2024

The US has accused Russia of deploying chemical weapons as a “method of warfare” in Ukraine, in violation of international laws banning their use. State department officials said Russia used the choking agent chloropicrin to win “battlefield gains” over Ukraine.

The allegations, which US officials said were not an “isolated” incident, would contravene

the Chemical Weapons Convention (CWC), which Russia signed. The Kremlin rejected the accusations, calling them “baseless”.

Spokesman Dmitry Peskov told reporters in Moscow that Russia stood by its obligations under the CWC, which prohibits states from developing or acquiring new weapons. Some 193 states have ratified the convention. Chloropicrin - which the US says Russia has used to “dislodge Ukrainian forces from fortified positions” - is an oily substance which was widely used during World War One. It causes irritation of the lungs, eyes and skin and can cause vomiting, nausea and diarrhoea, according to the US Centre for Disease Control (CDC). The chemical’s use in war is expressly banned under the CWC, and is listed as a choking agent by the OPCW. The state department also said Moscow had regularly used “riot control agents,” or tear gas, during the war. “We would respond if he uses it. The nature of the response would depend on the nature of the use,” Mr Biden said. But there have been consistent reports that Moscow has ignored that warning. US Assistant Secretary for Arms Control Mallory Stewart has previously said Russia was using riot control agents in the conflict.

And Ukraine says its troops have faced mounting chemical attacks in recent months. The Reuters news agency reported earlier this year that Russian forces had used grenades loaded with CS and CN tear gases. The report added that at least 500 Ukrainian soldiers have been treated for exposure to toxic gases, and that one had died after suffocating on tear gas. Three Russian bodies linked to the country’s biological and chemical weapons programme were sanctioned by the state department for their links to the production of chemical agents. Other firms that contributed to the government entities were also sanctioned.

<https://www.bbc.com/news/world-europe-68941220>

Kremlin responds to US chemical weapons accusations

May 2, 2024

Washington's claims that Moscow has engaged in banned forms of warfare against Ukrainian troops are baseless, Dmitry Peskov has said. Kremlin spokesman Dmitry Peskov has rejected claims by the US that Russia has engaged in chemical warfare in the Ukraine conflict. The allegation was made as the US Department of State announced a new round of sanctions targeting Russian entities on Wednesday. Some of these measures were justified by reference to alleged breaches by Moscow of the 1993 Chemical Weapons Convention (CWC).

However, Peskov told journalists on Thursday that the claims were *"absolutely baseless and not supported by any evidence."* Moscow remains committed to its international obligations, he added. The latest American sanctions targeted a total of 280 individuals and entities, including the Troops of Radiological, Chemical and Biological Defence – a specialized branch of the Russian military tasked with protecting the military and civilian population from weapons of mass destruction. Washington alleges that the unit has *"facilitated the use"* of chemical weapons in the Ukraine conflict.

The US Department of State specifically claimed that Russia had deployed the toxin chloropicrin, which was used in chemical warfare during World War I and is now predominantly utilized as a pesticide and herbicide. A senior Ukrainian military commander claimed last year that his troops had been targeted with chloropicrin on multiple occasions. In February, Kiev alleged that Russia had conducted more than 200 chemical weapons attacks on the battlefield in January alone.

Moscow has accused Ukrainian forces of staging chemical weapons incidents with a view to blaming Russia for them. *"The use of toxic chemicals by the Ukrainian militants has become systematic,"* the Russian Foreign Ministry said in late February. It added that the Ukrainians were also using improvised drone-dropped chemical weapons. *"The first recorded instance of the use of chloropicrin by Ukrainian neo-fascists happened during the siege of the House of Trade Unions in Odessa on May 2, 2014,"* the ministry said. Fumes produced by the chemical during a fire at the building contributed to the high death toll arising from the incident, according to Moscow. The US sanctions were announced one day before the tenth anniversary of the mass killings in Odessa, which claimed the lives of 48 people, according to the official Ukrainian count.

<https://www.rt.com/russia/596879-kremlin-chemical-weapons-sanctions/>

Imposing New Measures on Russia for its Full-Scale War and Use of Chemical Weapons Against Ukraine

May 1, 2024

The United States is today sanctioning more than 280 individuals and entities to impose additional costs on Russia for both its foreign aggression and internal repression. In this action, the Department of State is imposing sanctions on more than 80 entities and individuals, including those engaged in: development of Russia's future energy, metals, and mining production and export capacity; sanctions evasion and circumvention; and furthering Russia's ability to wage its war against Ukraine.

The Department of State is concurrently delivering to Congress a determination pursuant to the Chemical and Biological Weapons Control and Warfare Elimination

Act of 1991 (CBW Act) regarding Russia's use of the chemical weapon chloropicrin against Ukrainian troops. Pursuant to the CBW Act, the Department is re-imposing restrictions on foreign military financing, U.S. Government lines of credit, and export licenses for defense articles and national security-sensitive items going to Russia. The Department also is sanctioning three Russian government entities associated with Russia's chemical and biological weapons programs and four Russian companies that have contributed to such entities.

Among these actions, the Department is also sanctioning an additional three individuals in connection with the death of Aleksey Navalny in Russian Penal Colony IK-3. All targets are being designated pursuant to Executive Order (E.O.) 14024, as amended, which authorizes sanctions with respect to specified harmful foreign activities of the Government of the Russian Federation.

The United States will continue to use the tools at its disposal to disrupt support for Russia's military-industrial base and curtail Russia's use of the international financial system to further its war against Ukraine. We continue to stand in solidarity with Russians striving for a more democratic future and with Ukrainians defending their homeland from Russia's aggression.

The Department of State has made a determination under the CBW Act that Russia has used the chemical weapon chloropicrin against Ukrainian forces in violation of the Chemical Weapons Convention (CWC). We make this determination in addition to our assessment that Russia has used riot control agents as a method of warfare in Ukraine, also in violation of the CWC. The use of such chemicals is not an isolated incident, and is

probably driven by Russian forces' desire to dislodge Ukrainian forces from fortified positions and achieve tactical gains on the battlefield. Russia's ongoing disregard for its obligations to the CWC comes from the same playbook as its operations to poison Aleksey Navalny and Sergei and Yulia Skripal with Novichok nerve agents.

In coordination with the Department of the Treasury, the Department of State is designating three Russian Federation government entities associated with Russia's chemical and biological weapons programs and four Russian companies providing support to such entities. The Department of the Treasury is separately designating three entities and two individuals involved in procuring items for military institutes involved in Russia's chemical and biological weapons programs, pursuant to a separate WMD non-proliferation authority.

<https://www.state.gov/imposing-new-measures-on-russia-for-its-full-scale-war-and-use-of-chemical-weapons-against-ukraine-2/>

'China developing marine toxins for biological warfare'

April 24, 2024

The US state department has raised alarms in its latest arms control compliance report about China's military conducting research on marine toxins, suggesting potential violations of the Biological Weapons Convention (BWC). The convention, which China ratified in 1984, aims to eliminate biological weapons, yet ongoing activities suggest a secretive development that could be geared toward military use.

The state department report explicitly mentions that China's research involves "biological activities with potential biological

weapons applications,” specifically pointing to the development of toxins for military purposes. This research is linked to sea-based neurotoxins, some of the most potent poisons known, which target the central nervous system and can be lethal in minimal quantities, a Washington Times report said.

This concern is heightened by China’s past biological weapons programs which included agents like ricin and anthrax. The recent focus on marine toxins marks a new direction in strategic weapons research for Beijing. The US intelligence has suspicions that the People’s Liberation Army (PLA) is repurposing civilian research—ostensibly aimed at preventing marine toxin poisoning from seafood—for weapons development.

The report draws on a 2014 government-sponsored Chinese research that discussed the potential of using anatoxins, saxitoxins, and tetrodotoxin as biological weapons. Despite these disclosures, China has reportedly not provided comprehensive details about its past or present biological weapons programs to other BWC signatories, breaching the convention’s requirements.

Thomas DiNanno, a former arms control official, criticized the current administration for not pressing China on these issues, suggesting a reluctance to address what he perceives as a significant escalation in bioweapons development. Meanwhile, Ryan Clarke from the National University of Singapore views this revelation as an indicator of the Chinese Communist Party’s focus on integrating bioweapons into their standard military capabilities.

The issue is set to be a topic of discussion at an upcoming BWC working group meeting in Geneva. Meanwhile, the U.S. continues to press China on these matters in various international forums, aiming to build

diplomatic pressure for transparency and compliance.

<https://timesofindia.indiatimes.com/world/us/china-developing-marine-toxins-for-biological-warfare/articleshow/109565397.cms>

OPCW and IPU underscore role of parliamentarians in promoting effective implementation of Chemical Weapons Convention

April 23, 2024

The Organisation for the Prohibition of Chemical Weapons (OPCW), in collaboration with the Inter-Parliamentary Union (IPU), organised a side event at the 148th IPU Assembly on the role of parliamentarians in fostering global peace and security through advancing the effective national implementation of the Chemical Weapons Convention (CWC).

The event, which was held on 26 March 2024 in Geneva, Switzerland, featured presentations and a panel discussion highlighting the importance of adopting national legislation to fully implement the Convention. Honourable Ms Aigul Kuspan, Chair of the Committee on Foreign Affairs, Defence and Security of the Mazhilis of the Parliament of Kazakhstan delivered a keynote speech at the event highlighting the vital role of parliaments in advancing the implementation of the Convention alongside Kazakhstan’s fight against the proliferation of chemical weapons.

Participants at the event learned about parliamentarians’ role in championing and supporting the adoption of such legislation. They also discussed how parliamentarians can assist law enforcement entities and national authorities’ efforts in enhancing national capacities in chemical emergency

preparedness. Discussions underscored the Convention's relevance in fostering global peace and security as well as sustainable development by advancing Sustainable Development Goals 12 and 16.

<https://www.opcw.org/media-centre/news/2024/04/opcw-and-ipu-underscore-role-parliamentarians-promoting-effective>

North Korea's bioweapons program, including 'Poison Pens', raises alarm: US Report

April 18, 2024

North Korea has been developing 'poison pens' and sprays as a part of their biological weapon programme, US officials have warned. The US intelligence have said that the Kim Jong Un-led country has been developing lethal bacteria and viruses to spread pandemics through bugs like anthrax and small pox. The US officials' warning was reported by UK-based The Times in an article titled "Adherence to and Compliance with Arms Control, Nonproliferation and Disarmament Agreements and Commitments".

North Korea have remained a coenobite when it comes to foreign reporting. Most of what is known for North Korea is their reported massive nuclear artillery. However, this report has said that the North Korea has an extremely active biological weapon development programme. "The United States assesses that the Democratic People's Republic of Korea (DPRK) has a dedicated, national level offensive BW program. The DPRK has the capability to produce biological agents for military purposes." the report posted on US State Department's website said.

The report further read that North Korea has the technical capability to produce

bacteria, viruses, and toxins that could be used as biological weapons.

The report further goes on to mention sprays and poison pens which the North Korea could possibly use via biological weapon agents. Pyongyang probably is capable of weaponising Biological Weapon agents with unconventional systems such as sprayers and poison pen injection devices. The report further mentions that North Korea may have already deployed chemical weapons and these could be used to covertly deliver biological weapon agents.

<https://www.livemint.com/news/world/north-koreas-bioweapons-program-including-poison-pens-raises-alarm-us-report-11713449940057.html>

Is North Korea developing biological weapons?

April 18, 2024

The threat North Korea's nuclear weapons programme poses to the world is well known. But as the hermit kingdom actively expands its weapons arsenal, and international institutions struggle to contain it, we shouldn't ignore its development of chemical and biological weapons either.

A report from the United States State Department asserts that North Korea has a 'dedicated' biological weapons programme, which it could use against the militarily-superior US and South Korea. Concerningly, the report highlights North Korea's ability to produce bacteria, viruses, and other toxins which could be used as biological weapons agents. We have already seen evidence of Pyongyang's unabashed usage of chemical weapons, especially in highly public places. Who can forget when, in February 2017, Kim Jong Nam, the half-brother of Kim Jong Un, was assassinated by VX nerve agent whilst in Kuala Lumpur International Airport?

Unlike its nuclear and chemical weapons programmes, however, much less is known about North Korea's biological weapons capabilities. Instead of disclosing information about these capabilities, state media has preferred to make spurious statements denouncing the US for its past involvement with biological weapons. These unevidenced claims have included criticising the US military's alleged usage of biological weapons during the Korean war or accusing the US of targeting North Korea with anthrax after the US erroneously sent an anthrax sample to South Korea in 2015. Months after Russia's invasion of Ukraine in February 2022, too, Pyongyang lashed out at Washington for operating biological laboratories in Ukraine and thereby catalysing the spread of monkeypox. It's no surprise that Russia made the same accusation.

Yet, in 2015, the North Korean regime gave us a rare insight into its possible bioweapons ambitions, when state media lauded Kim Jong Un's visit to the Pyongyang Bio-technical Institute. Whilst the North Korean regime emphasised that the facility was producing new insecticides to enhance agricultural production, the possibility of North Korea producing biological weapons, not least anthrax, became increasingly plausible. Nine years on, and Pyongyang's bioweapons capabilities will likely have improved. The Covid-induced shutdown of the country, for over three years, would only have contributed to accelerating any indigenous development of new types of weapons of mass destruction beyond nuclear weapons.

Whilst we may not know much about North Korea's bioweapons capabilities, looking at the country's earlier ventures into acquiring nuclear weapons can offer a useful, if worrying, lesson. After signing the Nuclear Non-Proliferation Treaty in 1985 – thereby renouncing its right to develop nuclear

weapons – North Korea continued to assert that it had neither the intention nor the means to go down the nuclear route. History, however, tells a different story. In gross violation of its Treaty commitments, North Korea was, in fact, actively joining clandestine proliferation networks with Pakistan, Syria, and Iran, in order to develop highly-enriched uranium.

<https://www.spectator.co.uk/article/is-north-korea-developing-biological-weapons/>

How to Avoid a Genetic Arms Race

April 16, 2024

A quiet biological revolution in warfare is underway. The genome is emerging as a new domain of conflict. The level of destruction that only nuclear weapons could previously achieve is fast becoming as accessible as a cyberattack. Now for the bad news. Great power conflicts and proxy wars are back. The rules-based world order crumbles while an unpredictable—and potentially unstable—multipolar one emerges.

Rapidly accelerating breakthroughs in our ability to change the genes of organisms are generating medically thrilling possibilities. They are also generating novel capabilities for biological weapons, a form of warfare that has been largely abandoned for decades. Take the recent AI-enabled advancements in gene-editing, construction of artificial viral vectors for human genome remodeling, protein folding, and the creation of custom proteins. Far outpacing the regulatory environment, these advances are facilitating the weaponization and delivery of harmful bioagents—overcoming impediments that previously made biological weapons impractical.

<https://www.thehastingscenter.org/how-to-avoid-a-genetic-arms-race/>

Southern African States fortify capacity to combat biological threats and implement Biological Weapons Convention

March 28, 2024

In a bid to strengthen regional cooperation and bolster national implementation of the Biological Weapons Convention (BWC), 60 delegates from ten Southern African states and international and regional organisations convened in Gaborone, Botswana, from 12 to 14 March 2024 for a three-day workshop. The event, organised by the United Nations Office for Disarmament Affairs (UNODA) in partnership with the Ministry of Defence and Security of Botswana, aimed to fortify the region's capacity to combat biological threats and promote adherence to international disarmament norms and standards. In addition, representatives of Portugal, the United States, the World Organization for Animal Health (WOAH), the Africa Centers for Disease Control and Prevention (ACDC), and the UN Regional Centre for Peace and Disarmament in Africa (UNREC) were in attendance.

On the opening day, delegates heard from the Honourable Thomas Kagiso Mmusi, Botswana's Minister of Defence and Security, who stated that "the Biological Weapons Convention represents a cornerstone of the global disarmament and non-proliferation regime and reaffirms our commitment to the peaceful uses of biological sciences and technology". The coordinator of UNODA's project to support implementation of the BWC in Africa, Sylvain Fanielle, noted that "while the COVID-19 pandemic demonstrated our collective vulnerability in the face of disease that spreads rapidly across borders and causes incalculable human, social and economic damage, it also brought biosafety and biosecurity to the forefront of international peace and security planning,"

noting therefore the timely organisation of the workshop.

The workshop served as a platform for participating States to provide updates on the progress of BWC implementation at the national level. Delegates discussed rights and obligations under the Convention and interacted with their counterparts from the region, with a view to sharing experiences, challenges and best practices, and to strengthening networks and working relationships to enhance BWC implementation. Delegates' presentations highlighted efforts related to developing and adopting national implementing legislation, the roles of National Contact Points (NCPs), processes to prepare and submit Confidence Building Measures (CBMs), as well as initiatives focusing on biosafety and biosecurity.

Delegates also worked closely with UNODA to identify opportunities for technical assistance and capacity building support. In addition to plenary sessions, bilateral meetings between UNODA and participating delegations were conducted, facilitating deeper discussions on national assistance needs and priorities. These engagements laid the groundwork for tailored national workplans aimed at advancing BWC implementation in each represented State. Furthermore, delegates were briefed on United Nations Security Council Resolution 1540 (2004), which deals with preventing the proliferation of chemical, biological, radiological, and nuclear weapons to non-state actors, and the United Nations Secretary General Mechanism for the Investigation of Alleged Use of Chemical and Biological Weapons.

<https://disarmament.unoda.org/update/southern-african-states-fortify-capacity-to-combat-biological-threats-and-implement-biological-weapons-convention/>

OPCW workshop in Lisbon enhances national implementation of the Chemical Weapons Convention

March 27, 2024

The Organisation for the Prohibition of Chemical Weapons (OPCW), in collaboration with the Government of Portugal, organised a workshop on advancing the national implementation of the Chemical Weapons Convention (CWC) in Portuguese-speaking Member States, from 27 to 29 February 2024 in Lisbon, Portugal.

The main objective of the event was to support the implementation of OPCW's policy-making organs' recommendations, with a special focus on providing tailored and systematic technical assistance to address the practical national implementation issues and concerns of States Parties to the Convention. This event marked a significant milestone as it brought together all the Lusophone Member States for the first time in OPCW history, conducting proceedings entirely in Portuguese, and centered around CWC implementation. The workshop succeeded in enhancing communication among participants and fostering stronger cooperation among Member States.

The three-day event gave experts the opportunity to exchange information, identify common challenges and share best practices related to the national implementation of the Convention. It emphasised the importance of promoting the national implementation of the CWC, and the advantages of attaining comprehensive legislation in this regard. The workshop included briefings on best practices regarding national strategies on advancing CWC legislations, as well as rights and obligations of States Parties under the Convention, placing an emphasis on assisting in the review, drafting, and advancement of comprehensive implementing legislation.

In addition, the event included presentations delivered by experts from international organisations, including the Community of Portuguese Language Countries (CPLP) and World Customs Organization (WCO). The workshop featured dynamic activities focused on the review legislative texts and comprised practical exercises addressing common misconceptions about chemical weapons and CWC related issues.

The event was attended by 19 delegates from eight Portuguese-Speaking countries: Angola, Brazil, Cabo Verde, Guinea–Bissau, Mozambique, Portugal, São Tomé and Príncipe and Timor–Leste.

<https://www.opcw.org/media-centre/news/2024/03/opcw-workshop-lisbon-enhances-national-implementation-chemical-weapons>

Biosecurity: where science and diplomacy combine

March 26, 2024

The latest event in TWAS's science diplomacy series addressed respecting and navigating international treaties about biological dangers, from pandemics to weapons. From virus detection to preventing biological weapon development—biosecurity is an arena in which science and diplomacy must ultimately combine, said the participants at the latest science diplomacy course co-organized by TWAS.

The event brought 18 early-career researchers from low- and middle-income countries to Trieste, all life scientists for whom science diplomacy was new, to teach them about the field, as well as research responsibility. The event also taught them ways to provide policy advice, contribute to international agreements, and build on the UN Sustainable Development Goals (SDGs). After two days of the course on science

diplomacy, the participants relocated to International Centre for Genetic Engineering and Biotechnology (ICGEB) headquarters in Trieste for three days of hands-on biotechnology training in the laboratory.

Partnering with TWAS in organizing the event were the Biological and Toxin Weapons Convention (BWC) Implementation Support Unit, ICGEB and the InterAcademy Partnership (IAP). Of the 18 scientists, nine were from the science-and-technology-lagging countries (STLCs) identified by TWAS, seven were from UN-recognized Least Developed Countries, and six were women. They were from Burkina Faso, Cameroon, Ethiopia, Kenya, Malawi, Mozambique, Pakistan, Rwanda, Tanzania, Thailand, Türkiye, Uganda, Uzbekistan.

“We need to understand global priorities or even local priorities, to understand how our research fits into an ongoing problem or ongoing possibilities,” said Clarissa Rios Rojas, political affairs officer for the UN Office for Disarmament Affairs (UNODA), and one of the event’s speakers. Rios Rojas added that science diplomacy brings scientists from laboratories and academia to a level where they can communicate very complex information and data to policy makers, citizens and others. This should then enable science to become an important part of policy-making processes. “We really need to bring it back to society and local and global decisions.”

<https://twas.org/article/biosecurity-where-science-and-diplomacy-combine>

US still operating biolabs in Ukraine – Russian envoy

March 25, 2024

Washington is trying to hide its own activities by blocking Moscow’s push for tougher

controls, a diplomat claims. The US continues to operate 30 biolabs on the territory of Ukraine as part of an illegal military-biological program, Russia’s envoy to the Netherlands has claimed. The number of American laboratories on Ukrainian territory has been “*well-known for a long time*,” Vladimir Tarabrin, who is also Russia’s Permanent Representative to the Organization for the Prohibition of Chemical Weapons (OPCW), said in an interview with the Izvestia newspaper on Sunday.

The diplomat recalled that the head of Russia’s Nuclear, Chemical and Biological Protection Forces, Lieutenant General Igor Kirillov, had claimed in March 2022 that 30 such biolabs existed. “*Our armed forces discovered documents confirming the extensive military biological program deployed by the US and NATO countries on the territory of Ukraine and other former Soviet republics*,” he said.

The Kiev government allegedly began destroying dangerous pathogens in the laboratories and suspending research on February 24, 2022, the day Russia launched its military operation against Ukraine, but “*in 2023 the implementation of those programs resumed, only their name was changed*,” Tarabrin claimed. Asked if the number of the US biolabs in Ukraine still stands at 30, the ambassador said: “*According to our data, yes.*”

“It’s not surprising, therefore, that over the past 20 years, Washington has been blocking all Russian initiatives aimed at strengthening the Biological Weapons Convention (BWC) regime and creating an effective mechanism for verifying compliance with its provisions by all participating countries,” Tarabrin said.

<https://www.rt.com/news/594882-biological-laboratories-us-ukraine/>

International course on biological weapons and toxicology

March 22, 2024

The course was attended by members of the armed forces of Bosnia and Herzegovina, Greece, Egypt, Italy, Hungary, the United States of America, Slovenia and Spain. The trainees broadened their knowledge of biological weapons and toxicology and practiced the use of military equipment for the protection against biological agents, as well as the equipment for biological detection, identification, and decontamination.

During the course, they used an improvised laboratory, which was set up so that the participants could practice countering bioterrorism. The training course was delivered by the CBRN Training Centre instructors and toxicology experts from the Military Medical Academy and “Vinèa” Institute of Nuclear Sciences. The objectives of the course were successfully fulfilled. Such and similar international training activities carried out at the Serbian Armed Forces CBRN Centre testify to the quality of instructors and training system in the Serbian Armed Forces, contributing also to the improvement of cooperation with the partner countries’ armed forces.

<https://www.mod.gov.rs/eng/21072/medjunarodni-kurs-o-bioloskom-oruzju-i-toksikologiji21072>

Experts from developing countries gather in Trieste to learn about science diplomacy, biosecurity and virus detection in the framework of the Biological Weapons Convention

March 21, 2024

From 4 to 8 March 2024, the Implementation Support Unit (ISU) of

the Biological Weapons Convention (BWC), together with The World Academy of Sciences (TWAS), the InterAcademy Partnership (IAP), and the International Centre for Genetic Engineering and Biotechnology (ICGEB), organised a joint capacity-building course on science diplomacy, biosecurity and virus detection in the framework of Article X of the BWC in Trieste, Italy.

Under Article X, States Parties undertake to cooperate in contributing with other States or international organisations to the further development and application of scientific discoveries in the field of biology for the prevention of disease, or for other peaceful purposes. Fourteen experts, seven of them women, from 14 developing BWC States Parties (Bangladesh, Burkina Faso, Cameroon, Ethiopia, Kenya, Malawi, Mozambique, Pakistan, Rwanda, Tanzania, Thailand, Türkiye, Uganda and Uzbekistan), participated in the course. Selected participants were mainly mid-career professional experts with backgrounds in molecular biology, microbiology, virology and infectious diseases representing national research or academic institutes that deal with disease outbreaks. The event started with a two-day course at TWAS headquarters, which focused on science diplomacy and the role of scientists in the context of the BWC. Participants also practiced with different scenarios in two tabletop exercises about science diplomacy and biosecurity. The course was further enriched with presentations by participants from Bangladesh, Kenya and Tanzania on national and regional challenges of virus detection and the implementation of biosecurity regulations. Experts from the ICGEB scientific partners’ network also shared their experiences in establishing diagnostic laboratories and implementing diagnostic techniques in Cameroon, Moldova and Slovenia.

The course was organised with the financial support of the Norwegian Ministry of Foreign Affairs and the Government of Finland. The contributions from Finland and Norway aim specifically to provide technical assistance to developing BWC States Parties and foster cooperation on issues relating to the implementation of Article X.

<https://disarmament.unoda.org/update/experts-from-developing-countries-gather-in-trieste-to-learn-about-science-diplomacy-biosecurity-and-virus-detection-in-the-framework-of-the-biological-weapons-convention/>

Strengthening the Chemical Weapons Convention by updating Germany's legislation

March 19, 2024

By revising Germany's legislation related to the Chemical Weapons Convention (CWC), the German Government is further reducing proliferation risks and at the same time setting a good example for the international community with regard to the national implementation of the Convention. The German Government is thereby also carrying out the task it set itself in its National Security Strategy, namely to increase its endeavours to contain chemical, biological, radiological and nuclear risks.

In early March 2024, the changes to national legislation related to the CWC, specifically to the Implementing Act and to the Implementing Regulation, took effect. The amendments were informed by nearly 30 years of experience with implementation of the CWC, specifically industry inspections, trade in listed chemicals and the discovery of old chemical weapons.

A number of important changes have been made. For example, a notification

requirement has been established for when chemical weapons or chemicals listed under the CWC (referred to as scheduled chemicals) are found or stolen. This aims to better protect the population. Also, an appropriate legal basis has been created for the previously voluntary procedure that aims to investigate transfer discrepancies, or differences between the declarations of import and export of scheduled chemicals.

<https://www.auswaertiges-amt.de/en/aussenpolitik/chemical-weapons-convention/2649628>

Strengthening biosecurity in São Tomé and Príncipe: National workshop on the effective implementation of the Biological Weapons Convention and Resolution 1540

March 19, 2024

From 4 to 6 March 2024, the UN Office for Disarmament Affairs (UNODA) and the Ministry of Foreign Affairs, Cooperation and Communities of São Tomé and Príncipe gathered key national stakeholders and decision makers to raise awareness about the implementation of the Biological Weapons Convention (BWC) and UN Security Council Resolution 1540 (2004). Jointly organized by UNODA's Biological Weapons Convention Team and the 1540 Support Unit, the workshop was an important step towards fostering national ownership and renewing commitment to the BWC, Resolution 1540, and biosafety and biosecurity issues more broadly among national experts and practitioners.

This event unfolded after São Tomé and Príncipe's simultaneous submission of assistance requests to the Security Council Committee established pursuant to Resolution 1540 (1540 Committee) and

under UNODA's project aimed at bolstering the implementation and universalization of the BWC across Africa. Months of subsequent consultations and coordination with the authorities of Sao Tome and Principe culminated in a gathering of 38 participants representing over 20 national institutions as well as regional and international experts.

Among national participants were senior officials such as Mr. Jorge Amado, Minister of Defense and Internal Administration who inaugurated the workshop together with Mr. Eric Overvest, UN Resident Coordinator, and Mr. David Theard, Coordinator of the 1540 Group of Experts. In his opening remarks, Mr. Jorge Amado reiterated the commitment of São Tomé and Príncipe to the comprehensive, integrated, and effective national implementation of the BWC and Resolution 1540.

The workshop aimed at enhancing a shared understanding of the two instruments among all relevant actors, fostering cooperation and coordination among them to take advantage of diverse expertise during the implementation process and equipping participants with the tools to implement the BWC and Resolution 1540 effectively. Through interactive sessions and insightful discussions, the participants delved into the intricacies of biosecurity, exploring the synergies between the two instruments, and mapping out the roles and responsibilities of various stakeholders.

International cooperation played a pivotal role, with representatives from Portugal and Angola sharing insights and lessons learnt on their respective experiences in implementing the BWC and Resolution 1540. This exchange of experience allowed São Tomé and Príncipe to better assess national implementation needs, including international assistance. In that regard, representatives of the World

Organization for Animal Health (WOAH) and the Africa Centers for Disease Control and Prevention (Africa CDC) also participated in the event, sharing assistance opportunities, and informing about the roles of the animal and human health sectors in strengthening biosecurity through the two instruments.

<https://disarmament.unoda.org/update/strengthening-biosecurity-in-sao-tome-and-principe-national-workshop-on-the-effective-implementation-of-the-biological-weapons-convention-and-resolution-1540-2004/>

The Department of Homeland Security Is Embracing A.I.

March 18, 2024

The Department of Homeland Security has seen the opportunities and risks of artificial intelligence firsthand. It found a trafficking victim years later using an A.I. tool that conjured an image of the child a decade older. But it has also been tricked into investigations by deep fake images created by A.I. The agency will be the first in the federal government to roll out a comprehensive plan to integrate the technology into a variety of uses, from fighting crime to helping disaster survivors.

Now, the department is becoming the first federal agency to embrace the technology with a plan to incorporate generative A.I. models across a wide range of divisions. In partnerships with OpenAI, Anthropic and Meta, it will launch pilot programs using chatbots and other tools to help combat drug and human trafficking crimes, train immigration officials and prepare emergency management across the nation.

As part of its plan, the agency plans to hire 50 A.I. experts to work on solutions to keep the nation's critical infrastructure safe from A.I.-generated attacks and to combat the use

of the technology to generate child sexual abuse material and create biological weapons.

<https://www.nytimes.com/2024/03/18/business/homeland-security-artificial-intelligence.html?searchResultPosition=12>

Russia appears to be using chemical weapons in Ukraine. And admitting it.

March 15, 2024

Ukraine claims there has been a dramatic spike in Russian use of banned chemical weapons since the beginning of the war there two years ago. A quarter of the alleged chemical attacks in the war occurred in the month of February, the Ukrainian military reported recently.

According to an article in *Forbes*, the Ukrainian general staff reported 81 chemical attacks in December. *Reuters* reported that a general staff statement claimed those numbers rose to 229 in January. (The wire service said that the military press release mentioned only CS, a form of tear gas.) Then in February, the *Kyiv Post* reported that Russia hit Ukraine with tear gas 250 times. The paper said that there have been 1,068 tear gas attacks since the war began.

For Lennie Phillips, a former inspector for the Organisation for the Prohibition of Chemical Weapons (OPCW), which implements the Chemical Weapons Convention, some of Ukraine's claims appear credible, including a segment on Russian state-controlled TV that included an interview with a man the US embassy in The Hague reports is a Russian soldier discussing the effectiveness of chemicals as weapons. "The piece on Russia's Channel [One] alone makes the use of tear gas by the [Russian Federation] very credible," Phillips, now a research fellow at the UK defense think tank RUSI, said.

According to the US embassy's translation of the May new clip, a soldier tells an interviewer, "Now that we have started using them, the enemy has decided gas masks would help. The gas masks don't help." (Gas masks do in fact protect against tear gas and are a regular part of military training.) Phillips also cited numerous photos and videos that suggest Russian troops have "easy access" to grenades for riot control agents as adding to the credibility of the Ukrainian claims.

The increased Ukrainian allegations of Russian chemical attacks may reflect an emphasis on reporting incidents and not a true increase in chemical weapons use, Phillips cautioned. Ukrainian officials have also alleged that Russia has used other chemicals, some also classified as riot control agents. Phillips called those assertions "less clear."

<https://thebulletin.org/2024/03/russia-appears-to-be-using-chemical-weapons-in-ukraine-and-admitting-it/>

Japan contributes near •190K to OPCW assistance and protection programmes

March 14, 2024

The Government of Japan has voluntarily contributed •187,514 to the Trust Fund for the Implementation of Article X of the Organisation for the Prohibition of Chemical Weapons (OPCW). The contribution is earmarked for OPCW assistance and protection activities related to Ukraine. The voluntary contribution was formalised on 11 March 2024 in a signing ceremony held between the Ambassador, Permanent Representative of Japan to the OPCW, H.E. Mr. Minami Hiroshi, and the OPCW Director-General, Ambassador Fernando Arias, at the OPCW's Headquarters in The Hague.

“The Government of Japan has decided to make a contribution to the ongoing assistance and protection against chemical weapons for Ukraine. We would like to express our gratitude for all the works carried out by the OPCW Technical Secretariat. Our support extends not only to the OPCW’s activities in response to the use or possible use of chemical weapons, but to all the activities conducted by the OPCW Technical Secretariat,” said Ambassador Minami.

”I would like to thank the Government of Japan for its continuous political and financial support to the OPCW and its mission to achieve a world free of chemical weapons. Ensuring the capabilities and preparedness of Member States to protect their populations in the case of a chemical emergency is a critical factor for the effective implementation of the Chemical Weapons Convention,” stated the OPCW Director-General. Contribution will enhance ongoing assistance and protection activities related to Ukraine.

<https://www.opcw.org/media-centre/news/2024/03/japan-contributes-near-eu190k-opcw-assistance-and-protection-programmes>

Implementation of the Biological Weapons Convention Discussed in Almaty

March 14, 2024

Issues of implementation of the provisions of the Biological and Toxin Weapons Convention (BTWC) and its further strengthening were the main topics of discussion at the regional workshop held in the UN Plaza building. The event, organized by the United Nations Office for Disarmament Affairs (UNODA) and the Ministry of Foreign Affairs of the Republic

of Kazakhstan with support of the European Union, was attended by national coordinators on BTWC issues from the countries of Central Asia and Azerbaijan.

The workshop provided an opportunity for participants to exchange information and best practices regarding the improvement of legislation and national action plans, as well as the preparation and presentation of information on the implementation of confidence-building measures – a key mechanism for ensuring transparency in the biosafety practices of States Parties to the Convention.

Representatives of the UN Office for Disarmament Affairs thanked Kazakhstan for the opportunity to organize a training course in Almaty and the representatives of relevant government agencies from Kazakhstan, Azerbaijan, Tajikistan and Uzbekistan for participation in the event, and emphasized the critical importance of comprehensive and active implementation of the Convention at the national level. National contact points play a key role in this regard.

Representatives of Kazakhstan drew attention to the strict fulfillment by Kazakhstan of its obligations under the BTWC. It was noted that the priority issue for our country in the field of biological safety is the implementation of the initiative to establish the International Agency for Biological Safety (IABS). Kazakhstan shares the belief in the need for active cooperation to ensure the use of the latest achievements of biotechnology for peaceful purposes. The IABS will ensure control over the development of science and technology in areas related to the BTWC.

<https://www.gov.kz/memleket/entities/mfa/press/news/details/726340?lang=en>

A.I. Is Learning What It Means to Be Alive

March 10, 2024

Given troves of data about genes and cells, A.I. models have made some surprising discoveries. What could they teach us someday? Just like ChatGPT, biological models sometimes get things wrong. Kasia Kedzierska, a computational biologist at the University of Oxford, and her colleagues recently gave GeneFormer and another foundation model, scGPT, a battery of tests. They presented the models with cell atlases they hadn't seen before and had them perform tasks such as classifying the cells into types. The models performed well on some tasks, but in other cases they fared poorly compared with simpler computer programs.

Dr. Kedzierska said she had great hopes for the models but that, for now, "they should not be used out of the box without a proper understanding of their limitations." Dr. Leskovec said that the models were improving as scientists trained them on more data. But compared with ChatGPT's training on the entire internet, the latest cell atlases offer only a modest amount of information. "I'd like an entire internet of cells," he said.

More cells are on the way as bigger cell atlases come online. And scientists are gleaming different kinds of data from each of the cells in those atlases. Some scientists are cataloging the molecules that stick to genes, or taking photographs of cells to illuminate the precise location of their proteins. All of that information will allow foundation models to draw lessons about what makes cells work. Scientists are also developing tools that let foundation models combine what they're learning on their own with what flesh-and-blood biologists

have already discovered. The idea would be to connect the findings in thousands of published scientific papers to the databases of cell measurements.

If foundation models live up to Dr. Quake's dreams, they will also raise a number of new risks. On Friday, more than 80 biologists and A.I. experts signed a call for the technology to be regulated so that it cannot be used to create new biological weapons. Such a concern might apply to new kinds of cells produced by the models. Privacy breaches could happen even sooner. Researchers hope to program personalized foundation models that would look at an individual's unique genome and the particular way that it works in cells. That new dimension of knowledge could reveal how different versions of genes affect the way cells work. But it could also give the owners of a foundation model some of the most intimate knowledge imaginable about the people who donated their DNA and cells to science.

<https://www.nytimes.com/2024/03/10/science/ai-learning-biology.html?searchResultPosition=14>

Dozens of Top Scientists Sign Effort to Prevent A.I. Bioweapons

March 8, 2024

An agreement by more than 90 said, however, that artificial intelligence's benefit to the field of biology would exceed any potential harm. Dario Amodei, chief executive of the high-profile A.I. start-up Anthropic, told Congress last year that new A.I. technology could soon help unskilled but malevolent people create large-scale biological attacks, such as the release of viruses or toxic substances that cause widespread disease and death.

Senators from both parties were alarmed, while A.I. researchers in industry and academia debated how serious the threat might be. Now, over 90 biologists and other scientists who specialize in A.I. technologies used to design new proteins — the microscopic mechanisms that drive all creations in biology — have signed an agreement that seeks to ensure that their A.I.-aided research will move forward without exposing the world to serious harm.

The biologists, who include the Nobel laureate Frances Arnold and represent labs in the United States and other countries, also argued that the latest technologies would have far more benefits than negatives, including new vaccines and medicines. “As scientists engaged in this work, we believe the benefits of current A.I. technologies for protein design far outweigh the potential for harm, and we would like to ensure our research remains beneficial for all going forward,” the agreement reads. The agreement does not seek to suppress the development or distribution of A.I. technologies. Instead, the biologists aim to regulate the use of equipment needed to manufacture new genetic material.

This DNA manufacturing equipment is ultimately what allows for the development of bioweapons, said David Baker, the director of the Institute for Protein Design at the University of Washington, who helped shepherd the agreement. “Protein design is just the first step in making synthetic proteins,” he said in an interview. “You then have to actually synthesize DNA and move the design from the computer into the real world — and that is the appropriate place to regulate.”

<https://www.nytimes.com/2024/03/08/technology/biologists-ai-agreement-bioweapons.html>

How the Biological Weapons Convention could verify treaty compliance

March 5, 2024

While significant chemical and nuclear weapons agreements contain verification provisions, the 1972 Biological Weapons Convention (BWC) does not. World governments have not discussed this topic within the treaty framework for two decades, after several years of work to develop a verification system failed in 2001.

Much has changed in science and security since then: Artificial intelligence (AI), genome editing, and other capabilities continue to accelerate and converge, resulting in ever more powerful technologies in the hands of a growing number of actors. In parallel, the international security environment has become more complex and competitive. Under these circumstances, it was remarkable that at the Ninth BWC Review Conference in late 2022, 185 countries agreed on a report with a forward-looking strategy to form a working group to discuss the long-standing issues of compliance and verification of the BWC, among several other matters.

Despite the challenging geostrategic context, the group engaged in a constructive dialogue over three days in December 2023, managing to move beyond the impasse around the failed verification protocol negotiations decades ago that stymied discussion on verification and compliance ever since. Moreover, the group recognized significant scientific and technological developments, including new open source verification opportunities and microbial forensic techniques that weren't available in the late 1990s and early 2000s, but may be now. But there remains a gap between what is technically possible in terms of verifying

that countries are in compliance with the treaty, and what BWC member states view as politically feasible and financially acceptable.

A path to verification? Before any new methods of treaty verification, whatever their merit, can be deployed, BWC members must overcome several hurdles to develop a verification system.

Conceptual clarity. During the December working group session, it was apparent that many countries were in the “early stages of conceptual thinking” about verification, with differing visions on the definition, objectives, and scope of any BWC verification mechanism. To progress, states will have to develop a shared understanding of the scope and purposes of BWC verification ahead of a working group meeting later this year.

https://thebulletin.org/2024/03/how-the-biological-weapons-convention-could-verify-treaty-compliance/?utm_source=Twitter&utm_medium=SocialMedia&utm_campaign=TwitterPost032024&utm_content=DisruptiveTechnologiesBio_VerifyTreaty_03052024

Ukraine using ‘chemical warfare agents’ – Moscow

March 5, 2024

Russia’s security service claims to have arrested a man who was planning an attack in Zaporozhye Region. Ukraine has used chemical warfare agents secretly supplied to it by the West to attack Russian troops, Moscow’s Deputy Minister of Industry and Trade Kirill Lysogosky has claimed. The Russian Federal Security Service (FSB) claimed to have thwarted an “attempt by the Ukrainian special services to commit a terrorist act in Zaporozhye Region using an analog of the BZ chemical

warfare agent, according to the NATO classification” in which one man was arrested.

Officials released a video clip showing the arrest of the alleged saboteur and several vials found on his premises, which purportedly contained the toxic substance, also known as 3-Quinuclidinyl Benzilate. Prohibited under the Chemical Weapons Convention, BZ induces hallucinations, delirium, blindness, and inability to perform basic tasks. “The results of the investigation show that Western nations professing to have a wish to begin dialogue on strategic stability with us are effectively the developers and providers of chemical warfare agents prohibited under the [Chemical Weapons] Convention to Ukraine,” Lysogosky said on Monday, as quoted by TASS.

He also criticized the fact that Russia had been replaced on the executive council of the Organization for the Prohibition of Chemical Weapons (OPCW) by Ukraine, Poland and Lithuania last November after failing to get enough votes to retain its seat. In February, the head of Russia’s Nuclear, Chemical and Biological Protection Forces, Lieutenant General Igor Kirillov, accused Ukrainian forces of using banned chemical warfare agents on the battlefield. He claimed that Washington had been aiding and abetting Kiev in these activities. According to the general, the two nations had thus violated the OPCW’s charter.

The Russian commander cited several cases from last year, including one in which Ukrainian troops dropped US-made gas grenades containing “CS” compound on Russian positions. This chemical is classified as a riot-control tool that irritates the eyes and upper respiratory tract, and can cause skin burns, respiratory paralysis and cardiac

arrest when deployed in high concentrations. The general also claimed at the time that Ukraine was incorporating the use of chemical weapons into its military doctrine, under the auspices of its Western backers. In support of this claim, Kirillov cited an order for hundreds of thousands of antidotes, gas masks and other personal protective equipment that Kiev had supposedly placed with the European Union. According to Kirillov, the OPCW had not responded to evidential materials presented by Russia. The general concluded that the international body was being effectively run by the US, and used as a tool to target its political opponents.

<https://www.rt.com/russia/593785-russia-accuses-west-ukraine-chemical-warfare/>

Preventing chemical weapon re emergence by countering chemical terrorism

March 4, 2024

The OPCW Open-Ended Working Group on Terrorism (OEWG-T) met in its first session of 2024 at the Headquarters of the Organisation for the Prohibition of Chemical Weapons (OPCW) to review activities from 2023 and elaborate on future plans. The risk of chemical weapons being used by non-state actors has been identified as an emerging challenge in the struggle for a world free of chemical weapons and poses a growing risk for all countries. The possibility of non-state actors using chemical weapons is furthered by technology advances, such as Artificial Intelligence (AI) tools which could aid chemical synthesis and novel delivery mechanisms, such as drones.

The OEWG-T forms the nucleus of efforts by OPCW Member States in addressing the growing risk of chemical terrorism. Its first

meeting for 2024 reviewed activities from the previous year, culminating in a two-day Tabletop Exercise organised in November 2023 with financial support from the European Union and facilitated by the OPCW Technical Secretariat.

The Tabletop Exercise centred around a simulated scenario of a chemical attack which participants were asked to manage and react to, and to develop best-practice recommendations for future action. Forty-eight participating professionals from 24 OPCW Member States shared recommendations for best practices, drawing on their personal and national expertise in emergency response, law enforcement, diplomacy, chemical industry, the military, and chemical incident investigation.

The Chair of the OEWG-T, H.E Ambassador Vusimuzi Madonsela of South Africa, called on Member States to act: “Even after the destruction of the last declared stockpiles of chemical weapons in July 2023, we continue to live in precarious times, when there are still such weapons that may emerge in the hands of non-state actors, which continues to pose a serious threat to international security. The insights gained from the Tabletop Exercise can significantly contribute to strengthening our global response mechanisms against the threat of chemical terrorism. Let us use the Open-Ended Working Group on Terrorism to enhance our knowledge, sharpen our skills and unify our efforts towards a safer and more secure world.”

The importance of the exercise in the current global environment was also highlighted by Mr, Marcin Wroblewski Director of the OPCW’s Office of Strategy and Policy, stating: “Chemical terrorism is a significant emerging threat; terrorist actors using new technologies have unprecedented access to chemical weapons of mass destruction.”

OEWG-T highlighted five steps for consideration:

1. The importance of additional assistance — from OPCW and bilateral — in capacity building and implementation;
2. Conducting further practical exercises at a regional level to address local circumstances;
3. A mechanism to incorporate policies addressing emerging technological challenges and opportunities;
4. Streamlining OPCW efforts with those of other relevant international bodies such as INTERPOL or the World Customs Organisation; and
5. Streamlining information sharing among States Parties to provide a common knowledge base.

<https://www.opcw.org/media-centre/news/2024/03/preventing-chemical-weapon-re-emergence-counter-chemical-terrorism>

Jack Teixeira Expected to Plead Guilty in Leak of Trove of Secrets

February 29, 2024

Airman Teixeira is accused of posting national defense information and classified documents to a gaming chat group and has been in custody since being arrested in the spring. Airman Teixeira is accused of posting national defense information and classified documents to a gaming chat group and has been in custody since being arrested in the spring. A Massachusetts Air National Guardsman accused of posting dozens of secret intelligence reports and other sensitive documents on a gaming chat group is expected to plead guilty in federal court on Monday, prosecutors said in a court filing on Thursday.

The airman, Jack Teixeira, intends to withdraw his not-guilty plea in a deal that is likely to entail prison time, but less than the 60-year maximum sentence he faced on charges of improperly handling and publicly disclosing national defense secrets, according to two people briefed on the agreement. Prosecutors often suggest a range of potential punishments to judges, who have the power to impose the sentences they deem appropriate. Airman Teixeira, 22, who has been in custody since being arrested at his mother's house in North Dighton, Mass., in the spring, was responsible for one of the most far-reaching leaks of sensitive information in years.

Even as he relished the respectability and access to intelligence he gained through his military service and top secret clearance, he seethed with contempt about the government. He accused the United States of a host of nefarious activities: making biological and chemical weapons in Ukrainian labs, creating the Islamic State, even orchestrating mass shootings.

<https://www.nytimes.com/2024/02/29/us/politics/jack-teixeira-military-classified-documents.html?searchResultPosition=7>

China grows domestic bio weapons tech industry

February 28, 2024

China is advancing its domestic, dual-use biological research capabilities with applications for the People's Liberation Army germ warfare programs, according to an open-source intelligence report. Recent virology studies "demonstrate that China is now able to operate its own dual-use virology research agenda on-shore and without international inputs or considerations," according to a new report by the Chinese Communist Party Biothreats Initiative, a think tank.

“China now has robust domestic capabilities that potentially provide Beijing with a range of asymmetric options against perceived adversaries,” the report said. The development of biological weapons by China has been overshadowed by many intelligence and strategic analysts who have instead focused on Beijing’s large conventional military buildup. China, however, remains overmatched militarily by the U.S. and its allies, and thus its biological arms development provides a major asymmetric advantage, the report said.

China is continuing high-risk pathogen research on SARS-CoV-2, the virus that causes COVID-19, and the work is a major strategic worry, the report said. Studies published in China show Beijing is continuing work banned in the West on the virus that killed millions during the global pandemic. So far, none of China’s recent SARS-CoV-2 research has been linked to a current vaccine, therapeutic, prophylactic or diagnostic, the report said, raising questions about the potential for using the virus for military purposes. “The fact that this work continues, including in Wuhan itself, likely demonstrates that there is a broader strategic logic underpinning this continued high-risk pathogen research,” the report said.

China’s nanotechnology research is also linked to military capabilities that include weaponizing nanomedicine, tiny robots and autonomous weapons, the report said. These arms can include “nano-bioinformatics for biological warfare, nano-cyber biological weapons, covert assassination and targeted biological warfare,” the report said. The capabilities “have the potential to fundamentally and irreversibly transform the nature of the next generation of dual-use research in China,” the report said. “The deliberate national prioritization of dual-use pathogen research and nanotechnology

provides insight into where Beijing assesses its own unique strengths to lie and, possibly, where Beijing has assessed its adversaries to have weaknesses in their own systems.” Previously, China required intensive and targeted international cooperation to obtain the technology and specialized knowledge needed for its virology and nanotechnology programs. Recent evidence suggests that is no longer the case, the report said.

On Jan. 4, the Beijing Advanced Innovation Center for Soft Matter Science and Engineering, part of the Beijing University of Chemical Technology, conducted a high-risk experiment with SARS-Cov-2, the virus that caused COVID-19. Researchers conducting the experiment stated that a new coronavirus isolate taken from a pangolin caused 100% mortality in humanized mice. “The researchers then tried to take the ‘lethal’ tone out of their report with a new Jan. 24, 2024, version that attempted to justify their study as an approach for vaccine or drug development studies,” the report said.

The university stated in a 2021 overseas talent recruitment announcement that its work includes “treating industrial-academic fusion and military-civil fusion as key development opportunities.” A team of scientists at the Wuhan Institute of Technology, the location U.S. intelligence says is one potential source of the COVID outbreak, stated in a journal article that their work created a new coronavirus with very high lethality in aged mice. The virus also had the potential to infect human beings. Another Chinese institute, the Hefei Institute of Physical Science, part of the Chinese Academy of Sciences, recently developed a “smart” DNA molecular nanorobot model for targeted drug delivery that has potential biological weapons uses. “The ability of nanorobots to transport biological agents directly to target cells with

such precision could also have dual-use applications, especially when considering the established linkages between [the Hefei Institute] and China’s People’s Liberation Army,” the report said.

As part of the strategy to leverage advanced technology, the Pentagon’s Defense Science Board is working to developing new strategic weapons and capabilities that will provide asymmetric advantages for continued U.S. military “operational dominance.” The strategy is outlined in an executive summary made public in November by the board that provides a few clues to the mostly secret effort. Board Chairman Eric Evans said in the summary that a task force on strategic options was converted into a new permanent DSB subcommittee devoted to new weapons and operational capabilities. The subcommittee will look at effective systems to strengthen the military’s ability to deter local conflicts involving allies and partners and to win those wars at the lowest cost if deterrence fails. “The task force considered advanced undersea assets and operational concepts, new uses of space assets, development of new countermeasures for electronic warfare, employment of cyber weapons, and as well as other areas that involved the adversary’s use of countermeasures to undermine U.S. dominance in the air, space, sea and cyber domains,” Mr. Evans said.

<https://www.washingtontimes.com/news/2024/feb/28/inside-ring-china-grows-domestic-bio-weapons-tech/>

Key stakeholders and decision-makers convene in Chad to advance accession to the Biological Weapons Convention

February 27, 2024

On 6 and 7 February 2024, the United Nations Office for Disarmament Affairs

(UNODA) visited N’Djamena to promote Chad’s accession to the Biological Weapons Convention (BWC). The visit brought together key national stakeholders and decision-makers involved in the accession process in order to raise awareness concerning the importance of BWC universalization and to encourage broad national cooperation to that end. While the Biological Weapons Convention boasts almost universal membership, twelve States, including Chad, are not yet party to the Convention.

The first day of the visit consisted of a briefing of 25 senior Chadian government officials and members of parliament hosted at the Ministry of Foreign Affairs in N’Djamena. Presentations were aimed at familiarising delegates with the Convention and the rights and obligations of States Parties, as well as on the technical assistance and capacity building support available to support States’ accession to and post-accession implementation of the Convention. In opening remarks at the briefing, UNODA Geneva Branch Chief of Service, Mélanie Régimbal, highlighted that “Chad’s accession to the Biological Weapons Convention would strengthen its commitment to the fight against weapons of mass destruction and would help to strengthen Chad’s national capacities in areas such as public health, veterinary medicine, agriculture, and emergency preparedness and response.”

<https://disarmament.unoda.org/update/key-stakeholders-and-decision-makers-convene-in-chad-to-advance-accession-to-the-biological-weapons-convention/>

Ukrainian chemical terror attack thwarted – FSB

February 27, 2024

Moscow’s agents have seized an analog of the incapacitating chemical BZ in Russia’s

Zaporozhye region. Russian operatives have prevented Kiev from staging a terrorist attack using chemical weapons in the southern part of the country not far from the frontline, the Federal Security Service (FSB) has said. In a statement on Tuesday, the agency said it had prevented *”an attempt by the Ukrainian special services to commit a terrorist act in Zaporozhye Region using an analog of the BZ chemical warfare agent, according to the NATO classification.”*

BZ, also known as 3-Quinuclidinyl Benzilate, is an odorless bitter-tasting powder that can cause hallucinations, delirium, blindness, and inability to perform basic tasks. The Chemical Weapons Convention, which has been signed by virtually all countries in the world, including Ukraine, prohibits the use of BZ on the battlefield. The FSB noted that the confiscated chemical agents are used for producing weapons of mass destruction and were developed in the US, adding that it had detained three Ukrainian citizens in the raid. The agency released a video showing a group of its operatives bursting into a single-story building and arresting one of the suspects. It also showed several pictures of small vials filled with chemical agents. The head of Russia’s Nuclear, Chemical and Biological Protection Forces, Igor Kirillov, said last week that Kiev’s forces had used toxic agents against Russian troops on numerous occasions.

At the time, he said that an agent similar to BZ had been found in Melitopol in Russia’s Zaporozhye region. He added that Ukrainian troops were also using drones to drop US-made gas grenades containing a CS compound, which could trigger respiratory paralysis when applied in high doses. He noted at the time that the delivery of such munitions by the US to Ukraine was a direct violation of the rules of the Organization for the Prohibition of Chemical Weapons (OPCW).

However, according to Kirillov, the OPCW did not react in any way to the evidence which he said proved that Ukraine was violating the Chemical Weapons Convention.

Zaporozhye Region, along with Kherson Region and the Donetsk and Lugansk People’s Republics, were integrated into Russia following referendums held in September 2022.

<https://www.rt.com/russia/593250-ukrainian-chemical-terror-attack-thwarted/>

Sounding the alarm on AI-enhanced bioweapons

February 26, 2024

The convergence of artificial intelligence and biotechnology is producing novel threats which pose an existential risk both to specific demographic groups and the population at large. Alongside this, the Biological Weapons Convention Implementation Support Unit, which has a role in coordinating mitigation measures, is severely under-resourced. This demands urgent rectification. Artificial intelligence (AI) is enabling us to finally understand biology, in all of its complexity. This, in turn, allows us to harness billions of years of evolution to solve some of humanity’s most pressing challenges; from curing previously incurable diseases to the phasing out of fossil fuels.

With this massive potential for positive impact comes large, novel threats. Threats which could ultimately wipe out the whole of humanity. For brevity, this commentary only explores the increasing scale, democratisation and specificity of bioweapons enabled by AI; it explores three of the most pressing mitigations and calls on governments to overcome the stagnancy in this space and take urgent action.

AI has long been used for drug discovery – where a therapeutic molecule is searched for with the lowest toxicity possible. When a team of scientists flipped this parameter to instead optimise for toxicity, the algorithm generated not only VX (one of the most potent poisons in existence) but also novel toxins which were predicted to be more toxic. Alongside toxicity, AI can also enhance the transmissibility of a virus – and this is often done in laboratories researching pandemic viruses. If one were to imagine the transmissibility of COVID-19 with the death rate of Ebola, it's clear why the ever-increasing harm potential of bioweapons represents an existential risk.

AI can also be used to simulate the spread of pandemics – which is a useful tool in optimising quarantine measures and allocating testing resources. However, this can also be reversed for optimising the spread of a pathogen, thus scaling its harmful impact. The advent of large language models (LLMs) such as ChatGPT is democratising skills that used to take a long time to learn. In a recent paper, students in a class at MIT used chatbots to suggest four likely pandemic pathogens, explained how to generate them, supplied companies who were unlikely to screen orders and recommended that if they lacked the skills to implement this, that they engage a contract research organisation; they managed to do all of this in only one hour. This democratisation widens accessibility to bioweapons, making it available to smaller organisations with fewer resources, such as terrorist groups.

Democratisation extends beyond the use of large language models, with various initiatives set up to decrease the cost and skills barriers to accessing biotechnology. These initiatives include community laboratories, DIY biohacking communities

and cloud laboratories which perform experiments remotely. The advent of DNA printers is set to democratise the synthesis of DNA, which has already dramatically reduced in price (and therefore accessibility) over the past 5 years. Even if these DNA printers have measures to prevent the synthesis of potentially dangerous DNA, they could still be hacked or security measures overcome by bad actors.

Finally, the specificity with which bioweapons can target specific demographics is increasing as further developments (eg. cell and gene therapy) are made in the pursuit of precision medicine (the tailoring of medical treatment to an individual). This poses existential threats to particular groups of people, facilitating persecution and potentially even genocide.

<https://europeanleadershipnetwork.org/commentary/sounding-the-alarm-on-ai-enhanced-bioweapons/>

OPCW identifies ISIL as perpetrators of 2015 chemical attack in Marea, Syria

February 22, 2024

The Organisation for the Prohibition of Chemical Weapons (OPCW) Investigation and Identification Team (IIT)'s fourth report concludes that there are reasonable grounds to believe that units of the Islamic State in Iraq and the Levant (ISIL) were the perpetrators of the chemical weapons attack on 1 September 2015 in Marea, Syria. IIT report concludes ISIL held exclusive means, motives, and capabilities to deploy sulfur mustard in 2015 attack. The IIT's comprehensive investigation was conducted from January 2023 to February 2024.

Key findings

1. Sulfur mustard attack by ISIL:

- The IIT concludes that there are **reasonable grounds to believe** that on 1 September 2015, between 09:00 and 12:00 (UTC+3), during sustained attacks aimed at capturing the town of Marea, units of the **Islamic State in Iraq and the Levant (ISIL)** deployed sulfur mustard.
- The chemical agent was delivered using one or more **artillery guns**.

2. Impact locations and remnants:

- The IIT identified several **impact locations** across Marea, with no discernible targeting pattern.
- All remnants and munitions observed at these sites were **conventional artillery projectiles**, specifically of a 122-mm calibre, modified to **disperse a liquid payload**.
- Upon impact, at least six projectiles leaked a **black, viscous substance** with a distinct **"pungent"** and **"garlic-like" smell**.
- **Eleven named individuals** who came into contact with the liquid substance experienced symptoms consistent with **exposure to sulfur mustard**.

3. ISIL's exclusive and dedicated capability in this incident:

- The IIT established that the chemical payload was **deployed by artillery from areas under ISIL control**.

- No other entity possessed the **means, motives, and capabilities** to deploy sulfur mustard as part of an attack in Marea on 1 September, 2015.

- The IIT was able to **reconstruct the organisational structure and chain of command** that led to the use of chemical weapons by the Islamic State in Marea on 1 September 2015.

- Strategic military operations such as the attack carried out in Marea, involving the large-scale deployment of chemical weapons, would only have occurred **pursuant to direct orders from ISIL's Executive Branch**, i.e., Delegated Committee, operating directly under ISIL's so-called "Caliph", according to IIT conclusions.

- In the course of its investigation, the IIT was able to link additional organisational structures and individuals to the use and deployment of chemical weapons by the Islamic State, including ISIL's *Diwan Al-Jund* (Department of Soldierly) and the Committee for Military Development and Manufacturing, identifying a total of **four named individuals as perpetrators**. Two further ISIL members were **identified as the primary drivers of ISIL's chemical weapons programme**.

4. Degree of certainty:

- The IIT reached its conclusions based on the standard of proof known as **"reasonable grounds"**, consistently adopted by international fact-finding bodies and commissions of inquiry.
- The assessment included information from the **Fact-Finding Mission (FFM)**, States Parties, interviews

conducted by the IIT, and analyses of samples, computer modelling, satellite imagery, front-line maps, authenticated videos and photos, and other relevant data.

Upon releasing the report, OPCW Director-General Ambassador Fernando Arias said: “With the fourth report by the Investigation and Identification Team (IIT), the Secretariat of the OPCW has once again delivered on the mandate it has received to identify perpetrators of chemical weapon use in Syria. In this report, the IIT concluded that ISIL used sulfur mustard in Marea on 1 September 2015. This independent investigation has been conducted based on a sound scientific methodology and on the combination, consistency, and corroboration of all of the information gathered and analysed, in line with the highest international standards.

Once again, the OPCW Secretariat has demonstrated that it is able to identify perpetrators of the use of chemical weapons, States and non-State actors alike. This is a stark reminder to the international community that non-State actors like ISIL have developed the capacity and the will to use chemical weapons. This emphasises the OPCW’s pivotal role and expertise in addressing such threats. The facts are now known – it is up to the international community to take action, at the OPCW and beyond.”

<https://www.opcw.org/media-centre/news/2024/02/opcw-identifies-isil-perpetrators-2015-chemical-attack-marea-syria>

OPCW and European Union sign MoU to strengthen collaboration

February 21, 2024

The European Union (EU) and the Organisation for the Prohibition of Chemical Weapons (OPCW) have signed a Memorandum of Understanding (MoU) to enhance and strengthen collaboration in common areas of interest in accordance with the OPCW programme and the mandate of the Technical Secretariat. The MoU aims to operationalise efforts in the field of peace, security and disarmament and to reinforce cooperation between the two sides in order to make the greatest possible joint contributions to the full implementation of the Chemical Weapons Convention (CWC).

The MoU was signed by the High Representative of the European Union for Foreign Affairs and Security Policy, H.E. Mr Josep Borrell Fontelles and OPCW Director-General, Ambassador Fernando Arias. The ceremony took place on 20 February at the OPCW’s Headquarters in The Hague, where the European Union was represented by the European Union Liaison Officer to The Hague H.E. Ambassador Mika-Markus Leinonen, accompanied by OPCW Director-General Ambassador Fernando Arias, Deputy Director-General Ambassador Odette Melono and several high ranking officials of the Organisation.

The High Representative said: “The OPCW was founded to put an end to and eliminate chemical weapons once and for all. Last year, it verified the destruction of the world’s last declared chemical weapons stockpile. However, we continue to witness the barbaric consequences of these heinous weapons. We still have work to do. With the signature of

this new agreement, we are increasing our cooperation with the OPCW to safeguard and implement the Chemical Weapons Convention (CWC). The objective is clear: a world free from chemical weapons for the sake of all mankind.”

The Director-General remarked: “I express my sincere appreciation to the European Union for its continuous financial and political support to the activities of the OPCW. The present Memorandum of Understanding with the European Union will enable us to take further steps towards a better and more effective implementation of our mandates provided for under the Chemical Weapons Convention and the relevant decisions of the Policy Making Organs of the OPCW. It also underscores our collective determination to eliminate chemical weapons and prevent their re-emergence in order to achieve our common goal of ridding the world of chemical weapons and advancing peace and global security.”

<https://www.opcw.org/media-centre/news/2024/02/opcw-and-european-union-sign-mou-strengthen-collaboration>

Ukraine has used US-made chemical weapons – Russia

February 19, 2024

Washington and Kiev have violated articles of the Organization for the Prohibition of Chemical Weapons (OPCW) as Ukrainian forces have used illegal munitions on the battlefield, Russian Lieutenant General Igor Kirillov has claimed. The head of Russia’s Nuclear, Chemical and Biological Protection Forces provided several examples of Kiev’s alleged use of banned chemical weapons and non-lethal chemical agents that he said were obtained from the US.

Kirillov claimed that Ukraine used drones to drop US-made gas grenades on December

28, 2023 containing “CS” compound – a chemical classified as a riot-control tool that irritates the eyes and upper respiratory tract, and can cause skin burns, respiratory paralysis and cardiac arrest when used in high concentrations. He said the delivery of such munitions by the US to Ukraine was a direct violation of the rules of the OPCW, which states that a country must “*never, under any circumstances, transfer chemical weapons directly or indirectly to anyone.*”

He also reported that, on June 15, 2023, Moscow’s forces were attacked by a drone carrying a container filled with chloropicrin, which is classified as a Schedule 3 compound under the Chemical Weapons Convention and is strictly prohibited – even for law enforcement purposes. The same chemical was also used by Kiev on August 3 and 11, 2023 near the village of Rabotino, according to Kirillov. The general also provided several examples of Kiev using toxic substances against Russian military personnel, as well as poisoning high-ranking officials such as the head of Russia’s Kherson Region Vladimir Saldo in August 2022.

<https://www.rt.com/russia/592680-ukraine-us-chemical-weapons/>

First ever national workshop on the Biological Weapons Convention held in Hanoi, Viet Nam

February 2, 2024

From 18 to 19 January 2024, the Implementation Support Unit (ISU) for the Biological Weapons Convention (BWC) within the United Nations Office for Disarmament Affairs (UNODA) and the Ministry of Health of Viet Nam, jointly organized a national workshop on the implementation of the Convention. The purpose of the workshop was to deepen understanding of the BWC, to share effective practices relating to the preparation of Confidence-Building

Measures (CBMs), and to inform participants about capacity-building opportunities available to strengthen biosafety and biosecurity.

The two-day gathering in Hanoi brought together approximately 20 participants from different Vietnamese ministries and institutions, two regional experts from the Ministry of Foreign Affairs of the Lao People's Democratic Republic and the Philippines and staff from the ISU and UNODA. Opening remarks were delivered by the ISU, the Ministry of Health of Viet Nam, and the Delegation of the European Union to Viet Nam, as the EU provided funding for the workshop.

Throughout the workshop, participants discussed different national implementation aspects in regard to the Convention and identified opportunities for technical assistance and capacity-building support. Information on the preparation of CBMs was also exchanged in great detail and lessons learned were shared by regional experts. Various learning methods were applied during the workshop, including brief thematic presentations, a CBM tabletop exercise, an active learning session on specific CBM aspects carried out in smaller breakout groups and a quiz on the BWC.

“The objective of CBMs is to prevent or reduce the occurrence of ambiguities, doubts, and suspicions and to improve international cooperation in the field of peaceful biological activities” said Alex Lampalzer, Deputy Chief of the ISU. He also expressed his hope that, “this workshop will facilitate the preparation of Viet Nam’s first-ever CBM report in 2024.” Workshop participants underlined the importance of maintaining the strong norm against biological weapons, as well as the need for further awareness of, and international

cooperation and assistance towards, the Convention’s full implementation.

<https://disarmament.unoda.org/update/first-ever-national-workshop-on-the-biological-weapons-convention-held-in-hanoi-viet-nam/>

Russia and China unite over US bioweapons threat

February 1, 2024

The Russian and Chinese governments have held an inter-agency meeting in Beijing to share their assessments of biological security concerns, and address the threats posed by bioweapons – particularly those allegedly being developed by the US military. The two countries have pledged to collaborate in confronting dangers posed by the Pentagon’s “biological activities”

Moscow and Beijing agreed to work together in seeking to strengthen the Biological and Toxic Weapons Convention (BTWC), a treaty signed by 109 nations in 1972 to block the development of these unconventional armaments, the Russian Foreign Ministry said on Thursday in a statement. “The meeting confirmed the unity of approaches of Russia and China to the biological security,” the ministry said, adding that “particular attention in this context was paid to the military and biological activities of the United States.”

“The need for further close coordination and constructive interaction both in bilateral format and at relevant multilateral fora, primarily within the framework of the BTWC, the UN and the SCO [Shanghai Cooperation Organization] was noted,” the ministry added. Russia, China, and 14 other nations issued a joint statement in December calling for strengthening the UN’s policing of

biological and chemical weapons. "Convinced that such use would be repugnant to the conscience of humankind, we are determined to condemn any use of toxic chemicals, biological agents or toxins as weapons by anyone, anywhere at any time, and to hold accountable those responsible for any such use," the statement declared.

Moscow and Beijing have repeatedly pressed for greater transparency from the US and its allies regarding their military biological activities. Wednesday's talks between the two governments devoted "particular attention" to the Pentagon's bioweapons activities, the Russian Foreign Ministry said.

<https://www.rt.com/news/591678-china-russia-us-biological-activities/>

A.I. Is Coming for the Past, Too

January 28, 2024

We don't have to imagine a world where deepfakes can so believably imitate the voices of politicians that they can be used to gin up scandals that could sway elections.. Fortunately, there are numerous reasons for optimism about society's ability to identify fake media and maintain a shared understanding of current events. While we have reason to believe the future may be safe, we worry that the past is not.

History can be a powerful tool for manipulation and malfeasance. The same generative A.I. that can fake current events can also fake past ones. While new content may be secured through built-in systems, there is a world of content out there that has not been watermarked, which is done by adding imperceptible information to a digital file so that its provenance can be traced. Once watermarking at creation becomes

widespread and people adapt to distrust content that is not watermarked, then everything produced before that point in time can be much more easily called into question.

In 1924 the Zinoviev Letter, said to be a secret communiqué from the head of the Communist International in Moscow to the Communist Party of Great Britain to mobilize support for normalizing relations with the Soviet Union, was published by The Daily Mail four days before a general election. The resulting scandal may have cost Labour the election. The letter's origin has never been proved, but its authenticity was questioned at the time, and an official investigation in the 1990s concluded that it was most likely the work of White Russians — a conservative political faction led at the time by Russian émigrés opposed to the Communist government.

Decades later Operation Infektion, a Soviet disinformation campaign, used forged documents to spread the idea that the United States had invented H.I.V., the virus that causes AIDS, as a biological weapon. And in 2004 CBS News withdrew a controversial story because it could not authenticate the documents, which were later discredited as forgeries, that called into question the earlier service by George W. Bush, then the president, in the Texas Air National Guard. As it becomes easier to generate historical disinformation and as the sheer volume of digital fakes explodes, the opportunity will become available to reshape history or at least to call our current understanding of it into question.

<https://www.nytimes.com/2024/01/28/opinion/ai-history-deepfake-watermark.html?searchResultPosition=19>

Could AI help bioterrorists unleash a new pandemic? A new study suggests not yet

January 25, 2024

Could new AI technology help unleash a devastating pandemic? That's a concern top government officials and tech leaders have raised in recent months. One study last summer found that students could use chatbots to gain the know-how to devise a bioweapon. The United Kingdom brought global political and tech leaders together last fall to underscore the need for AI safety regulation. And in the United States, the Biden administration unveiled a plan to probe how emerging AI systems might aid in bioweapons plots. But a new report suggests that the current crop of cutting-edge AI systems might not help malevolent actors launch an unconventional weapons attack as easily as is feared.

The new RAND Corporation report found that study participants who used an advanced AI model plus the internet fared no better in planning a biological weapons attack than those who relied solely on the internet, which is itself a key source of the information that systems like ChatGPT train on to rapidly produce cogent writing. The internet already contains plenty of useful information for bioterrorists. "You can imagine a lot of the things people might worry about may also just be on Wikipedia," Christopher Mouton, a senior engineer at the RAND Corporation who co-authored the new report said in an interview before its publication.

Mouton and his colleagues had 12 cells comprising three members who were given 80 hours each over seven weeks to develop plans based on one of four bioweapons attack scenarios. For example, one scenario involved a "fringe doomsday cult intent on

global catastrophe." Another posited a private military company seeking to aide an adversary's conventional military operation. Some cells used AI, others only the internet. A group of experts then judged the plans these red teams devised. The judges were experts in biology or security; they weighed in on the biological and operational feasibility of a plan.

None of the groups scored particularly well. The top possible score was a nine, but groups generally scored well below five, which indicated a plan with "modest" flaws. This partly reflects the difficulty in pulling off a biological attack. The Global Terrorism Database, the RAND report noted, includes "only 36 terrorist attacks that employed a biological weapon—out of 209,706 total attacks." The database comprises 50 years of data. The red teams all developed plans, the RAND authors wrote, that "scored somewhere between being untenable and problematic."

<https://thebulletin.org/2024/01/could-ai-help-bioterrorists-unleash-a-new-pandemic-a-new-study-suggests-not-yet/>

Report reveals new details of China's biological weapons programs

January 24, 2024

China's military is engaged in secret biological weapons development that is a key element of Beijing's asymmetric warfare strategy, according to a new report by the CCP BioThreats Initiative, a think tank. The report provides new details on biological weapons efforts of the People's Liberation Army, which researchers say controls all civilian biological research in China. "Bioweapons are part of the CCP's standard order of battle; not an unconventional set of capabilities only to be used under extreme circumstances," the report states, using the abbreviation for Chinese Communist Party.

The report is based on open-source research and Chinese military writings. In 2015, for example, He Fuchu, who was then president of the Academy of Military Medical Sciences, said that biotechnology is a new “strategic commanding heights” of national defense requiring biomaterials and “brain control” weaponry. The Chinese military’s authoritative textbook, “Science of Military Strategy,” includes a section identifying biology as a domain for military struggle. The book mentions the potential for new types of biological warfare to include “specific ethnic genetic attacks” designed to affect targeted ethnic groups.

China’s military is developing biological arms disguised as civilian research in places like the Wuhan Institute of Virology, considered a main source of the COVID-19 virus outbreak.

The objective of the covert arms programs, researchers say, is to weaponize biology for use in a future conflict. The spectrum of potential biological weapons includes human genome editing for soldiers, genetic manipulation of bacteria and the use of human-computer interfaces that seek to control populations, the report said. “These research programs are not obscure ‘moonshots’; they are core strategic focus areas that are designed to be utilized over the near term and within current state strategic circumstances, such as in Taiwan,” the report said. “Any breakthrough in this dual-use research would provide unprecedented tools for the [Chinese Communist Party] to forcibly establish a new world order which has been [Chinese President] Xi Jinping’s lifelong goal,” the report said.

<https://www.washingtontimes.com/news/2024/jan/24/inside-ring-report-reveals-new-details-of-chinas-b/>

Elections and Disinformation Are Colliding Like Never Before in 2024

January 11, 2024

A wave of elections coincides with state influence operations, a surge of extremism, A.I. advances and a pullback in social media protections. Billions of people will vote in major elections this year — around half of the global population, by some estimates — in one of the largest and most consequential democratic exercises in living memory. The results will affect how the world is run for decades to come.

At the same time, false narratives and conspiracy theories have evolved into an increasingly global menace. Baseless claims of election fraud have battered trust in democracy. Foreign influence campaigns regularly target polarizing domestic challenges. Artificial intelligence has supercharged disinformation efforts and distorted perceptions of reality. All while major social media companies have scaled back their safeguards and downsized election teams.

Disinformation campaigns like this easily traverse borders. Conspiracy theories — such as claims that the United States schemes with collaborators in various countries to engineer local power shifts or that it operates secret biological weapons factories in Ukraine — have sought to discredit American and European political and cultural influence around the world. They could appear in Urdu in Pakistan while also surfacing, with different characters and language, in Russia, shifting public opinion in those countries in favor of anti-West politicians.

<https://www.nytimes.com/2024/01/09/business/media/election-disinformation-2024.html?searchResultPosition=25>

CBW Magazine

Journal on Chemical and Biological Weapons
Summer / January-June 2024



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