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Two years of living with the pandemic and the COVID-19 virus continues to mutate while the impetus of discovering the needed cure has been comparatively slow. The new normal has made international travel more stressful and economies stagnant but has re-ignited the debates surrounding biowarfare. In this context, one major argument has been regarding the origin of the virus and Dany Shoham and Yossi Kuperwasser provide a comprehensive outlook on the efforts put by the US government to untangle the mystery in their article “The U.S. intelligence community and the roots of the pandemic virus.” Furthermore, Mrinmayee Bhushan presents a proposal for a biosecurity framework in India and DPK Pillay highlights the lessons learned from COVID-19 and India’s resilience during the crisis.

The Winter edition also accounts for the continual progress made in the abolition of CW. Recently, on December 3, 2021, the 26th Session of the Conference of the States Parties to the CWC in The Hague concluded. The Member States of OPCW assessed the progress in the implementation of the CWC and marked the path forward. In this regard, Paul Walker writes a very timely article that comprehensively covers the history as well as the way forward in his article, “In Search of a Chemical Weapons-Free World: Three Decades of Abolishing Chemical Weapons.” In addition, Animesh Roul articulates on the concerning Russian behaviour of flouting CWC obligations in his article “Novichok and Murkier case of Navalny poisoning.” Finally, the Kaleidoscope section carries forward “a Biological Security Education, Awareness, and Outreach as Essential Elements of Strengthening the Review of Science and Technology under the BTWC” by Tatyana Novosiolova, Lijun Shang, and Malcolm Dando. This issue also comprises other features like Chemical-Biological News and Book Review. 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.

The U.S. intelligence community and the roots of the pandemic virus

Dany Shoham and Yossi Kuperwasser

Lt.-Col. (res.) Dr. Dany Shoham, Israel

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Summary

The U.S. Intelligence Community (IC) report regarding the roots of the SARS-CoV-2, as reflected in a published unclassified summary (August 2021), was excessively inconclusive, and has hence been followed, as a result of President Biden's request, by a more detailed - yet still unduly faint - unclassified summary (October 2021). Assessments of low confidence predominate both summaries. Related methodological, analytical, and motivational issues, which are highly consequential, lead to focusing on the U.S. IC within that context. Inevitably, the outcome embodies much criticism.

The U.S. intelligence reports about the roots of the pandemic virus

On May 26, 2021, in a statement issued by the White House¹, U.S. President Joe Biden noted: “I have now asked the Intelligence Community to redouble their efforts to collect and analyze information that could bring us closer to a definitive conclusion (about the roots of the pandemic, including whether it emerged from human contact with an infected animal or, from a laboratory accident), and to report back to me in 90 days. As part of that report, I have asked for areas of further inquiry that may be required, including specific questions for China. I have also asked that this effort include work by our National Labs and other agencies of our government to augment the Intelligence Community’s efforts. And I have asked the Intelligence Community to keep Congress fully apprised of its work.”

On August 27, 2021, The U.S. Office of the Director of National Intelligence (ODNI) released an unclassified summary of the IC assessment on the roots (direct source and genomic origin) of the COVID-19 pathogen.² The core issues of that unclassified summary can be highlighted and commented on, in short, as presented in the following two tables (Table 1 and Table 2).

Table 1. Different assessments reached by agencies and elements of the U.S. IC regarding the roots (direct source and genomic origin) of the pandemic virus (as of August 27, 2021)

Assessment confidence level	Assessment content	Argumentative factors Comments	Comments (by authors of the present article)
Moderate (one element of the IC)	The first human infection with SARS-CoV-2 most likely was the result of a laboratory-associated incident, probably involving experimentation, animal handling, or sampling by the Wuhan Institute of Virology.	The inherently risky nature of work on coronaviruses.	Plentiful and diversified, unclassified and declassified information provides many additional argumentative factors that strengthen both the mentioned assessment confidence level and the assessment content.
Low (four elements and the National Intelligence Council)	The initial SARS-CoV-2 infection was most likely caused by natural exposure to an animal infected with it or a close progenitor virus-a virus that probably would be more than 99 percent similar to SARS-CoV-2.	China's officials' lack of fore-knowledge of the virus before the initial outbreak of COVID-19 emerged; the numerous vectors for natural exposure, and other factors.	The two mentioned argumentative factors are weak; particularly in light of various, indirectly opposite data. The term "officials" is not defined. No vectors of the index virus have been detected.
None (three elements)	Coalescing around either of the two above-mentioned assessments is out of reach.	Heterogeneity of estimates, due to the inadequacy of information.	An entirely acceptable approach, generally speaking. Regarded as preferable over low confidence assessments.
Low (most agencies)	SARS-CoV-2 probably was not genetically engineered	Not mentioned	Virus evolution via man-induced serial passages is not referred to at all, otherwise.
None (two agencies)	Assessing whether the virus was genetically engineered or not is out of reach.	No sufficient evidence either way.	The balances of evidence tend anyhow to some human intervention, genomically.

Table 2. Evaluations reached by the U.S. IC as a whole, in relation to the roots of the pandemic virus (as of August 27, 2021)

Essence of evaluation	Content of evaluation	Comments (by the authors)
Assessment	SARS-CoV-2, the virus that sparked the pandemic, probably emerged and infected humans through an initial small-scale exposure that occurred no later than November 2019.	An accidental - apparently small-scale - environmental leakage of the virus most likely occurred in Wuhan prior to November, considering various concrete, though circumstantial, evidence.
Judgment	The virus was not developed as a biological weapon.	In what way, however, should be observed the tight interfaces between the PLA and the WIV's coronaviruses programs during the recent decade.
Assessment	China's officials did not have foreknowledge of the virus before the initial outbreak of COVID-19 emerged.	The term 'officials' is not adequately defined - at large or specifically - within this context.
Judgment	China's cooperation most likely would be needed to reach a conclusive assessment of the roots of COVID-19. China, however, continues to hinder the global investigation, resist sharing information, and blame other countries, including the U.S.	A cardinal point that is not referred to concretely is why China resists sharing information concerning the roots of the virus, while there are multiple examples that clearly follow such a Chinese line. The unshared information appears to be crucial.
Judgment	Providing a more definitive explanation for the roots of COVID-19 is out of reach, unless new information allows to determine the virus initial emanation.	An apparent corollary would be, then, the coping between U.S./ NATO/the Five Eyes intelligence systems and China's counter-intelligence system.

President Biden thanked the IC for its work but indirectly admitted that the result it produced was insufficient, and called upon it to continue its effort to have clearer answers to the questions he posed to it in May. At the same time, he criticized China for withholding the information necessary to come up with a better understanding and denying access to it; he further pledged to form international like-minded states appeal to Beijing to change its attitude.³

Biden's call upon the IC for clearer answers was met, ostensibly, on October 29, in the form of an "Updated Assessment", produced and published by the ODNI.⁴ It included elaborations

referring to a variety of issues related to the roots of the pandemic virus, far beyond the August report, as presented and discussed in the following table (Table 3), but was based on the same information that stood behind the August publication.

Table 3. Main informational and interpretative elaborations issued by the ODNI in the form of an “Updated Assessment” (as of October 29, 2021)

General context under discussion	Content of elaboration	comments (by the authors)
Geographical location of the initial SARS-CoV-2 human infection in China	Although all of the earliest confirmed cases of COVID-19 were documented in China's Hubei Province, where Wuhan is located, according to Western and China's press reports, it is plausible that a traveler came in contact with the virus elsewhere and then went to Wuhan.	According to a wealth of heterogeneous information, it is much more plausible that the initial human infection occurred in Wuhan. China's press reports are tendentious (unsurprisingly), and often affect or induce Western press reporting in a manner serving China's interests.
Identity and timing of the primary recognizers of the initial SARS-CoV-2 in humans in China	China's officials probably did not have fore-knowledge that SARS-CoV-2 existed before WIV researchers isolated it, subsequent to infections in the general population. Suggestively, WIV personnel were unaware of the existence of SARS-CoV-2 until the outbreak was underway (purportedly December 2019).	This observation is incompatible with a range of facts; such as the fact that on September 12, 2019, a critical database regarding viruses collected by WIV was removed from the institute. The removal was explained (much later) by Dr. Shi Zhengli, the principal investigator at the WIV, as a step taken "during the COVID-19 pandemic... to (ostensibly) prevent cyber security attacks."
Location and mode of SARS-CoV-2 contraction by patient zero in China	The IC assesses that information indicating that several WIV researchers reported symptoms consistent with COVID-19 in autumn 2019 is not diagnostic of the pandemic's origins. Even if confirmed, hospital admission alone would not be diagnostic of COVID-19 infection.	Undisclosed cases of human COVID-19 infections probably occurred in Wuhan before the discussed event, in and/or off the WIV. Off the WIV, an initial, non-human contagion preceding human cases could as well emanate from accidental leaking from WIV, or from an unnoticed transfer of infected animals from WIV elsewhere.
The feasibility of a laboratory-associated incident being the most likely scenario of initial SARS-CoV-2 contagion in China	In general, a variety of arguments led to such an assessment, the only assessment (among others) with a confidence level higher than low (moderate).	The reasoning for this assessment appears the most sound one along with the whole ODNI document. Plenty of additional arguments independently lead to the same assessment.

General context under discussion	Content of elaboration	comments (by the authors)
Aberrant activities at and adjacently to the WIV during 2019 (also before 2019 and thereafter)	Steps taken in fall 2019, as expounded by the Multi-Agency Collaboration Environment, are regarded by the IC to be unremarkable.	Even if correctly regarded (ostensibly) by the IC, a lot of various other aberrant activities did take place at and adjacently to WIV, in a highly suspicious manner, prior to and after patient zero.
The feasibility that SARS-CoV-2 and the initial contagion originated naturally, being the most likely scenario in China	In general, a variety of arguments led to such assessments, overall with a low confidence level, though. SARS-CoV-2 is thereby categorized, tentatively, as just a regular zoonotic virus.	The presented arguments are entirely conceivable, yet they are anchored in a theoretical sphere, thus far; in actuality, there are still no concrete findings to support the case of SARS-CoV-2 being a natural outcome.
The feasibility that SARS-CoV-2 came into being via genetic engineering, or, alternatively, naturally in China	<p>The WIV previously created chimeras, or combinations, of SARS-like coronaviruses, but this information does not provide insight into whether SARS-CoV-2 was genetically engineered by the WIV.</p> <p>A 2017 dissertation by a WIV student showed that reverse genetic cloning techniques left no trace of genetic modification of SARS-like coronaviruses.</p> <p>We still have not observed genetic signatures in SARS-CoV-2 that would be diagnostic of genetic engineering, according to the IC's understanding of the virus.</p> <p>Naturally occurring events of genetic recombination could yield SARS-CoV-2.</p> <p>We have not identified any existing coronavirus strains that could have plausibly served as a backbone if SARS-CoV-2 had been genetically engineered.</p>	<p>Though indirectly, the arguments posed by the ODNI actually attribute feasibility rate to a natural genomic origin, yet such rate which at its maximum would merely equal the feasibility rate of engineered genomic origin, in that:</p> <p>The WIV mastered and practiced the creation of chimeric SARS-like viruses;</p> <p>The WIV mastered and practiced the genetic engineering techniques that leave no genomic signatures or traces;</p> <p>Albeit possible in principle, the chances for natural origination are considerably lower than engineered origination, statistically, given the multiplicity of human-adapted traits of the index virus, which are widely regarded to constitute an unordinary cluster;</p> <p>A variety of important existing bat coronavirus strains isolated (and often upgraded) by WIV are currently hidden, hence cannot be referred to.</p>

General context under discussion	Content of elaboration	comments (by the authors)
Serial passages of a potential progenitor virus through experimental animals and/or cell cultures (laboratory adaptation), as a possible mode of SARS-CoV-2 genome origination.	<p>The process would require the differentiation and maintenance of primary cells, and the development of appropriate animal models.</p> <p>The process probably would take years.</p>	<p>The mentioned requirements have been accomplished in WIV by 2019. Within the time period from 2013 (i.e. the Mojiang mine events) to 2019 should well suffice.</p> <p>Moreover, the process could conjoin or substitute for genetic engineering.</p>
Possible linkages between SARS-CoV-2 and China's biological warfare programs (offensive/defensive)	Claims that SARS-CoV-2 was created in China as a biological weapon, as expounded by a Hong Kong virologist, are invalid due to scientific inadequacy.	Irrespective of that observation, there are multiple indications of WIV having particular ties with the Chinese army, which demand clarifications.
Inadequate reporting by China, as for the following issues (next column):	<p>a. reservoir and potential intermediate species of the virus;</p> <p>b. identification of a progenitor virus that gave rise to the pandemic virus;</p> <p>c. leading candidates or regions for spillover.</p>	<p>a. with special reference to laboratory and other experimental animals;</p> <p>b. with special reference to the related viral strains dealt with in Wuhan labs;</p> <p>c. with special reference to experiments done in the Mojiang mine (as a possible alternative source of initial contagion).</p>
Undisclosed data held by China, and institutionalized reporting coming from China	<p>The global scientific community does not know exactly where, when, or how the first human infection with SARS-CoV-2 occurred.</p> <p>Closing persistent information gaps on the origins of COVID-19 is very likely to require greater transparency and collaboration from Beijing.</p> <p>However, at least some relevant data on coronaviruses of interest has either been unavailable or has not been published by the WIV; particularly, in reference to coronaviruses isolated in Mojiang mine.</p>	<p>In principle, published information pertaining to the WIV and coming from China might potentially be misleading, at least since July 2019, when China's Dr. Xiangguo Qiu was evicted in Canada (a severe affair apparently not connected to SARS-CoV-2).</p> <p>The undisclosed information China holds is essential for tracing the virus' roots.</p> <p>Nonetheless, diagnosticity should not necessarily rely on direct evidence; circumstantial evidence often leads, vitally, to moderate, even high-level confidence of diagnosticity, especially when there is a lack of direct evidence.</p>

Estimate

By demanding clearer answers after the August report appeared, President Biden has done the right thing; but if concrete answers can be reached only with China's goodwill, and if most evaluations of the IC are some low confidence judgments and assessments regarding a critical factual question, then another question emerges – what is the added value of intelligence in such a case?

Low confidence assessments may be acceptable when the IC deals with vague issues that we sometimes refer to as riddles or mysteries. For example, what was the motivation of a certain individual or group to act in a certain way, and what may happen if a certain ruler passes away, or if the US leaves a certain country? In the riddles, the answers are known to some people but are not accessible, and it is hard to determine which is the right one. In the mysteries, there is no real answer, as it refers to developments that have not happened yet. Nevertheless, there is an expectation from the IC to be able to provide assessments and judgments with some substance about such issues.

In the case of SARS-CoV-2, the questions posed to the IC are factual questions, belonging to a different category. It is the category of secrets. In this domain, the answers are known and well defined, and are out there for the intelligence to find them. This is the first Raison D'être of intelligence – to reveal secrets that somebody protects and makes an effort to deny you access to. Assessing with low confidence an answer to this kind of questions may not be good. It is especially so, since the WIV should obviously have been a high priority target for the IC, and particularly for the National Center for Medical Intelligence (NCMI), long before SARS-CoV-2; and much more so in the year and a half of time that has elapsed since

SARS-CoV-2 was first identified. There is no doubt that huge efforts were directed to obtain access to the required information, but judging by the unclassified summary it seems that they did not bear the expected results at all. This reflects probably the difficulties of getting such information, but if this is the case the best way to respond would be to simply say that the IC does not have enough reliable information to provide answers with sensible confidence, other than the one moderate confidence assessment, which it did reach.

Thus, the actual contribution, if any, of low confidence intelligence assessments is critically doubtful, as a principle. It would seem much more reasonable, if not definitive, that the minimal level of confidence of an intelligence assessment ought to be 'moderate', so as to be regarded as valid, hence contributory, within the context of factual intelligence issues. Moreover, the acceptance of low confidence assessments – particularly when there are many of that kind (majority, in the present case) – might probably be misleading, given the consumer's normal inclination to follow the content of an assessment, rather than pay attention to its confidence level. Therefore, it would be advisable, as a principle, to refer to low confidence level assessments as equivalents to out-of-reach-assessments (due to the inadequacy of information).

Irrespective of the above, which is a fundamental methodological essential, the ODNI August unclassified summary appears to be faint, to say the least, in light of the U.S. State Department Fact Sheet (January 15, 2021 – “Activity at the Wuhan Institute of Virology”),⁵ and the U.S. House Foreign Affairs Committee Report Minority Staff (August 2, 2021 – “The Origins of COVID-19: An Investigation of the Wuhan Institute of Virology”),⁶ which strongly points to a lab-

leak scenario. The two latter documents are much unlike the former. The differently oriented politics of the Republicans and the Democrats cannot be regarded as the sole, not even the main reason for the far distance between the contents of the two latter documents and the ODNI ostensibly predominant version that the initial SARS-CoV-2 infection was most likely caused by natural exposure (four IC elements and the National Intelligence Council; low confidence). Neither could the main reason be the fact that the two early documents were formally not a product of the IC, considering the fairly detailed argumentation and clarifications posed by Dr. David Asher (currently affiliated with Hudson Institute) after the Fact Sheet had been published (and earlier considerably structured by him).⁷

One cardinal reason does seem to be, then, the methodology that acknowledges the validity of intelligence assessments based on low confidence level, within the context of factual intelligence issues. The opposite methodology, as described above, is the much preferable one, and would overshadow the unneeded complexity argued in the ODNI unclassified summaries, posed as: “Variations in analytic views largely stem from differences in how agencies weigh intelligence reporting and scientific publications, and intelligence and scientific gaps.”

Subsequent to the ODNI August report, two remarkable letters were sent during September from other committees of the U.S. Congress, in reference to that report. One letter, coming from the Committee on Oversight and Reform, asked the DNI to provide “all raw intelligence reports, meeting notes, and emails relied upon by the IC to develop the Assessment”, because the assessment was “unacceptable” and “only served to provide more confusion.”⁸

The second letter, sent from the Permanent Select Committee on Intelligence Minority to President Biden, noted: “Shockingly, ODNI has repeatedly refused to tell the Committee which scientists the IC consulted... Surely you can see the absurdity of ODNI withholding this information from us... Without this information, we cannot find the IC’s report remotely credible.”⁹

The IC October report detailed much of the process through which the final assessments and judgments were developed within 90 days; it was still unduly faint, though. It included an opening session in which the questions of inquiry were determined, and the collection was charged with requirements and later on two analysis sessions were held, in which two Structured Analysis Techniques were used. In the first session representatives of the various agencies conducted an Analysis of Competing Hypothesis (ACH) that led to the conclusion that most reporting was consistent with both hypotheses and the reporting that was inconsistent was deemed to be not credible. Such ACH was probably done by the agencies separately and led them to different assessments with low confidence. Before the start of drafting, the National Intelligence Council (NIC) hosted a wide Team A/Team B analytic exercise to explore how the IC could strengthen either hypothesis through a debate-style format. Agencies pulled from these conversations – along with the work conducted during and before the study – to solidify their consensus positions. Then the NIC conducted four rounds of outside review of the draft assessment. These sessions, according to the report, provided valuable feedback that was incorporated into the assessment.

It is not clear from the unclassified summaries what other methods were used by the various agencies. Anyhow, providing

assessments with low confidence to a factual intelligence question is not contributing real value and is insufficient. Even the contribution of moderate confidence assessments is debatable, unless a high confidence one is out of reach (as is the case, purportedly, with the ODNI reports under discussion). It would hence have been better if the IC simply said it is unable to come up with more valuable answers – beyond the moderate confidence assessment it generated – and excluded the low confidence assessments. No wonder that the faint message emanating from the report was heavily criticized, and raised a question mark about the IC's ability to have adequate access to priority intelligence requirements in China; as well as an actual possibility that the assessments were presented this way to help avoid increasing tensions with China.

The ODNI unclassified summaries do not clarify whether all the mentioned intelligence agencies and elements had the very same informational base, and the very same scientific consultants. Further, it is quite obvious, in general, that the capacities and eminence of the related agencies and elements vary within the U.S. IC, yet there isn't any such connotation in the present case.

Moreover, the ODNI unclassified summaries do not mention anything as to whether they rely on, i.a., on U.S. important domestic intelligence resources, such as EcoHealth Alliance and North Carolina University (just two examples among many); as well as important external intelligence resources, such as NATO and the Five Eyes. This factor might be crucial, due to the interactions of multiple Western and Australian academic institutions and suppliers with various research facilities across China, and particularly in Wuhan, during the last decade.

Former DNI John Ratcliffe (replaced on January 20, 2021), and others, implicitly – yet unequivocally – questioned the extent to which the IC report was devoid of the possible impact of its findings, as it should have been. Ratcliffe said on September 20, 2021, in reference to intelligence analysts he interacted with while in office: “the people that had the most access to the most intelligence, are telling you that the most likely origin of COVID-19, of the Wuhan virus, was a lab leak at the Wuhan Institute of Virology. This is really most likely what happened... It is probably a certainty... When we looked more closely at the WIV, a lot of scientists, like Dr. Peter Daszak and Dr. Anthony Fauci, were saying there is no live bats there, there is no gain of functions research there, there is no military there; and we had intelligence that was telling us all of those things were occurring there... There is compelling intelligence that hasn't been declassified... I think the time has come for the Biden administration to declassify additional information that would, again, (provide) more evidence...”¹⁰

Further, former FBI Assistant Director Kevin Brock commented (20 Sep 2021) on the ODNI August report: “We have the intelligence community that can get to the truth on this (the roots of the pandemic virus). The question is, do we have the will? Are there political, are there foreign international relation issues that come into play, that obfuscate us finally getting to the truth?... The (ODNI August) report, to me, indicates that there may have been more behind the scenes toward downplaying this question than it may seem. Our intelligence community is filled with people, analysts who can do analysis, specifically when there's as much open-source material available. I'm not convinced that we are flying so blind in China right now from an intelligence collection standpoint that this report

intimates. That's just not the truth. We have good sources, we have good methods, we have good tactics, and we should be able to aggregate the intelligence that we need as a government to formulate policy going forward. So the question becomes, then why did they issue a report like this?... There are political influences exercised in this country (US) by China in a very sophisticated way against our politicians that can sometimes compromise from a conflict of interest's standpoint. I think we have to be honest about that. So all of these factors come into play and ultimately result in a concern that perhaps our quest for truth is being downplayed or blocked in some way."¹¹

Obviously, the FBI is supposed to obtain factual information, as well as opinions and impressions, from persons and institutions in the U.S., concerning their full interfaces with Chinese partners, either actual or tentative; as well as to interfere, when needed. Fairly complicated, yet potentially highly fruitful (and indeed, there is a version maintaining that the above-mentioned one moderate confidence-based assessment is the FBI's¹²). A parallel complexity, if appreciably variant, marks the interactions of the CIA with its allies within NATO and the Five Eyes.

Speaking about the period when he led the CIA (January 2017 – April 2018) Mike Pompeo referred – in an interview that dealt with the intelligence relating to the pandemic virus – to the entanglement of this duty, in general: “As former director of the CIA, I was always worried that we were collecting information, but we were not able to process it efficiently and timely get that information to the right places.”¹³

The domestic interactions among the agencies comprising ICs, and the domestic interfaces between ICs and governments are known to be problematic worldwide, quite

often; certainly, more than should be expected, objectively. Alike is the interplay between intelligence collection and analysis systems. Those ought not to be the cases, nonetheless, whenever they concern a colossal issue such as the roots of the pandemic virus. Let alone – the collaboration among ICs of different countries, which is highly imperative under such circumstances.

Finally, it was recently disclosed that the WIV (together with EcoHealth Alliance) intended to artificially incorporate human-specific furin cleavage sites into an unspecified SARS-related bat virus, transform it into a dispersible aerosolic form, and spray it in the Mojiang mine, so as to experimentally vaccinate bats residing therein. A pertinent research proposal asking for funding was submitted in 2018 to the U.S. Defense Advanced Research Project Agency and rejected, due to being hazardous, as explained: “It is clear that the proposed project... could have put local communities at risk.”¹⁴

But this does not mean it has not been carried out by WIV. The collaboration with EcoHealth and, alongside, the corollary joint research proposal (looking for more than a U.S.\$14 million grant) were highly desirable for WIV – in various senses meeting one common Chinese optimal modus operandi, which combines such peculiarity with legitimacy, finance, sophisticated know-how, upgraded constituents, and scientific spying – yet not a necessity. WIV could *well have* carried out this research project, hence, on its own, eventually, and into 2019. The uncanny experimental layout of that research proposal, overall, is noticeably suspicious and obviously consistent with the lab-leak scenario. Surprisingly or not, this basically unclassified research proposal has been leaked by an anonymous whistleblower, in September 2021. Much earlier, already in 2018, it should have been

regarded to be a meaningful warning signal, if not a concrete alert. Surprisingly or not, additionally, this highly intriguing affair has not been mentioned at all in the ODNI's unclassified documents.

Dr. David Asher, who officially and thoroughly inquired into the roots of the pandemic virus, was critical and direct in reference to the ODNI's October document at large: "Personally, I find it startling and almost a disgrace to the nation's intelligence or the international intelligence."¹⁵

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Endnotes:

¹ The White House, *Statement by President Joe Biden on the Investigation into the Origins of COVID-19*, May 26, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/05/26/statement-by-president-joe-biden-on-the-investigation-into-the-origins-of-covid-19/>.

² Office of the Director of National Intelligence, *Unclassified Summary of Assessment on*

COVID-19 Origins, August 27, 2021 <https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2021/item/2236-unclassified-summary-of-assessment-on-covid-19-origins>.

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⁵ US Department OF State; Fact Sheet: *Activity at the Wuhan Institute of Virology*, January 15, 2021, <https://2017-2021.state.gov/fact-sheet-activity-at-the-wuhan-institute-of-virology/index.html>.

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Novichok and Murkier case of Navalny poisoning: Is Russia Flouting Chemical Weapon Convention obligations?

Animesh Roul

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Summary

Novichok nerve agents developed by the Soviet Union during the Cold War emerged as a lethal tool due to their use in attempted assassinations recently. Two such attempts involving deadly Novichok nerve agents in Salisbury, UK (2018) and Omsk, Russia (2020) raised doubts about Russia's existing tactical CW arsenal. Despite recent requests and pressure from several European countries and the OPCW, Russia rejected the proposal to use the CWC's consultation and clarification procedures to resolve any allegation against its involvement in producing and using Novichok nerve agents. The Alexei Navalny poisoning case significantly raised doubts about the efficacy of the CWC and seriously questioned Russia's compliance with international agreements.

Alexei Navalny, the Russian pro-democratic opposition figure and anti-corruption activist, wrote in an August 2021 article that “[I] did not die from poisoning by a chemical weapon, and it would seem that corruption played no small part in my survival.”¹ Fortunately, he lives to tell this ordeal. Navalny was recollecting the assassination attempt on his life exactly a year back, with a suspected nerve agent. On August 20, 2020, Navalny was grievously ill onboard a flight from Tomsk (Siberia) to Moscow. He was taken to a city hospital midway in Omsk for treatment after the flight made an emergency landing.² A couple of days later he was shifted to Berlin's (Germany) Charite University hospital for treatment. He eventually recovered and survived the ordeal.

Novichok Again

Novichok agents, also known as fourth-generation agents (FGA), are a class of nerve agents developed by the Soviet Union during the Cold War.³ These nerve agents emerged as a significant chemical weapon threat due to their use in the attempted assassination recently.

In the Navalny poisoning case, a toxicology test at a specialist military laboratory in Germany revealed the presence of a substance from the group of cholinesterase inhibitors (e.g. Novichok nerve agent).⁴ Subsequent laboratory sample tests in France and Sweden confirmed that Navalny was poisoned with this Soviet-era nerve agent. The Organisation for the Prohibition of Chemical Weapons (OPCW), through its designated laboratories too confirmed that the biomarkers of the cholinesterase inhibitor found in Navalny's blood and urine

samples have similar structural characteristics as the toxic chemicals belonging to schedules 1-A.14 and 1-A.15, added to the Annex on Chemicals in November 2019.⁵

Following the confirmation of Novichok poisoning, German Chancellor Angela Merkel in early September 2021 termed the event as ‘shocking’ and underscored Navalny was “the victim of a crime intended to silence him.” She directly pointed at the Russian government, saying that the poisoning case raises “very serious questions that only the Russian government can answer and the world will wait for an answer.”

On October 15, 2020, the European Union imposed ‘restrictive measures’ on six senior Russian officials, including Aleksandr Bortnikov, the Director of the Federal Security Service of the Russian Federation and a chemical research facility, State Scientific Research Institute for Organic Chemistry and Technology, over the Novichok poisoning of Navalny.⁶ Previously, the U.S. authorities have also blacklisted this civilian scientific facility in August 2020 for developing Novichok, the military-grade nerve agent. This chemical research facility has been on the US intelligence radar since the poisoning of Russian national Sergei Skripal and his daughter, Yulia Skripal, in Salisbury, the UK, in March 2018.

Private investigating group Belingcat corroborated shreds of evidence gathered from open-source research and investigation suggesting that Russia’s military intelligence agency, the GRU Glavnoye Razvedyvatel’noye Upravleniye) was responsible for the Navalny case.⁷ However, the Russian government denied any role in the Navalny poisoning case and rejected all allegations regarding the use and origin of the Novichok agent.

Russia on the Chemical Crosshair

Alexei Navalny case is not the first time Russia has been accused of using this novel method to neutralise dissent and opposition against the state authority. Similar to the Navalny case, the poisoning of Sergei Skripal, a former Russian military intelligence official, and his daughter on March 4, 2018, in Salisbury, (United Kingdom) had caught the attention of the international community regarding Russia’s covert assassination operations. Like Angela Merkel’s reaction in the Navalny case, British Prime Minister Theresa May directly blamed Russia following British intelligence services investigations named, Alexander Petrov and Ruslan Boshirov who were believed to have been employed by the Russian state. She expelled several Russian diplomats in retaliation and demanded an explanation from the Russian government about the Novichok incident on British soil.⁸

In the light of these recent Novichok cases, another previous poisoning and attempted-assassination incident came to light in Bulgaria. In October 2018, Bulgaria reopened the investigation into the April 2015 poisoning of Emilian Gebrev, a Bulgarian arms dealer, to determine whether it involved Novichok. Both the US and UK intelligence agencies joined the probe with Bulgarian agencies. In January 2019, formal charges of attempted murder were announced in absentia against three Russian suspects. However, in September 2020, the Bulgarian Prosecutor-General has ordered the suspension of investigation for unknown ‘geopolitical concerns’.⁹

Browbeating OPCW?

In the 98th session of the OPCW Executive Council (October 5-8, 2021), the United

Kingdom raised a CWC treaty mechanism to urge Russian assistance in seeking clarity on the whole episode of Navalny poisoning.¹⁰ Along with 44 western countries, the UK activated the CWC's Article IX (2) process. Under this article, each member state of CWC has the right to request clarification on any matter that causes doubt regarding compliance with the treaty. These countries have again sought clarity on Russia's involvement in the attempted assassination of Navalny, urging its cooperation with OPCW. Russia is blamed for the lack of transparency and cooperation surrounding the poisoning cases in the past. However, despite requests and pressure from the European countries and the OPCW, Russia rejected the proposal to use the CWC's consultation and clarification procedures to resolve any allegation against its involvement in producing and using Novichok nerve agents. On October 7 this year, Russia placed a document on the Navalny investigation at the OPCW.¹¹ The 235-page document comprised previous OPCW and Russian federation's communications/ statements and confidential communications within Russian German, French, and Swedish authorities. Also, this document collated various news reports related to the Navalny case.

Earlier, Russia termed western allegations as 'cynical fiction' and cautioned for any politically motivated decision at the OPCW. Russia raised the issue of 'deep divide' in the OPCW, especially supporting Syria in similar chemical weapon use investigations. In the Navalny episode, Russia too accused Western countries of taking OPCW hostage for their geopolitical interests. Russia reiterated that its trust in the implementing body for the Chemical Weapons Convention is rapidly declining.

It is alleged that Russia may remain adamant on its stance in any future deliberations on this issue. This is likely to increase Russia's differences with the OPCW and Western countries, which may go beyond the present status quo. All this could raise more questions than answers about the effectiveness of CWC's multilateral mechanisms.

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A Proposal for Biosecurity Framework in India

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Summary

Perpetual biological threats in India presented in different forms, and of various intensities call for a comprehensive biosecurity framework. Rapidly advancing scientific developments in synthetic biology have altered the landscape of probable biological threats. Taking cues from legal biosecurity frameworks of developed nations; legally binding regulations along with integrated and wide-ranging biosafety, biosecurity and biodefense policies need to be re-designed to form the backbone of this robust comprehensive biosecurity framework.

Introduction

The biological threats in various forms and degrees of severity have been knocking on the door at a disturbing regularity. Fast-paced changes in interdisciplinary scientific advancements and geopolitical paradigms have been key to an equally fast-paced metamorphosis of the biosecurity landscape. The biosecurity preparedness domain in India is awaiting a complete overhaul in the approach; progressive, if not revolutionary!

The word plague is synonymous with tremendous morbidity, mortality, fear of unknown, psychological, psycho-social and economic impact. Though the Surat plague in 1994 was endemic, there is a distinct similarity between that plague and COVID-19 on several parameters. Some of them are mass testing and hospitalizations of suspected cases, massive scales of sanitary measures, national and international media coverage, travel restrictions, tourism and export bans resulting in economic impact. Another distinct similarity relates to the outbreaks giving rise to some unanswered questions such as the nature of the disease, mode of transmission, the origin of the outbreak, whether it was natural or man-made.¹

Irrespective of the origin of an outbreak of such nature and scale, the nation should be prepared to tackle the challenge swiftly. In this context, biosecurity preparedness comprises surveillance, detection, prevention, response and mitigation. Another important backbone of biosecurity preparedness is the legal framework to support various components of the biosecurity landscape.

Biosecurity

Biosecurity is a collective responsibility of the society to create a 'Web of Prevention' to protect populations, plants, animals and the environment against all biological threats and risks; whether incidental, accidental, intentional or experimental in nature and presented by biological agents, toxins and vectors.

As it was evident during COVID-19, the complexities of biological threats demand an equally complex collaborative and interdisciplinary 'Biosecurity Web of Prevention' that involves multiple agencies and countermeasures.

Biosecurity Landscape

The concept of Biosecurity and the regulations are distinctly different and empower different ministries or agencies that are responsible for sectors associated with public health, food safety, forests, agriculture, livestock, and the environment. Often, the terms 'Biosafety' and 'Biosecurity' are used interchangeably. However, broadly biosafety is to do with safety protocols, standard operating procedures (SOPs), safety related infrastructure and waste disposal, whereas biosecurity has many dimensions. The biosecurity perspective may be distinctly different for different stakeholders, even within the science and technology domain. The biosecurity landscape comprises of:

- Accidental lab leak, accidental spillage of biological agents or related information
- Theft, sabotage or weaponization of biological agents
- Gain of function research and dual-use research of concern (DURC)
- Foreign invasive species & agriterrorism

- Genetically Modified Crops, weeds and field testing
- Deliberately released infectious or toxic biological agents
- Food security
- Animal biosecurity, import, quarantine breeding and diseases
- Synthetic infectious agents built using freely available genomic knowledge on the internet and readily available building blocks
- Pests, vector-borne diseases, genetically modified and intentionally released insect vectors
- Zoonotic spill-over of diseases

The length and breadth of the biosecurity landscape need to be covered under a robust legal framework comprising of new legal provisions, some existing laws with necessary amendments, revival and required modifications in some draft bills presented in the past. This framework would facilitate the management of all biological threats whether public health challenges and emergencies, biosafety, biosecurity or biodefence needs of the nation.

Biosecurity Governance

The American biosecurity framework is an exemplary case. Since the American anthrax incident after the 9/11 attacks, various measures have been undertaken to implement and improvise the administrative aspects of biosecurity and biodefence. Multiple laws, statutes, regulations, directives, and government directives aimed at countering the biological threats are in force. These legally binding regulations form the critical backbone of the biosecurity web

of prevention. Some of the critical legal provisions include²:

- The Biological Weapons Anti-Terrorism Act of 1989
- Public Law 107–188, Public Health Security and Bioterrorism Preparedness and Response Act of 2002
- Presidential Directives
 - HSPD 4: National Strategy to Combat Weapons of Mass Destruction (WMD): The strategy contains three principal pillars:
 - Counter-proliferation to combat WMD use,
 - Strengthened non-proliferation to combat WMDs,
 - Proliferation consequence management to respond to WMD use.
 - HSPD 9: Defence of United States Agriculture and Food
 - HSPD 10: Biodefense for the 21st Century
 - A comprehensive framework for biodefense,
 - The creation of the National Biodefense Analysis and Countermeasure Centre,
 - Increased funding for
 - New vaccines,
 - Intelligence initiatives,
 - Bio-surveillance,
 - Mass casualty care.

➤ HSPD 18: Medical Countermeasures Against Weapons of Mass Destruction

➤ HSPD 21. Public Health and Medical Preparedness

- Preparedness for all potential catastrophic health events;
- Coordination across levels of government, jurisdictions, and disciplines;
- Regional approaches to health preparedness;
- Engagement of the private sector, academia, and other non-government entities in preparedness and response efforts; and
- Delineate the important roles of individuals, families, and communities.

➤ National Biodefense Strategy 2018

These legally binding regulations along with integrated and wide-ranging biosafety, biosecurity and biodefense policies form the backbone of the robust comprehensive biosecurity framework in the US.

Similarly, Biosafety Strategy 2018 of the UK, Federal Law of Biological Safety, 2020 of Russia and Biosecurity Law, 2019 of China along with related biosecurity governance frameworks of these nations will be helpful to design and improvise Indian Biosecurity frameworks.

Legal provisions in India

During the early stage of COVID-19 pandemic, Epidemic Act 1897 and Disaster Management Act 2005 were invoked for the management of the outbreak.

Epidemic Diseases Act (ED1897)

Despite the criticism of it being an outdated law, this is the only law that has provisions to deal with such a situation specifically. The act emphasises on the states to manage public health crises while giving only ancillary powers to the centre. The 122-year-old law has many limitations with respect to the scope, limited and age-old surveillance, containment and quarantine methods or it does not specify the power structure in case of a dispute. Acknowledging this, Public Health Bill 2017 was drafted to repeal the Epidemic Diseases act (1897).

Disaster Management Act (DM2005)

While declaring the COVID-19 pandemic ‘a notified disaster’, the centre enforced the provisions of the DM2005. Though the DM act is not aimed at targeting epidemic disasters specifically and envisaged primarily for tackling natural disasters, the centre used another entry in the list to utilize the Act; ‘social security and social insurance; employment and unemployment’. The DM Act has provisions for both centre and the states to share power and responsibilities. Though public health is primarily listed under the State’s List, which is a caveat. This provision does not impede the centre from enacting a public health legislation related to outbreaks of epidemic proportions. There is a provision in entry 29 of the Concurrent List for the purpose of ‘prevention of the extension from one state to another of infectious or contagious diseases or pests affecting men, animals or plants’³.

Public Health (Prevention, Control and Management of Epidemics, Bio-Terrorism and Disasters) Bill 2017

Considering the limitations of age-old ED1897 and the need to empower the

government to effectively manage any health emergencies, the Public Health Bill 2017 was drafted by the National Centre for Disease Control (NCDC) and the Directorate General of Health Services (DGHS).

Challenges in the implementation of and comments on the Public Health Bill 2017:

- All the powers of the government at each level are clearly mentioned, but possible violations of rights during public health emergencies have not been taken into account and its redressal mechanisms are not clearly defined. An appeal can be made under this act, but still, the scope to appeal is very limited in the context of Sections 9 and 10.⁴
- Maintaining a balance between the rights provided by the constitution and the powers of the government is essential for the public health law. Contact tracing of affected individuals as a response to pandemic may violate the Right to Privacy in absence of any legislative provision as such. However, as public health is of paramount importance, privacy and public interest will be balanced once brought under the rigour of the law.⁵
- There is a need for a dedicated public health cadre to implement a Public Health Bill effectively.
- With easy access to the internet misinformation and disinformation campaigns can cause fear and panic among the people. The addition of penalties to prevent such activities should be considered. Provision of payment of compensation to the people affected by the government orders during an epidemic may be considered.
- During the COVID-19 outbreak several significant unresolved issues emerged. A

structured legal framework controlling mismanagement, malpractices, the lapse in providing basic medical aid, availability and distribution of medical essential drugs and equipment, is necessary.

- There needs to be a balance between the government's role in maintaining public health and human rights.⁶
- Though the Constitution does not directly have provisions for public health emergencies like the current pandemic, according to Article 246 of the Constitution, matters related to public order and health are mentioned in the state list. However, once central legislation becomes applicable, that is, Article 256. This provision says that states must comply with central laws, and the Centre can issue directions to demand compliance. The draft Bill mentioned the role and responsibilities of the Centre and states in a medical emergency.⁷

The Epidemic Diseases (Amendment) Bill 2020 has limited scope and is temporarily available. This legislative provides safeguards for healthcare workers need to be included in the new Public Health Bill with stringent penalties in respect of the duration of imprisonment and penalty amount etc.

The limitations of both ED1897 and Public Health Bill 2017 highlighted during the current pandemic can be overcome by drafting a new Public Health and Biosecurity Bill to make legal provisions for future health emergencies.

An important feature of The Public Health Bill 2017 is the inclusion of Schedule 1 (Epidemic Prone Diseases) and Schedule 2 (Potential Bioterrorism Agents). Both these schedules should be revisited and included

while drafting a new Public Health and Biosecurity Bill.

There is also a need to scrutinize some other relevant Acts and Bills with respect to Biosecurity, such as:

- Livestock Importation Act 2001
- Plant Quarantine Regulatory Act
- Customs Act 1962
- WMD & their delivery systems Act 2005
- Water & Air (Prevention and control of pollution) Acts
- National Security Act 1980
- Biotechnology Regulatory Authority of India Bill (BRAI2013) and Agricultural Biosecurity Authority of India Bill (ABAI2013)

A comprehensive Biosecurity framework calls for a fresh Biosecurity perspective to assess the legal provisions accorded by all above-mentioned laws and bills proposed earlier. Some amendments may be necessary to empower respective government dispensations for effectively managing their Biosecurity situations.

There is a need for a legal provision for a central mechanism with a team of epidemiologists, public health experts, policymakers, public health engineers to be in place to decide and declare diseases as public health emergencies based on International Health Regulations.⁸ Taking cues from BRAI2013, another legal provision calls for a Regulatory and Emergency Committee to examine unexpected outbreaks; also being responsible for strengthening national disease surveillance, prevention, control and response systems and responses at the international level.⁹

The proposed Biosecurity Framework would ideally comprise of:

- Relevant structured legal provisions with power structure at all levels with clearly defined roles and responsibilities at all levels of governance;
- SOPs, penalties and redressal mechanisms for all relevant situations and health emergencies;
- Healthcare Emergency management should be inclusive of logistics of essential medical supplies and equipment and emergency authorizations.

Taking cues from legal biosecurity frameworks of developed nations; legally binding regulations along with integrated and wide-ranging biosafety, biosecurity and biodefense policies need to be re-designed to form the backbone of this robust comprehensive biosecurity framework.

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Can we Become Wiser from the Havoc of COVID-19?

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Summary

COVID-19 sent the whole world and economy into a tailspin. This article first explores the brief history of use of biological weapons. Furthermore, it encapsulates the debates surrounding the biological weapon convention in general and COVID-19 in particular. Finally, the article highlights India's ability to fight back a pandemic and her resilience that was tested in the initial phase of COVID-19 and during the second wave.

Humans are the only beings with an inborn instinct to carry out large-scale destruction. They have damaged the environment for long and also found waging war against fellow beings. Inherent to this nature is a capacity to harness or create necessary and fatal weapons that can destroy enemies and unfortunately also have a prolonged impact on the environment. Among them, the techniques of using of biological agents against humans and agriculture is as old as civilization. Ancient Indian stories and even the Indian treatise Arthashastra defined among many other methods the nurturing of 'Vish Kanyas' – women brought up by administering small doses of poison who later became assassins with even their kiss being fatal. Poisoning of wells and livestock, scorching fields to render them barren was a common tactic among other forbidden activities.

In more recent times, World War I saw the widespread use of poisonous mustard gas, producing fatal and wretched casualties in thousands. This catastrophic use and its devastating effects led to the 1925 Geneva Protocol attempting to ban bioweapons. However, many countries continued producing bioweapons secretly, which include but was not restricted to Japan, the United States of America (USA), the United Kingdom (UK), Germany, and the former Soviet Union. The whole world saw the horror of the concentration camps and what happened in them and many were subjected to all kinds of human experiments.¹ It is also believed that the Japanese killed Chinese prisoners by experimenting on them using anthrax, cholera, plague and other pathogens.²

The table below indicates the bioweapons programmes during World War II.

BIOLOGICAL WARFARE PROGRAMMES DURING WORLD WAR II

Nation	Focus
GERMANY	Plague, typhoid, cholera, anthrax, and a new synthetic medium for the spread of these bacteria; aerosol dispersants and methods of spraying nerve agents like Tabun and Sarin from aircraft; malaria-carrying mosquitoes (secret)
CANADA	Animal and crop diseases, rinderpest, anthrax
UK	Animal and crop diseases, anthrax, foot and mouth disease
JAPAN	Extensive; official information suppressed by a treaty with USA in which all charges for war crimes were dropped for exchange of information from experiments
SOVIET UNION	Typhus, plague
USA	Chemical herbicides, anthrax (started too late to be important)

* Estimated

Source: Baylor College of Medicine, US, and other research websites

Even after World War II, many countries were known to have ongoing bioweapons programmes such as the US and Germany.³ As of now, the regimes in Iraq and Syria have been alleged to have used chemical weapons against their own populations.

A Failed Biological Weapons Convention?

The Biological Weapons Convention (BWC) came up in 1972 and entered into force on 26 March 1975 and almost has universal membership with 183 States Parties. The BWC supplements the 1925 Geneva Protocol, which had prohibited only the use of biological weapons and effectively prohibits the development, production,

acquisition, transfer, stockpiling and use of biological and toxin weapons⁴. It was the first multilateral disarmament treaty banning an entire category of weapons of mass destruction (WMD). Despite its noble intentions, the treaty lacks any significant provisions for enforcement or verification. Unlike the nuclear weapons program, this treaty lacks any international inspections regime to ensure treaty compliance. Many policymakers argue that such a measure would provide a backlash against genuine biotech research and cause harm to legitimate research. As a result, there is a possibility that some signatories to the treaty could have maintained active (covert) bioweapons programs.⁵

Lessons from COVID-19

The inception of COVID-19, allegedly from a Lab in Wuhan (China) shows how vulnerable humans are towards invisible bioweapons. The pandemic sent the whole world and economy into a tailspin. The outbreak allegedly began from Wuhan in central China, and some specialists are of the

opinion that the virus could have leaked from the Wuhan Institute of Virology (an institute believed to be a part of Beijing's secret bioweapons programme).

There are various known potential bioweapons agents in the world and some of them are indicated in the chart below.

POTENTIAL BIOTERRORISM AGENTS/DISEASES		CATEGORY A	CATEGORY B	CATEGORY C
	<ul style="list-style-type: none"> Anthrax Botulism Dengue Ebola Hantavirus Lassa Marburg Plague Smallpox Tularemia 	<ul style="list-style-type: none"> ◆ Pose the highest risk to national security ◆ Can be easily disseminated or transmitted from person to person ◆ Result in high mortality rates and could have a major public health impact ◆ Require special public health preparedness actions ◆ Have potential to cause public panic and social disruption 	<ul style="list-style-type: none"> Caliciviruses, Chikungunya, Cholera, E. coli O157:H7, Hepatitis A, Ricin toxin, Salmonella, Typhus fever, Yellow fever, Zika ◆ Pose the second highest risk to national security ◆ Are moderately easy to disseminate ◆ Result in moderate morbidity rates and low mortality rates ◆ Require enhanced diagnostic capacity and disease surveillance 	<ul style="list-style-type: none"> Antimicrobial Resistance, Hendra, Influenza (highly pathogenic strains), MERS, Nipah, Prions, Rabies, SARS, Tickborne encephalitis, Tuberculosis ◆ Emerging pathogens that could be engineered for mass dissemination ◆ Are easily produced and disseminated ◆ Have potential for high morbidity and mortality rates and major health impact ◆ Are available

Source: Baylor College of Medicine, US

Is India ready for a Bioweapon Attack?

The possibility of any state vs state war using biological weapons in near future is very little. However, there is always a possibility that the India could come under a bioterror attack (could even be covertly supported by the adversary). What remains to be answered is how prepared is India for a similar attack of outbreaks in the foreseeable future. India has ratified the 1972 biological weapons convention, and maintains research and development institutions of toxicology, biochemical pharmacology and other associated fields. In military arena, India has a biodefence programme and the Defence

Research and Development Establishment (DRDE) located at Gwalior in Madhya Pradesh is responsible to ensure countering bio threats such as anthrax, brucellosis, cholera, plague, smallpox, viral haemorrhage fever and botulism.

India has made good investments in the field of biotechnology and pharmacology. India's ability to fight back a pandemic and her resilience was tested in the initial phase of COVID-19 and its second wave in India (Apr-May 2021). Despite representing almost, the sixth of human population the death caused due to the outbreak was comparably quite low,⁶ that is 334 per million.⁷ The fightback demonstrated an ability to mass-produce

vaccines, which included one an indigenously developed vaccine, which has the World Health Organisation's (WHO's) approval. All this was possible only owing to the extensive help from the indigenous pharmaceutical industry, scientific community and defence labs.

The COVID response has shown that initially India's preparedness to tackle a bioterror attack range was limited. Doctors and specialists had expressed reservations about how initially the Indian medical system was overwhelmed and was inadequately prepared. However, the speed with which India reacted is a case study by itself. This endeavour included vaccinating over 100 Crore (1 Crore = 0.01 Billion) people within a record time and also developing and delivering over 707 Lakh (1 Billion = 10,000 Lakhs) vaccines for 95 countries under the vaccine Maitri scheme.⁸ It is important to note that some other states in the world had not shown the similar human approach taken by India. In fact, the US President Biden had invoked the Defence Production Act of 1950 to prevent American manufacturers from supplying critical materials needed by Indian vaccine manufacturers.⁹

What has not been established is whether COVID-19 is a bioterror weapon that went awry or a runaway virus from a lab. The world had rallied after the use of Biological and Chemical agents in the aftermath of World War I and restricted their uses. If anything, the COVID-19 is a trailer of what could happen, if the world does not rally together to stop the possibility of any state or non-state actor creating biological weapons in the future.

Endnotes:

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⁴ For more details may please see Biological Weapons Convention homepage at <https://www.un.org/disarmament/biological-weapons/> accessed on 22 November 2021.

⁵ For more details on this may also read Mark Shwartz, "Biological warfare emerges as 21st-century threat," available at <https://news.stanford.edu/news/2001/january17/bioterror-117.html> accessed on 21 November 2021.

⁶ May see the statistics of COVID-19 pandemic at <https://www.worldometers.info/coronavirus/#countries> updated on 24 November 2021.

⁷ Counter 'one-sided' world media narrative on govt's pandemic 'failure', Jaishankar tells Indian diplomats, Indian Express available at <https://indianexpress.com/article/india/counter-one-sided-world-media-narrative-on-govts-pandemic-failure-jaishankar-tells-indian-diplomats-7296036/> accessed on 22 November 2021.

⁸ Vaccine supply statistics from MEA, Government of India website available at <https://www.mea.gov.in/vaccine-supply.htm> accessed on 22 November 2021.

⁹ Pillay, DPK "America's Vaccine War" available at <https://chanakyaforum.com/americas-vaccine-war/> accessed on 22 November 2021.

In Search of a Chemical Weapons-Free World: Three Decades of Abolishing Chemical Weapons

Paul F. Walker

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Summary

The CWC will celebrate its 25th anniversary in 2022 since its 1997 entry-into-force. The accomplishments of its implementation agency, the OPCW, have been many including safe and verified elimination of over 70,000 metric tons of chemical agents and millions of weapons in eight declared possessor states. However, recent uses of deadly chemical agents in Syria and assassination attempts in Malaysia, Russia, and Britain have presented new challenges to building a world free of a whole class of WMDs. This article will briefly cover this history and point toward new priorities for strengthening this important abolition regime.

Chemical Weapons Demilitarization

Within the next two years, the world will witness a historic turning point – the completion of over three decades of international efforts to safely destroy all declared chemical weapons stockpiles. This has been an enormous and costly task, far beyond what the negotiators of the 1993 Chemical Weapons Convention (CWC) envisioned during their twelve years of treaty drafting and discussion.

But this long wait will be well worth the time, finances, and public debates since the 1980s. Over 72,000 metric tons¹ of deadly chemical agents and millions of varied weapons systems will have been safely and irreversibly destroyed by the eight declared possessor countries – Albania, India, Iraq, Libya, Russia, South Korea, Syria, and the United States. Of those eight countries, Albania, South Korea, India, Iraq, Syria, Libya and Russia have completed destruction of their declared arsenals. Syria, however, may not have declared its entire stockpile.² These complicated and dangerous destruction processes have also been verified on-site by the inspectors of the Organization for the Prohibition of Chemical Weapons (OPCW) in The Hague, the international organization tasked with implementing and verifying the CWC.

Russia and the United States accounted for 95% of the declared stockpiles and have been the most challenging stockpiles to destroy. Russia declared 40,000 metric tons of chemical agents at seven large stockpiles, six of which were west of the Urals in the Eurasian part of Russia, and one stockpile east of the Urals on the steps of Siberia. The United States declared 28,600 metric tons at nine stockpiles spread out from Kentucky in the East to Utah and Oregon in the

western US. The US total also included a stockpile on Johnston Atoll, 750 miles west of Hawaii in the Pacific Ocean.

The United States was the first to unilaterally initiate its CW destruction process, seven years before the CWC entered into force. In 1990 the US began operating a prototype incinerator on Johnston Atoll to burn a stockpile of 1,842 metric tons of mustard agent. These weapons had been secretly moved years earlier from the forward deployment in Germany and Okinawa, and were successfully incinerated over a decade. Combined with the second US incinerator which began operating in Tooele, Utah, the US destroyed 1,436 metric tons of chemical agents before the CWC entry into force in April, 1997.

The Soviet Union and the United States had met in the mid-late 1980s to discuss the mutual elimination of their chemical weapons stockpiles, judging them too old and dangerous for any military use and endangering local communities due to leakage and proliferation risks. This resulted in the Wyoming Agreement in 1989 whereby both countries agreed to “a bilateral verification experiment and data exchange related to prohibition of chemical weapons.”³ While this bilateral effort was delayed with the breakup of the Soviet Union two years later, the US organized its first on-site inspection of the easternmost of Russia’s chemical weapons stockpiles, Shchuch’ye, in the Kurgan Oblast with 5,400 metric tons of nerve agent weapons in the summer of 1994. This visit, hosted by the Russian chemical corps, included two US representatives, an assistant secretary of defense, and the head of the US Chemical Material Agency, illustrated the lack of security at old Soviet chemical weapons stockpiles, the lack of any demilitarization plan, and Russia’s inability to fund any timely destruction process.

The US, with support from Germany, Britain, and other like-minded countries, worked closely with Russia throughout the 1990s to provide much-needed security at two stockpile sites, Shchuch’ye and Kizner, which held portable chemical weapons subject to theft and proliferation, and to determine the most appropriate, Russia-based technologies for safe stockpile destruction. By 2002, twelve years after the US had started its own CW destruction operations, Russia began neutralizing mustard and lewisite agents in bulk containers at Gorny in the Saratov Oblast. Fifteen years later, in 2017, Russia completed the safe destruction of its 40,000 MTs of chemical agents with neutralization, but left much of its neutralized toxic liquid product, 10-15 times the original volume, in storage for later remediation.

Much of Russia’s successful demilitarization of its large chemical weapons stockpile was due to the financial and technical support by the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction. Also important was the public outreach and education efforts at each stockpile site organized by Green Cross Russia and Green Cross International with the support of the US Cooperative Threat Reduction (CTR) program.⁴ This community outreach effort included the establishment of local Citizen Advisory Commissions (CACs), public hearings, a global annual dialogue in Moscow, and independent environmental and public health risk assessments.

The other six declared possessor countries – Albania, India, Iraq, Libya, South Korea, and Syria – all have interesting stories to tell, too long for this article, but these countries all deserve credit for completing their CW destruction programs between 2007 and 2018. All countries missed deadlines under

the CWC, but most States Parties understood that the most important goal was to protect workers, citizens, and the environment rather than meet diplomatic deadlines.⁵

The United States will be the last declared possessor country to complete its CW destruction program, currently on track and approved by the OPCW States Parties to finish by September, 2023. Two chemical weapons stockpiles still remain in the US – Pueblo, Colorado and Blue Grass, Kentucky, originally holding 2,349 and 475 metric tons respectively. The Pueblo stockpile started operations in 2015 and has now safely destroyed 1,902 metric tons of agent, 80% of its stockpile. The Blue Grass stockpile started operations in 2019 and has now safely destroyed 165 metric tons, 35% of its stockpile. Major challenges still remain, including the use of Static Detonation Chambers (SDCs) at both stockpiles for destroying badly corroded weapons, but the neutralization first-stage process has gone relatively well at both stockpiles, and the bioremediation second stage process at Pueblo has also been successful. Super-Critical Water Oxidation (SCWO), a new technology for processing chemical weapons, chosen as a second-stage process at Blue Grass, has unfortunately not been successful, so this has slowed the schedule to date.⁶

Challenges Ahead

CWC Universality: Although declared chemical weapons stockpile destruction, including on-site OPCW verification, will come to a close in the next few years, the OPCW still faces many challenges. First to note is that four countries still have not joined the CWC – Egypt, Israel,⁷ North Korea, and South Sudan. Of these four, North Korea – is known to possess an estimated 5,000 metric tons of chemical weapons, most weaponized and deployed along the north/

south border. Both Egypt and Israel are suspected of harboring secret stockpiles, and South Sudan is not known to have any chemical weapons. A fifth country, Taiwan, which has one of the world’s largest chemical industries, potentially subject to OPCW commercial industry inspections, has not been allowed to join multilateral organizations due to China’s “One China” policy. So the OPCW inspectorate could very well have new stockpiles and industries to inspect, should these last CWC holdouts finally join the treaty.

Chemical Assassinations: At least three assassination attempts have happened with chemical agents in recent years. North Korean citizen and half-brother of the North Korean leader, Kim Jong-un, Kim Jong Nam, was assassinated with a VX nerve agent in the Kuala Lumpur airport in 2017. It is clear that North Korea was behind this criminal act and violation of the CWC; while North Korea has neither signed nor ratified the Convention, such blatant use of a banned and deadly chemical agent is a violation of the prevailing norms against the use of chemical agents.

A second assassination attempt took place in Salisbury, the United Kingdom in 2018 when a former Soviet spy, Sergei Skripal, and his daughter, Yulia Skripal, were attacked with Novichok, a Soviet-era military-grade nerve agent, but fortunately survived. Unfortunately, several other British citizens were also impacted by this agent, with one woman dying later that year. Britain has identified two Russian spies as the assassins, but they remain in Russia today. Russia, speaking since then at the OPCW’s annual Conference of States Parties and its Executive Council meetings in The Hague, has denied any relation with this attempted assassination, but most informed observers and many States Parties identify this as a clear violation of the CWC.

A third prominent assassination attempt took place in Omsk, Russia in 2020 of a Russian political candidate, Alexei Navalny, once again using another version of Novichok nerve agent. Fortunately, Navalny was flown to Germany for medical treatment and survived. Once again, most observers identify Russia as the assassin, but Russia has continued to deny any involvement and has accused Germany and other countries as the culprits. The OPCW and States Parties have smartly updated the CWC Schedules of banned chemical agents and precursors to include Novichok, and have requested Russia to clarify its past CWC declarations which have not included any Novichok information.

Chemical Warfare: Since 2012 Syria has used chemical weapons, primarily Sarin nerve agent and chlorine, a dual-use chemical, to attack rebel forces and civilians in the deadly Syrian civil war. The use of chemical weapons became most apparent when the eastern suburb of Damascus, Ghouta, was attacked with nerve agent bombs in August, 2013, killing a reported 1,400 Syrians. Under international pressure, especially from Russia and the United States, Syria joined the CWC two months later and declared 1,308 metric tons of banned chemical agents and precursors to the OPCW. This stockpile, the great majority of which were precursor chemicals, was removed by ship from Syria in 2014 and safely neutralized on board the modified US Merchant Marine ship, MV Cape Ray, and incinerated ashore in Germany, Finland, Britain, and the United States.⁸

The accession of Syria and the timely destruction of its declared chemical stockpile was a major step forward for the OPCW and the global ban on chemical weapons. However, it quickly became apparent that Syria had either not fully declared its chemical stockpile and/or illegally imported

precursor chemicals for additional weapons production. Syria continued to attack rebel forces and civilians in Syria with Sarin nerve agent and chlorine barrel bombs, validated by OPCW reports of the Investigation and Identification Team (IIT) and the Fact-Finding Mission (FFM), along with United Nations reports of the Joint Investigative Mission (JIM).⁹

Although Syria continues to deny any use of chemical weapons over the past decade, some non-governmental groups have estimated that some 300 strikes with chemical agents have been made by Syrian military forces.¹⁰ Syria has also been criticized by the OPCW Director General Fernando Arias, as well as his predecessor DG Ahmet Uzumcu and the Declaration Assessment Team (DAT) for incomplete declarations to the OPCW of chemical weapons and related facilities and activities; this year DG Arias, for example, stated again in his monthly report to the Executive Council on Syria that because of "...identified gaps, inconsistencies, and discrepancies that remain unresolved, the Secretariat assesses that the declaration submitted by the Syrian Arab Republic still cannot be considered accurate and complete in accordance with the Convention,"¹¹

Because of Syria's failure to adequately respond to ongoing questions regarding its required declarations and the numerous reported uses of chemical weapons in Syria, the 25th CWC Conference of States Parties (CSP-25) voted, 87-15, to sanction Syria, withdrawing its voting and other rights as a CWC State Party.¹² And over the past year, Syria has refused to respond to a number of OPCW inquiries and has recently refused visas to OPCW inspectors.

The blatant use of chemical weapons in Syria, in direct violation of Syria's obligations under the Chemical Weapons Convention, along with the continued denial of such actions by

Syria, and its refusal to abide by its clear obligations under the Convention have led to a number of split votes on major issues including the OPCW annual budget, the funding of investigative mechanisms, and the sanctioning of Syria. Fortunately, all votes have passed by large majorities of States Parties, but these actions appear to be efforts by a few States Parties to erode the authority of the world's most universal arms control agreement.

Final Points

The Organization for the Prohibition of Chemical Weapons (OPCW) will celebrate its 25th anniversary in 2022 since its entry-into-force in 1997. The world has now witnessed the success of its century-old global effort to ban chemical weapons and a whole class of weapons of mass destruction. The OPCW is now almost universal and is just a couple of years away from completing the safe and sound elimination of over 72,000 metric tons of deadly chemical agents, and millions of weapon systems, in eight declared possessor states.

As this treaty regime, along with the States Parties, has matured over these years, we've learned many lessons including the need for transparency and accountability; the need to not only verify the destruction of declared chemical weapons, but assure that chemical weapons do not reemerge; the need to improve public outreach and education; the need to identify treaty violations and to work closely with States Parties and the United Nations for accountability; and the need to liaison with other treaty regimes and multilateral organizations in order to create a much safer and sustainable world.

As we move closer, to complete the elimination of all declared chemical weapons stockpiles, the OPCW must focus more on old and abandoned chemical weapons, those

that were either buried on land or dumped at sea. All States Parties must survey their own territories and waters for these toxic legacies of the two world wars and other chemical weapons use over the past century.¹³ And we all must push forward with efforts to promote peaceful uses of chemistry and universality of the treaty. Only with all countries and regions as part of the Chemical Weapons Convention can we be sure that weapons stockpiles have been eliminated and that there is no proliferation or diversion from chemical laboratories, industry, and facilities.

Endnotes:

- ¹ See the OPCW total, 72,304 metric tons, as of November 17, 2021, <https://www.opcw.org/media-centre/opcw-numbers>. This total has varied slightly over time when on-site measurements are taken during destruction processes.
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- ³ Goldblat, Jozef, and Thomas Bernauer. "The US-Soviet Chemical Weapons Agreement of June 1990: Its Advantages and Shortcomings." *Bulletin of Peace Proposals*, vol. 21, no. 4, Sage Publications, Ltd., 1990, pp. 355-62, <http://www.jstor.org/stable/44481537>.
- ⁴ See www.gpwmd.com for background on the Global Partnership.
- ⁵ For more information on CWC deadlines for stockpile destruction, see Part IV(A) of the CWC Annexes on "Principles and methods for destruction of chemical weapons," <https://www.opcw.org/chemical-weapons-convention/annexes/verification-annex/part-iva-destruction-chemical-weapons-and>.
- ⁶ For additional information on these processes, see <https://www.peoacwa.army.mil/>.
- ⁷ Israel has signed the CWC in 1993 but has yet to ratify the treaty; it regularly attends the annual CWC Conference of States Parties (CSP) in The Hague and recently contributed to the new OPCW ChemTech Center construction.

- ⁸ For more information on this destruction process, see Paul F. Walker, “Syrian Chemical Weapons Destruction: Taking Stock and Looking Ahead,” *Arms Control Today*, December 2014, <https://www.armscontrol.org/act/2014-12/features/syrian-chemical-weapons-destruction-taking-stock-looking-ahead>.
- ⁹ See the OPCW on investigations of alleged use of chemical weapons at <https://www.opcw.org/work/responding-use-chemical-weapons>.
- ¹⁰ See, for example, Bellingcat at <https://www.bellingcat.com/>, and the Global Public Policy Institute at <https://www.gppi.net/>.
- ¹¹ OPCW, “Report by the Director General: Progress in the Elimination of the Syrian Chemical Weapons Programme,” EC-98/DG.24, 24 September 2021, page 4, paragraph 19, <https://www.opcw.org/sites/default/files/documents/2021/09/ec98dg24%28e%29.pdf>.
- ¹² See the CSP-25 final report for specifics on this vote, 87 States Parties in favor, 15 opposed, and 34 abstentions, paragraph 9.24, <https://www.opcw.org/sites/default/files/documents/2021/04/c2505%28e%29.pdf>.
- ¹³ Many of the former chemical weapons possessor states have been removing and destroying “non-stockpile” chemical weapons, especially in the former warring regions of Europe. But the United States is the only country which has produced a public report on suspected burial sites of chemical weapons. See U.S. Army Program Manager for Chemical Demilitarization, “Survey and Analysis Report: Second Edition,” Project Manager for Non-Stockpile Chemical Materiel, December 1996.

Biological Security Education, Awareness, and Outreach as Essential Elements of Strengthening the Review of Science and Technology under the BTWC

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Declaration

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Once the rockets are up, who cares where they come down? That's not my department – says Wernher von Braun.” Tom Lehrer’s satirical song is an important reminder of the social, ethical, and legal responsibilities incumbent upon those engaged in science and technology whether in government, industry, or academia. Fostering a culture of responsible innovation that promotes and supports consideration of the broader impacts of research and development can contribute to the process of ensuring that scientific and technological advances are used only for peaceful purposes and the benefit of humankind and the environment.

The revised *Recommendation on Science and Scientific Researchers* adopted by UNESCO in 2017 underlines the civic and ethical aspect of scientific research and encourages the development of appropriate mechanisms and measures that support and promote the fullest exercise, respect, and protection of the social responsibilities of researchers. It is important that science practitioners are able to “express themselves freely and openly on the ethical, human, scientific, social, or ecological value of certain projects, and in those instances where the development of science and technology undermine human welfare, dignity and human rights or is “dual-use”, they [should] have the right to withdraw from those projects if their conscience so dictates and the right and responsibility to express themselves freely on and to report these concerns.”¹

As regards the life sciences, the World Health Organisation (WHO) defines dual-use research of concern (DURC) as life sciences research that has the potential to provide knowledge, information, products or technologies that could be directly misapplied to create a significant threat with

potential consequences to public health and safety, agricultural species and other plants, animals, and the environment.² Consideration of DURC issues in life science practice is an element of effective laboratory biosecurity and relevant organisations and research facilities should establish and have in place appropriate arrangements for ensuring a regular and continued risk assessment of life science DURC throughout the entire research cycle. In developing a DURC risk assessment process, attention should be given to emerging biological risks arising from novel advances in life sciences and related fields. Biotechnology is progressing at a rapid pace and cutting-edge capabilities including genomic editing and gain-of-function experiments raise security concerns regarding the integrity of the existing international norms against the development and use of biological and toxin weapons by state or non-state actors.

Managing life science DURC research is a complex multi-layered process that requires the active engagement of multiple stakeholders along the entire innovation cycle. The World Organisation for Animal Health (OIE) has developed an indicative framework, which maps the range of stakeholders with a role in the identification, assessment, and management of dual-use risks, including researchers and their institutions, funding bodies, industry, educators, scientific publishers and other communicators of research, and regulatory authorities.³ This framework allows identifying needs and options for strengthening the management of life science DURC and enables different stakeholders to develop a better understanding of their specific responsibilities in safeguarding research and innovation against accidental or deliberate misuse.

Recently, the World Health Organisation has initiated a series of consultations to foster a

dialogue on the development of standardised approaches and tools for addressing life science DURC research. This includes outreach to science academies and councils, science editors and publishers, and funders and donors of life science research.⁴ The consultations are part of a broader effort to develop a Global Guidance Framework to Harness the Responsible Use of the Life Sciences.⁵ The envisaged Framework seeks to assist scientific communities in understanding the new ways in which their research could create both benefits and risks. To this end, it is recommended that the development of the Framework is accompanied by a process of providing stakeholders with appropriate training, resources, and tools for identifying, assessing, and communicating DURC issues in life sciences.⁶ The importance of engaging life science stakeholders with DURC issues, including through awareness-raising has also been acknowledged as part of a WHO-led horizon scanning exercise on the impact of emerging technologies on global public health.⁷

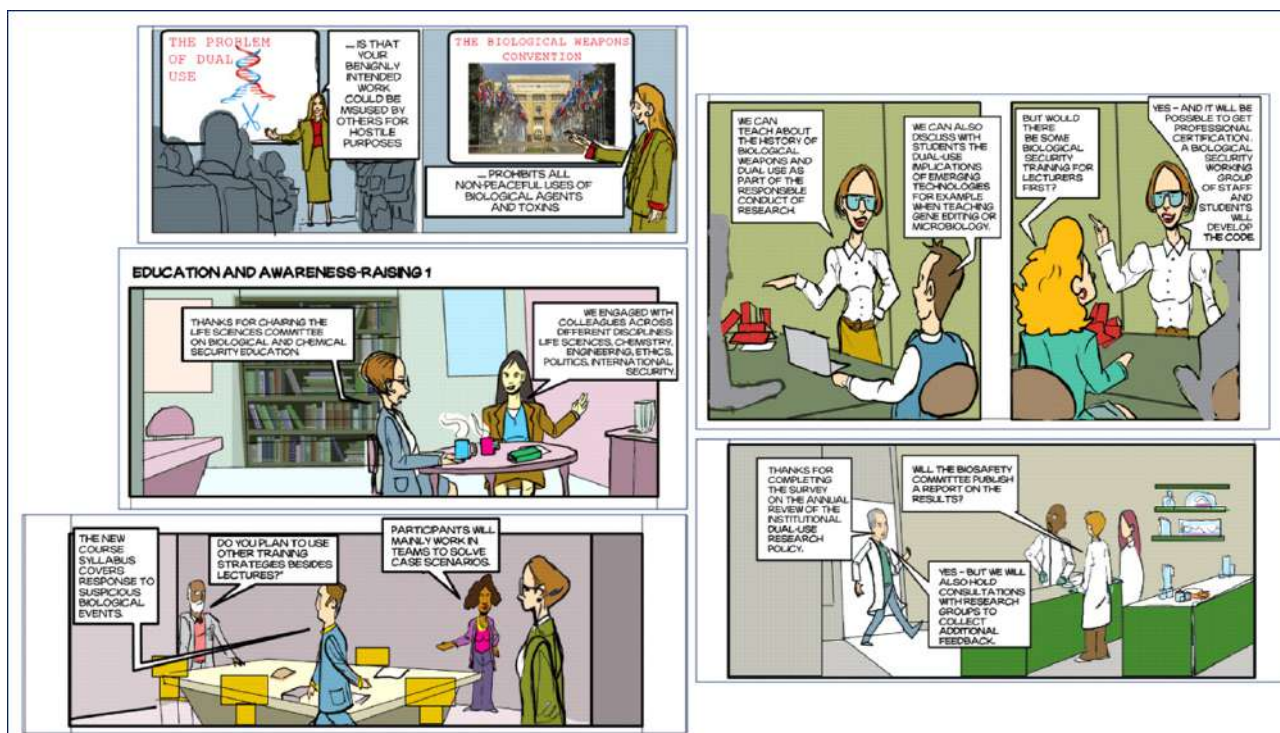
DURC issues in the life sciences often involve the possibility of deliberate misuse by third parties which is why such issues may not be immediately evident to science practitioners.⁸ Encouraging consideration of DURC risks could benefit from the use of innovative awareness-raising and training approaches that could illustrate how such risks may manifest themselves and what steps and measures could be taken to prevent and address potential consequences. Active learning strategies could be particularly useful, as they provide for a richer and immersive training experience that leverages peer-to-peer interaction and self-assessment.⁹

To help promote consideration of DURC issues among life science stakeholders, the London Metropolitan University in the UK

has recently published an awareness-raising cartoon series available in multiple languages.¹⁰ The series titled “Strengthening the Web of Prevention against Chemical and Biological Weapons” features five two-page cartoons, whereby each cartoon examines a specific concept related to biological (and chemical) security (Figure 1). Concepts covered in the series include (1) prevention of biological weapons; (2) codes of conduct; (3) education and awareness-raising; (4) biological security culture; and (5) one health security. The cartoons are designed as illustrative scenarios that can be used for

facilitating deliberation and reflection on DURC issues. The cartoon series has been translated into 12 different languages, including the six official UN languages: Arabic, Armenian, Chinese, French, German, Greek, Italian, Japanese, Russian, Spanish, Ukrainian, and Urdu. The translations have been carried out by biological security experts and education practitioners from around the world. The cartoons series is open-source and available in different languages via the London Metropolitan University Repository.¹¹

Figure 1: Cartoon Series – “Strengthening the Web of Prevention against Chemical and Biological Weapons”



Source: The cartoon series is available via the London Metropolitan University repository. For further information, see London Metropolitan University, *Heightened Risk of Disease as a Means of Terrorism, say international security experts*, Press release, 30 June 2021, <https://www.londonmet.ac.uk/news/spotlight/heightened-risk-of-disease-as-a-means-of-terrorism-say-international-security-experts/>.

The cartoon series was discussed within the framework of a webinar series on “Responsible Science” hosted by the Science and Technology Center in Ukraine (STCU) in June 2021.¹² Dr Tatyana Novosiolova, a

co-author of the series made a demo presentation highlighting possible strategies for using the cartoon scenarios for training and awareness-raising. The cartoon series has been piloted during a regular elective

seminar on chemical and biological disarmament taught as part of the International Relations degree programme at the National University of Lanus, Argentina. The feedback received from students attending the seminar has indicated that the cartoons offer an easy-to-understand approach for teaching complex security concepts.¹³ Information about the cartoon series was also shared at international conferences in Russia and China, as well as at the 39th Annual Meeting of the European Culture Collections' Organisation (ECCO).

Engaging life science stakeholders with DURC issues is a long-term endeavour that requires sustained and concerted action, as well as international cooperation and adequate resourcing. Earlier this year, the Inter-Academy Partnership, an umbrella organisation for more than 140 national, regional, and global science academies, endorsed the Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists which aim to promote a culture of responsibility and guard against the hostile misuse of life sciences.¹⁴ The Tianjin Guidelines set out ten elements for strengthening biosecurity procedures and practices to reinforce the norms enshrined in the 1975 Biological and Toxin Weapons Convention (BTWC) and ensure that life sciences are used only for peaceful purposes. One of the elements of the Tianjin Guidelines specifically refers to the role of education and training in preserving the integrity of laws, regulations, international obligations, and norms with relevance to the prohibition of biological and toxin weapons.¹⁵

A Working Paper tabled at the latest BTWC Meeting of Experts recommended that the Ninth Review Conference of the Convention should endorse the Tianjin Biosecurity Guidelines and set up a mechanism for the exchange of good practices on their

implementation during the next Intersessional Process.¹⁶ Reaching agreement on this proposal among States Parties would constitute a significant move to enhance the process for review and assessment of relevant life science advances, not least because it could help facilitate scientist engagement with the Convention and encourage the development and implementation of biosecurity education and awareness-raising programmes. Moreover, any BTWC mechanisms that are pertinent to the Tianjin Biosecurity Guidelines would provide a forum for dialogue and exchange with other relevant international initiatives, including the World Health Organisation's Science and Technology Foresight for Global Health initiative.¹⁷

Endnotes:

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- ² World Health Organisation, *Laboratory Biosafety Manual*, 4th ed., WHO: 2020, <https://www.who.int/publications/i/item/9789240011311>.
- ³ World Organisation for Animal Health, *Guidelines for Responsible Conduct in Veterinary Research: Identifying, Assessing, and Managing Dual-Use*, May 2019, <https://www.oie.int/app/uploads/2021/03/a-guidelines-veterinary-research.pdf>.
- ⁴ World Health Organisation, *Dual Use Life Science Research (DUR/C) Dialogue with Academies and Councils*, Virtual Meeting Report, 6 July 2020, [https://www.who.int/publications/m/item/dual-use-life-science-research-\(dur-c\)-dialogue-with-academies-and-councils](https://www.who.int/publications/m/item/dual-use-life-science-research-(dur-c)-dialogue-with-academies-and-councils); World Health Organisation, *Dual Use Life Science Research (DUR/C) Dialogue with Science Editors and Publishers*, Virtual Meeting Report, 28 July 2020, [https://www.who.int/publications/m/item/dual-use-life-science-research-\(dur-c\)-dialogue-with-science-editors-and-publishers](https://www.who.int/publications/m/item/dual-use-life-science-research-(dur-c)-dialogue-with-science-editors-and-publishers); World Health Organisation, *DUR/C Dialogue: Perspective from Donors of Life Sciences Research on Dual-Use Research of Concern (DUR/C)*, Virtual

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Book Review

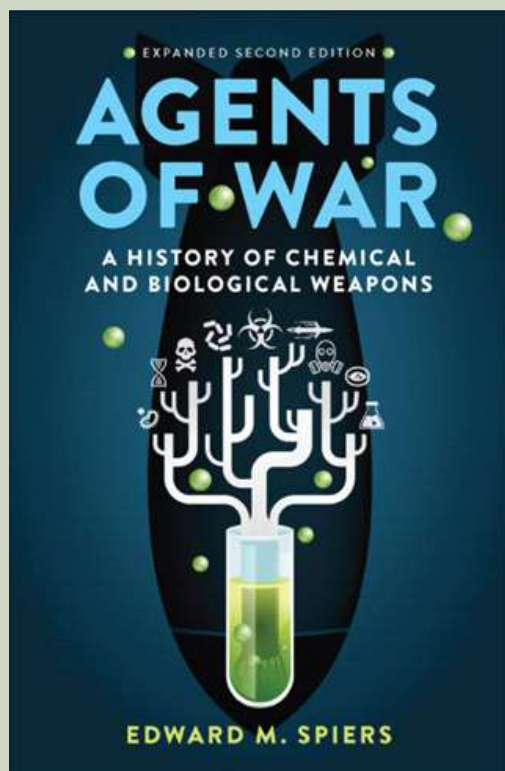
Agents of War: A History of Chemical and Biological Weapons

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Biological and Chemical Weapons have a very special place in the scheme of Weapons of Mass Destruction (WMD). The debate surrounding the use and production of these weapons has always intrigued the masses. With the outbreak of the COVID-19 pandemic, there has been a renewed interest globally about the feasibility and effects of biological and chemical weapons. With the outbreak of newer diseases and breakthroughs in technologies this debate around biological and chemical weapons will continue to intensify. Every time an outbreak occurs on a large scale the fears of it being biological warfare or have been artificially induced gains momentum. The fears are justified given the history of biological attacks.

The book 'Agents of War: A History of Chemical and Biological Weapons' attempts to answer some of the important questions surrounding these weapons, pertaining to their development, use, effectiveness and detection. It provides a detailed narrative about the history of chemical and biological weapons. The challenges and the advantages of using these weapons have also been discussed in the book. The author rightly states, "Chemical and biological weapons arouse a peculiar degree of ire and passion, so much so that unlike many conventional weapons they have been subject of various attempts to ban their development, production and usage" (pp. 11).

The book covers in detail the use of chemical and biological weapons in the Middle East and the challenges faced by organizations trying to establish the creditability of these incidents. It is a known fact that in case of use by any state or non-state actors, one of the major challenges has been establishing with certainty that any chemical or biological weapon was used. The author argues, "It's

research, development and production in Iraq had exposed the limitations of Western intelligence monitoring and the difficulties of on-site inspection” (pp. 127).

One of the interesting chapters in the book is one discussing the use of biological and chemical weapons for ‘political assassination and poisoning’. The author covers a range of incidents in the past and recent times to argue that such actions are a result of state-sponsored efforts. One of the major states, which has actively used such means has been Russia. The chapter also juxtaposes the challenges which such state-sponsored acts bring to the domestic security of the country where the assassinations take place. It also asserts the limitations in the preparedness of the countries regarding monitoring the movement of chemical and biological weapons and their safe elimination. Such acts also underscore the argument that the dissidents do not feel safe, and they can be singled out and eliminated anywhere. Such acts also strengthen the argument that chemical and biological weapons can be successfully employed for covert operations.

However, it’s not only for wars or assassinations, chemical and biological weapons have also been used for domestic security. For instance, chemical weapons play a useful role in challenges like crowd control, riot control etc. Because they prove to be useful for such acts, there has been further research and development on these chemicals. But there is a fine line between the use of chemical and biological weapons as the lethal and non-lethal modes of weapons. However, it is not very difficult to transform them into lethal weapons.

The book also argues that though chemical and biological weapons may not always be the weapons of choice or primary weapons in any conflict or war, they can successfully be used as a force multiplier. They help in

demoralizing the enemy army as well as the population. Even then there have been very few prominent instances where they have been successfully used, the reason being ethical issues and also there have been challenges with successful delivery mechanisms. Biological and chemical weapons efficiency depends on a number of external factors (wind, rain, sunlight, terrain, temperature, etc.) and thus they are not perceived to be as accurate as conventional weapons. The author states, “However effective tactically, as chemical weapons undoubtedly were in one-sided Third World conflicts, where the victims often lacked any means of defence and still less of any ability to retaliate-in-kind, the political costs often seemed to outweigh these tactical benefits” (pp. 89).

The book does cover almost all the aspects of debate surrounding the issues related to chemical and biological weapons. The development challenges, the challenges associated with the Chemical Weapons Convention, lack of delivery mechanisms, and also the incidents where these weapons have been used by non-state actors (Aum Shinrikyo), all have been covered in detail. However, one keeps waiting for something new to be discussed and highlighted. The book does a good job of covering the Iran-Iraq War in detail and also Desert Storm and the recent incidents of use of these weapons in Syria. The book is a good addition to the existing literature on the topic and will provide a good source of information for scholars and students interested in chemical and biological weapons. The author rightly concludes by saying, “....aspirations to acquire these weapons are likely to endure as long as the technology keeps opening up new possibilities for their development and usage” (pp. 221). It is these aspirations and easy access to the technologies which continue to make chemical and biological weapons an attractive option for state as well as non-state actors.

Chemical and Biological News

NATIONAL AND INTERNATIONAL DEVELOPMENTS

New Omicron cases detected as coronavirus variant spreads

28 November 2021

New cases of the Omicron coronavirus variant have been detected around the world, with two cases reported in Australia, as more countries try to seal themselves off by imposing travel restrictions.

First discovered in South Africa, Omicron has since been recorded in the Netherlands, Denmark, Belgium, Botswana, Germany, Hong Kong, Israel, Italy and the United Kingdom.

The discovery of Omicron, dubbed a “variant of concern” on Friday by the World Health Organization, sparked worries that it could resist vaccines and prolong the nearly two-year COVID pandemic.

Omicron is potentially more contagious than previous variants, but experts do not know yet if it will cause more or less severe COVID-19.

<https://www.aljazeera.com/news/2021/11/28/omicron-covid-variant-spreads>

Protective Biosystems: Parasites to Fight Chemical and Biological Weapons

Global Biodefense Staff, October 2, 2021

Charles River Analytics announced on September 14, 2021, that it was awarded a contract by the Defense Advanced Research

Projects Agency (DARPA) to lead a team of research organizations seeking to develop a novel biosystem solution to protect warfighters from chemical and biological threats. The five-year, \$16M contract will focus on neutralizing threats at vulnerable internal tissue barriers (including skin, airway, and ocular barriers) using a configurable biological countermeasure.

The effort is part of DARPA’s Personalized Protective Biosystem (PPB) program, which is exploring the use of new transgenic commensal organisms—specifically hookworms and schistosomes—to secrete therapeutics specifically targeting chemical and biological threats, including neurotoxins (such as organophosphates) and microbial pathogens.

<https://globalbiodefense.com/2021/10/02/protective-biosystems-parasites-to-fight-chemical-and-biological-weapons/>

Sophisticated Tardigrade malware has attacked Biomanufacturing firms

Graham Cluley, November 25, 2021

Security researchers are warning biomanufacturing facilities around the world that they are being targeted by a sophisticated new strain of malware, known as Tardigrade.

The warning comes from the non-profit Bioeconomy Information Sharing and Analysis Center (BIO-ISAC) which revealed that at least two large facilities working on manufacturing bio-drugs and vaccines have been hit by the same malware this year, in what appear to be targeted attacks.

Charles Fracchia, founder of BioBright and a BIO-ISAC board member, says that Tardigrade is an APT targeting Windows computers in the bioeconomy and biomanufacturing sector “using tools of unprecedented sophistication and stealth.”

<https://www.tripwire.com/state-of-security/security-data-protection/sophisticated-tardigrade-malware-launches-attacks-on-vaccine-manufacturing-infrastructure/>

DISARMAMENT

Damascus Has Not Fully Complied With UN-backed Chemical Weapons Probe

Nisan Ahmado, October 12, 2021

On October 4, Bassam Sabbagh, the Permanent Representative of Syria to the United Nations, claimed during a U.N. Security Council briefing on Syria’s chemical weapons that his country had met all its obligations under the chemical weapons ban. Sabbagh commented after U.N. Undersecretary-General and High Representative for Disarmament Affairs, Izumi Nakamitsu, complained of “unaddressed discrepancies and insufficient cooperation” by the Syrian government. She said Syria’s declaration of compliance was inaccurate.

An Organization for the Prohibition of Chemical Weapons (OPCW) fact-finding mission has been investigating allegations that Syrian government forces used chemical weapons during the country’s civil war. Sabbagh claimed the mission used flawed investigative methods. “Syria is cooperating with OPCW and is keen to close the file as soon as possible,” he said. But that is false.

Since the investigations began eight years ago, Syrian President Bashar Assad has blocked investigators and provided inaccurate information.

Damascus allegedly began using chemical weapons in 2012, targeting opposition-held neighborhoods in the cities of Homs and Aleppo. In August 2013, a large-scale attack targeting the Ghouta region outside Damascus reportedly took place, killing more than 1,000 civilians. In September 2013, under pressure from its main ally Russia, the Syrian government signed the international Chemical Weapons Convention, which bans the development, production, stockpiling and use of chemical weapons.

In August 2014, the Assad government declared it had completely destroyed its chemical weapons arsenal. The OPCW continues to dispute the accuracy of that assertion. Following the reported attack on Ghouta, a U.N. investigation team headed to inspect the targeted areas, but snipers prevented the team from entering. Responding to that incident, then-U.S. Secretary of State John Kerry accused the Assad regime of delaying the team for five days to cover up the evidence. Earlier this month, the OPCW said Damascus had refused to issue a visa to a member of its inspection team. It wasn’t the first time. Damascus has declined to provide accurate data on its chemical weapons activities, the OPCW has said, or to answer questions about chemical traces found at several alleged attack locations.

<https://www.polygraph.info/a/fact-check-damascus-has-not-fully-cooperated-with-un-backed-chemical-weapons-probe/31505761.html>

INTERNATIONAL COOPERATION

India contributes •20,000 to future OPCW Centre for Chemistry and Technology

25 November 2021

The Government of the Republic of India has contributed •20,000 to a special Trust Fund of the Organisation for the Prohibition of Chemical Weapons (OPCW) to support the construction and operation of a new facility, the OPCW Centre for Chemistry and Technology (“ChemTech Centre”), currently being built outside The Hague.

The contributions was formalised on November 24, during a ceremony between the Permanent Representative of the Republic of India to the OPCW, H.E. Ambassador Pradeep Kumar Rawat, and the Director-General of the OPCW, H.E. Mr Fernando Arias.

Ambassador Rawat stated: “I am happy to announce India’s voluntary contribution to OPCW Trust Fund for construction of the new ChemTech Centre. As the original signatory to the Chemical Weapons Convention, India remains a strong supporter of its full, effective, and universal implementation. We appreciate the role played by OPCW and hope that the ChemTech Centre will further strengthen capabilities of Member States to jointly deal with the new and emerging challenges. We envisage the Centre to be the fulcrum for research and training, technical partnerships and greater exchanges between the scientists and experts.”

Director-General Arias additionally expressed his gratitude to the OPCW States Parties and other donors who supported the project and encouraged continued

participation in this important initiative. He further emphasised the role the new ChemTech Centre will play in strengthening the OPCW’s ability to address chemical weapon threats and enhance capacity building activities to the benefit of all 193 OPCW Member States.

The ChemTech Centre Trust Fund remains open for further contributions. Additional funds will provide extra assurances for the successful completion of the project and for the international cooperation projects to be carried out at the Centre once the building is operational.

National Authorities consider ways to enhance global implementation of Chemical Weapons Convention

26 November 2021

The Twenty-Third Annual Meeting of National Authorities brought together more than 200 representatives from over 100 Member States of the Organisation for the Prohibition of Chemical Weapons (OPCW). The online meeting, held from 23 to 26 November, provided National Authorities with an opportunity to exchange views with the OPCW Technical Secretariat on recent developments related to the implementation of the Chemical Weapons Convention (CWC) and to discuss capacity building approaches to chemical security.

The Director-General of the OPCW, H.E. Mr Fernando Arias, noted in the opening session: “As the OPCW evolves against the backdrop of a changing security environment, our future priorities will require a range of activities to ensure the Organisation remains fit for purpose as the bulwark against chemical weapons. We will need to continue to strengthen engagement with diverse stakeholders around the globe to effectively

prevent the re-emergence of chemical weapons.” He added: “National Authorities are integral in this respect as they are actively involved in CWC implementation on the ground.”

During the meeting, the Secretariat updated the participants on policy-related issues, as well as on its activities in the implementation of the verification regime and highlighted the most important developments within its capacity building programmes. Attendees were briefed on the ongoing construction of the ChemTech Centre – an important upgrade to the OPCW’s facilities that will help the Organisation fulfil its mandate and further support Member States in implementing the Chemical Weapons Convention.

Participants exchanged views on OPCW’s capacity building support related to the development of legislative and regulatory frameworks for chemical security, to chemical security management, and to strengthening response capacities against the use or threat of use of chemical weapons. The meeting was attended by representatives from all five OPCW regional groups: Africa, Asia, Eastern Europe, Latin America and the Caribbean (GRULAC), and Western Europe and Others Group (WEOG).

<https://www.opcw.org/media-centre/news/2021/11/national-authorities-consider-ways-enhance-global-implementation-chemical>

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