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LOAC Research Paper: Regulation of Biological and Chemical Warfare

In the modern age, we are no strangers to conflict and the pursuit of power that comes as the world expands and advances. One of these main sources of power is biological and chemical warfare, which can take out cities or countries in seconds, leaving those without such capabilities in fear. In this research paper, we examine the intricate fabric of regulations governing biological warfare, with a focus on how closely states adhere to treaties and conventions. In our attention to these regulations, there is a critical question: Is there a need for more regulation in the field of biological warfare? As we explore this multifaceted issue, we will explore the landscape of challenges, regulations, and compliance, seeking to uncover the complex web that governs the production, storage, and research of these agents.

We will begin with an examination of the current regulations and laws that govern the use of biological and chemical weapons. From international treaties such as the Chemical Weapons Convention (CWC) and the Biological Weapons Convention (BWC) to the national legislation enacted by sovereign states, we will find the legal and normative foundations that provide the framework for regulating these weapons of mass destruction. The current regulations are not enough to facilitate the new and upcoming technologies.

As we delve deeper into this multifaceted landscape, we encounter a stark reality – the modern threats that challenge the efficacy of existing regulations. Recent real-world examples,

from Syria's use of chemical weapons[1] to the Aum Shinrikyo cult's sarin attack in Tokyo[2], stand as vivid reminders of the evolving and unpredictable nature of warfare in the 21st century along with the new threat of the CRISP (Clustered Regularly Interspaced Short Palindromic Repeats) technology. We find ourselves navigating a world where the potential for misuse, whether by states or non-state actors, has multiplied.

However, our exploration does not end with the revelation of these disconcerting facts; we continue to explore innovative methods and approaches to enhance compliance with biological and chemical weapons regulations. We consider the benefits of encouraging nations to engage in ongoing evaluations and discussions, strengthening and expanding existing treaties, enhancing the authority and capabilities of international organizations tasked with verification, and introducing the concept of random, unannounced inspections of suspected facilities.

In sum, as we navigate the intricacy of these regulations, grapple with contemporary threats, and contemplate innovative methods, we are driven by a shared aspiration for peace, security, and the preservation of humanity. Our journey represents not merely the pursuit of knowledge but also a collective endeavor to safeguard against the darkest facets of human potential. With each step, we draw nearer to comprehending and addressing the compelling need for more robust regulation in the realm of biological warfare.

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[1] Office of Spokesperson. “OPCW Condemns Syria’s Repeated Use of Chemical Weapons - United States Department of State.” U.S. Department of State, U.S. Department of State, 22 Apr. 2021, www.state.gov/opcw-condemns-syrias-repeated-use-of-chemical-weapons/.

[2] "Doomsday on the Tokyo tube: On 20 March 1995 the Aum cult launched a sarin gas attack on Tokyo's subway. Twelve people died, thousands were injured, and Japan was left traumatized. Here, for the first time, survivors describe how their lives changed forever on that fateful day." Observer [London, England], 14 May 2000, p. 1. Gale In Context: Global Issues, link.gale.com/apps/doc/A75850219/GIC?u=utahvalley&sid=bookmark-GIC&xid=1617f74d. Accessed 12 Oct. 2023.)]

In international security, the production, storage, and research of biological and chemical weapons are subject to a complex set of regulations. Internationally, treaties such as the Biological Weapons Convention (BWC) and the Chemical Weapons Convention (CWC) are pivotal instruments prohibiting the development, acquisition, transfer, and use of these hazardous weapons. Simultaneously, national legislation within sovereign states imposes rigorous controls on the possession, research, and handling of biological and chemical agents.

Additional Protocol I[3] to the Geneva Conventions provides crucial provisions that apply to the regulation of biological and chemical warfare, emphasizing the protection of civilians, the environment, and installations during armed conflicts. Article 48[4] states "In order to ensure respect for and protection of the civilian population and civilian objects, the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives and accordingly shall direct their operations only against military objectives. "Effectively prohibiting attacks against civilians and civilian objects, establishing a fundamental principle safeguarding non-combatants from the devastating effects of warfare. Article 52(2)[5] states "Attacks shall be limited strictly to military objectives. "Extending this protection by forbidding attacks that may result in excessive harm to civilians, setting a standard against disproportionate use of force. Article 35(3)[6] addresses environmental

[3] ICRC. "Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977." IHL, ihl-databases.icrc.org/en/ihl-treaties/api-1977. Accessed 21 Nov. 2023.

[4] ICRC. "Article 48 - Basic Rule." IHL, ihl-databases.icrc.org/en/ihl-treaties/api-1977/article-48?activeTab=undefined. Accessed 21 Nov. 2023.

[5] ICRC. "Article 52." *IHL*, ihl-databases.icrc.org/en/ihl-treaties/api-1977/article-52?activeTab=undefined. Accessed 21 Nov. 2023.

[6] ICRC. "Article 35." IHL, ihl-databases.icrc.org/en/ihl-treaties/api-1977/article-35?activeTab=undefined. Accessed 21 Nov. 2023.

concerns, prohibiting the use of methods or means of warfare "which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment." This provision holds particular significance in the context of chemical and biological weapons and their potential for ecological devastation.

Article 51(4)[7] reinforces the prohibition of indiscriminate attacks by defining the attacks as " (a) those which are not directed at a specific military objective; (b) those which employ a method or means of combat which cannot be directed at a specific military objective; or (c) those which employ a method or means of combat the effects of which cannot be limited as required by this Protocol;" Finally, Article 56[8] safeguards installations containing dangerous forces, such as those involving chemical or biological materials, from attack unless they serve a military purpose, underscoring the need to protect against the indiscriminate effects of these weapons on both the environment and civilian populations. Section 2 of this article dives into the specifics and explains as follows "(a) for a dam or a dyke only if it is used for other than its normal function and in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support; (b) for a nuclear electrical generating station only if it provides electric power in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support; (c) for other military objectives located at or in the vicinity of these works or installations only if they are used in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support." Together, these articles contribute to the comprehensive

[7] ICRC. "Article 51." IHL, ihl-databases.icrc.org/en/ihl-treaties/api-1977/article-51?activeTab=undefined. Accessed 21 Nov. 2023.

[8] ICRC. "Article 56." *IHL*, ihl-databases.icrc.org/en/ihl-treaties/api-1977/article-56?activeTab=undefined. Accessed 21 Nov. 2023.

regulatory framework aimed at mitigating the impact of biological and chemical warfare, emphasizing the imperative to minimize harm to civilians and the environment during armed conflicts.

In this global endeavor, customary international law, fortified by United Nations Security Council resolutions, plays a crucial role in establishing norms that prohibit the use of these weapons and facilitate cooperation among states. Transparency measures, requiring nations to submit declarations and reports, enhance mutual understanding and verification. Violations of these regulations carry substantial consequences, ranging from diplomatic repercussions to legal sanctions and economic penalties, highlighting the severity with which the international community views breaches of these conventions.

However, as the technological landscape evolves at an unprecedented pace, a pressing discourse emerges concerning the adequacy of current regulations in encompassing these advancements. Questions continue over whether emerging technologies, with their potential dual-use applications, should be integrated into the existing strict legal frameworks. Discussions about including new developments highlight the need to stay vigilant and adaptable in our rapidly changing world. As we navigate the challenges of advancing technology, the talk about expanding regulatory frameworks reminds us of the ongoing effort required to make sure existing rules effectively prevent the spread and use of biological and chemical weapons.

The unsettling instances of chemical and biological weapon misuse in the real world serve as examples of the urgent need for heightened regulation in this dangerous domain, a need echoed and fortified by the provisions of international law established in the Hague and Geneva Conventions. Syria's utilization of chemical weapons during the civil war, the sarin attack in Tokyo by the Aum Shinrikyo cult, The Halabja Chemical Attack in 1988, and the anthrax attacks in the United States stand as haunting illustrations of the potential devastation wrought by these

weapons, underscoring the need to fortify global regulations rooted in the principles set forth by the Hague and Geneva Conventions.

The Syrian government's alleged deployment of chemical weapons against its citizens is a clear violation of Article 1[9] of the Geneva Protocol of 1925, which prohibits the use of chemical and bacteriological weapons in warfare. Such actions underscore the necessity for robust international regulation to prevent such egregious violations. The 1995 sarin gas attack in Tokyo is an example of the unpredictable threat posed by non-state actors. This incident further emphasized the importance of strict control over access to chemical weapons precursors, aligning with the prohibition against the use of poison or poisoned weapons as outlined in Article 23(a)[10] of the Hague IV Convention.

The Halabja Chemical Attack in 1988[11], perpetrated by Saddam Hussein's regime in Iraq, stands as a harrowing illustration of the devastating consequences of unchecked biological and chemical warfare. In this tragic event, the Iraqi military employed mustard gas and nerve agents against the Kurdish town of Halabja, resulting in the death of thousands of innocent civilians. The use of chemical weapons in this context flagrantly violated international norms and agreements, including the Biological Weapons Convention (BWC) Article 1 with the provision

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[9] Laurence Boisson de Chazournes, Luigi Condorelli. "Common Article 1 of the Geneva Conventions Revisited: Protecting Collective Interests." ICRC, 1, 31 Mar. 2000, www.icrc.org/en/doc/resources/documents/article/other/57jqcp.htm.

[10] ICRC. "Regulations: Art. 23." IHL, ihl-databases.icrc.org/en/ihl-treaties/hague-conv-iv-1907/regulations-art23#:~:text=Regulations%3A%20Art.%2023%20In%20addition%20to%20the%20prohibitions,forbidden%20%28a%29%20To%20employ%20poison%20or%20poisoned%20weapons%3B. Accessed 26 Nov. 2023.

[11] Bureau of Public Affairs. "Saddam's Chemical Weapons Campaign: Halabja, March 16, 1988." U.S. Department of State, U.S. Department of State, 14 Mar. 2003, 2001-2009.state.gov/r/pa/ei/rls/18714.htm.

stating to" ... never under any circumstances to develop, produce, stockpile, acquire or retain biological weapons. " and the Chemical Weapons Convention (CWC)[12] Article 1 which states ", Each State Party to this Convention undertakes never under any circumstances: To develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone;" This violation underscores the urgent need for strengthened regulations and accountability mechanisms for state actors engaged in biological and chemical warfare. In 2001, the anthrax attacks in the United States, involving the weaponization of anthrax spores, raised concerns about the misuse of biological agents and unveiled vulnerabilities in biosecurity measures. These attacks, in violation of the prohibition against the use of poison or poisoned weapons under Article 23(a)[13] of the Hague IV Convention, highlight the need for strict controls and security measures to prevent the cruel application of biological agents.

The distressing real-world events display the pressing necessity for a comprehensive regulatory framework grounded in the principles of the Hague and Geneva Conventions. It is imperative not only to address state actors but also to account for the diverse and evolving threats posed by non-state actors. International cooperation and rigid controls, as mandated by these conventions, are crucial to safeguard against the misuse and proliferation of these lethal weapons. As the global community confronts these challenges, the call for enhanced regulation becomes an imperative ethical and strategic response, ensuring the protection of humanity from

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[12] OPCW. "Chemical Weapons Convention." OPCW, www.opcw.org/chemical-weapons-convention. Accessed 26 Nov. 2023.

9 ICRC. "Regulations: Art. 23." IHL, ihl-databases.icrc.org/en/ihl-treaties/hague-conv-iv-1907/regulations-art23#:~:text=Regulations%3A%20Art.%2023%20In%20addition%20to%20the%20prohibitions,forbidden%20%28a%29%20To%20employ%20poison%20or%20poisoned%20weapons%3B. Accessed 26 Nov. 2023.

the indiscriminate and devastating impact of chemical and biological warfare in accordance with the established principles of international humanitarian law.

In the present era, the evolving technological landscape presents a heightened threat to the regulation of biological and chemical warfare, requiring a thorough examination of emerging challenges and the need for enhanced regulatory measures. The advent of synthetic biology, exemplified by the ability to manipulate genetic material, presents a disturbing prospect of developing new biological agents with increased virulence or specific targeting capabilities. This capability raises profound concerns about the potential weaponization of organisms designed at the molecular level. The new science of gene-editing technologies, particularly the widely utilized CRISPR[14], presents a new dimension of risk, enabling the precise modification of genetic material in a way that could enhance the pathogenicity of existing biological agents challenging the regulations already established by the BWC. The regulation of CRISPR technology under the BWC is crucial due to the technology's potential misuse in the development of biological weapons. While CRISPR can be used for harm it is a dual-use technology making it more dangerous as it can also be used for the welfare of humanity by treating and preventing once incurable diseases. This aspect of CRISPR is a further reason for the need for CRISPR specific regulations as there needs to be explicitly defined permissible applications to prevent the misuse of this technology. CRISPR's precision in genetic editing raises concerns about its application to modify microorganisms for harmful purposes, contravening the central tenets of the BWC. This international treaty expressly prohibits the

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[14] "Techniques, promises, and risks of synthetic biology." Biotechnology Law Report, vol. 26, no. 4, Aug. 2007, p. 371. Gale In Context: Global Issues, link.gale.com/apps/doc/A191907043/GIC?u=utahvalley&sid=bookmark-GIC&xid=877de8d5. Accessed 12 Oct. 2023,

acquisition, development, and use of biological weapons, emphasizing the need to prevent the weaponization of biological agents as seen in Article I "Undertaking never under any circumstances to develop, produce, stockpile, acquire or retain biological weapons."[15] The use of CRISPR to enhance pathogens may undermine the core objectives of the BWC, necessitating increased regulation to ensure compliance with the treaty's prohibitions.

These tools' accessibility contributes to the need for stronger frameworks that can effectively mitigate the misuse of gene-editing technologies in biological warfare. The combination of nanotechnology and chemical and biological agents enhances the potential for more sophisticated and targeted delivery systems. While holding promise for medical applications, nanoscale materials and devices could be exploited to optimize the dispersion and potency of harmful substances, demanding heightened scrutiny and regulatory oversight. Drones and autonomous systems, first designed for benign purposes, emerge as potential vectors for covert dispersal of chemical or biological agents over expansive areas. The use of unmanned aerial vehicles (UAVs) with the prospect of weaponized payloads necessitates stringent regulations to prevent their repurposing for malicious intent.

Artificial intelligence (AI), with its ability to optimize the design and synthesis of chemical and biological agents, accelerates the pace at which new threats could be created and this would be a direct violation of the BWC as the first article prohibits the development or production of any biological weapon. The combination of AI with the field of biological and chemical warfare demands international cooperation to establish ethical guidelines and rigid controls to curb the potential weaponization of these technologies. Advanced materials, exemplifying innovations in materials science, may contribute to the development of more

[15] "Biological Weapons Convention." United Nations Office for Disarmament Affairs, disarmament.unoda.org/biological-weapons/. Accessed 26 Nov. 2023.

powerful chemical agents, adding a layer of complexity to the regulatory system. Furthermore, biometric technologies, initially designed for identification and authentication, could be utilized for the targeted delivery of harmful agents, necessitating regulations that encompass the ethical and secure use of biometric data. If any of these advancements are used to facilitate harm then it is in violation of Article 1 of the BWC which prohibits any states to "to develop, produce, stockpile, acquire or retain biological weapons." The link between cyber and physical systems introduces vulnerabilities in critical infrastructure, where cyberattacks could potentially enable the release of harmful substances. This convergence emphasizes the need for comprehensive regulatory frameworks that address the interconnected nature of modern threats.

In the complex world of international security, the regulation of chemical and biological weapons requires innovative methods and approaches. One fundamental strategy is to encourage nations to actively engage in ongoing evaluations and discussions. This entails creating a structured platform where nations collectively address new dangers, fostering a dynamic dialogue that allows for the continuous strengthening and expansion of current treaties, notably the Chemical Weapons Convention (CWC) and the Biological Weapons Convention (BWC). Such ongoing evaluations provide a crucial mechanism for adapting these treaties to the evolving nature of threats. By establishing a regular cadence of international discourse, nations can collaboratively assess the effectiveness of existing frameworks, identify gaps, and introduce necessary amendments. This approach ensures that the regulatory architecture remains responsive to emerging challenges, enhancing the global community's ability to prevent the development and use of chemical and biological weapons.

A second pivotal approach is to strengthen the capacity and authority of international organizations responsible for verifying compliance with the BWC and CWC. Notably, the

Organization for the Prohibition of Chemical Weapons (OPCW)[16] and relevant United Nations bodies play a significant role in enforcing and verifying these conventions. To ensure their effectiveness, it is essential to provide these organizations with increased capabilities, both technologically and in terms of human resources. These organizations require adequate funding, training, and access to advanced technology to conduct thorough and effective verification processes. Moreover, empowering these organizations to be more independent is crucial, enabling them to act decisively in cases of non-compliance, thereby strengthening the deterrent effect of these international regulatory mechanisms.

Complementing these measures is the implementation of random and unannounced inspections, a proactive strategy to regulate facilities suspected of engaging in prohibited activities. This method is an effective tool in ensuring compliance with international agreements. By conducting surprise inspections of research centers and production facilities suspected of involvement in the manufacturing of chemical and biological weapons, the global community can swiftly detect and prevent illicit activities. The element of surprise acts as a strong deterrent, dissuading potential violators and reinforcing the commitment to rigorous oversight.

In conclusion, this research paper has explored the imperative need for increased regulation in the realm of biological warfare, with a specific focus on the compliance of states with existing treaties and conventions. By examining the current regulations and laws governing the production and storage of biological and chemical weapons, it has become evident that international legal frameworks and national legislation form the backbone of control. However, the evolving landscape of modern threats, as illustrated by real-world examples, emphasizes the urgency for stronger oversight, enforcement, and regulation to address developing technology.

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[16] OPCW. “Chemical Weapons Convention.” *OPCW*, www.opcw.org/chemical-weapons-convention. Accessed 26 Nov. 2023.

The methods and approaches discussed in this paper, including ongoing evaluations, enhanced verification mechanisms, and unannounced inspections, offer concrete steps toward bolstering compliance. The global community must remain vigilant, adaptable, and cooperative in the face of these pressing challenges, continually reinforcing the regulations that safeguard against the misuse of these dangerous weapons. The quest for peace and security necessitates not only the maintenance but also the enhancement of these crucial regulations.