



Research Report

First General Assembly (GA1)

Issue 2: Addressing the Threat
of Chemical and Biological
Weapons in Modern Warfare

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Introduction

The second issue being addressed by the First General Assembly is on the matter of “Addressing the threat of chemical and biological weapons in modern warfare”. This issue concerns the continued international threat posed by the development, proliferation, and potential usage of chemical, and biological agents as instruments of armed conflict, and the potential humanitarian consequences this could bring. Although the international community has formally prohibited the usage of such weapons through international agreements such as the Chemical Weapons Convention (CWC)^[13] and Biological Weapons Convention (BWC)^[12], their existence and the rapid evolution of relevant and related technologies demonstrate that the threat still remains pressing.

Chemical and biological weapons are unique compared to other more standard weaponry such as bullets and bombs. Bio and chemical weapons are capable of unprecedented, indiscriminate, and mass harm, with many effects lingering well beyond the initial impact, harming civilian populations, overwhelming healthcare systems, and destabilizing entire regions^[14]. In the modern age, advances in biotechnology, synthetic biology, pathogen and chemical engineering, and gain-of-function capabilities have significantly increased worldwide, heightening concerns regarding proliferation, concealment, and non-abedience to international legislation.

The consequences of chemical and biological warfare are not confined to a state's borders, this being the prime reason why this is such an internationally relevant issue. The spread of toxic chemical agents or infection pathogens can quickly become a multinational crisis, spreading far beyond the intended target, with the impacts affecting trade, migration, economies, and international security^[15]. Moreover, the usage of such weaponry undermines International Humanitarian Law (IHL) with the impacts being incredibly inhumane and unnecessary^{[5][6]}. Global accusation of treaty violation, gaps in verification frameworks, and the issue of state anonymity alongside geopolitical tensions further fuel debate as to the effectiveness of existing UN legislation.

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Addressing the threat of chemical and biological weapons in the modern era therefore demands multilateral cooperation. No single state can monitor compliance or adequately respond to a large-scale chemical or biological attack. By strengthening international verification systems, enhancing transparency, and reinforcing global norms against weaponisation we can ensure long lasting peace and security for the international community. As technology, public opinion, and national legislation evolves, so too must international law.

Definition of Key Terms

Chemical Weapons:

A chemical weapon is defined as being a toxic chemical substance designed to cause death, injury, or harm through its properties. These are prohibited under the Chemical Weapons Convention^[3].

Biological Weapons:

Biological weapons refer to pathogens or biological toxins used with explicit intent to cause illness, disease, or death in humans, animals, or plants, typically with the intent of achieving military, economic, political, or strategic objectives. These weapons can include bacteria, fungi, or toxins, and are distinct from naturally occurring outbreaks of illness and are the result of planning and deliberate deployment^[1].

Bioethics:

Bioethics is the field of ethics that studies specifically the moral principles from advances in biology, physiology, medicine, and other life sciences. In the context of weaponization of bio-sciences, bioethics is what addresses the moral responsibility held by scientists. It also sets limits of research and attempts to balance scientific exploration with global safety^[2].

Dual-Use Research of Concern (DURC):

Dual-use research of concern is an international term used to describe legitimate scientific research that has the potential to be used militarily or for other harmful purposes. This concern often arises as research aiming to advance public health or scientific understanding will inadvertently lower the barriers to weaponization, making the line between biological weapons research and medical studies incredibly blurred^[4].

Gain-of-Function Research:

Gain-of-function research are experiments that increase the strength of biological agents; this rise in strength can mean greater transmissibility, virulence, or host range. While often conducted within contained and controlled conditions to better understand the behaviours of pathogens and improve preparedness, it can simultaneously result in the release of a pathogen far stronger than what humans can survive, raising substantial ethical and security concerns.

International Humanitarian Law (IHL):

International Humanitarian Law is a set of rules to limit the suffering and unnecessary damages of conflict^[6]. This is not the same as the declaration of human rights and only applies to conflict. The 4 key goals of IHL are as follows; “The prohibition on the infliction of unnecessary suffering; the principle of proportionality; the notion of necessity; the principle of humanity”^[5].

Background

The use of chemical weaponry on mass first began during World War One, and marked a turning point in the way we view humanitarian law and legislation surrounding conflict. The first uses of chemical weaponry demonstrated the devastating impacts that toxic agents such as ‘mustard gas’ can have in conflict. In response to these tragedies the international community came together to establish the Geneva Protocol against biological and chemical weapons which prohibited the use of chemical and biological weapons in conflict, however, it did not ban their development or proliferation^[18]. This allowed states to continue research and strengthen such weapons throughout the twentieth century.

During the Cold War, several states around the globe, but particularly the US and USSR, expanded their chemical and biological weapons programmes, raising tensions and bringing fears of a global extinction level threat if such weapons were to be used^[19]. As such, international action was prompted, leading to the 1972 Biological Weapons Convention (BWC)^[12], which became the first ever treaty to ban an entire category of weapons. Only 20 years later in 1993 was the Chemical Weapons Convention (CWC) introduced, which similarly banned the usage of certain chemical weaponry under the oversight of the Organization for the Prohibition of Chemical Weapons (OPCW)^[13]. Despite being widely regarded as a successful framework, allegations of chemical weapons usage in recent conflicts have raised concerns as to the effectiveness and degree of enforceability these conventions still hold.

Unlike typical weapon development, biological and chemical weaponization does not require extensive industrial manufacturing, and often only requires a formula and team of scientists. This makes it far more accessible to non-state actors. Terrorist groups or criminal networks may exploit publicly available data in order to manufacture deadly forms of attack. This raises ethical concerns regarding the responsibility that producers have for preventing misuse, theft, and publication, particularly when scientific knowledge is being shared with positive aims of innovation and collaboration^[20].

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Private entities are becoming increasingly involved in biotechnology and human–chemical testing, complicating accountability. While governing bodies still remain the focus of international law, private laboratories and businesses continue to grow in their advancements, often operating outside of in depth regulation and on varying standards. Ethical responsibility is therefore increasingly less prominent, challenging the security of oversight and liability.

The UN has addressed this issue several times through General Assembly debates and Security Council resolutions, however the threat of these weapons still persists. Over time, these threats have evolved substantially, with rapid advancements in biotechnology and chemical sciences further complicating the oversight of international regulatory bodies^[21]. As a result, the issue has shifted from simply prohibiting such weaponry under international law, but overcoming the challenges of verification, oversight, compliance, governance, and adapting international frameworks for modern technological realities.

Few areas of warfare embody as profound a paradox as the biological and chemical sciences; the same innovations capable of curing disease and extending human life also possess the potential to enable forms of warfare capable of unprecedented, indiscriminate, and mass harm. It is therefore imperative that the United Nations General Assembly come to a consensus on the major issue.

Major Countries and Organizations Involved

China:

On the global stage, China has established itself as a major world power. In the realm of biological and chemical sciences they are especially relevant. China has increasingly grown their scientific influence and rapidly expanded in the biotechnology sector. In international debate, China has frequently highlighted the need for transparency, biological and chemical safety regulation, and international cooperation. China officially stands in support for international legislation and regulation on the matter of biological and chemical sciences, but still emphasises states' need for sovereignty within scientific exploration^[7].

European Union (EU):

The European Union plays a substantial role through their coordinated scientific regulations, research oversight mechanisms, and trade regulation on dual-use biotechnologies. The EU publicly advocates for stronger international verification mechanisms under the BWC and supports multilateral cooperation approaches to achieve ethical biotechnology governance^[8].

India:

India stands as an important stakeholder given their expanding biotechnology and pharmaceutical sector. India expresses support for strengthening global biosecurity cooperation but still emphasises the importance of equitable access to biotechnology and scientific development. India urges the need for balancing scientific progress with responsible oversight and capacity building within developing states^[9].

Russian Federation:

Russia remains a key actor particularly due to its history of biological weapons programmes especially during the Cold War. Russia publicly advocates for stronger verification methods under the Biological Weapons Convention. Amidst mutual accusations among states regarding compliance and compliance, tensions have risen^[10].

United Nations Office for Disarmament Affairs (UNODA):

The United Nations Office for Disarmament Affairs was established in 1982 with the goal of promoting international peace and security by fostering nuclear disarmament, non-proliferation, and the limitation of conventional weapons^[11]. UNODA is central in supporting the implementation of bio and chemical weaponry disarmament legislation, particularly when discussing administrative and coordination support from the United Nations.

United States of America (USA/US):

The United States of America is a major global power economically, politically, militarily, and culturally, in addition to this, their leading biotechnology sector places them in a high regard within international bio and chemical security policy making. Historically, the US has been heavily involved in biological weapons development, but now heavily invests into biosafety, biodefense and national oversight of dual-use research. It generally supports strengthening of controls while maintaining national security and keeping international verification regimes non-invasive.

World Health Organization (WHO):

Tasked with pathogen monitoring, health emergency preparations and biosafety guidance, the World Health Organisation advocates for objective, reason based solutions. They urge all member states to review scientific evidence and convert them into enforceable policies on biological sciences. The WHO supports dual-use research for potential mental health benefits^[17] and advocates for strong international conventions prohibiting misuse. However WHO does not take major political stances as they are a multinational organisation and therefore purely present scientific reasoning and encourage public health based decisions.

Possible Solutions

Strengthening International Verification and Compliance Mechanisms:

A frequently discussed method involves bettering the compliance mechanisms and monitoring systems that are being relied on to ensure cooperation with international law. This could be done through a number of means such as transparency measures, voluntary peer reviews, approval by INGOs, and enhanced confidence-building. Improved international cooperation in inspections, data collection and voluntary compliance review could better improve trust between states and reduce the uncertainty surrounding biological and chemical weapons research.

Global Standards for Dual-Use Research Oversight:

Growing international guidelines for dual-use research can give more clear insights to the global community as to what levels of research cross boundaries, setting clear borders as to what states can and cannot do. This can be achieved through inspections at the national, international, public, and private levels. Simultaneously this will ensure that potentially sensitive research is conducted in a safe and responsible manner while maintaining scientific collaboration, and international assurance.

Capacity-Building and Safe Scientific Infrastructure Development:

Many states in the international community lack the technical capacity to effectively monitor and ensure advanced scientific research is done in a safe and responsible manner. International programs supporting biosafety, chemical safety, laboratory certification, and technological development can reduce the chances for accidental release or the misuse of biologically and chemically dangerous materials. Such initiatives would not place strain on freedom of research as they would simply inform and assist where requested. Due to the optional and invasive nature of this technique, member states fearing research interference or infringement of sovereignty may be more open to this.

Ethical Education and Scientific Responsibility Frameworks:

By expanding biological research education and the dangers that come with it along with the responsibility standard expected within the scientific community, it can significantly reduce the chance of accidental release or uninformed use of biological materials. Integration of mandatory ethics modules and institutional accountability policies could strengthen the role of the scientific community in preventing weaponisation of future biological sciences.

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