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1st Committee of the General Assembly
(Disarmament and international security committee)

*Topic area B: “Prohibition of the development,
production and stockpiling of biological and
toxin weapons and on their destruction”*



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Topic Area B: Prohibition of the development, production and stockpiling of biological and toxin weapons and on their destruction

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Welcoming Letter by the chairs of the First Committee

Dear Delegates,

We are pleased to welcome you all to the 1st Committee of the General Assembly. At first, we would like to congratulate each and every one of you for taking part into this year's edition of the Thessaloniki International Students Model United Nations and promise that we will do anything within our powers to facilitate you throughout the conference so as to have a productive and unforgettable experience.

This year's sessions will focus once again on two pressing issues. The first topic, calls upon combating the spillover of terrorist activity in Sub-Saharan Africa. Losing ground in the Middle East has led terrorist groups – mainly but not limited to Al Qaeda, ISIS and their affiliates – to seek for more fertile ground to carry out their operations. Sub Saharan Africa is an enormous region totally vulnerable to such groups and the activities they are associated with - including arms, human, currency and drug trafficking – due to its vast expanses of desert and porous borders. Currently there are three main centers of it; Somalia (spillover into Kenya), Mali (spillover into Burkina Faso) and the states surrounding Lake Chad (Nigeria, Niger, Cameroon, Chad). Apparently the phenomenon under discussion is internationalizing. It already poses a threat to international security and as such it calls for the 1st Committee of the GA to take action towards tackling the spread of extremism, organized crime as well as the possible triggering of more armed conflicts in the area.

The second topic deals with the issue of the prohibition of the development, production and stockpiling of biological and toxin weapons and on their destruction. Although the Biological Weapons Convention has been active since 1975, many countries have violated it during the course of the years that followed. Since July 2018, 181 states parties have signed it. However further measures have to be taken into consideration and negotiations have to be made in order to ensure that no country, group or individual will create and use any form of biological and toxin weapon. Acknowledging the continuous increase of terrorist and extremist groups using chemical weapons,



these same groups could take advantage of the biological weapons by spreading deadly viruses such as Ebola in specific major cities.

This study guide aims at helping you get a better insight into the Topic Areas of the Committee and offers you a starting point for your research. Nevertheless, it is highly advised to conduct a thorough examination on your country's position concerning the matter discussed and also elaborate on your key national policies within the context of the position paper you will be requested to deliver before the opening of the conference. We trust in your academic and diplomatic skills and sincerely hope for a remarkable outcome. We thank you in advance for your in-depth understanding and cooperation and look forward to meeting you in person!

The chair and co-chair of the First Committee of the General Assembly,

Albi Cristo,

Alexandros Pantelakos.

Introduction to the Committee

The 1st Committee of the General Assembly (Disarmament and International Security Committee)¹ was established in 1993 and constitutes one of the main committees of the GA. The role of the committee is circumscribed in Article 11, Chapter IV of the United Nations Charter.

*“The General Assembly may consider the general principles of cooperation in the maintenance of international peace and security, including the principles governing disarmament and the regulation of armaments and **may make recommendations** with regard to such principles to the Members or to the Security Council or to both”. As per this article, the mandate of the 1st Committee of the General Assembly is highlighted as, “**to promote the establishment and maintenance of international peace and security with the least diversion for armaments of the world's human and economic resources**”.*

The body's pivotal responsibilities are interconnected with issues of disarmament, global challenges and threats to peace, all of which greatly affect the international community. The Committee further seeks out solutions to the challenges in the international security regime. Any arising disarmament and international security matter falls within the ambit of the Charter relating to the powers and functions of the 1st Committee. It implements the following principles when drafting its documents or in session:

- The general principles of cooperation in the maintenance of international peace and security.
- Principles governing disarmament and the regulation of armaments.
- And, last but not least, the promotion of cooperative arrangements and measures aimed at strengthening stability through lower levels of armaments.

¹ The official page of the First Committee of the General Assembly:
<http://www.un.org/en/ga/first/>



The Committee works in close cooperation with the United Nations Disarmament Commission and the Geneva-based Conference on Disarmament. Moreover, it is the only Main Committee of the General Assembly entitled to verbatim records coverage.



Introduction to the Topic

“Whether it occurs by a quirk of nature or at the hand of a terrorist, epidemiologists say a fast-moving airborne pathogen could kill more than 30 million people in less than a year. And they say there is a reasonable probability the world will experience such an outbreak in the next 10-15 years.”

Bill Gates, 2017 Munich Security Conference

Living in a world of continuous breakthroughs in various scientific and technological breakthroughs, the human race is susceptible to take actions, often leading to devastating results. One of the areas with tremendous technological development, is that concerning biology. The scientific community has enabled various possibilities in order to improve the quality of the human life, through synthetic biology and genome editing. However, can this technology be used against the humanity? Can this technology, in the wrong hands, be used as a weapon in order to create chaos and mass destruction?

Biological and toxin weapons (also known as bacteriological weapons) involve the application of different infectious biological agents for massive contaminations of specific target groups. Such kind of weapons have been used multiple times through the ages, showing their devastating results both against the environment but also human beings.² Although the reason behind the use of biological weapons have remained the same, through the ages, the perpetrators have changed. At first, their capabilities could be harnessed only by the powerful and wealthy, but nowadays, nearly everyone with the right financial background can use such weapons. Furthermore, the perpetrators have shifted from mainly being the leaders of nations, to individuals or groups willing to serve personal object objectives.

² Newman, T. (2018). *Biological weapons and bioterrorism: Past, present, and future*. [online] Medical News Today. Available at: <https://www.medicalnewstoday.com/articles/321030.php> [Accessed 16 Dec. 2018].

In order to contain such a threat, states have to deeply understand the current situation in a variety of different aspects, starting from the history of such attacks and concluding in today's threat of bioterrorism. The nations should understand that the lack of preparedness of the global health system, to respond to large scale disease outbreaks, exists, as it has been proven by the Ebola outbreak, which was of natural causes. So, how devastating will be for the states, if such a threat is unleashed by someone as a weapon, custom made for his specific purposes? Moreover, the countries should consider, if the existing legal framework and more specifically the legal action plan undergoing with starting point the Gas Protocol in 1925 until today, is enough to withstand the threat of bioterrorism. Last but not least, the countries should understand that the enhancement of biosecurity is a necessary step for a safer, more secure world and that they have to work together in order to understand the subject in depth in order to protect themselves from today's and future's challenges.

Definitions

Weapon of mass destruction (WMD): *Weapons of mass destruction (WMDs) constitute a class of weaponry with the potential to, in a single moment, kill millions of civilians, jeopardize the natural environment, and fundamentally alter the world and the lives of future generations through their catastrophic effects.*³

Biological weapon: *a harmful biological substance combined with a delivery mechanism.*⁴

Terrorism: *unlawful acts with the intent to cause death, serious injury or hostage-taking. The aim is to create fear in the population or compel a government or an international organization to perform or refrain from performing a particular action.*⁵

Biological Agent: *microorganisms (viruses, bacteria, fungi), parasites or toxins (from living organisms) which can be used offensively*⁶

Delivery systems: *spraying equipment and other unmanned systems capable of disseminating biological substances.*⁷

³ UNRCPD. (2019). Weapons of Mass Destruction - UNRCPD. [online] Available at: <http://unrcpd.org/wmd/> [Accessed 27 Jan. 2019].

⁴ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

⁵ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

⁶ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

⁷ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

Biosafety: *a set of preventive measures, including procedures and proper use of laboratory containment facilities, to prevent unintentional infection of facilities, personnel and the general population.*⁸

Biosecurity: *a set of preventive measures to protect human, animals and plants against malicious use, directly or indirectly, of biological agents, parts thereof, or their toxins.*⁹

Possession: *to own or have custody of controlled biological substances, delivery systems or related materials.*¹⁰

Weaponization: *a technical process by which a biological agent is made suitable for use in a biological attack.*¹¹

⁸ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

⁹ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

¹⁰ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

¹¹ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity.* [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

Historical Background

The use of biological weapons is not a phenomenon that occurred only the last decades. There are various reported incidents, through the ages, indicating the use of weapons containing biological elements.

The use of biological weapons before the 20th century

The use of biological weapons dates back many centuries. The main aspects of their use remain the same until today. The “bio-weapon” consists of two elements, the biological element and the delivery mechanism. Both the agents and the delivery mechanisms derive from the technology available each century. For example, before the 20th century the delivery mechanisms comprised infected bodies or blankets.

One of the first recorded uses of bio-weapons in history occurred in 1347, when the Mongolian forces catapulted, as reported, plague infested bodies into the Caffa port (Feodosiya, Ukraine). Three centuries later, in 1710, another use of biological weapons was recorded, when the Russian army used plague infested corpses against the Swedish forces that had barricaded into Reval (Tallinn, Estonia). The use of biological warfare was also reported during Pontiac's Rebellion in 1763, when the British forces passed contaminated blankets to the Native Americans, infecting them with smallpox virus.¹²

Examining the aforementioned attacks, one could deduce a variety of conclusions concerning the use of bio-weapons before the 20th century. At first, bio-weapons during the previous centuries were used by state-actors, mainly armies. Second, the access to the relative materials was limited only to the state or military officials. Finally, the use of bio-weapons was reserved for times of war and open rebellions.

Bioweapons in the two World Wars

The alleged use of bio-weapons during the First World War featured the same characteristics as the use during the previous centuries, meaning the actors behind the use

¹² Encyclopedia Britannica. (2018). *Biological weapon*. [online] Available at: <https://www.britannica.com/technology/biological-weapon> [Accessed 11 Dec. 2018].

and the political context. States participating in the Great War allegedly used disease-producing bacteria to contaminate horses and cattle which were supposed to be shipped to the USA. Moreover, the same agents are said to be spread to sheep from Romania, with the purpose to be exported in Russia. However, the evidence in support of these allegations were found insufficient by the League of Nations, the research of which was directed towards chemical and not biological warfare. Furthermore, the charges were denied by the alleged users. For this reason these cases are mentioned only to showcase that the framework within which bio-weapons were perceived during World War I remained the same with the past.

In response to the horror caused by the evidence of chemical warfare during World War I, the international community stepped up the pace towards controlling the proliferation of WMDs. This goal led to the 1925 “Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases and of Bacteriological Methods of Warfare”, commonly known as the Geneva Protocol of 1925. Withal, the Protocol did not include articles concerning state “compliance” and “verification” of the possession of dangerous materials and was considered a less meaningful document. Although it was signed by 108 states, among which were the permanent members of the Security Council, some of them began the production of bio-weapons shortly after its ratification.

The Second World War was characterized by accusations and allegations of biological threats by the states engaging in a biological warfare program race. The protagonist of this competition was Japan. Japan was experimenting on the effects of a variety of organisms and diseases to prisoners of the Korean War, engaging also in “field trials”. An attack in the Chinese village of Changtech resulted in an estimated of 10 thousand deaths. Among the deceased were 1700 Japanese military personnel. This event led to the abortion of these “field trials” by Japan in 1942. Years later, after the trial of several members of the Japanese troops in post-war tribunals, the Japanese government characterized these methods as “most regrettable from the viewpoint of humanity”.

However, the production of biological weapons during World War II was not limited only to Japan, as it is mentioned above. Allegations of biological warfare programs in Germany, Great Britain, USA and the Soviet Union surfaced after the war. This conjuncture is linked to a general antagonistic climate that led to the Cold War. The arms race after the Second World War between the USA and the Soviet Union and their allied could not start without biological WMDs. However, in 1972 the Biological Weapons Convention was signed, the first legal document to ban a whole type of weaponry.¹³

The Cold War and the Biological Weapons Convention

The Cold War era of biological weapons

During Cold War, both the United States of America, the Soviet Union, and their allies, had active research and development (R&D) programs, concerning the production of biological weapons and large-scale biological warfare. Those programs included the research and development of biological agents and toxins in order to impact the enemy troops, livestock and supplies, countermeasures against biological attacks and research of vaccines and therapeutic agents.¹⁴

After the demise of the Soviet Union, the USA and the 15 newly formed independent states pledged to work together in order to contain the spread of biological warfare, including information, technical assistance, production equipment, materials, etc.¹⁵

The Biological Weapons Convention (BWC)

After the end of World War II, a second round of discussions started concerning the biological disarmament based on the Geneva Protocol of 1925. However, it was only

¹³ Riedel, S. (2019). *Biological warfare and bioterrorism: a historical review*. [online] PubMed Central (PMC). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200679/> [Accessed 20 Jan. 2019].

¹⁴ Riedel, S. (2019). *Biological warfare and bioterrorism: a historical review*. [online] PubMed Central (PMC). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200679/> [Accessed 20 Jan. 2019].

¹⁵ Encyclopedia Britannica. (2018). *Biological weapon*. [online] Available at: <https://www.britannica.com/technology/biological-weapon> [Accessed 11 Dec. 2018].

after the submission of a working paper supporting a separate consideration of biological weapons to the Conference of the Eighteen-Nation Committee on Disarmament in Geneva 1968, that formal negotiations officially started. Two years later, the BWC was opened for signature on 10 April 1972 and entered into force on 26 March 1975, with the signing of 103 states and the ratification of 22 states.¹⁶

The post-BWC era

The critics of the BWC stress the fact that the convention lacks the main elements that rendered the Geneva Protocol of 1925 a “toothless” and less meaningful document, verification and compliance, stressing the need to reinforce a biological compliance regime. Although the agreement was signed in 1972, various countries which signed the agreement, participated in a variety of activities that were outlawed by the convention. These incidents show the ineffective application of the convention, in many occasions, for the eradication of biological and toxin weapons and for the prevention of their further proliferation.

Allegations made during the late 1970s, that various aerial vehicles were delivering aerosols with the purpose of attacking the inhabitants of Laos and Kampuchea, the poisoning of wells in Rhodesia, the plans of the apartheid regime in South Africa to create an antifertility vaccine for black women prove that biological weapon programs and attacks were becoming more and more a reality.

Furthermore, recent events of bioterrorism are not difficult to find. However, in most of these cases, the responsibility does not fall upon governmental authorities but upon groups and individuals serving their personal agenda. Such examples are the attack at Tokyo’s subway system in 1995, whose responsibility claimed the cult group “Aum

¹⁶ s3.amazonaws.com. (2017). *The Biological Weapons Convention, An Introduction*. [online] Available at: <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2017/07/BWS-brochure.pdf> [Accessed 30 Jan. 2019].

Shinrikyo” and of course the “anthrax letters” attacks shortly after the terrorist attacks of 9/11.¹⁷

Nowadays, the Biological Weapon Convention (BWC) numbers 197 members, including all 193 United Nations member states, with 182 ratifications or accessions. However, it is clear that although there is a rising number of countries, which are eager to comply with the prohibitions of the Biological Weapons Convention (BWC), the threat of biological weapons is not fully contained as it can be seen by the aforementioned attacks, whose responsibility falls not upon a country but upon groups and individuals with their own agenda.

The historical evolution of the issue

From all the above examples, it is clear that although the use of biological weapons started without the necessary control of the situation and the results could not be as expected, as the contamination could easily reach the perpetrators, through the years, the improvement of technology has led into targeted attacks, much better controlled by the attacking party. Furthermore, there is a shift into the profile of the perpetrators. At first it was the appointed leading authorities, who were able to use the biological weapons to neutralize enemy forces and then against enemies in general. Through the ages the perpetrators altered into being groups or individuals against enemy countries or populations. Despite this fact, as technology evolves today and the new developments in the fields of synthetic biology and gene-editing emerge, they create new and innovative challenges concerning the topic. However, one basic problem remains the same, the inability to determine that an attack has occurred and to identify the source.

¹⁷ Riedel, S. (2019). *Biological warfare and bioterrorism: a historical review*. [online] PubMed Central (PMC). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200679/> [Accessed 20 Jan. 2019].

Main analysis

Dual use technology

The term “dual use technology” describes scientific researches and technology development designed to produce beneficial outcomes both for civilian, commercial and military purposes. The concept of dual use creates the debate about how such research and technology should be understood, used and regulated, in order to avoid possible dangers, many of which could be devastating for the world.

It is necessary to understand that biotechnology is mainly applied for beneficial purposes towards the human life. Biotechnology can contribute towards improving the growing public and global health needs. The constantly improving technology on this field have led into new drug delivery methods, new methods for therapeutics and new services. That results into the increase of health, life quality and life expectancy of the human population, as now parasitic and infectious diseases can be diagnosed significantly sooner and be treated effectively and a variety of products can be modified and customized into the needs of the targeted individual.¹⁸ Even the developments in gene-editing aim towards this goal.

Beyond the actual outcome of a technological development, there is also vast knowledge that can be gained and misused if published. The Fink Committee Reports lists several classes of experiments and concludes that this technology could lead into the following experimentally gained knowledge of how to:

- a) Modify a pathogen in order to make it undetectable and resistant to any kind of treatment
- b) Modify a pathogen’s host spectrum
- c) Amplify the pathogenic potential of a microorganism

¹⁸ Afzal, H., Zahid, K., Ali, Q., Sarwar, K., Shakoor, S., Nasir, U. and Ahmad Nasir, I. (2019). Role of Biotechnology in Improving Human Health. [online] Journal of Molecular Biomarkers & Diagnosis. Available at: <https://www.omicsonline.org/open-access/role-of-biotechnology-in-improving-human-health-2155-9929-1000309.php?aid=82443&fbclid=IwAR1seAHluFAekuftiWuzquljKKWrnIff5MrODnFSxQfHtY7S8ewxDuQ7zcg> [Accessed 28 Jan. 2019].

- d) Create and produce new biological substances that can be misused in order to cause harm
- e) Create new delivery systems for the biological agents¹⁹

Biotechnology is deemed a part of a country's economic, technological and commercial affairs. This is why the idea of imposing a very strict legal framework around it has not been welcomed by the international community. On the other hand, if a country decides to use this technology today with a hostile purpose, this could backfire in many ways, including financially and commercially. However, it would be necessary to determine if an attack has occurred, how and by whom, something very difficult with the contemporary technological and legal means²⁰.

Taking into consideration all of the above concerning the dual use of biotechnology, it is understandable that the field itself is not harmful but that it can be used in order to provide new tools for the improvement of human life. However, it should be used with prudence and without being exploited for the wrong purposes.

Bioterrorism and biological weapons

Bioterrorism can cover a broad spectrum of incidents, from terrorist attacks with mass casualties to microevents using low-end technology in order to produce civil unrest and terror. The threat of biological warfare seems highly unlikely to the most of the developed and developing countries. However, the actual threat of bioterrorism, should concern each member state. The danger of biological agents to be used by extremists and terrorist organizations as weapons against civilian popula-

¹⁹ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity*. [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

²⁰ Charlet, K. (2018), *The New Killer Pathogens*, [online], Foreign Affairs, Available at: <https://www.foreignaffairs.com/articles/2018-04-16/new-killer-pathogens> [Accessed in 3 Feb. 2019]

tions is more than real. Although such an attack is particularly difficult to predict, the consequences of such an incident could be catastrophic for the society.²¹

Throughout the previous century, various countries and terrorist groups have used various tactics to attack to their enemies. Starting with small weapons and reaching the level weapons of mass destruction such as nuclear bombs and chemical weapons, the use of biological ones is more than certain.²² Terrorists, who previously relied mostly on firearms and bombs, are now in position to exploit biological weapons that can be used against humans, livestock and water supplies. Another factor that is crucial for the use of biological weapons is the fact that some terrorists may sacrifice their own lives in order to achieve their goals, so they are not deterred by the risk of contamination by a fatal disease.²³

Bioterrorist attacks could be caused by a wide variety of pathogenic microorganisms. These microorganisms, in order to be effective, have to produce a specific effect, death or disease, in low concentrations. The agent has to be contagious at a high level and with a relative short and predictable incubation period. Moreover, it should be economic efficient in order to be produced in massive quantities, it should be difficult to be identified in the targeted population and the target should have little to no treatment against the agent.

The ways that a biological weapon will enter into the human body are mainly through inhalation, contact or the gastrointestinal tract. The most common ways to deliver a biological weapon is through the air, that means that the bioweapons will be delivered through bomblets or spray tanks in order to cover large geographic

²¹ Das, S. and Kataria, V. (2011). *Bioterrorism: A Public Health Perspective*. [online] PubMed Central (PMC). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4921253/> [Accessed 20 Jan. 2019].

²² Encyclopedia Britannica. (2018). *Biological weapon*. [online] Available at: <https://www.britannica.com/technology/biological-weapon> [Accessed 11 Dec. 2018].

²³ Durrant, G. (2019). *Bioterrorism: the current threat*. [online] PubMed Central (PMC). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1279289/> [Accessed 28 Jan. 2019].

areas with the use of aircrafts as a mean of transport. Other methods could be the infection of an animal, vector or pest that will infiltrate through the international borders.²⁴

Biological Weapons Production

In order to produce a biological weapon, various stages must be completed. Firstly the producer must find and harvest the appropriate biological agent. Then, the agent must be multiplied to reach a certain population. in the meantime, the producer modifies the agent in order to acquire specific characteristics. When the second stage is completed, and the delivery mechanism is chosen based on efficiency and accessibility, then the weaponization is finished and the biological agent is ready to be delivered. When the producer chooses a particular agent, he must take under consideration specific characteristics such as the pathogenicity, the incubation period, the virulence, the lethality and the transmissibility.

An agent can be harvested from two major sources, its natural environment and a microbiology laboratory. Both sources create difficulties for the potential producer. If the agent is acquired by its natural environment such as soil, water or animals, it should be purified and the producer should analyze the agent to confirm its integrity. If the case of the laboratory, the agent could be difficult to obtain due to the security of the facility.²⁵ However, a terrorist with knowledge of the operations and technical procedures of laboratories could exploit potential vulnerabilities in order to smuggle biological agents out of the perimeter of the facility. Another way for the terrorists to obtain the necessary substances is via the Internet. Then that individual can “hire someone with the scientific knowledge to weaponize the biologi-

²⁴ Das, S. and Kataria, V. (2011). *Bioterrorism : A Public Health Perspective*. [online] PubMed Central (PMC). Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4921253/> [Accessed 20 Jan. 2019].

²⁵ Federation of American scientists. (2013). *Introduction to biological weapons*. [online] Available at: <https://fas.org/programs/bio/bwintro.html> [Accessed 20 Jan. 2019].

cal agent and to combine it with the delivery mechanism, constructing at the very end the biological weapon.²⁶

Biosecurity, Biosafety and Biopreparedness

Biosecurity, biosafety and biopreparedness are three different concepts that often overlap and interrelate.

Biosecurity

Biosecurity is not just barricading inside a building. It is the prevention of malicious misuse of biological substances and related materials and it is divided into three main categories that work together to provide the maximum security against biological incidents. A good biosecurity system includes the laws, the administrators, the procedure and the biosecurity culture that will make effective the laws and procedures.

At this point we have to address the three main pillars in order to create a sustainable biosecurity system: a political, an administrative and an institutional.

The political pillar contains the lawmaking officers of each country who should oblige with UNSC RES/1540 by enacting national legislation. That will fortify that the same standards are applied to everyone in each country, and that these standards will be mandatory for everyone.

The administrative pillar promotes the creation of a national biosecurity agency, established by each country, that will monitor and ensure the compliance of the laws and executive orders concerning biosecurity. Moreover, the agency should bear the responsibility for the education and raising of the awareness of the citizens.

²⁶ Wagner, D. (2017). *Biological Weapons and Virtual Terrorism*. [online] Huffpost. Available at: https://www.huffingtonpost.com/entry/biological-weapons-and-virtual-terrorism_us_59d23151e4b034ae778d4c3c?fbclid=IwAR2-xPPizhrG3ULVFbsQbrwA4Ws2LALMBn7kC6VxRvmdJSq8pWuGA_ah22A&guccounter=1 [Accessed 28 Jan. 2019].

The institutional pillar contains all individuals, groups or legal entities, f.e retailers, distributors, universities, private companies, research institutes and diagnostic laboratories, that are in possession and use of biological substances or related materials.

However, in order for a biosecurity system, law or procedure to be effective, the people should favor, respect and comply with it. That is, at the very end, the meaning of biosecurity culture: the respect for the laws and procedures concerning biosecurity and the understanding of their necessity. At this point we have to underline the importance of the respect towards the biosecurity culture by the biosecurity players – the lawmakers, the administrators and the facilities. They also have to interact within the borders of a good biosecurity culture.²⁷

Biosafety

Biosafety is the prevention of potential accidents that contain the release of harmful biological agents and pathogens. Measures, concerning biosafety, are designed to safeguard the individuals who work with related substances. Biosafety is highly related with biosecurity and biopreparedness, considering that many rules and regulations concerning biosecurity can also enhance laboratory safety.²⁸

Safety inside a laboratory is achieved by establishing safety layers including primary and secondary containment. The primary containment layer provides immediately the necessary protection to the working personnel from exposure to biological and chemical materials. Primary containment barriers and equipment include safety cabinets, fume hoods and other protective devices such as personal protective

²⁷ Anon, (2019). *An efficient and practical approach to biosecurity*. [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 20 Jan. 2019].

²⁸ Anon, (2019). *An efficient and practical approach to biosecurity*. [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 20 Jan. 2019].

equipment (PPE) used by the technicians while working with biohazard. The secondary containment layer includes all the necessary architectural and mechanical designs of the facility to prevent any potential contamination of the working personnel and the escape of the pathogens from the environment of the laboratory to the outside world.²⁹

Biopreparedness

Biopreparedness is interlinked with biosecurity and biosafety, as expected. It is translated into the action that must be taken in case of a failure of biosecurity or biosafety. As we can understand, biopreparedness is the ability to quickly control, minimize and eliminate the effect of a dangerous incident involving controlled biological substances and related materials. It contains all the measures concerning the immediate warning, detection, containment and decontamination of the unit in case of an accidental or intentional release of a harmful biological substance.

In order to start taking measures concerning biopreparedness, there should be at least one of the three following situations:

- a) The presence – suspected or confirmed – of controlled materials that are not registered and licensed
- b) The absence of controlled materials without being registered into the necessary logbooks.
- c) The release, intentional or accidental, of controlled biological pathogens.³⁰

²⁹ Donato, B. (2019). *What is Biosafety?*. [online] Chabsa.org. Available at: https://www.chabsa.org/index.php?option=com_content&view=article&id=42&Itemid=218&fbclid=IwAR0FbgBivzYueCI90aC0yccZsURtTS46YMLaWRFcT-W8DmDLtVkAKDoeG6E [Accessed 20 Jan. 2019].

³⁰ Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity*. [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

Legal framework

Biological weapons are strictly prohibited under international law. The Biological and Toxin Weapon Convention³¹ in 1972, has banned the production, possession and distribution of biological weapons and binds member states to destroy or use only for peaceful purposes any such weapon in their possession or under their jurisdiction.

The Gas Protocol and International Humanitarian Law

Biological weapons in their current form are considered unlawful under the general rules of IHL. More specifically, they are considered unlawful under Article 48 and 51(4) (b)³² of the Additional Protocol I to the Geneva Conventions, 1977 (API). Moreover, the effects of the use of biological and toxin weapons cannot be limited to military use and objectives and for this reason are considered respectively as indiscriminate under the Article 51(4)(c) of API.

Biological weapons that can and will cause permanent damage, harm or death, for enemy militants could also be considered to be violating the prohibition against the use of "weapons, projectiles and material and methods of warfare" that lead to injury and suffering in Article 35(2) of the Additional Protocol I to the Geneva Conventions.

The prohibition regarding the use of biological and toxin weapons in the 1925 Gas Protocol is characterized as customary law, and for this reason, it is not binding on every state.³³ More specifically, the use of biological weapons is prohibited under the Customary IHL Chapter 23, Rule 73, which is applicable both in international

³¹ Un.org. (2018). [online] Available at: http://www.un.org/en/genocideprevention/documents/atrocities-crimes/Doc.37_conv%20biological%20weapons.pdf [Accessed 13 Dec. 2018].

³² Article 51 (4) b, 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

³³ *Prosecutor v. Tadić*, Decision on the Defense Motion for Interlocutory Appeal on Jurisdiction. No. IT-94-I-AR72, 2 October 1995. §§ 96-127; ICRC Customary Study rule 73

and in non-international armed conflicts, in case that these weapons are meant to affect humans.³⁴

The Biological Weapons Convention (BWC) and the Implementation Support Unit (ISU)

The Biological and Toxin Weapon Convention in 1972 is the legal instrument that controls biological weapons. It was the first convention that banned a category of weapons entirely. It has been signed by every member state, except twelve. It prohibits the use of biological and toxin weapons, including the production, stockpiling, acquisition, retention and distribution of bacteriological weapons, covering all scientific and technological developments during the time of the ratification of the convention. During its Sixth Review Conference, it has been decided to establish an Implementation Support Unit (ISU) for the Convention, considering the necessity of providing administrative support, comprehensive implementation and universalization of the Convention and exchange of confidence building measures. The Implementation Support Unit (ISU) is obliged to provide:

- a) Support and assistance in an administrative level
- b) Support and assistance for the National Implementation of the Convention
- c) Support and assistance in order to establish confidence-building measures
- d) Administration of the databases for requests and offers of assistance and facilitation for the exchange of information
- e) Support for the efforts of the state parties in order to implement and apply the decisions and recommendations of the review conference.³⁵

The criticism towards the BWC stresses on two main flaws considered persistent. These flaws are the lack of a meaningful enforcement mechanism and the ineffec-

³⁴ ihl-databases.icrc.org. (2019). *Customary IHL - Rule 73. Biological Weapons*. [online] Available at: https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_cha_chapter23_rule73 [Accessed 20 Jan. 2019].

³⁵ bwc1972.org. (2019). *ISU - Biological Weapons Convention*. [online] Available at: <https://bwc1972.org/home/the-biological-weapons-convention/isu/> [Accessed 20 Jan. 2019].

tive verification method³⁶. However, acknowledging these legal gaps of the convention, its signing has created a legal norm against the hostile use of biological and toxin weapons, making it difficult for a country to openly use of accept a biological attack by another state.

The UNSC RES/1540

the Security Council decided in 2004 with resolution 1540, that all states are obliged to refrain from providing support and assistance to third parties that attempt to *develop, acquire, manufacture, possess, transport, transfer or use nuclear, chemical or biological weapons* and their delivery mechanisms, especially for purposes concerning terrorist attacks.

Other Treaties

The prohibitions of the convention have been amplified by other weapon prohibition treaties, such as the Anti-Personnel Mine Ban Convention (APMBC), the Chemical Weapons Convention (CWC) and the Convention on Cluster Munitions (CCM). The prohibitions include biological agents and toxins of types and quantities that cannot be used for peaceful or peacekeeping purposes. Furthermore, they cover the use of weapons, equipment and means of transfer, specifically designed for the use of biological agents and toxins for armed conflicts and hostile purposes.³⁷

Other measures

Apart from the legal commitments that the countries have already signed, the states have developed a few non-binding, non-mandatory measures, designed to provide with adequate reassurances and compliance with all the provisions of the Biological and Toxin Weapons Convention. The main mechanism, that is applied, is the

³⁶ Joyce, S., (2018), *Strengthening the BWC: The case against mobile biomedical units*, [online], Brown Political Review, Available at: <http://www.brownpoliticalreview.org/2018/03/strengthening-bwc/>

³⁷ Un.org. (2019). *UN Security Council Resolution 1540 (2004) – UNODA*. [online] Available at: <https://www.un.org/disarmament/wmd/sc1540/> [Accessed 20 Jan. 2019].

exchange of Confidence-Building Measures (CBMs), which is a system for the exchange of information between the member states that lead to the enhancement of transparency conceding issues of biological arms and their monitoring.³⁸ The Confidence-Building Measures have been expanded and modified many times since their creation, and they presently include the exchange of information on laboratories, research centers and complexes, biodefence research and development programs, as well as incidents of infection diseases' outbreaks caused by biological agents and toxins. Furthermore, CBMs include actions such as the encouragement of public displays of research results and the promotion of the use of this knowledge for purposes that are permitted by law, declaration of legislation, regulations and measures concerning the subject, past biological research, both offensive and defensive, development programs and authorized facilities for vaccine production.³⁹

Recent developments

The implementation of the BWC and the UNSC RES/1540

The Biological Weapons Convention (BWC)

Concerning the further implementation of the Biological Weapons Convention (BWC), the seventh review conference was held in December 2011, reaching into the conclusion that the use of biological and toxin weapons is prohibited under any circumstances, and that the states should condemn the use of biological agents and toxins for any than peaceful purposes. Furthermore, with the eighth review conference

³⁸ Second Review Conference, 8-26 September 1986, Final Document, BWC/CONF.II/13, Part II.

³⁹ Nwp.ilpi.org. (2018). *Biological weapons under international law | ILPI Weapons of Mass Destruction Project*. [online] Available at: http://nwp.ilpi.org/?p=5739&fbclid=IwAR23O_20BdOpZMk9BBubr3qFQfzT_1u2_WN4djiWAVzEVdTCaktS_4rUZD0#_ftn23 [Accessed 13 Dec. 2018].

that was held in November 2016, the states, among other items in the agenda, extended the existence of the Implementation Support Unit (ISU) for five more years.⁴⁰

The UNSC RES/1540

The United Nations Security Council has continued its efforts for the full implementation of RES/1540 by all member states. More specifically, in 2016, with UNSC RES/2325, that the Committee created by RES/1540 shall continue its efforts to promote the full implementation of RES/1540 by all states and give particular attention on measures concerning the enforcement of the resolution, biological, chemical and nuclear weapons and financial proliferation, on accounting for and securing related materials and on controls concerning national exports and transshipment. Furthermore RES/2325 continues to enforce the establishment of the necessary control system over related materials, especially to the states that have not followed the beforementioned guideline.⁴¹

The future of biological threats

Nowadays, with the development of new technologies, it becomes easier over time to acquire the necessary DNA in order to create the biological agent needed directly in a microbiological laboratory. For this reason, it is easy to understand that persons with ill intentions can manufacture a biological weapon in a small period of time and with a low cost and expose it to a large population resulting in maximum damage. Furthermore, with the current access everyone has to information, an emerging threat is that individuals and groups who are not members of the scientific community are experimenting with relatively advanced biological materials, equipment and technology. Although, these groups and individuals are experimenting mostly for entertainment purposes, rather than for usefulness, they can create, accidentally or intentionally, a

⁴⁰ The Biological Weapons Convention (BWC) At A Glance | Arms Control Association. 2019. *The Biological Weapons Convention (BWC) At A Glance | Arms Control Association*. [ONLINE] Available at: <https://www.armscontrol.org/factsheets/bwc>. [Accessed 21 January 2019].

⁴¹ Lutay, G. (2017). *United Nations Security Council Resolution 1540 (2004)*. [online] Supportoffice.jp. Available at: [https://supportoffice.jp/outreach/2017/asian_ec/pdf/21Mr.GennadyLutayUNSecurityCouncil1540\(2004\).pdf](https://supportoffice.jp/outreach/2017/asian_ec/pdf/21Mr.GennadyLutayUNSecurityCouncil1540(2004).pdf) [Accessed 21 Jan. 2019].

weaponized agent and for this reason they could pose a threat for the world. Last but not least, in order for the international cooperation to be effective, it must enclose every nation with emerging biotech industry. These countries should assist each other by providing the necessary resources, technological and human, they should be drawn into the culture concerning international biosecurity and at the political level, they should establish a mandatory biosecurity and biopreparedness system in order to enable foreign assistance concerning the biotech industry.⁴²

Synthetic biology

The technological field of synthetic biology which is emerging at a high rate is essentially the quest to discover, design and create new life forms that can perform a variety of useful functions. However, it can also bring potentially dangerous capabilities in the frontline. Nowadays, scientists have the ability to create entirely new strings of DNA and combine complicated molecular machinery. With that being said, not only the scientific community but also each country should take the necessary measures in order to strictly monitor research facilities and laboratories, where such breakthroughs may take place, in order to preserve the technical knowledge from falling into the hands of individuals or groups with malicious purposes, such as recreating or engineering a virus more deadly than any other.⁴³

Genome editing

Genome editing is the intentional alteration of a particular DNA sequence in a living cell. Nowadays, gene-editing techniques, such as the CRISPR, have made a significant progress in the evolution of biotechnology, both medically and possibly hostile

⁴² Centre for biosecurity and biopreparedness. (2015). *An efficient and practical approach to biosecurity*. [online] Available at: https://www.biosecurity.dk/fileadmin/user_upload/PDF_FILER/Biosecurity_book/An_efficient_and_Practical_approach_to_Biosecurity_web1.pdf [Accessed 21 Jan. 2019].

⁴³ Singer, E. (2019). *The Dangers of Synthetic Biology*. [online] MIT Technology Review. Available at: https://www.technologyreview.com/s/405882/the-dangers-of-synthetic-biology/?fbclid=IwAR0TtsMr6vc6jA3XLT4kU_Q8J4K6ssHNeX2id0iiUfEHegjoUM8I9klD2UQ [Accessed 20 Jan. 2019].

way. These techniques could make bioweapons more deadly, even capable of discriminating among populations based on ethnic, racial and other genetic characteristics. Furthermore, the CRISPR has made gene-editing less expensive. Consequently, this could lead to a clandestine development of biological weapons.

Genome editing can be a potential global danger, and the technology can be used as method to create a weapon of mass destruction. The lower cost of weapon production, the easier access to malicious materials and the great effectiveness of potential weapons provide a fertile ground and incentives for states, mainly rogue or small states to reconsider and reenergize their old bioweapons programs or start new ones⁴⁴.

Conclusion

Bacteriological weapons have been in use by countries, groups or individuals for many centuries and the results of their application have been more than devastating. Such weapons should never fall on the wrong hands. For this reason, member states should make one of their first priorities not only to comply with but also to promote and enhance the Biological Weapons Convention (BWC) and its review conferences, customary IHL Rule 73 and the UNSC RES/1540. Furthermore, countries should take measures to protect potential biological agents that can be weaponized, from being exploited by terrorist and extremist groups against specific targets that can cause permanent damage or even lead to loss of life. Last but not least, the enormous breakthroughs of technology in fields like biology, although it can be beneficial for the humankind, by providing the necessary tools and knowledge to the technicians, in fields like synthetic biology and genome editing, it can be exploited for others than peaceful purposes and for this reason the countries should take the necessary measures in order to protect that kind of technology from falling under the control of terrorists.

⁴⁴ Buchanan, M, (2018), *From Gene-Editing Cures to Bioweapons Nightmare*, [online], Bloomberg, Available at: <https://www.bloomberg.com/opinion/articles/2018-07-07/crispr-brings-investment-but-also-bioweapon-risks>

Points to be addressed

1. Is the existing legal framework adequate or there is a need to create a new one?
2. Can the Biological Weapons Convention (BWC) provide a more strict and meaningful enforcement mechanism? How?
3. How can a more effective mechanism of verification be introduced within the framework of the BWC?
4. How can the Implementation Support Unit (ISU) further enforce and support the Biological Weapons Convention (BWC)?
5. How can the countries ensure the prevention of the creation of unauthorized laboratories with the purpose of producing biological agents?
6. How can the countries enhance their biosecurity, biosafety and biopreparedness measures?
7. How can the recent developments in biotechnology enhance biosecurity?
8. How can the recent technological breakthroughs be used against the use of biological weapons?
9. How can the countries neutralize potential threats concerning the misuse of the latest technological developments in the field of biotechnology?
10. How can the countries secure the necessary materials and the equipment for the creation of biological weapons?
11. How can the countries prevent the technical knowledge for the creation of biological agents and delivery systems from being spread and used by terrorist groups?
12. What disincentives could prevent countries for revitalizing their biological weapon programs?

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