

Alika GUCHUA¹
Georgia

**SARS-COV-2 AS A POTENTIAL BIOLOGICAL WEAPON AND
EMERGING CHALLENGES OF BIOTERRORISM IN THE CONTEXT
OF ASYMMETRIC THREATS**

***Abstract:** Biological weapons are a significant threat to global security. A clear example of this in the modern period is the factor of the spread of SARS-CoV-2. When biological weapons are released, it is impossible to control them, to develop defence mechanisms, because new biological weapons appear in front of the world, which in many cases are artificially created. All this gives a more crushing effect. It must be said that these weapons falling into the hands of terrorists and bioterrorism pose the greatest threat to global security. The paper aims to investigate the potential threat of SARS-CoV-2 as a biological weapon, as well as the history and dynamics of its development. More specifically, the mechanisms of the spread of biological weapons and their prevention. This issue is interesting due to the developments in the world since bioterrorism poses the greatest threat to humanity. It is vitally important for the international community to take timely measures and pay more attention to this threat. It is also necessary to consider the creation of groups obsessed with extreme and fanatical ideas together with terrorists, whose goal is the destruction of humanity. Biological weapons are a very attractive and convenient weapon for organizations of this type, as a dangerous destructive force. The task of the paper is to identify mechanisms that will focus on the management components of biological weapons to examine the risks of its spread, as well as to determine prevention measures from the defence agencies, such as preparedness, detection and rapid response.*

***Keywords:** biological weapons, SARS-CoV-2, terrorism, asymmetric threats, global security, weapons of mass destruction.*

¹ Alika Guchua, PhD, Caucasus International University (CIU, Georgia). Email: alika_guchua@ciu.edu.ge

Introduction

In the modern period, global security faces many risks and challenges, among which are: armed conflicts, separatist movements, wars, terrorism, asymmetric threats, global warming, non-state aggressive actors, proliferation of weapons of mass destruction, pandemics, etc. Among these threats and challenges, it is important to distinguish the challenges arising from biological warfare and bioterrorism. Accordingly, the world events in 2019 attract significant attention and are a subject of study. Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), the cause of COVID-19, has shattered economies, and upended patterns of life globally. The first reports in late 2019 indicated that an epidemic caused by a zoonotic virus was spreading from Wuhan, China, believed to have been transmitted from an animal reservoir at a live-animal market. Speculation remains that the blame lies elsewhere, however, which seems surprising to scientists. For the public, the truth is easy to question because of the vast amounts of circulating misinformation².

Biological weapons are a significant threat to global security. A clear example of this in the modern period is the factor of the spread of SARS-CoV-2. When biological weapons are released, it is impossible to control them, to develop defence mechanisms, because new biological weapons appear in front of the world, which in many cases are artificially created. All this gives a more crushing effect. It must be said that these weapons falling into the hands of terrorists and bioterrorism pose the greatest threat to global security.

This issue is interesting due to the developments in the world since bioterrorism really poses the greatest threat to humanity. It is vitally important for the international community to take timely measures and pay more attention to this threat. It is also necessary to control the activities of groups obsessed with extremist and fanatical ideas, together with terrorists, and to respond in time to threats coming from them, whose goal is to destroy humanity. Biological weapons are a very attractive and convenient weapon for organizations of this type, as a dangerous destructive force.

SARS-CoV-2 as a potential biological weapon

There are many problems and challenges facing humanity in the world. All this poses a threat to human health. COVID-19 is a clear example of the scale of a pandemic. And also how powerless humanity is to fight it. It must be said that it is quite challenging to fight viruses, the origin of which is determined, but there are no vaccines against them. In order to better understand what a

² D. Knight, *COVID-19 Pandemic Origins: Bioweapons and the History of Laboratory Leaks*, "Southern Medical Journal", Vol. 114/2021, p. 466.

biological weapon is and what threat SARS-CoV-2 poses. Until then, let's explain the essence of weapons of mass destruction. In 1977, the General Assembly, through its resolution A/RES/32/84-B, affirmed the definition of Weapons of Mass Destruction as – atomic explosive weapons, radioactive material weapons, lethal chemical and biological weapons, and any weapons developed in the future which might have characteristics comparable in destructive effect to those of the atomic bomb or other weapons mentioned above³.

Weapons of mass destruction (WMD) are different from conventional weapons. with incomparably greater destructive power, which the subsequent and subsequent events of their use bring. The total power of M.G. in the world today is much more than it would be enough to completely destroy life on Earth. Therefore, during the Cold War, one of the main issues of West-East relations was the limitation of MGI production and disarmament. Currently, the creation of the so-called M.G.I. is a special threat. By pariah (unready) states (see recalcitrant state). The efforts of the democratic countries of the world are also aimed at preventing this weapon from ending up in the hands of authoritarian and irresponsible regimes. The proliferation of weapons of mass destruction and their delivery systems could have incalculable consequences for national, regional and global security⁴.

The ongoing COVID-19 pandemic has exposed global vulnerabilities to biological threats and refocused attention on the possibility of deliberate biological attacks⁵. The COVID-19 pandemic is also giving rise to the spectre of bioterrorism. Experts have warned that the pandemic may lead to a resurgence in interest among terrorists in using chemical and biological weapons. The possible risk of biological attacks by either state or non-state actors highlights the need to ensure effective biodefense strategies and strengthen international governance frameworks in the field of biosecurity and arms control, including the *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction* (BTWC). Preparedness is essential both for deterrence purposes and to ensure adequate mechanisms to monitor and when necessary to

³ United Nations, Regional Centre for Peace and Disarmament in Asia and the Pacific, *Weapons of Mass Destruction*, <<https://unrcpd.org/wmd/>> (21.11.2022).

⁴ North Atlantic Treaty Organization, *Weapons of mass destruction*, <https://www.nato.int/cps/en/natohq/topics_50325.htm> (21.11.2022).

⁵ L. Alleslev, *Biological Threats: Technological Progress and the Spectre of Bioterrorism in the Post-COVID-19 Era*, NATO Parliamentary Assembly, Science and Technology Committee, October 2021, <<https://www.nato-pa.int/download-file?filename=/sites/default/files/2021-10/024%20STCTTS%2021%20E%20rev.%201%20fin%20-%20%20BIOLOGICAL%20THREATS%20-%20ALLESLEV.pdf>> (21.11.2022).

deny access to the building blocks of biological weapons as well as respond to a biological attack⁶.

From the early stages, wild speculation existed regarding the origins of the virus. In March 2020, the US Department of State summoned the Chinese ambassador to protest statements of a Chinese spokesperson, who suggested that the virus was brought to Wuhan by the US military, allegedly as a bioweapon. Then, a US senator suggested that the virus resulted from a botched Chinese bioweapons program. Other US officials suspected that the virus came from a Wuhan laboratory that was performing legitimate viral research because safety concerns had been previously identified at this laboratory. As time went on, concern grew because China was found to be censoring the results of research into the origins of the pandemic. The virus as a bioweapon and the possible laboratory leak from legitimate research are the two most common remaining theories about the origins of SARS-CoV-2⁷.

The World Health Organization (WHO) defines biological and toxin weapons are either microorganisms like viruses, bacteria or fungi, or toxic substances produced by living organisms that are produced and released deliberately to cause disease and death in humans, animals or plants⁸. Biological warfare is called a war where biological toxins or infectious agents are used. Viruses, bacteria and fungi are used to kill or harm a person, animal or plant. Biological weapons (also called bio-agents) include living organisms and replicating nanoparticles (viruses) that reproduce in host organisms. Toxins do not multiply in the host organism, although they are also classified as biological weapons. Entomological (insect) war is also a type of biological war.

Biological weapons form a subset of a larger class of weapons sometimes referred to as unconventional weapons or weapons of mass destruction, which also includes chemical, nuclear and radiological weapons. The use of biological agents is a serious concern, and the risk of using these agents in a terrorist attack is thought to be increasing⁹.

Biological weapons can be used in different ways. All of these are used to gain a strategic or tactical advantage over the opponent. Biological agents can be lethal (killing) or non-lethal and can be used against a single person, a group of people or an entire population. They generally consist of two parts – a weaponized agent and a delivery mechanism. In addition to strategic or tactical military applications, biological weapons can be used for political assassinations, the infection of livestock or agricultural produce to cause food

⁶ *Ibidem*, p. 3.

⁷ D. Knight, *op. cit.*, p. 465.

⁸ World Health Organization, *Biological weapons*, <https://www.who.int/health-topics/biological-weapons#tab=tab_1> (22.11.2022).

⁹ *Ibidem*, p. 1.

shortages and economic loss, the creation of environmental catastrophes, and the introduction of widespread illness, fear and mistrust among the public.¹⁰ In terrorism, when biological agents are used, it is called bioterrorism.

Almost any disease-causing organism (such as bacteria, viruses, fungi, prions or rickettsia) or toxin (poisons derived from animals, plants microorganisms, or similar substances produced synthetically) can be used in biological weapons. The agents can be enhanced from their natural state to make them more suitable for mass production, storage, and dissemination as weapons. Historical biological weapons programmes have included efforts to produce: aflatoxin; anthrax; botulinum toxin; foot-and-mouth disease; glanders; plague; Q fever; rice blast; ricin; Rocky Mountain spotted fever; smallpox; and tularaemia, among others¹¹.

A brief history of the use of biological weapons

Simple forms of biological weapons were used even in the distant past. There are many examples from antiquity. According to ancient records, the Assyrians poisoned the enemy's food with mushrooms, in the 6th Century BC. In 184 AD, Hannibal, along with his warriors, used clay pots filled with snake venom. These pots were thrown in the direction of the Pergamon ships. In 1346, the Mongols threw corpses infected with the Black Death into the besieged city of Kafa. This was repeated in 1710 when the Russians besieging Swedish forces at Reval in Estonia catapulted the bodies of people who had died from the plague¹². During the Sino-Japanese War (1937-1945) and World War II, Japan had secret facilities (e.g. Unit 731) where it conducted experiments on prisoners, among them, hundreds of Chinese, and observed the development of various diseases. They also used biological weapons against Chinese soldiers, causing thousands of casualties.

Fearing that Nazi Germany was developing biological weapons, the US, Britain, and Canada began biological weapons development programs in 1941, resulting in the conversion of anthrax, brucellosis, and botulism toxins into potential weapons. Later, it turned out that the fears of the Germans about biological weapons were greatly exaggerated. In terms of the development of biological weapons, significant research was conducted during the Cold War (1947-1991) by the United States, the United Kingdom, and the Soviet Union.

¹⁰ United Nations, Office for Disarmament Affairs, *What are Biological Weapons?*, <<https://www.un.org/disarmament/biological-weapons/about/what-are-biological-weapons/>> (21.11.2022).

¹¹ *Ibidem*.

¹² E. Hooker, W. C. Shiel Jr., M. Conrad Stöppler, *Biological Warfare*, <https://www.emedicinehealth.com/biological_warfare/article_em.htm> (20.11.2022).

However, it is believed that biological weapons were not used during this period¹³.

General description of biological weapons

Biological weapons have the potential to cause far more deaths than nuclear, chemical or conventional weapons. Therefore, it can be used strategically to gradually weaken the opponent. From a tactical point of view (i.e., in a small-scale battle and in a short period of time), it is less effective, because it often takes several days for a biological weapon to produce its characteristic biological effect.

Some believe that in modern times, humans will never use biological weapons on purpose. Due to its uncontrolled nature. A disease can be traced back to the host state, and it can do worse than its target. e.g. The virus that causes smallpox can spread worldwide quite quickly, and eventually, it will surely harm the person who uses it. However, this argument does not necessarily apply to all microbiological agents, as, for example, some bacteria can be used in such a way that they act only within a certain radius.

Ideal characteristics for a biological agent that can be used as a biological weapon against humans are high infectivity (the ability of a pathogen to cause infection, which determines how often it spreads between host organisms), high virulence, and the absence of vaccines. For a biological weapon, a desirable characteristic is that the biological weapon retains its infectivity and virulence even under long-term storage conditions. It is also desirable to be able to control its spread. Producing biological weapons is not so much a problem as finding the means to store and distribute them effectively.

Especially dangerous pathogens are biological agents with an epidemic and pandemic spread pose a special threat to human or animal health. It has the potential to become a biological weapon and is relatively easy to spread. It can cause widespread morbidity, mortality, or mass disruption of public functions, which requires national-level measures to contain the spread and eliminate the consequences¹⁴.

For example, *Bacillus anthracis* (the bacterium that causes anthrax, also known as anthrax) is considered one of the most effective agents for several reasons. First, it produces spores, which is important for its aerosol distribution. Second, its incubation period (the time period from exposure to the first clinical signs of the disease) is short, and in more than 90% of cases, inhalation of

¹³ E. M. Spiers, *Agents of War: a History of Chemical and Biological Weapons*, London 2021.

¹⁴ *Resolution of the Government of Georgia No. 347. Especially regarding the approval of the response plan for dangerous pathogens and biological incidents*, Tbilisi 2014, pp. 8-9.

anthrax spores ends in death if it is not treated in time. At the same time, the spreaders can protect themselves by using appropriate antibiotics.

For a large-scale attack with anthrax, it is necessary to create its aerosols, the size of which will be up to 1.5-5 microns. Because larger particles cannot pass through the lower respiratory tract. Also, biological weapons should be resistant to rain and ultraviolet radiation.

Biological agents believed to potentially be or have been used as biological weapons include the following bacteria: *Bacillus anthracis*, *Brucella* spp., *Burkholderia mallei*, *Burkholderia pseudomallei*, *Coxiella burnetii*, *Francisella tularensis*, *Vibrio cholera* and others. Among the viral agents, there are Ebola viruses, representatives of the Bunyaviridae family, viruses of the Flaviviridae family, and others. Among the fungal agents studied are *Coccidioides* spp.

Biological agents like anthrax, botulinum toxin and plague can pose a difficult public health challenge causing large numbers of deaths in a short amount of time. Biological agents which are capable of secondary transmission can lead to epidemics. An attack involving a biological agent may mimic a natural event, which may complicate the public health assessment and response. In case of war and conflict, high-threat pathogens laboratories can be targeted, which might lead to serious public health consequences¹⁵.

Toxins that can be used as weapons include ricin, staphylococcal enterotoxin B (an enterotoxin produced by the bacteria *Staphylococcus aureus*), botulism toxin, and many types of mycotoxins.

Biological agents can be spread in a variety of ways:

- a. In the air, in the form of aerosols: This is an effective way of spreading and for the infection to develop, a person needs to inhale a sufficient amount of it.
- b. By Explosives: The spread of biological agents is possible by the detonation of any explosive device, although this is not as effective a method as spread by aerosols. Because of the explosion, the biological agents are damaged and only less than 5% remain that can cause disease.
- c. Biological weapons can be spread through food or drink.

Delivery mechanism – Biological weapons delivery systems can take a variety of forms. Past programmes have constructed missiles, bombs, hand grenades and rockets to deliver biological weapons. A number of programmes also designed spray tanks to be fitted to aircraft, cars, trucks and boats. There have also been documented efforts to develop delivery devices for assassinations or sabotage operations, including a variety of sprays, brushes and injection systems as well as means for contaminating food and clothing.¹⁶

¹⁵ World Health Organization, *Biological weapons...*

¹⁶ United Nations, Office for Disarmament Affairs, *What are Biological Weapons?...*

The following can be used as a means of defence:

- a. Vaccination, for example, currently there are anthrax and smallpox vaccines;
- b. Antibiotics, in the case of bacterial organisms, antibiotics can be used for treatment;
- c. Special masks, currently available respirators or other types of air particle filters can be used to protect against biological weapons.

Biosecurity involves technologies, procedures, and protocols to secure the exchange of highly infectious pathogens and to control access to those pathogens within a defence, research, industrial, or storage facility. Biosecurity can include¹⁷:

- a. Licensing of facilities to work with highly infectious pathogens;
- b. physical protection barriers;
- c. procedures to ascertain personnel reliability;
- d. Pre-transport approval for highly infectious pathogens and appropriate security during
- e. transport;
- f. measures to ensure accountability for highly infectious pathogens;
- g. proper oversight of scientific, defence, and commercial activities; and,
- h. appropriate security for information related to processes and techniques that could be
- i. useful in the weaponization of the agent¹⁸.

Technological advances. In addition to concerns that biological weapons could be developed or used by States, recent technological advances could increase the likelihood of these weapons being acquired or produced by non-state actors, including individuals or terrorist organizations. For more information about recent scientific and technological advances relevant to the Convention. The 20th Century saw the use of biological weapons by individuals and groups committing criminal acts or targeted assassinations, biological warfare conducted by States, and the accidental release of pathogens from laboratories. There were also false accusations of biological weapons use, highlighting the difficulty in differentiating between naturally-occurring diseases, accidents and deliberate use¹⁹.

Entomological warfare

Entomological warfare is a type of biological warfare that uses insects to attack humans. The concept has been around for centuries and research is

¹⁷ *The Biological Weapons Threat and Nonproliferation Options. A Survey of Senior U.S. Decision Makers and Policy Shapers*, November 2006, pp. 5-6,

<<https://carnegieendowment.org/files/BIO-survey-final-report.pdf>> (21.11.2022).

¹⁸ *Ibidem*, p. 7.

¹⁹ United Nations, Office for Disarmament Affairs, *What are Biological Weapons?...*

ongoing even in modern times. In entomological warfare, insects are used as a means of personal attack or as vectors of disease. There are three types of entomological warfare: In the first, insects are used as vectors (carriers) that carry the pathogen; These insects spread to the target area and then, infect the people they bite. In the second type, insects are used against the crop of the enemy, therefore it is a danger to agriculture. In the third type, insects such as bees, wasps, mosquitos and others are used to directly attack the target²⁰.

The modern world is concerned about the illegal use of radioactive, chemical and biological materials, which often lead to tragic incidents. For example: the use of chemical weapons in Syria: during the years 2011-2018, 33 chemical incidents were recorded by the UN Commission. One recent incident in the city of Douma had dire consequences. On 7 April 2018, 70 people died and several hundred were seriously poisoned. According to widespread information, the poisoning was caused by sarin bombs (there is also a version about the use of chlorine bombs).

According to various sources, it could be the so-called Barrel bombs, custardy, cylindrical metal containers filled with explosives, damaging shrapnel, and poison gas. A mixture of fertilizer, ammonium nitrate and any fuel will be used as an explosive, the so-called ANFO (Ammonium Nitrate/Fuel Oil) which is well known to those who trade or use industrial explosives. And the function of poisonous gas can be performed both by sarin and ordinary chlorine. Chlorine was first used as a chemical weapon in World War I. by the Germans during the Battle of Ypres. It is a heavier-than-air gas and inhalation causes suffocation and damage to lung tissue²¹.

Chemical attack in the Tokyo subway. It was a terrorist act of a poisonous substance with a nerve-paralytic effect using sarin.

On 20 March 1995, an act was organized by the neo-religious destructive sect Aum Sinrikyo, which according to various sources killed 10 to 27 people, and 5,000 to 6,300 people received various degrees of poisoning. It was later found out that the members of the sect were making sarin themselves, and they bought the production technology from another country.

Political scandals followed the poisoning of Alexander Litvinenko with the radioactive substance polonium-210 in 2006. Also, the case of Salisbury, when the so-called Novichok class military poison A-234 was used to kill the Skripals²².

²⁰ *Biological warfare*, Tbilisi 2013, <<https://geoarmada.wordpress.com/2013/02/17/%e1%83%91%e1%83%98%e1%83%9d%e1%83%9a%e1%83%9d%e1%83%92%e1%83%98%e1%83%a3%e1%83%a0%e1%83%98-%e1%83%9d%e1%83%9b%e1%83%98/#more-1133>> (20.11.2022).

²¹ *Guidelines for raising awareness on the export control of dual-use products related to chemical, biological, radioactive and nuclear hazards*, Tbilisi 2020, p. 147.

²² *Ibidem*, p. 148.

The above examples show how much danger the uncontrolled trade and use of biological and chemical substances pose to the world. This is precisely why those involved in international trade should be well aware of their role in maintaining international security and peace. Political groups use chemical and biological weapons to eliminate their opponents.

Global threats from bioterrorism

In April 2020, the United Nations Secretary-General warned that “the weaknesses and lack of preparedness exposed by this pandemic provide a window onto how a bioterrorist attack might unfold – and may increase its risks”. The overall COVID-19 experience has stressed the importance of better preparedness against all types of public health threats, including bioterrorism²³.

Bioterrorism is the deliberate release and use of biological toxins or infectious agents. That causes disease or death in humans, animals or plants. These agents can be bacteria, fungi, toxins or viruses. They can be naturally occurring or man-modified.

Interpol's definition of bioterrorism refers to the intentional release of biological agents or toxins to harm or kill humans, animals or plants with the intent to intimidate or coerce a government or civilian population to further political or social objectives²⁴.

Bioterrorism is to destroy the population. Introduction of various infectious agents and biotoxins in the territory of the country by various means. In terrorism, if biological agents are used, it is called bioterrorism.

A bioterrorism attack is the deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants. Biological agents can be spread through the air, through water, or in food, and may be used by terrorists. Some bioterrorism agents, like the smallpox virus, can be spread from person to person and some, like anthrax, cannot²⁵.

The act of bioterrorism is the deliberate use of a pathogenic biological agent or toxin to cause disease in a person or groups of people.

During the conflict, the use of biological agents is considered one of the most dangerous weapons. This type of weapon is different from chemical, nuclear and radiological weapons, which, together with biological, make up the military acronym for weapons of mass destruction. None of these are

²³ L. Alleslev, *op. cit.*

²⁴ Interpol, *Bioterrorism*, <<https://www.interpol.int/en/Crimes/Terrorism/Bioterrorism>> (25.11.2022).

²⁵ State of Hawaii, Department of Health, *Bioterrorism. Chemical, Radiological, and Nuclear Emergencies*, <<https://health.hawaii.gov/docd/prevention/bioterrorism/>> (23.11.2022).

conventional weapons, essentially due to their explosive, kinetic, or incendiary potential.

It is important to know what is meant by a biological incident – the release and/or spread of a pathogenic biological agent caused by natural means or as a result of unintentional or intentional action. At what time it can harm human health or cause death?

The purpose of a biological weapon varies in its form and purpose. Typically, the opposing party's goal is to gain a strategic or tactical advantage while instilling fear and panic in the public. Like some chemical weapons, the use of biological weapons can force the target group to leave the area. There are both lethal and non-lethal forms of biological agents that are used against a specific person, group of people, or an entire population.

Experts are concerned that the destructive social and economic implications of the COVID-19 crisis have drawn attention to the potentially potent impact of biological agents and may lead to a resurgence of interest in such methods among terrorists. These concerns are underpinned by reports that extremist groups have called on their followers to intentionally spread COVID-19 by coughing on targeted individuals or through other means. In the United States, at least two people have already been charged with terrorism offences after claiming they were intentionally trying to spread the virus. In the Middle East and North Africa (MENA) region, groups associated with Daesh and Al-Qaeda have also spread conspiracy theories claiming that the virus is a ‘soldier of Allah’ that is being used to punish the enemies of Islam²⁶.

Forms of bioterrorism

Bioterrorism directed against humans. This is a form of bioterrorism in which people are poisoned by using various biological agents. The advantage of such a weapon is that it is characterized by high infectivity (the ability of a pathogen to cause infection, which determines how often it spreads between host organisms). High virulence (ability to cause disease) and, in addition, there may be no vaccines to prevent transmission. Producing biological weapons is not so much a problem as finding the means to store and distribute them effectively. It is possible that a biological agent cannot maintain infectivity and virulence under long-term storage conditions. It is also possible that its spread cannot be controlled.

For example, the bacterium that causes anthrax, also known as anthrax, is considered one of the most effective agents for several reasons. First, it produces spores, which is important for its aerosol distribution. Second, its incubation period (the period from exposure to the first clinical signs of the

²⁶ L. Alleslev, *op. cit.*

disease) is short, and in more than 90% of cases, inhalation of anthrax spores ends in death if it is not treated in time; At the same time, its spread can protect itself by using appropriate antibiotics.

Bioterrorism directed against agriculture (crops, plants and aquaculture). It is a form of bioterrorism where diseases (e.g., bioherbicides or mycoherbicides) are used to destroy enemy agriculture. which causes plant wilting. Aquaculture and underwater plants can also be targeted by such biological weapons. Plant pests are sprayed using spray tanks and cluster bombs in agricultural areas. which subsequently leads to the initiation of plant epidemics.

Although a herbicide is a chemical against weeds, it is often thought of as a biological and chemical warfare weapon. This is because the herbicide can have a similar effect to that of biotoxins. Biotoxins are substances that are toxic and have a biological origin. Biotoxin is taken in different forms. There are mycotoxins (made from fungi), zootoxins (made from animals) and phytotoxins (made from plants). Taking these biotoxins is a simple formula and does not need special mechanisms. That is why it remains an acute challenge in the field of bioprotection.

Bioterrorism in which insects are used. It is a form of bioterrorism in which insects are used to attack the enemy. At this time, insects are used as weapons of direct attack (for example, bees, locusts, etc.), or insects infected with various pathogens spread to the target area. At this time they have the function of spreading various diseases.

As we can see, the danger of biological weapons is primarily the fact that, unlike other weapons of mass destruction, any person can become the owner of this weapon. It can be produced, developed, or stockpiled by both state and non-state actors. Accordingly, the use of biological weapons at both levels (covert from the arms of states and targeted terror from non-state actors) is uniquely classified as bioterrorism.

In bioterrorism, members of a nation or group that pose a mass threat can change the rules/norms by which they interact with members of another nation or group. A biological weapon allows its owner to create a potentially destructive threat. Moreover, unlike nuclear, chemical or conventional weapons, it does not require special storage conditions or storage costs. Therefore, this form of terrorism can be advantageous for strategic players at the international or state level and use biological agents as a weapon of attack on the battlefield.

The use of biological weapons is prohibited by the norms of international law, as well as by various international agreements. The use of biological agents in armed conflict is a war crime.

It is also important to focus on biological weapons in the context of biosafety. The use of biological weapons for offensive purposes is prohibited by the 1972 Convention. As of 2016, 178 countries had ratified and 6 had

ratified and in August 2019, 183 countries ratified or acceded to the treaty. The main purpose of this convention is to prevent biological weapons attacks. This is because all of this can lead to the death of large numbers of people and, at the same time, damage to the economy and infrastructure²⁷. Many countries, including those that have ratified the Convention, are conducting research into biological warfare, which is not prohibited under the Convention.

Although the United States, Russia, United Kingdom, Syria, Japan, and Iraq have had bioweapon programs in the past, China and Iran have never admitted to a developed program, although small-scale production is certainly possible. The US Department of State's 2020 Compliance Report notes, "The United States does not have sufficient information to determine whether China eliminated its assessed biological warfare program, as required under Article II of the Convention"²⁸.

In 1979, the ineffectiveness of the convention was demonstrated by an accidental airborne release of anthrax spores by a Soviet military microbiology facility in Sverdlovsk (now Ekaterinburg, Russia), which led to numerous deaths. Non-state-sponsored biological terrorism began to surface in the 1980s, which culminated with the 1995 sarin gas attack on the Tokyo, Japan, subway system by the Aum Shinrikyo cult. Soon after the 11 September 2001, terrorist attacks on the United States, letters laced with anthrax were sent to several news agencies and two Senators. This led to five deaths and many illnesses and one of the most extensive Federal Bureau investigations in US history. In 2013, the United Nations confirmed the use of government-sponsored chemical weapons (sarin and chlorine) during the Syrian Civil War²⁹.

The 2018-2020 Ebola outbreak in the Democratic Republic of Congo took place as violent conflict was raging in the country. The convergence of both events amplified the crisis and provoked concerns that adversaries could deliberately spread disease in future conflicts to inhibit responses and decision-making³⁰.

Despite some legal forms that prohibit the use of biological weapons, there is still a threat that these agents are being secretly produced in several countries. It is also possible that the stocks are owned by criminal and terrorist organizations. Consequently, the threat of bioterrorism continues to be a significant concern in virtually all states, including military and civilian populations.

²⁷ V. Maisaia, A. Guchua, *NATO and Non-State Aggressive Religious Actors (Islamic Caliphate, Al Qaeda and Taliban) – The Fourth Generation War Strategy and Its Geopolitical Aspects of Regional and National Security (2010-2019)*, Tbilisi 2020, p. 204.

²⁸ D. Knight, *op. cit.*

²⁹ C. Skolnick, *External Eye Manifestations of Biological and Chemical Warfare*, [in:] M. J. Mannis, E. J. Holland, *Cornea*, 5th Edition, 2019, p. 1043.

³⁰ L. Alleslev, *op. cit.*

Globalization factor in the spread of terrorism

The factor of globalization – nowadays, the threat of terrorism is recognized as one of the main challenges in the establishment of universal peace in the whole world. The asymmetric threat, which emerged not from conflicts between countries, but from terrorist organizations, in terms of maintaining security in the world, has become more and more noteworthy. In the era of globalization, parallel to the process of removing borders, terrorism has acquired a global scale. After the terrorist attacks on New York and Washington on 11 September 2001, the mentioned problem was further advanced. After the leaders of al-Qaeda publicly announced that their organization was actively testing weapons of mass destruction, this form of terrorism has become more of a concern to America and the world. In March 2002, US President Bush said in a speech that "all nations must seriously consider the growing threat of terrorism and its catastrophic proportions – terrorism armed with biological, chemical or nuclear weapons".

"Globalization can be defined as the intensification of social relations on a worldwide scale that bind distant places together in such a way that processes of local significance are affected by events many miles away."

Global terror has replaced political boundaries that coincided with national and state borders. The threat posed by terrorism has penetrated the borders of every nation-state. Considering that the free movement of products and investments is no longer a difficulty in the era of globalization. All this leads to the conclusion that smuggling between borders has become easier.

Along with the opening of borders, the financial independence of terrorist organizations has increased. Attracting new followers is not concentrated within the borders of a particular country, but covers the whole world. In particular, the growing spread of Al-Qaeda followers in all regions of the world (mainly in North Africa and Southeast Asia) is observed. Consequently, the globalization of terrorism and network connections have made terrorist organizations more flexible. The adoption of modern technologies has made the fight against terrorism relatively difficult.

It is difficult to determine the extent to which globalization affects international security. Because different regions are affected differently by the accompanying processes of globalization.

Geopolitical aspects

During the fight against terrorism, it is important to consider the geopolitical aspects of the state. Effective cooperation of international and regional organizations and the involvement of states are also important. This is to reduce the prevalence of organized crime in the first place. Also, the transit

of agents of weapons of mass destruction and illegal migration is associated with many dangers.

The COVID-19 pandemic has emphasised the importance of understanding biological vulnerabilities and assessing biological threats comprehensively. Such an assessment of biological threats requires risk/capability evaluations in many different areas, among others in the state of national healthcare systems, risks arising from international trade/travel, or the resilience of global supply chains³¹.

Because of the wide spectrum of potential biological hazards, efforts to manage the risks should be multidisciplinary, multi-sectoral, and above all, coordinated. As such, the BWC relies primarily on a network approach based on coordination with international, regional, and nongovernmental organizations and initiatives to address the interconnected nature of biological threats in a holistic manner. Under the framework of the BWC, improved coordination would provide positive externalities for managing disease, whatever the cause. Such an approach ensures that resources are used optimally to provide benefits for many. In this sense, for example, building capacities across sectors to monitor disease not only strengthens the ability to detect and respond to a biological attack, but also provides States with the capacity to track and mitigate naturally occurring diseases, thus vastly improving public health worldwide³².

Conclusion

Viruses are constantly mutating, and this leads to the emergence of new variants. It is logical to expect that of the thousands of variants resulting from mutations in the SARS-CoV-2 virus genome, some variants will eventually acquire a biological advantage and become more infectious, clinically aggressive, and resistant to therapies or vaccines. Alternatively, the dominance of a particular variant strain may be due to mere chance or the social behaviour of the population. The dimension of threats is added by the factor of terrorist organizations that want to obtain biological weapons.

Biological weapons falling into the hands of terrorists will cause significant crises and threats around the world. It will be impossible to deal with all this by one state or even by a group of states. Therefore, when there are terrorism-sponsoring states in the world that covertly finance and support terrorists, they should also understand that biological weapons falling into the hands of terrorists will lead to their spread, and therefore it will harm their population. Because it is impossible to control the spread of biological

³¹ L. Alleslev, *op. cit.*

³² United Nations, Office for Disarmament Affairs, *What are Biological Weapons?*

weapons. It must be said that the SARS-CoV-2 virus genome can be artificially mutated by terrorists as a biological weapon. To make it more deadly, to spread quickly and to make the fight against it more difficult. There is also the danger of dangerous viruses and deadly biological weapons being stolen from biological laboratories and falling into the hands of terrorists. All this will be associated with the worst consequences. Therefore, it is important to tighten the policy of non-proliferation of biological weapons at the international level. Ensuring chemical safety is also important. Along with this, in the future, humanity may be faced with more dangerous artificially or naturally occurring viruses and biological weapons. For the prevention of such risks and threats, strict control of international agreements is necessary. It is also important to increase the funding of peaceful scientific research by states and international organizations. The most important thing is to detect and neutralize (arrest) terrorist organizations and groups.

Accordingly, the protection of global security requires coordinated cooperation, sharing of information and new scientific studies on the part of global actors, international organizations and states.

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