

FORUM:	Disarmament Commission
ISSUE:	Measures to Promote Biosecurity in the Post-pandemic Era
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Introduction

Biological warfare refers to the usage of biological toxins and infectious agents, such as bacteria, virus, and insects, with the deliberate purpose to kill or cause severe amounts of harm towards humans, animals, or plants as an act of war. The microorganisms and their toxins are widely considered as biological agents that can not only be typically found in nature but also be mutated or altered to improve their capability of causing diseases within their hosts, increase their resistance to present medications, or enhance their transmission ability. Following these types

of manual actions that can escalate the levels of destruction of the biological weaponry, these harmful agents can be also released intentionally by non-state groups as an act of terrorism. This type of attack is recognized as bioterrorism, which can drastically damage both armed forces and innocent civilians of a state.

To cope with these threats and other risks towards humans' health and wellbeing, such as a global pandemic or an alarming disease outbreak, the spotlight has turned on the measures that have been put forth and executed to advocate biosecurity. Actions that promote biosecurity normally consist of "strategic and integrated approaches to analyze and manage the risks related to human health and the natural environment" according to the World Health Organization (WHO). These measures are carried out through a combination of diverse processes and systems that have been implemented by bioscience laboratories, governmental regulatory agencies, and even agricultural administrators to achieve the main goal of preventing the use of harmful biological toxins and pathogens. Due to the recent global COVID-19 pandemic, the significance of biosecurity efforts has been evidently highlighted, compelling governments to advance biosecurity within their borders through adopting procedures that limit, control,



Sign that prohibits entry due to biosecurity measures being in effect



and manage biological risk factors. However, further schemes can also be proposed to help tackle the current pandemic and prepare nations beforehand in case a similar situation materializes in the future.

Ahead of proposing possible solutions regarding measures that counter adverse biosecurity events or interventions, such as bioterrorism, delegates must consider that biological warfare itself is a subset of successive biological incidents. Before classifying an event as biological warfare or an act of bioterrorism and undertaking follow-up actions to resolve the arousing issue, the origin and intent of the event must first be taken into consideration. For example, the spread of dangerous biological or bacteriological substances in research laboratories may or may not be classified as biological warfare based on its legitimate purpose. Whether the dissemination of the harmful agents was accidental or not, the subsequent impacts it brings to the general public and the international community may be similarly detrimental, so the delegates must acknowledge that biosecurity does not only comprise of preventing the introduction and transmission of treacherous microorganisms from parties with malevolent intent, but also of undertaking measures to minimize any direct biological threats that take place naturally, such as potential flu pandemics or influenza epidemics.

Background

The concept of “biosecurity” was originally coined and employed by agricultural and environmental communities across the world to describe the preventative measures against naturally occurring diseases and pest-related threats, subsequently broadened to introduced species that can potentially harm the new ecosystem they are placed in. By 2010, numerous countries such as Australia and New Zealand incorporated this term into their legislation, while New Zealand was the first state to adopt a comprehensive approach towards securing its natural environment through its Biosecurity Act in 1993. This Act of Parliament was successful in raising global awareness regarding the importance of biosecurity in terms of animal and plant life within the ecosystems, due to the undesirable damage like infected food supplies generated by pests and other microorganisms.



Public poster that promotes biosecurity in New Zealand, one of the renowned nations in its agricultural biosecurity measures

Biosecurity has been further developed to counter the devastating impacts of both biological warfare and naturally occurring pandemics. Since the onset of the trend in weaponization of biological substances and other toxins mainly in the 20th century, new measures, legislations, and conventions have been produced both on a national and a global scale to diminish the vulnerability of nations effectively and adequately towards biological threats primarily posed by biochemical armament and naturally occurring pandemics. The earnestness and sincerity depicted by most states across the globe regarding the implementation of biosecurity measures have substantially impacted the effectiveness in preventing threats from diseases from even happening. For example, there have not been any recorded bioterrorism attacks across the world since the 2001 anthrax mailings. Also, although several nations' initial responsive actions towards the recent COVID-19 pandemic have been categorized as problematic by several academic sources and global institutions, the current vaccination programs and procedures developed in a limited amount of time have brought numerous desirable outcomes. For instance, at least one quarter of the world's population have been already fully vaccinated. However, as technology and the and the harmfulness of biological agents are rapidly developing, the need for both reactive and proactive actions in tackling threats are always present. This is evident through the recent surge in positive COVID-19 cases, due to reportedly quick enhancements in resiliency the virus conducted especially towards outdated vaccines and treatment methods.



Image of the COVID-19 virus

Problems Raised

Dual-Use Dilemma

The term “dual-use” is traditionally used to describe technologies that can be utilized for both civilian and military purposes, but the term has at least three different dimensions, creating a dilemma for modern biology and its possible abuse for hostile purposes. On the surface, it can be a civilian facility that is used for the development and production of military or terrorist biological weapons. Moreover, equipment and agents that can be misappropriated or abused in the development and production of biological weapons are also deemed as threats due to their “dual-use” capability. The final dimension is the production and release, whether intentional or not, of scientific knowledge that can be misapplied into the development and production of biological weapons. These three different aspects of the "dual-use



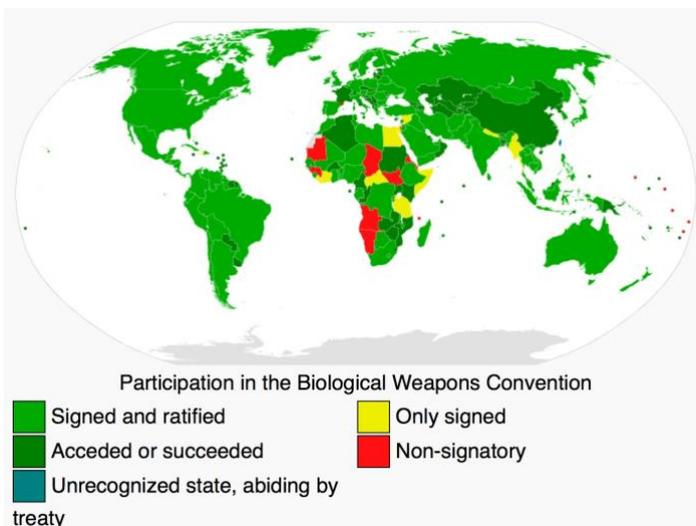
dilemma" are often confused, and each aspect requires a specific preventative approach to reduce the risk of bioterrorism and biological warfare. Thus, proposed solutions in promotion of global biosecurity in the post-pandemic era must consider all three above-mentioned dimensions and the devastating impacts from the recent pandemic to eventually prepare for future biological threats from warfare and pandemics.

Emergence of Uncontrollable Pandemics

Displayed by the ongoing COVID-19 pandemic and its severe, dire consequences, government bodies throughout the world has directly recognized the significance of biosecurity and the regret of not investing into preparation measures for global pandemics. The initial emergence of the coronavirus was not considered as a global threat until it already impacted the lives of the global population, as it created horror and fear among the mass public and even government agencies. However, if there were previously implemented measures, strategies, and frameworks that states employed to tackle the emerging virus, it could have led to significantly different consequences for nations. Crucially due to the inadequate attention and consideration directed to the virus at the initial stages, the coronavirus has been prompted to a global pandemic, teaching all countries the importance of preventive and preparatory actions regarding highly infectious or fatal diseases an extremely valuable lesson and redirecting their concern towards promoting international biosecurity.

International Actions

Strengthening the Biological Weapons Convention



Member states' participation in the BWC by 2020

The Biological Weapons Convention (BWC) is a global disarmament treaty that effectively bans biological weaponry and toxic agents by prohibiting their development, production, acquisition, transfer, stockpiling and use. This convention was initiated in 1972, and about 165 countries have now signed this treaty, implementing its requirements into their own legislation. There were numerous efforts devoted to strengthen the BWC itself to cooperate towards the utter eradication of biological warfare and bioterrorism in the

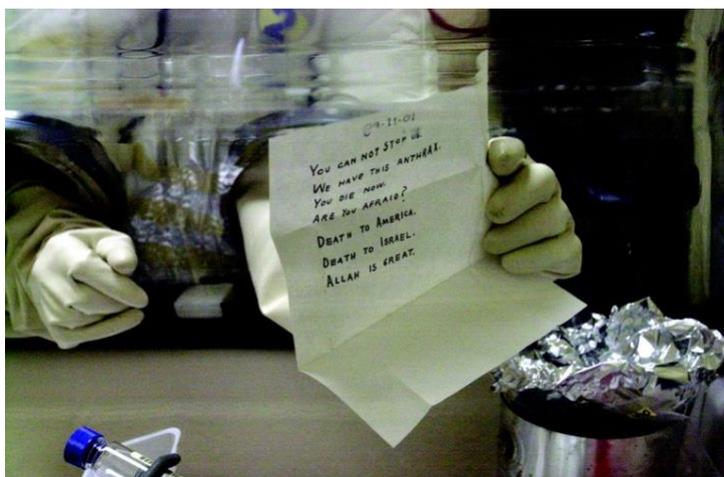
future. For instance, eight Review Conferences were held to discuss the feasibility and capability of the Biological Weapons Convention, all considering the new scientific and technological developments,



progress made by State Parties to implement the BWC, and others. Moreover, actions decided upon from these Review Conferences were further implemented as well, including the establishment of the Ad Hoc Group of governmental experts to enhance identity verification measures of individuals who are granted access to biological agents that possess the dangers of “dual-use”. Previous attempts to strengthen international agreements surrounding biological warfare has been quite successful in alleviating the harms of bacteriological armament, including the introduction of an export control mechanism, consisting of proposals for dispute settlements and transfer denials after the eighth Review Conference for the BWC. This can help to adequately regulate the exports of bacteriological agents that can possibly fall into the hands of actors with malicious intent, eventually diminishing the possibility of future use of pathogenic armament. However, further solutions can be devised and put forth to advocate these attempts and treaties themselves to ultimately ensure and advocate biosecurity globally.

Technical and Technological Developments in Civil Defense against Bioterrorism

Civil defense measures were newly developed in accordance with the rapidly developing technological world, which can strongly resist major biological attacks. Improvements in civil defense can be recognized by significant progress in sensors, early warning systems, vaccines, medications, training of responders, public education, and emergency procedure planning. These exemplary biosecurity measures were mostly put into effect following the September 11th attacks in 2001 mainly in the United States and other Western states.



Mails sent to US government officials that contained anthrax in 2001

The key foundation of the civil defense against attacks via biological armament is the medical system that has been previously established to cope with naturally occurring diseases. Special vaccines, targeted towards common biological agents utilized in attacks or warfare, have been developed, tested, and approved to be put into use. For example, the two deadliest and easily weaponized biological agents—anthrax and smallpox—have been already tackled with these type of vaccination frameworks. The US government currently has enough smallpox vaccines to vaccinate the entire American population and enough anthrax vaccine to vaccinate at least all personnel in their armed forces. Additional medical research is also being carried out to examine the possibility of generating vaccines and supplements that may raise the effectiveness of the recipients’ immune system when administered. These developments



will ultimately help protect civilians from a whole spectrum of treacherous biological agents employed during attacks.

Moreover, further research has also been conducted regarding the installation of technological systems that reduce the number of infected individuals following an attack through biological agents. One example is the initial development and evaluation of sensors that detect the presence of potentially harmful biological agents in the air, in water, or on various surfaces put forth by nations like the United States and the Czech Republic. The main objectives of the researchers are to create a "detection-warning" system to allow potential victims enough time to put on a mask, cover themselves, and take shelter before being infected.

However, significant progress does not indicate absolute success for these enhancement in civil defense actions. Although satisfactory vaccines for plague and cholera have now been approved for use, only limited quantities have been produced, which may be insufficient when large numbers of the state's population has been infected. Furthermore, numerous vaccines in the United States for pathogens such as tularemia and Venezuelan equine encephalitis are still categorized as Investigational New Drugs (IND), which must await additional trials before the Federal Drug Association (FDA) can certify their effectiveness and safety. In addition, there are no vaccines present at all for adequately preventing infections from biological agents including glanders, brucellosis, or staphylococcal enterotoxin B. These are all agents that have been weaponized and researched for military purposes by multiple states in the past. Moreover, the currently existing "detect-to-treat" systems are at unsatisfactory levels because responders would be treating already infected victims, causing time lag to be an important issue to resolve to effectively implement this type of system. Most current biological detectors are also point detectors, which are unable to provide an advance warning after scanning an airborne cloud of particles to discern whether harmful substances are present or not. Thus, more solutions need to be suggested and advanced to eventually promote effective and intact biosecurity measures.

Key Players



Soviet Union/Russia

Soviet Union's Scientific Production Association (also known as biopreparation) was a biological warfare agency from the 1970s. It was a civilian disguised series of secret lab experiments with the objective of developing pathogenic weapons that could be used during a war. Furthermore, there has been other evidence in which the Soviet Union was actively developing biological weapons, such as Poison Laboratory of the Soviet Secret Services (alternatively known as Laboratory 1) and Vozrozhdeniya Island (Island that includes Aralsk-7, a biological weapons test site). In recent history, Russia has been an active participant in putting its efforts to control the usage of biological weapons, as there have been numerous cases where Russia signed treaties such as the BWC for the cause of regulating toxins. Furthermore, in the hopes of the promotion of biosecurity within its geographical area, Russia spent nearly 800 million USD in supporting and further executing measures that help with the process of nonproliferation of biological agents that may have the risk of being utilized offensively by malicious actors.



Soviet Unions' biological weaponry testing

However, it is still suspected that Russia still possesses chemical agents, due to multiple occasions of the Novichok nerve agent being used on Russia-related individuals. For instance, at a meeting convened by the Russian president Vladimir Putin, the Minister of Defense Serdyukov informed Putin that the nation is “developing weapons based on new physical principles: radiation, geophysical waves, genetics, psychophysical, and more.” As the Russian government deleted the statement from the public records in response to concern expressed from Russia and abroad, it still raises the questions on whether or not the Russian Federation is establishing an offensive biological warfare program.



Russian criminals wanted for the usage of Novichok nerve agents



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United States of America

The United States is one of the major nations that took part in the weaponization trend of biological agents during the 20th century. Accordingly, the country was subject to numerous biological attacks from both non-state actors and individuals, severely damaging certain innocent civilians' lives. Several noteworthy events scattered throughout the country's history, such as the 1984 Rajneeshee Salmonella incident and the 2001 anthrax mailings all demonstrated the vulnerability of bioterrorism and the importance of training programs and staff reliability with the emphasis on biosecurity.

The government and its agencies successfully directed their attention to measure preventing the harm from biological dangers towards its civilians, animals, and plants. Both cases mentioned above subsequently resulted in policy changes aimed at reducing the risk of future misuse of organisms for research and disease prevention. In October 2003, the 'Fink Report' was released from the from the National Research Council of the National Academies. This advocated life science scientists to strengthen oversight and self-regulation and recommended that the Department of Health and Human Services (HHS) establish a national committee to provide guidance to funding agencies. In 2005, HHS established the National Scientific Advisory Board for Biosafety (NSABB) to advise the federal government on tackling diverse biosafety problems through solutions. US also turned to civil defense as a crucial approach in ensuring biosecurity within its borders, developing the Strategic National Stockpile program, which has created 50-ton "push packages" of vaccines, medicines, decontamination agents, and emergency medical equipment. These packages are stored in at least dozen locations throughout the country to prepare for potential biological emergencies. The Centers for Disease Control and Prevention (CDC) also drafted model legislations and guidelines on emergency health powers for states to employ to respond to such crises.

US has also taken part in the promotion of agricultural biosecurity, primarily through its National Institute of Food and Agriculture (NIFA). NIFA and its partner institutions and universities mainly across the nation focus on disease transmission and detection, plant and animal disease diagnosis, information outreach to the public, and even the generation of suitable tools and management tactics. Its primary purpose

is to monitor and prevent disease outbreaks to protect the US agricultural system from pests, diseases, contaminants, disasters, and attacks with malicious intent. Along with this desire, NIFA advocates the US plant, animal, and food production systems so that agricultural sustainability is promoted throughout the country and serious disruptions to international business and trade are minimized. Distinct duties NIFA



United States Department of Agriculture
National Institute of Food and Agriculture

Logo of USDA and NIFA



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carries out drastically help United States to ensure agricultural biosecurity, making the state a key player for aiding the promotion of global biosecurity.

Possible Solutions

Improvements in Surveillance and Coherence in Communication



Factors that contribute towards public health surveillance

Increased efforts in surveillance regarding disease outbreak in possibility of an event of biological warfare can help improve the effectiveness of the biosecurity measures that are implemented both on a global and national scale. For example, state governments can collaborate with several international organizations, such as the WHO, in order to strengthen public health surveillance and response activities. These

strengthened actions include improving the

national surveillance of disease outbreaks, along with early warning and response systems at all levels, to detect diseases that may have been deliberately caused. Strengthening the coherence in communication between multiple sectors within member states, such as authorities that specialize in public health, water supply, food safety, and poison control, is another example of a competent measure to ensure national biosecurity. It is also extremely important for the governments to improve vulnerability assessments within nations and maintain effective communication between the professionals and the mass public. The actions can all prevent possible biological warfare and bioterrorism attacks not only by quickening the response mechanism to these cases, but also through rapidly detecting whether the outbreak itself occurred naturally or through a deliberate release of pathogenic substances, which can significantly alter the way governmental organizations react. Furthermore, private foundations and firms can contribute funding to intensify control measures and implement high-tech surveillance frameworks into national security authorities and other public settings, to increase the chances of identifying citizens who were responsible for the spread of fatal viruses and capturing those who deliberately utilized biological agents to conduct biological attacks. Thus, advancing surveillance systems and communication between distinct sectors within each state will help promote biosecurity across the globe.

Establishment of Additional International Treaties and Bolstering International Cooperation

There may be room for exploring the feasibility and desirability of a new international agreement that establishes standards for physical protection, containment measures, and operating procedures for dangerous pathogens storage or worked with in academic, government, industrial, or research laboratories. The issues regarding genetic modification involving pathogens or gene coding for various toxins with the purpose of warfare should also be addressed. States should in any case be encouraged to implement stricter internal controls on the use, storage, and transfer of pathogens. The United Kingdom's Anti-Terrorist legislation launched in 2001 provides significant insight regarding the introduction of new agreements, as it is an appropriate precedent that contains measures to prevent unauthorized access to pathogens and toxins. The act also includes the expanding the scope of devices containing biological agents and toxins used for hostile purposes to include those not captured by the Biological Weapons Act 1974. This is only one type of a new global treaty that can both reinforce previously released laws and issue new countermeasures towards biological attacks.

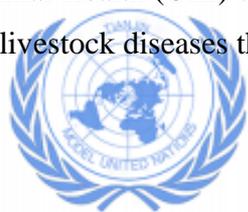
Furthermore, recent trends in agricultural biosecurity recommend a shift from a largely national approach to biosecurity towards broader international cooperation. International actions against common threats promote biosecurity in a way that benefits all parties as a shared approach can be developed in tackling dangers posed by pests and diseases that cross borders. There are several concrete opportunities for international action, including the identification of key pathways that new biological threats to agricultural systems on a national level are introduced. The enhancement and adoption of ballast water exchange conventions in response

to marine invasions of biological and microbial threats can be a previously advocated example of a quick but concerted responsive action. In addition, international eradication programs for animal and plant diseases like rinderpest can be developed, as the world has already experienced the

advantages of eradication frameworks for human diseases, such as smallpox. Improvements in warning networks with the aid of international bodies including but not limited to the WHO and the World Organization for Animal Health (OIE) can also ensure global biosecurity, as it assists in speculating and preventing zoonotic livestock diseases through epidemiological analysis and observations.



Logo of OIE



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Glossary

Biological Warfare

The intentional use of living infectious microorganisms or toxins that are derived from living organisms, to cause death or disease in humans, mainly as weapons of war

Biological Agents

Microorganisms or toxic substances that causes diseases in humans, plants, or animals, or causes the deterioration of material, which can be utilized and developed as means of biological warfare

Bioterrorism

Terrorism involving the intentional dissemination of toxins and other infectious agents, which are not state-sponsored and not used during war

Agroterrorism

The usage of microbes or their toxins, bacteriological weaponry, and any other infectious agents to terrorize human populations by destroying or contaminating food supply

Biosecurity

Procedures intended to protect humans, animals, or plants against disease or harmful biological agents that may be released either intentionally or naturally

Biological Weapons Convention

A disarmament treaty that effectively bans biological and toxin weapons by prohibiting their development, production, acquisition, transfer, stockpiling and use.

Dual-Use

Distinct types of technology and systems that can be used for both peaceful and military aims, including the biological agents that can be both utilized for warfare and medical purpose.

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