Countering the Russian biological weapons threat: implications for NATO security
Countering the Russian Biological Weapons Threat: Implications for NATO Security

Emma Nix
Advisor: Lt Gen Jack Weinstein

Pardee School of Global Studies
International Relations Honors Thesis
April 2, 2021
# Table of Contents

Nature of the Threat ............................................................................................................ 5  
Background .......................................................................................................................... 6  
  What are Biological Weapons? .......................................................................................... 6  
  How are Biological Weapons Developed? ....................................................................... 8  
  What is Biodefense? .......................................................................................................... 9  
Literature Review ................................................................................................................ 10  
  Biological Security Dilemma ............................................................................................ 10  
  Classification of Biological Weapons as Weapons of Mass Destruction ....................... 12  
Use of Force ....................................................................................................................... 14  
History of Use of Biological Weapons .............................................................................. 15  
  Ancient Usage .................................................................................................................. 15  
  Early History (1900-1945) .............................................................................................. 15  
  Modern (1945-present) .................................................................................................... 15  
International Response to Biological Weapons ............................................................... 18  
  Norms against Biological Weapons .............................................................................. 18  
  Using Intelligence to Find Threats .................................................................................. 19  
  Diplomatic Measures ..................................................................................................... 21  
    Geneva Protocol and its Failures ................................................................................... 21  
    Biological Weapons Convention and Failures .............................................................. 23  
    The Australia Group and Resolution 1540 .................................................................. 24  
Where NATO Stands ........................................................................................................... 24  
  NATO Collective Security versus Individual States ....................................................... 24  
  Contributions by Individual NATO states .................................................................... 25  
    US ................................................................................................................................. 25  
    UK ............................................................................................................................... 26  
    France ....................................................................................................................... 27  
    Italy ............................................................................................................................ 27  
    The Czech Republic ................................................................................................... 27  
    Hungary .................................................................................................................... 28  
    Poland ........................................................................................................................ 29  
    Germany .................................................................................................................... 30  
  Related Member Projects Outside of NATO ................................................................. 30  
  Involvement in International Agreements ....................................................................... 31  
  Global Health Security Risk ........................................................................................... 32  
  Past policies from NATO ............................................................................................... 33  
  Inferences from NATO Documents .............................................................................. 35  
  Previous Statements from NATO Leaders .................................................................... 37  
  NATO Groups and Task Forces .................................................................................... 38  
NATO Crisis Management Case Studies ......................................................................... 39  
  The Skripal Poisoning .................................................................................................... 39  
  The COVID-19 pandemic ............................................................................................... 40  
Where Russia Stands .......................................................................................................... 42  
  Soviet Union: First Program (1890-1970) .................................................................. 42
Soviet Union and Russia: Modern Insinuations (1992-2021) .............................44
Development of Soviet Biological Weapons Doctrine ........................................44
Does Russia Still Have Biological Weapons .......................................................47
Putin’s Biological Aspirations ............................................................................49
Poisonings - a One Off or a Pattern? .................................................................50
Russia and International Accountability ............................................................52
Russian Scientists and Proliferation ....................................................................53
Biosafety in Russia ...............................................................................................54
Disinformation ......................................................................................................54
The Gap Between Russia and NATO: Potential Threats ......................................55
  The Intelligence Gap .........................................................................................55
On the Battlefield ..................................................................................................57
Individual Uses ....................................................................................................58
The International Scene .......................................................................................59
Policy Recommendations .....................................................................................60
Conclusion ............................................................................................................64
Bibliography .........................................................................................................65
**Acronyms and Abbreviations**

**WMD:** Weapon(s) of mass destruction  
**BW:** Biological weapon(s)  
**Acquired Immunodeficiency Syndrome:** AIDS  
**COVID-19:** Coronavirus disease 2019  
**BWC:** Biological Weapons Convention (formally the Biological and Toxin Weapons Convention)  
**NATO:** North Atlantic Treaty Organization  
**CW:** Chemical weapon(s)  
**CBW:** Chemical and biological weapons  
**WWI:** World War I  
**WWII:** World War II  
**SIGINT:** Signals intelligence  
**MASINT:** Measures and signatures intelligence  
**OSINT:** Open source intelligence  
**HUMINT:** Human intelligence  
**AG:** Australia Group  
**WTO:** Warsaw Treaty Organization  
**PPE:** Personal protective equipment  
**CBRN:** Chemical, biological, radiological, nuclear  
**GDR:** German Democratic Republic (East Germany)  
**EU:** European Union  
**EDA:** European Defence Agency  
**NTI:** Nuclear Threat Initiative  
**DCI:** Defense Capabilities Initiative  
**PCC:** Prague Capabilities Commitment  
**NPT:** Treaty on the Nonproliferation of Nuclear Weapons  
**CWC:** Chemical Weapons Convention  
**STO:** Science and Technology Office (NATO)  
**NRF:** NATO Response Force  
**CBMs:** Confidence-building measures  
**FEMA:** Federal Emergency Management Agency  
**ICBM:** Intercontinental ballistic missiles
Nature of the Threat

Despite their official classification as weapons of mass destruction (WMD), biological weapons (BW) are perceived as less dangerous than other WMDs and given less attention in international policy spheres. Nuclear and missile technology present a continued danger and therefore are highly prioritized by policymakers. BW, on the other hand, are rarely discussed on the international stage. Nevertheless, peaceful, modern biotechnology continues to improve capabilities that can be key for everything from medical treatments to agricultural crop yield, but can be misused for malicious activities. To address the delicate balance between peaceful and malicious use, BW should be given higher attention in arms control. Furthermore, as pathogens are living things, they can naturally evolve to evade defenses. Regardless, the nature of the modern threat of BW itself continues to change. Biothreats can be natural or manmade and stem from various backgrounds or intentions, broadening their danger and difficulty to control. The primary focus of this paper revolves around the dangers of intentional use of BW.

Since the 2014 invasion of Crimea, Russia has developed new warfare techniques that have been described as “asymmetric war,” “hybrid war,” and “gray zone conflict.”¹ The exact term used has been highly debated as scholars struggle to classify Russian actions, such as the 2015 cyber attack on the Ukrainian power grid or ongoing disinformation campaigns in the West.² While the lack of clear terminology may be worrisome, the debate underlines the trend towards incorporating various strategies, which could involve BW. Unlike nuclear weapons, BW have a range of consequences and can be lethal or incapacitating, but their use does not cause physical destruction. Because of this, it is feasible they could be deployed in a hybrid-war situation to gain the advantage before an offensive, weaken an enemy’s defenses, or otherwise accomplish broad operational goals. Furthermore, Russia has shown great propensity for ignoring international law, as can be seen through their chemical attacks on political or state enemies such as Alexei Navalny and Sergei

Skripal. With an ongoing war in Ukraine, NATO must consider the potential threat of BW and prepare necessary defenses while also deterring Russia’s unacceptable flaunting of international law.

**Background**

*What are Biological Weapons?*

BW are a category of weapons including pathogens, toxins, and bioregulators that are used with the intention of causing mass illness or fatalities. Pathogens are viruses and bacteria, living microorganisms that are capable of replicating on their own and therefore spread self-sufficiently. These microorganisms are commonplace in everyday life and can cause minor illnesses such as the common cold and food poisoning or more extreme illnesses such as Acquired Immunodeficiency Syndrome (AIDS) and meningitis. Viruses function by invading a cell and hijacking cellular function, using them as a host to replicate and spread. Bacteria, on the other hand, can hijack cells or replicate within the body to prevent normal function. In both cases, pathogens create sickness by preventing cells from carrying out their necessary duties or killing them. Pathogens cannot immediately cause sickness, but require hours to days to replicate and grow, known as the incubation period. Moreover, the strength of any pathogen determines how transmissible it is, or how easily it spreads. Infectious diseases caused by pathogens occur naturally and can cause overwhelming illness or death, but BW are specially engineered to alter characteristics impacting transmissibility, symptoms caused, and resistance to immunity or medical countermeasures.4

While pathogens are living organisms that invade cells to cause illness, toxins and bioregulators are molecules that impact function through other means. Toxins are organic compounds found naturally in a wide range of living things from fungi to plants to venom-
producing animals. Toxins act as poisons with a range of capabilities such as damaging the cell and its DNA or inhibiting essential proteins and hormones. The effects of this damage quickly attack the nervous and cardiac systems, making them highly lethal. Ricin, a toxin isolated from the castor bean, is a well-known toxin that kills targets within days by prohibiting cells from making proteins. Furthermore, there aren’t medical countermeasures available to treat ricin poisoning, increasing its lethality.⁵

Bioregulators encompass a category of molecules found naturally in the body that regulate blood pressure, heart rate, temperature, immunity, mood, sleep, and more. These chemicals are vital to maintaining biological equilibrium, but their presence in excess concentration can overwhelm normal body function, making them ideal weapons. For example, bradykinin is a protein used to lower blood pressure, but in excess, can cause severe inflammation that can block the airway and cause respiratory distress.⁶ Both toxins and bioregulators are not self-replicating and cannot spread through infectious means. Regardless, their more immediate effects on a target increase their relevance as BW.⁷

Pathogens, toxins, and bioregulators all occur naturally, but can be classified as BW based on purposeful dissemination with the intention to cause harm. Many BW programs focus intensely on methods of dispersing an agent, which has driven research on bomblets and aerosols. Bomblets serve as a point source, releasing a BW at a precise location to target the surrounding region. Aerosols release powdered biological agents through sprayers, covering a broad, indiscriminate region where individuals may encounter and inhale them. Aerosolization has a higher transmission rate than bomblets from breathing in the agent as a powder. Aerosolized weapons also are more discrete, as they release inconspicuous powders and therefore are difficult to identify without advanced sensing technology. However, BW are sensitive to environmental factors such as

---

humidity or ultraviolet (UV) radiation that damage them while airborne, challenging their functionality as weapons.⁸

How are Biological Weapons Developed?

BW present an interesting dilemma as rapid advances in biotechnology and their application to civil society are inherently tied to BW development. This problem arises because the foundational research and basic tools or methods for peaceful and military applications are identical. For instance, CRISPR/Cas⁹ is a modern gene editing system that can insert novel pieces of DNA into existing systems. This capability is vital in modern biotechnology, especially in pharmaceutical or agricultural contexts, to therapeutically address genetic disorders, create genetically modified plants to increase crop yield, and more.⁹¹ The same tools can be used to invent BW if applied to a military context. As science continues to advance, it is likely that this dual-use technology will increase the opportunity for misuse.

Unlike other WMDs, regulating and tracking BW development proves difficult because of the wide availability of dual-use technology and equipment. Nuclear and chemical weapons both require large industrial facilities, making it possible to identify them using aerial surveillance and intelligence. BW, on the other hand, can be developed in a standard laboratory, such as those found at universities and biotechnology companies. The only difference between peaceful and dangerous research is intent, covering malicious actions under the guise of civilian work. Without differences in materials and methods, it can be difficult to determine motive for usage based on just the tools. Moreover, movements to socialize access to science education open dual-use technology equipment and lab space to the public with little to no oversight.¹¹

Modern biotechnology provides solutions to many longstanding issues that limited the effectiveness of BW. For example, using genetic engineering, scientists have invented chimera

---

⁹ CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats, a small piece of DNA that marks a cut site on target DNA, while Cas9 refers to a bacterial protein used to cut the target DNA.
pathogens. Chimera pathogens are pathogens that combine elements of various dangerous agents, provide antibiotic resistance, or produce lethal toxins after infection. These features allow an actor to edit a BW so that the body’s natural defenses may be insufficient, increasing the likelihood of a successful attack. A longstanding concern over how to practically carry out a BW attack has revolved around uncertainty with environmental conditions as pathogens degrade quickly depending on weather. Biotechnology can now cover an agent with a microcapsule to protect the pathogen, solving the weather issue. While these scientific advancements have not been tested for their strategic or tactical abilities, the potential applications suggest biothreats will only increase in the future as BW become more lethal and operationally useful.12

What is Biodefense?

Biodefense aims to minimize the dangers posed by a biological event, whether naturally occurring or manmade. Defense strategies involve measures such as developing antibiotics, vaccines, and treatments or detecting the presence of dangerous pathogens using sensors and public health tools.13 The goal of biodefense is to protect those who have been in contact with a potential threat while containing the threat and preventing further exposure. Through the COVID-19 pandemic, more attention has been brought to simple biodefense measures such as wearing a mask or quarantining sick or exposed individuals. Historically, the development of vaccines or treatments has taken years after the emergence of a threat, minimizing the practicality of relying on medical countermeasures. However, COVID-19 has shifted this thinking and demonstrated faster turnaround between development and deployment of these responses, though they are still generally too slow to rely on in lieu of public health measures. Overall, the pandemic has highlighted the importance of early detection of and preparing for biothreats, underscoring the reform needed for a sustainable biodefense strategy.

Literature Review

Despite the growing threat of BW and spread of related technology globally, very little work regarding security implications in Europe specifically exists. Furthermore, the current debate over BW primarily addresses the role and failures of diplomacy in biological arms control. Before evaluating the threat BW pose to the North Atlantic Treaty Organization (NATO), it is important to first gain a stronger grasp of security issues as they relate to BW. Below, I discuss three elements of biological security, including the biological security dilemma, classification of BW as WMD, and the use of force regarding BW.

The Biological Security Dilemma

Realism accepts the core tenet that the international system is inherently anarchic without a higher power to enforce international law or oversee cooperation. As such, the purpose of the state is to ensure its survival, which in an anarchic system leads to security-seeking behavior.\(^\text{14}\) The security dilemma emerges from this behavior, as each state assumes its enemies are seeking security through means that inherently endanger the first state’s survival.\(^\text{15}\) This spiral arises with all types of force ranging from conventional to nuclear weapons. However, BW change the balance due to the inability to judge intentions of biodefense research and secrecy surrounding them.

In his book *Biosecurity Dilemmas*, health security expert Christian Enemark remarks that BW are not in essence weapons and, “it is unhelpful to think of a state as possessing BW and more accurate to think of it as being in a *position* to threaten or perpetrate a biological attack.” Expanding on this thought, he argues that BW cannot be obtained in the traditional sense because they are not a physical weapon to be wielded, but a system of scientific advancements that produces a threat when states weaponize their technology. As biotechnology spreads around the world, the number of states with access to BW technology increases, putting more states in a position to threaten others with BW. In a realist international system, states cannot control the

---


usage of BW, leaving them uncertain of others’ intentions and encouraging security-seeking behavior.

Modern biotechnology shrinks the gap between offensive, defensive, and civilian research into systems with the potential to be weaponized, leaving intentions as the only indicator to the true goal of such research. Although states could increase security through understanding a potential enemy’s intentions, intense secrecy prevents any attempts to minimize the security dilemma. Gregory Koblentz, a professor of biodefense, discusses the role of secrecy in protecting a state developing BW versus the ability of distorting outsiders’ decisionmaking. States seeking BW rely on secrecy to protect their capabilities and minimize vulnerability to an outside attack. In terms of the security dilemma, the weapons-seeking state attempts to gain the upper hand by developing a weapons capability their enemies do not have and cannot defend against, supporting their goal of regime survival through military superiority. However, intense secrecy leaves outsider states unable to predict and prepare for a military threat. In turn, threatened states strengthen defenses or arm against their enemy. In the cycle of the security dilemma, the outsider state validates a weapons-seeking state’s quest to arm against the potential adversary. While this pattern remains true for many weapons systems, Koblentz argues that BW excessively damage the international security dilemma because of normative, diplomatic, and strategic restraints necessitating secrecy. Strategic concerns are remarkable in the security dilemma context. Depending on the agent used, BW can feasibly be defended against with public health or medical countermeasures. To ensure a biological attack succeeds, states must deny their adversaries the ability to defend against an attack. Regimes of secrecy emerge and pose a significant threat to international security when compounded with the security dilemma.\textsuperscript{16}

Searching for a solution to minimize the security dilemma, BW expert Jonathan Tucker adapts the premise of the security dilemma to fit what he calls the “Vicious Circle.” In his cycle, Tucker explains how fear of a bioterror or broader BW attack heightens threat assessment activities

\textsuperscript{16} Koblentz, \textit{Living Weapons: Biological Warfare and International Security}. 
that appear offensive to states on the outside. Without any evidence that a state researching BW has peaceful or defensive motivations, outside states begin to conduct threat assessments of their own and inevitably feel weak relative to the original state, leading to decisions to increase BW capabilities, offensive or defensive. This decision completes the circle as the original state recognizes greater danger from others and questions its relative strength once again. Tucker highlights the connections between this cycle, biological arms races, and self-fulfilling prophecies. To avoid the cycle, he argues for broader transparency and limited biodefense efforts, but these goals contradict the reality demonstrated by other authors that biotechnological advancement and secrecy are inherently tied to BW.17

Classification of Biological Weapons as Weapons of Mass Destruction

Despite their frequent categorization as a weapon of mass destruction, BW are unique and do not neatly fall into the same group as nuclear weapons, confusing strategy and security issues surrounding their development. In his “Defining ‘Weapons of Mass Destruction,’” Seth Carus breaks down the extensive history behind the ambiguous term “WMD.” Carus identifies multiple groups of the term with varying degrees of inclusion, leading some to suggest WMDs include chemical, biological, nuclear, radiological, or other highly explosive weapons while others include any tool capable of causing significant destruction or distraction, such as cyberweapons. Contrary to this broad interpretation, limited definitions may just call nuclear or radiological weapons WMDs. The existence of the debate itself exposes the difficulty in grouping BW with others, as they are inherently different from the other weapons on the basis of their nature as living organisms and biological materials. Unlike conventional or nuclear weapons, BW do not cause physical destruction, but rather attack the body itself. For this reason, experts have proposed the term “weapon of mass casualty” to better appreciate the threat to humans as opposed to infrastructure.18

The debate over terminology is further complicated when considering both BW and chemical weapons (CW). Many have previously tied the two weapons systems under the term “chem-bio” because of their similar lack of physical destruction and focus on biochemical properties. However, even this term avoids the vital significance BW provide for security. According to Koblentz, the danger of BW arises from their vast biological diversity, ability to naturally replicate, and applied technology, differentiating them from CW.\textsuperscript{19} CW are exclusively molecules used to quickly intoxicate or kill a person, but are unable to replicate like BW. Unlike weapons that cause physical destruction, BW represent a broad category of specific threats with some causing lethal disease, others causing minor ailments, and still more capable of merely incapacitating individuals. Moreover, the mechanisms of how each different agent acts determines the defenses against it, so diverse agents make it difficult to defend against any one specific threat. Because of their ability to replicate, BW do not represent a single incident or threat, but rather an exponentially growing public health crisis. Finally, their development sets them apart from their chemical, radiological, or nuclear counterparts. Koblentz cites a United Nations study from 1969 that prices the death of one person due to a BW at $1, while chemical and nuclear weapons cost $600 per death.\textsuperscript{20} The stark difference in cost arises due to the nature of multiuse technology, demonstrating that BW development does not fit neatly with other WMDs.

Considering blurry definitions separating weapons categories, especially BW and CW, academic Christopher Chyba presents WMDs as a continuum based on the potential for and success of nonproliferation efforts. The spectrum ranges from nuclear weapons, whose nonproliferation measures benefit from relatively easy verification methods and deterrent power, to cyber, which remains a complex puzzle for nonproliferation. BW and CW fall in the middle because controls against them exist, although Chyba presents CW as more similar to nuclear weapons and BW to cyber. Dual-use technology favors the proliferation of both, but the international community appears more dedicated to protecting against CW, leaving BW to

\textsuperscript{19} Koblentz, \textit{Living Weapons: Biological Warfare and International Security}, pp. 5.
resemble cyber issues because of the difficulty to dampen an emerging threat. While Chyba’s scale appears sensible, the terminology issue persists without international consensus, slowing progress for greater security issues.21

Use of Force

As follows with debates regarding simply naming a weapon, the use and strategic value of BW is hotly contested, especially regarding their deterrent capability. Deterrence intends to prevent another state from acting in a particular way using the overt threat of certain punishment. In “Pathogens as Weapons: The International Security Implications of Biological Warfare,” Koblentz argues BW cannot serve as a deterrent because they cannot ensure success and take too long to cause harm. The effectiveness of any BW is determined by atmospheric and environmental conditions. The agent must then be taken into the body to act, leaving an unpredictable outcome. Additionally, adversaries may be able to defend against an attack, as deterrence requires a clear threat that then leaves the attacker vulnerable if the enemy can respond before the use of force.22

Nonproliferation analyst Francisco Galamas refutes the longstanding agreement that BW cannot act as a deterrent. Galamas considers modern biotechnology to demonstrate how science has solved many of the practical issues with using a BW. For example, biotech now can design pathogens that are antibiotic or vaccine resistant, reducing the effect of preemptive or prophylactic biodefense. Scientists can also edit a pathogen’s genes to produce a protective coating that negates the risk of damage by atmospheric conditions. Finally, BW can be manipulated to be more virulent or lethal. Galamas argues that these scientific advances create a sense of certainty that a biological attack will cause harm; therefore, BW can act as a successful deterrent.23

History of Use of Biological Weapons

Ancient Usage

---

While modern biotechnology has pushed the development of WMDs in a new direction, BW are not a new tool. The concept of using natural disease and pestilence against an enemy has existed for hundreds of years without an understanding of germs and how they spread. Instead, historical bio-weaponeers poisoned food and water sources or used ill individuals themselves to carry disease to the enemy. For example, a European nomadic tribe from the times of ancient Greece dipped arrows into a mixture of rotten snakes and old, human blood before launching them towards an enemy to spread sickness. When attacking fortified cities, the Mongols allegedly catapulted the bodies of those who had died from disease into the city to infect the populous and weaken their ability to defend against an impending attack; this strategy did not result in military victory, but did effectively spread the plague. Similar attempts to spread disease involved sending sick individuals into enemy ranks to spread disease. Despite the lack of understanding of how infectious disease spreads, historical use demonstrates BW’s relevance as a strategic weapon to gain an advantage. With their usage, however, BW acquired a stigma as dirty and unethical tools of war.  

_Early History (1900-1945)_

In the 19th century, scientists discovered the causal relationship between germs and sickness, revolutionizing medicine, sanitation, and public health. Early on, most research sought to develop vaccines for naturally occurring diseases. Alternatively, public health experts implemented new hygiene and sanitation standards to minimize the spread of germs. During World War I (WWI), scientists devised the idea of applying new microbiological techniques to war when German military planners decided to infect enemy livestock and cavalry horses.  

This level of biological warfare continued in the ensuing decades, primarily dominated by Japanese research and use of BW against the Chinese in the years before World War II (WWII). Japanese weapons

---


26 Carus, _A Short History of Biological Warfare: From Pre-History to the 21st Century_, 15-19.
used basic methods to disseminate biological agents, such as dropping plague-carrying fleas or contaminated food from planes over China, but were somewhat successful nonetheless. Hallmarks of this era highlighted the growing understanding of pathogens as new agents were discovered, isolated, and tested for use, spurring the development of modern BW once paired with advancements in industrial production.

Modern (1945-present)

In recent history, BW are less relevant for state use and proliferation concerns, but have posed an increased threat for use by terrorist organizations or other nonstate actors. Many BW-seeking states abandoned offensive programs with the rise of nuclear weapons. The primary case of state-level BW proliferation involved Iraq in the 1980s and 1990s, who developed a wide range of weapons for protection and deterrence until they could acquire a nuclear weapon. As discussed, modern technology enables the production of BW to go unnoticed by verification regimes and lowers the barrier of access, allowing anyone with access to a lab and microbiology expertise to produce a weapon. Theoretically, the relative ease of obtaining BW over other WMD makes them an ideal target for nonstate actors with limited resources. BW further prove promising for terrorist organizations due to their ability to indiscriminately cause mass casualty events. In practice, it has been exceedingly difficult for terrorists to develop, produce, and effectively weaponize such agents, with only one major incident occurring in the US.27

The most successful instance of bioterrorism was not carried out by a known nonstate actor or terrorist organization, but by an American microbiologist, Dr. Bruce Ivins. Immediately following 9/11, a US Army scientist mailed seven envelopes filled with high-quality B. anthracis28 spores, leading to five deaths and 22 cases of anthrax.29 Potential motive for the attack may have been to bring legitimacy and urgency to his work developing an anthrax vaccine, with little

28 B. anthracis is the bacteria responsible for anthrax, a set of diseases that impact both humans and livestock and can attack the skin, gastrointestinal system, or pulmonary system.
evidence suggesting he intended to cause general panic as would be expected of a terrorist attack. The so-called Amerithrax attacks, named by the FBI, do not represent a great biological terrorism threat. The scientist responsible was an expert specializing on *B. anthracis* and had access to superior tools and materials, as well as necessary technical expertise. Moreover, the attack was not on the general population and did not require advanced dissemination techniques. Overall, the Amerithrax case highlights the level of expertise needed to create a successful weapon; simultaneously, however, the incident suggests even a minor attack can cause significant damage between the loss of life, the ensuing $6 billion in clean-up and investigation efforts, and heightened public fear of BW.30

In stark comparison, numerous nonstate actors around the world have sought to develop BW without success. A cult in the city of The Dalles, Oregon, called the Rajneeshees, attempted to contaminate salad bars with *Salmonella* in 1984, hoping to suppress voter turnout by infecting citizens.31 Though over 700 Oregonians were sickened in the incident, the overall effect of the attack was minimal. In the 1990s, the Japanese doomsday cult Aum Shinrikyo sought to develop a BW to employ against nonbelievers but was unable to overcome technical difficulties.32 The cult attempted multiple BW attacks using poorly prepared agents that were not of weapons-grade quality or were unfit for large use because of how the pathogen was prepared. Aum eventually resorted to the CW sarin for a successful attack on the Tokyo subway in 1995. Finally, al Qaeda prepared two laboratories to work with *B. anthracis* and botulinum toxin33 beginning in 1999, but the program was cut short by the US invasion of Afghanistan in 2001.34 Even without US intervention, it appears the group would not have succeeded in developing weapons because of limited technical expertise. The underlying importance of these three instances suggests that, while

33 Botulinum toxin is a neurotoxin that causes botulism, or neuromuscular paralysis.
International Responses to Biological Weapons

Limited controls exist to prevent the proliferation and use of BW. Normative behavior largely minimizes the risk of BW usage, but bad actors can still seek and acquire BW. Therefore, intelligence is key to understand the threat and prepare a proper response. Diplomatic controls should inherently depend on intelligence to ensure compliance. In the case of BW, however, intelligence largely fails to dig up evidence of BW development and production, weakening the existing diplomatic and normative controls.

Norms Against Biological Weapons

BW usage has been regulated through a combination of norms and legal obligations. As previously mentioned, BW have existed for thousands of years, though in less technical forms. However, their usage has remained rare despite scientific advances that produce larger quantities of more effective agents. Before the advent of modern BW or the scientific principles underlying them, humans were averse to the idea of poison and intentionally sickening others. Scholars have proposed the idea that humans are genetically averse to BW as an evolutionary mechanism to survive by avoiding dangerous substances. Historically, ancient India is the first place to have written record of prohibition of poisons, with the Hindu Laws of Manu from 500 BC banning Brahman warriors from using them. Natural rejection of poisons spanned different geographical regions, political structures, and religions, such as with the ban given from the first caliph, Abu-Bakr, in 632 or the European Christian rejection during the medieval period. The widespread taboo against biological and chemical agents carried up to the 20th century, where modern biotechnology and warfighting won out over longstanding ethical objections.

---

37 Zanders, “International Norms Against Chemical and Biological Warfare: An Ambiguous Legacy.”
diplomatic bans of BW and CW, a German representative explicitly advocated their usage as more humane, questioning whether modern biotechnology will enable actors to create superior weapons and therefore weaken restrictive norms.38

Using Intelligence to Find Threats

While sufficient for other weapons, intelligence modalities like signals intelligence (SIGINT) cannot feasibly detect offensive use of biotechnology solely based on a state’s facilities or equipment. BW could be produced in a university lab, where they are unlikely to be discovered via intelligence. On the contrary, chemical and nuclear weapons require specialized facilities and storage visible from aerial surveillance. Intentions alone differentiate offensive, defensive, and civilian research, but dual-use technology provides a viable cover for many projects with the potential to create a weapon. BW storage and security equipment stand apart from standard laboratory equipment and could have served as a marker for offensive weapons production. However, as the biotech field grows, the lines between normal and excessive security blur. In theory, an ideal modality for collecting intelligence on BW would track equipment purchases and ensure its safe delivery and implementation, but this strategy remains impractical as scientific advances make laboratory materials broadly accessible. Even the pathogens themselves are more broadly available as genetic engineering allows a relatively amateur scientist to weaponize an otherwise mundane pathogen, circumventing monitored agents stored in microbiology banks and labs. Finally, the life science field continues to grow globally as biotech and pharmaceutical companies flourish, increasing the sheer volume of available information to search through to find malicious intent.

Limited options exist for collecting intelligence on BW because of the nature of biological research, lack of identifiable markers, and regimes aiming to protect programs. Intensive secrecy employed to protect BW programs from outside scrutiny hinders SIGINT and denies information through communications. The small scale of BW and their relatively limited identifiable features

inhibit measurement and signatures intelligence (MASINT). The remaining options for potential BW intelligence collection methods include open source intelligence (OSINT) and human intelligence (HUMINT). OSINT seeks to find publicly available information regarding what research is being conducted and draw conclusions about an actor’s intentions based on the direction of the research. Moreover, key capability goals become clear through published research. For instance, information about vaccine development suggests that the actor in question fears the spread of a specific pathogen. However, OSINT cannot provide information regarding an actor’s intentions. With states unlikely to publish work directly related to BW production, resulting intelligence only serves as an indicator of capabilities, not threats.

The remaining option, HUMINT, represents the most successful intelligence method, as a source from a BW program can attest to both what capabilities are being developed and intentions. HUMINT proves how poorly other intelligence methods fare against BW. Intelligence services in the 1990s severely underestimated Russian and Iraqi capabilities and only realized the breadth and depth of their offensive programs when high-level defectors directed them to specific facilities. However, finding HUMINT sources of value remains difficult, especially considering how little information is available to hunt down a potential source and the unlikelihood of a perfectly placed source presenting themselves. Without HUMINT and based on limited support from other collection methods, BW face a chronic issue of insufficient evidence, allowing a proliferation threat to expand and present a valid risk before being caught.

The Soviet BW program provides a crucial case study to understand the failures of BW intelligence collection because of the long-term inability of Western intelligence services to find BW facilities and malicious research activities. During the Cold War, the US first learned of the surprisingly large BW industry in the Soviet Union from two WWII German military scientists, which served as the basis for the intelligence community’s analysis for decades.³⁹ By the late

1950s, satellite imagery confirmed one facility described by the German sources. Additionally, OSINT played a significant role in early intelligence estimates by analyzing published scientific articles to identify Soviet goals and intentions. However, the resulting information frequently led analysts to underestimate the scope of the BW program based on the theory that the research constituted legitimate public health or veterinary research.

In the 1980s, the CIA continued to find a few other facilities constructed after a 1972 decision to expand the Soviet program, but failed to find clear evidence of any offensive programs. As a result, Western intelligence leaders dismissed the possibility of a BW threat. Without tangible proof, intelligence officials fostered a bias against the belief of Soviet BW, impeding in-depth analysis and attempts to view the issue impartially.\textsuperscript{40} Intelligence failed to uncover solid evidence until Vladimir Pasechnik, a Soviet bio-weaponeer, and Ken Alibek, deputy chief of the largest BW entity, defected to the US. Overall, Western intelligence services dramatically underestimated Soviet capabilities or intentions, largely because of intensive security and secrecy within the Soviet system itself. Applied to the modern context, the case study of Soviet BW demonstrates that the intelligence community could benefit from aggressive, up-to-date intelligence collection and systemic reform to minimize analysts’ bias. As dual-use technology further hinders the ability to track a potential threat, creative thinking will be necessary to successfully target and clarify details surrounding offensive BW.

\textit{Diplomatic Measures}

\textbf{Geneva Protocol and its Failures}

The 1920s saw an increased interest in arms control and disarmament following the mass destruction of WWI, such as with the 1922 Washington Treaty’s limitations on naval power. Both BW and CW were similarly highlighted, though CW were considered a more pressing threat than BW. The Geneva Protocol emerged from the \textit{Convention for the Supervision of the International Security}.\textsuperscript{40}

\textsuperscript{40} Koblentz, \textit{Living Weapons: Biological Warfare and International Security}. 
Trade in Arms and Ammunition and in Implements of War to specifically address CW and BW.\textsuperscript{41} During WWI, CW were widely used and resulted in an estimated 1.3 million casualties.\textsuperscript{42} On the contrary, BW were generally used in small, tactical situations, such as the German use against livestock.\textsuperscript{43} As CW resulted in overwhelming casualty compared to BW, CW were the main focus of the debate. The original version of the Geneva Protocol prohibited the use of “asphyxiating, poisonous, or other gases,” which introduced the debate over whether or not this description covered BW.\textsuperscript{44} At the Polish Delegation’s insistences, bacteriological weapons were included, introducing an official ban on the offensive use of BW.

While BW may have been formally banned, the Geneva Protocol left loopholes for continued research and development. Notably, the Geneva Protocol only banned the offensive use of BW, not their development, production, or stockpiling. Moreover, states expressed concerns over their ability to retaliate in kind should another state use an offensive BW against them. As a result, states were able to develop BW as a response. The vague approach was somewhat necessary to permit civilian research into medical countermeasures, but these efforts can be used as a cover for offensive weapons production, further complicating diplomatic goals. Without firm restrictions on both offensive and defensive programs, the Geneva Protocol essentially institutionalized a preexisting taboo against BW and CW. However, aversion to these agents had not prevented their use in WWI and similarly the Geneva Protocol did not prevent offensive usage or development during the interwar period, demonstrated through Japanese BW experimentation in the 1930s.\textsuperscript{45}

The Biological Weapons Convention and its Failures

\textsuperscript{42} Sarah Everts, “A Brief History of Chemical War,” Science History Institute, April 11, 2015, https://www.sciencehistory.org/distillations/a-brief-history-of-chemical-war#:~:text=World%20War%20I%20ends%20with,100%2C000%20fatalities%2C%20primarily%20from%20phosgene.
\textsuperscript{43} Spiers, \textit{Agents of War: a History of Chemical and Biological Weapons}, pp. 44-45.
\textsuperscript{45} Carus, \textit{A Short History of Biological Warfare: From Pre-History to the 21\textsuperscript{st} Century}, 15-19.
In 1972, the *Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction*, informally referred to as the Biological Weapons Convention (BWC), emerged and signaled a changing outlook for global arms control. States originally intended on negotiating an agreement for the prohibition of both BW and CW. Deciding it would be too difficult to combine the two categories, the British recommended continuing with just BW to salvage an agreement. Unlike previous agreements, the BWC became the first international agreement to completely outlaw an entire class of weapons, prohibiting the development, production, stockpiling, or use of any biological agent or toxin and held states accountable for the destruction of existing stockpiles. In 1975, the BWC entered the world stage with 22 countries agreeing to unequivocally prohibit BW. As of 2020, 183 countries have ratified or acceded to the Convention. Absent states include a handful of small countries like with no apparent interest in BW development Tuvalu and Micronesia, as well as Israel and North Korea, who both are suspected of developing BW. Furthermore, four states, including Egypt, Haiti, Somalia, and Syria, have signed but not ratified the treaty.

Despite broad public approval, the BWC exists as a mostly spineless agreement with no practical ability to enforce any involved statutes and therefore is riddled with issues. In addition to the ban itself, the agreement requires states to legislate in accordance with it, encourages sharing scientific knowledge, and supports cooperatively addressing violations. Not included, however, are any means of recognizing, verifying, or policing violations. As discussed, verification remains difficult with BW due to their reliance on dual-use technology, which easily avoids detection. At mandated five-year review conferences, states have lobbied for stronger oversight and verification, especially through the creation of the Ad Hoc Group in the 1990s to provide recommendations on strengthening compliance. However, these measures are insufficient when combined with Russian

---

noncompliance and other states’ intransigence. The US essentially ended the conversation regarding verification by pulling out of the talks and refusing to reconsider the issue. The BWC still does not contain any measures for verification or oversight and therefore has remained ineffective, though it does succeed in reaffirming norms against the use of BW.  

**The Australia Group and Resolution 1540**

The Australia Group (AG), formed in 1985, complements the BWC and now includes 43 states dedicated to synchronizing their export controls to support nonproliferation of BW and CW. The AG’s success is uncertain because the regulations are not universal. The group excludes major non-member states such as China and Russia, which can freely export dangerous materials and therefore undermine the AG. The United Nations Security Council (UNSC) Resolution 1540 similarly aims at preventing nonproliferation to terrorist organizations or other nonstate actors by requiring states to secure and strengthen export controls for WMD. Resolution 1540 benefits from its existence as a UNSC resolution, providing it broad powers and binding legality; however, it is controversial because the UNSC essentially dictated international law to all UN states though only 15 states sit on the committee at a time. 

**Where NATO Stands**

*NATO Collective Security versus Individual States*

At its core, NATO is a military alliance emerging from the Cold War, but has grown to encompass broader political support for states with similar values, blurring the lines between alliance and a political organization. NATO was established in 1949 with the goal of increasing security like a typical alliance. However, NATO expanded on the concept of a traditional alliance to organize formal institutions such as independent agencies and a multi-national military

---


structure, leading to it simultaneously acting as an international organization and a military alliance. As an alliance, NATO relies on individual states to approve and implement policies and provide resources and capabilities, which leads to varying interests. This key tenet sets the stage for mismatched efforts in regards to BW with a few states leading the majority of NATO’s programs and policies. Considering the contributions and capabilities of individual states can identify the resources available for NATO’s use.

**Contributions by Individual NATO States**

**The United States**

The US launched its BW program in 1942 after the attack at Pearl Harbor due to concerns of Japanese BW. In preceding years, Japan openly tested BW in China, alerting others to their biological capabilities. Beginning with 18 agents to develop, selected because of inherent lethality and transmission potential, the US focused primarily on *B. anthracis* and botulinum toxin as anti-personnel agents. The US also continued research conducted by the British during the war to weaponize anthrax in a four-pound bomb and built facilities to mass produce these bombs. However, they did not complete the pilot program or achieve operational capability before the war ended. Additionally, Americans tested new aerosol dissemination methods. After the war, the US developed advanced delivery systems such as bombs that could cover more than 25,000 square miles with an agent, highlighting their success in both development of agents and dissemination.

During this era of BW development, the US explored anticrop agents for use against China or Russia, demonstrating the depth of military strategy involved with the program.

In 1969, President Nixon announced the unilateral termination of the American offensive BW program. Though the US did not believe BW were useless weapons, they wanted to avoid

---

52 Carus, A Short History of Biological Warfare: From Pre-History to the 21st Century, 24-25.
53 Spiers, Agents of War: a History of Chemical and Biological Weapons, 57.
the political risk of maintaining an offensive program. Military planners found it difficult to justify keeping BW due to their minimal strategic deterrence value and ineffectiveness. Furthermore, American deployment of herbicides and tear gas in Vietnam was viewed internationally as a violation of the Geneva Protocol, leading to domestic and international criticism. By signaling interest in greater arms reduction through terminating the program, the US gained political capital to fuel the Strategic Arms Limitations Talks on nuclear weapons with the Soviets.\textsuperscript{56} Through abolishing the offensive program, Nixon achieved numerous political goals by relieving pressure on his administration and opening space to discuss disarmament of various without damaging the defensive BW program. Details on modern US defensive measures remain classified, but the program is assumed to be robust based on the thriving American biotech industry.

The United Kingdom

The UK began offensive research primarily on aerosolization and cluster munitions in 1940 for use in WWII.\textsuperscript{57} They achieved operational capability, but did not employ a BW because they were highly inefficient and implausible for use during combat. By 1952, the program was considered unnecessary for military planning and phased out by 1957. In conjunction with British efforts, Canada explored multiple agents and conducted weapons tests from 1940-57.\textsuperscript{58} As of 2020, the UK is one of the primary global actors for biodefense due to history with weapons production themselves, a successful biotech industry, and forward planning based on detecting and preventing threats.\textsuperscript{59}

France

The French BW program officially spanned from 1921-1972, though with numerous interruptions. Unofficially, the program slowed down by 1956 when interest shifted to investing

\textsuperscript{56} Revill, “‘Muddling Through’ in the Biological and Toxin Weapons Convention,” pp. 391-393.
\textsuperscript{57} Carus, \textit{A Short History of Biological Warfare: From Pre-History to the 21\textsuperscript{st} Century}, 37-38.
\textsuperscript{58} Carus, \textit{A Short History of Biological Warfare: From Pre-History to the 21\textsuperscript{st} Century}, 29.
\textsuperscript{59} “UK Biological Security Strategy,” (The Home Office, United Kingdom, 2018).
more heavily in nuclear weapons. While active, the French focused on a range of pathogens and weaponization using grenades, artillery shells, and aircraft bombs with some success. Specifically, the French weaponized rinderpest, an anti-cattle disease with no human applications, indicating their intentions involved attacking cavalry or livestock.\(^60\) In recent years, French efforts focused on building large stockpiles of antibiotics and other medical countermeasures. They presumably conduct significant defensive research based on a review of state-sponsored biological institutes and in-depth biosafety and containment policies.

**Italy**

Italy operated a small program while considering the utility of BW when invading Abyssinia in 1936, though they ultimately rejected the idea.\(^61\) The program likely went underground at the outbreak of WWII. Modern Italian CBRN forces focus on civil defense of manmade threats and civil protection for both manmade and natural events. Both prongs of the Italian biodefense machinery are integrated with the army, fire brigades, and policymakers to ensure maximum control over emerging situations on a practical and policy level.\(^62\)

**The Czech Republic**

Czech expertise in poisonous weapons has been established repeatedly. Czechoslovakia provided significant support to Soviet BW efforts during the Cold War as a member of the Warsaw Treaty Organization (WTO), NATO’s eastern counterpart. For example, Czechoslovak scientists recount conducting research projects as designated by the Soviets. Despite official claims that the work was purely defensive, infrastructure such as expensive aerosol testing chambers and a primate testing program indicate offensive weapons development.\(^63\) Following the Cold War, Czech BW and CW expertise persisted, first demonstrating their proficiency during the Gulf War in the 1990s. Czech chemical detection teams were deployed to scope out chemical threats, which

---


\(^62\) Matteo E. Bonfanti, Francesca Capone, and Enrico Pautasso, “CBRN Integrated Response Italy” (Pisa, Italy, 2014), pp. 24-70.

upon finding potential CW, would quickly act to don personal protective equipment (PPE). The rapid Czech response to finding a weapon demonstrates advanced preparedness and thorough action plans, especially compared to other countries such as the US who ignored Czech warnings of chemical threats.64

Building on longstanding specialization with CBW threats, the Czech Republic has taken on a vital role in NATO’s Chemical, Biological, Radiological, and Nuclear (CBRN) defense through housing numerous defensive programs. In 2003, NATO launched its Multinational CBRN Defence Battalion under Czech leadership to improve reconnaissance, detection, and decontamination, especially in the realm of BW detection. Per a NATO press release, the group is responsive to active threats, with the ability to deploy within days, or can be integrated into specific missions.65 Moreover, the Czech Ministry of Defence and Armed Forces operates a Biological Defence Centre as a specialty hospital and research facility for dangerous pathogens, which contracts with NATO, though the exact work conducted is unclear.66

**Hungary**

In the lead up to WWII, Hungary launched a small, six-person effort to research pathogens of key concern such as *B. anthracis*, feared because of enemy work with these specific elements.67 The program considered weaponizing agents, but likely did not produce a ready-for-use weapon. Following WWII, Hungarian scientists aided the Soviet program and attended conferences led by military health institutes through the WTO, but likely played a smaller role than Czechoslovakia. Despite limited Soviet-era programs, Hungary currently houses a National Office for Research and Technology that seeks to elevate Hungary as a primary actor in the biodefense industry through

---

fostering innovation and development of new technologies. Furthermore, in 2004, Hungary rolled out a mobile biological defense laboratory to counter fears of terrorist attacks at the 2004 Summer Olympic Games in Athens through early detection and surveillance.

Poland

Before WWII, Poland prepared a sabotage campaign for a potential Soviet invasion, which eventually was employed against thousands of German personnel in targeted attacks. The Polish resistance movement reported the use of BW against the Germans resulting in nearly 2000 cases of illness and 150 deaths in enemy troops, 680 horses infected with the equine infection glanders, 17 towns with typhoid outbreaks, and food contamination on supply trains through their widespread scorched earth strategy. Throughout the Cold War, Polish institutes collaborated with the Soviets on basic research, with the most interesting instance involving producing radiation-resistant microbes. This research could relate to Soviet interests in developing a weapon resistant to environmental conditions that would survive dissemination and remain capable of infecting targets. Poland remains involved in non-NATO European biodefense measures. As of recent, Polish preparedness has been on display through their use of the military to support the COVID-19 response, especially with the deployment of chemical units to disinfect civilian and military infrastructure.

Germany

The German Democratic Republic (GDR – East Germany) minimally provided to the Soviet BW effort as a member of the Soviet bloc, primarily sending fermenters needed to produce BW to the Soviet Union in a secretive manner. Following unification with West Germany at the end of the Cold War, the German biotech industry flourished, allowing for strong biodefense

---

programs. In 2013, Germany launched a large biosecurity program to counter manmade biological threats, primarily in Africa and Central Asia. Little is known about specific capabilities, but the program includes five institutes and outlines primary goals as surveillance, detection, biosafety, and more, indicating the strength of the German biodefense sector.  

*Related Member Projects Outside of NATO*

The European Union (EU) is a political organization banding together 27 European countries, including 21 members of NATO. As many NATO members share membership in the EU, the defensive capabilities being developing for the EU provide insight into potential NATO preparations. The European Defense Agency (EDA) works to integrate EU countries’ defense policies, which frequently includes shared research initiatives. The EDA has recently undertaken a large project to bolster ‘testing and evaluation’ with regards to ‘biological detection, identification, and monitoring’ (T&E BioDIM). The project emerged from a report citing gaps in EDA policies and currently has two main focuses: to work towards better communication and cooperation between member states and to improve biological surveillance methods. Through the early phases of their work, the group has found a significant lapse in coordination that negatively affects the success of T&E efforts by increasing costs and decreasing efficiency as multiple states work towards similar objectives without effective communication. To streamline communication efforts and support burden-sharing, states intend on standardizing methods used for T&E by determining specific BW of concern and setting expectations for lab procedures and performance. Of the six countries involved, four are NATO states and include France, Germany, Italy, and the Netherlands. A related effort aims to build a lab network to identify threats, with involved NATO countries including Belgium, the Czech Republic, France, Germany, Italy, the Netherlands, and Poland. In January 2021, CBRN Surveillance as Service (SaaS), a project to heighten general

---


surveillance capabilities, launched in Croatia, Slovenia, and Hungary. Finally, the EDA introduced a competition to encourage innovation by incentivizing new ideas for autonomous surveillance technologies. From these recent examples, it becomes evident that the EDA focuses primarily on detecting potential threats and developing new technology or methods to do so more effectively.

Involvement in International Agreements

NATO countries hold a variety of individual stances on BW and their control, but all members support international agreements targeting nonproliferation. All member states have ratified or acceded to the BWC, though their individual stances on implementation vary. For instance, the US strictly opposes verification efforts under the belief they are invasive enough to harm the biotech industry, but not invasive enough to root out potential threats. The EU officially reports interest in verification, though inaction by countries with large biotech industries, like Germany, questions their dedication. Without widespread agreement on international arms control measures, it is difficult to assess genuine interest in global nonproliferation. NATO countries seem focused on internal debates regarding the impact of verification regimes on their domestic policy and stray away from confrontational debate on the future of the BWC. Additionally, all states except two (Albania and North Macedonia) are party to the AG. While the reasoning behind these notable absences is unclear, gaining membership is challenging due to difficult-to-meet benchmarks and the role of intelligence sharing, as current members may shy away from sharing information with potential members. Though involvement in international measures appears promising that NATO retains interest in biological issues, it is important to remember that Russia launched a massive upgrade of their BW program in the 1970s after joining the BWC and has since

75 Roberts, “Arms Control without Arms Control: The Failure of the Biological Weapons Convention Protocol and a New Paradigm for Fighting the Threat of Biological Weapons.”
had questionable compliance. In other words, commitment to international treaties or groups has little bearing on the reality of a state’s position or dedication to BW control.

Global Health Security Risk

In 2019, the Nuclear Threat Initiative (NTI) Johns Hopkins University (JHU) published a report, “Global Health Security Index: Building Collective Action and Accountability,” regarding biodefense, biosecurity, and overall preparedness to handle a biological threat. Based on 96 qualitative questions examining commitment to international norms, early detection systems, response preparations, and more, the NTI and JHU report a score of 40.2 out of 100 as the average global preparedness to handle a biological threat.77 Correlated to the scale of least to most prepared, this figure suggests the world is ‘more prepared’ relative to the least prepared category. As of 2019, the study stated that no country, including the US, was prepared to handle a biological crisis or pandemic. The COVID-19 pandemic has likely changed preparedness, but regardless, the study emphasizes that weak systems that leave any country or bloc vulnerable to BW. Below, NATO countries’ overall scores have been tabulated using the index data, as well as the average score of NATO countries. The average for NATO falls at 58.4 out of 100, significantly higher than the global level, but still well below the most-prepared category applied to scores above 67.0. Considering the US’s failed response to the COVID-19 pandemic despite their significantly higher score (83.5 vs. 58.4), the index indicates that NATO will not be prepared to address a biological threat in the near future. The study also compares the commitment to improving national infrastructure and supporting norms. The top four countries listed are the Czech Republic, Hungary, Poland, and France, highlighting ongoing efforts to bolster national capabilities and thereby NATO capabilities at large.

Table 1. Level of preparedness of all NATO states individually and averaged. The average level of preparedness for NATO states is recorded as 58.4. Seven countries were marked as most-prepared to handle a biological threat, highlighted in yellow, while the remaining 23 fell into the more-prepared category in orange.78


<table>
<thead>
<tr>
<th>State</th>
<th>Level of Preparedness</th>
<th>State</th>
<th>Level of Preparedness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>52.9</td>
<td>Lithuania</td>
<td>55.0</td>
</tr>
<tr>
<td>Belgium</td>
<td>61.0</td>
<td>Luxembourg</td>
<td>43.8</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>45.6</td>
<td>Montenegro</td>
<td>43.7</td>
</tr>
<tr>
<td>Canada</td>
<td>75.3</td>
<td>Netherlands</td>
<td>75.6</td>
</tr>
<tr>
<td>Croatia</td>
<td>53.3</td>
<td>North Macedonia</td>
<td>39.1</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>52.0</td>
<td>Norway</td>
<td>64.6</td>
</tr>
<tr>
<td>Denmark</td>
<td>70.4</td>
<td>Poland</td>
<td>55.4</td>
</tr>
<tr>
<td>Estonia</td>
<td>57.0</td>
<td>Portugal</td>
<td>60.3</td>
</tr>
<tr>
<td>France</td>
<td>68.2</td>
<td>Romania</td>
<td>45.3</td>
</tr>
<tr>
<td>Germany</td>
<td>66.0</td>
<td>Slovakia</td>
<td>47.9</td>
</tr>
<tr>
<td>Greece</td>
<td>53.8</td>
<td>Slovenia</td>
<td>67.2</td>
</tr>
<tr>
<td>Hungary</td>
<td>54.9</td>
<td>Spain</td>
<td>65.9</td>
</tr>
<tr>
<td>Iceland</td>
<td>46.3</td>
<td>Turkey</td>
<td>52.4</td>
</tr>
<tr>
<td>Italy</td>
<td>56.2</td>
<td>UK</td>
<td>77.9</td>
</tr>
<tr>
<td>Latvia</td>
<td>62.9</td>
<td>US</td>
<td>83.5</td>
</tr>
<tr>
<td><strong>NATO Average</strong></td>
<td><strong>58.4</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Past Policies from NATO**

Despite limited publicly available information, openly accessible documents indicate NATO’s consistent and continued concern regarding CBRN capabilities. For example, NATO state leaders issue a joint declaration after each summit that describes what was discussed and goals set, illustrating what issues NATO feels are most important at that time. In 1999, NATO members met for the Washington Summit and devised the Defence Capabilities Initiative (DCI) in an attempt to build capabilities.79 The initiative listed 58 areas where NATO members did not meet capability obligations that could be necessary during a conflict, such as CBRN detection and protection. This conference was followed by the 2002 Prague Summit. The main concern reiterated in Prague was that NATO needed to be able to quickly deploy troops to respond to a conflict or threat where they could encounter CBRN weapons. In response, the Prague Capabilities Commitment (PCC) called for allies to improve individual and collective capabilities necessary to counter CBRN threats.80 Based on the fact that the PCC repeated the capability priorities listed

---

two years earlier, combined with general failure to meet the DCI standards, BW defense capabilities likely were not advanced to a satisfactory level overall.

Responding to proliferation concerns and rapid scientific advancement, NATO released a Comprehensive, Strategic-Level Policy for Preventing the Proliferation of Weapons of Mass Destruction and Defence against Chemical, Biological, Radiological, and Nuclear Threats in 2009. In this policy, NATO commits to an “active policy” countering the proliferation of WMD through dedication to existing arms control agreements, enhanced intelligence sharing, and building on nonproliferation efforts to slow the spread of CBRN weapons globally, especially to terrorist organizations. Deepening connections between the military alliance and political affairs, states express intent to contribute broader resources to support nonproliferation efforts, such as through sharing advisors or using transportation networks to track WMD materials proliferation. Noting the possibility of a CBRN attack on a NATO state if relations fail with an enemy, the policy dictates the importance of maintaining strategic weapons for deterrence and operational capability through an attack. To accomplish this, the Alliance reinforces the importance of improving intelligence and defenses across NATO states to spread expertise throughout alliance states. While the policy options outlined generalize WMD issues under one document, BW are explicitly named as a primary concern due to rapid advances in the life sciences. Nonetheless, specific biological defenses are not discussed in connection with NATO’s overarching strategy and threats primarily refer to terrorism concerns over state actors.81

Inferences from NATO Documents

NATO publications do not necessarily include specific policy reports, but do frequently reference BW in the context of CBRN concerns, especially through official press releases stemming from NATO Summits. After a thorough review of summit publications, NATO appears

81 “NATO’s Comprehensive, Strategic-Level Policy for Preventing the Proliferation of Weapons of Mass Destruction (WMD) and Defending against Chemical, Biological, Radiological and Nuclear (CBRN) Threats,” NATO’s Comprehensive, Strategic-Level Policy for Preventing the Proliferation of Weapons of Mass Destruction (WMD) and Defending against Chemical, Biological, Radiological and Nuclear (CBRN) Threats (2009).
cognizant of the threat of BW, but takes limited tangible action to address them. In conferences since 1999, 11 of 15 publications have broadly referenced counter-CBRN capabilities or initiatives. Most references include vaguely worded statements that NATO intends on improving defenses or countering the threat, but do not include explicit, achievable goals. Aside from these comments, little attention is given to BW or CBRN weapons as a group.

One potential reason for limited concern over BW would be their relatively minimal relevance in recent decades. NATO summit publications appear to be highly reactive to international trends and threats and therefore represent current events from that year. The most pressing BW threat to emerge in this period came from the previously discussed Amerithrax case in the US, but the situation was not generalized to represent the threat of BW by nonstate actors. Unlike BW, chemical and nuclear weapons both receive more attention in NATO publications, corresponding with a more pressing and prevalent threat.

Following the 2018 poisoning of former-Russian intelligence officer Sergei Skripal in the UK, CW gained standing in the 2018 Brussels Summit, boosting BW as well. NATO called for broad condemnation of CBRN use and universal acceptance of relevant nonproliferation treaties, including the Treaty on the Nonproliferation of Nuclear Weapons (NPT), CWC, and BWC. In this context, BW are considered primarily because of their grouping as a CBRN threat, not because of their specific danger. This represents the lack of consideration given to them as a class of weapon and relative attention given only as a broader, vague WMD threat. The 2014 Wales Summit, largely considered the key summit since the end of the Cold War, further compounds the Russian threat with the CBRN threat. This summit was held months after the covert Russian invasion of Ukraine, leading to significant condemnation from individual NATO members and the organization as a whole. As such, Eastern European issues received extra attention, but little evidence indicates revamped policy to better address concern of a Russian CBRN threat.

The outcome of a review of summit documents demonstrates how BW are treated as an add-on and suggests little is being done to defend against biological threats. The minimal interest does still indicate some consideration of their danger. Considering summit documents overall, BW are receiving increased attention over time, especially with a reinvigorated focus on CBRN weapons since the Russian invasion of Ukraine. Unclassified information available through NATO does not indicate any significant policy change or preparation has taken place.

In 2020, NATO’s Office of Science and Technology (STO) published a report on technology trends and their potential influence on military capabilities, including a host of biological issues. Related to BW, the STO foresees growth in the synthetic biology and genetic engineering fields that will allow for faster identification of CBRN threats and rapid development of medical countermeasures. This advancement is considered in negative light due to the potential of new technology to, “increase casualties, reduce combat effectiveness, and present a strategic challenge to Alliance societies as a whole.” The document then lists synthetic biology and medical countermeasures as “high impact,” meaning they could alter capabilities and NATO strategy. Combining this information, it becomes clear that NATO recognizes a capability gap in science and technology and that they may be unprepared to respond to a threat or attack, presenting a significant vulnerability.

In addition to the direct threat of biotech advancements, the STO’s analysis indirectly captures the potential for an entirely different face of war through their focus on exoskeleton suits and augmented soldier capabilities. Though these do not directly suggest a heightened BW threat, the document explicitly notes the role CW have played in driving innovation to enhance sensing abilities, or how concern over CBRN exposure has led to development of biosensors to track soldiers’ health as it relates to warfighting abilities. Through their focus on improving the warfighter’s physical state to continue combat in the face of CBRN threats, the STO recognizes

---

shortfalls in current gear and sensing capabilities, but does not provide a solution nor task anyone to address them. Furthermore, the document notes the significant jump in investment in this realm, increasing from $68M USD to $1.8B USD between 2014 and 2025. Again, intensive spending on improving current gear indicates NATO’s interest in gaining operational advantages from new technology.

*Previous Statements from NATO Leaders*

In recent years, BW have gained new prominence in NATO leaders’ considerations, as can be seen through mention in speeches and public statements. Recently, Stockholm International Peace Research Institute (SIPRI) arms control expert Dr. Ian Anthony spoke at a NATO-sponsored event and referred to the “long term neglect of issues around biological weapons” as a significant threat surrounding WMD issues. This comment immediately follows NATO Deputy Secretary General Rose Gottemoeller’s statement pledging dedication to adapting the BWC where she admitted that more can be done to positively support regimes such as the BWC.

Related to the Russian threat, Deputy Secretary General Gottemoeller spoke at the Kyiv Security Forum in 2018, an annual conference discussing Eastern European security, where she expressed the need for CBRN “resilience.” Acknowledging Ukraine’s familiarity with the issue, she conveys her discontent that CBRN weapons remain an unsolved issue despite numerous international measures to curtail their development. Furthermore, Gottemoeller targets Russia’s intransigence regarding international law as a key problem for NATO. She does not indicate NATO’s level of readiness or a need to change defensive strategies, but this statement proves the relevance of Russian actions in NATO’s ongoing security concerns, likely including BW.

In December 2020, NATO Secretary General Jens Stoltenberg spoke out regarding NATO preparedness for a BW based on the response to the COVID-19 pandemic. Secretary General Stoltenberg emphasizes that while the pandemic was not manmade, the lagging response to contain

---

it demonstrates NATO’s lack of preparedness and need to build up its BW response capabilities. Interestingly, he mentions Article V, which calls for solidarity following an attack on one NATO state, to remind readers that NATO maintains a wide range of capabilities, including legal WMDs, and will utilize them as necessary in the face of an attack. Stoltenberg does not detail what changes must be made to prevent similar pandemics in the future but does advocate for reformed intelligence sharing within the Alliance.\textsuperscript{88}

\textit{NATO Groups and Task Forces}

While difficult to glean a view into what actions NATO has taken to strengthen defenses against BW, the focus of NATO groups on CBRN defense indicates growing concern over BW threats, among others. NATO instated Science for Peace and Security in 1958 in response to the Soviet launch of the Sputnik satellite the previous year with the goal of closing the technical gap between the Soviet bloc and NATO. Originally, the primary focus involved missile defense, but has shifted towards broader scientific dilemmas such as energy security, counterterrorism, cyber defense, and CBRN defense. Under CBRN defense, current areas of interest include sensing, surveillance, diagnostics, and medical countermeasures, connoting concern for biodefense capabilities.\textsuperscript{89}

Another notable group is the Combined Joint Chemical, Biological, Radiological, and Nuclear Defence Task Force, which serves NATO as a specific group that can engage in armed conflict in the face of a CBRN threat. The task force equips NATO with special training in reconnaissance, sampling potential agents, and operations involving incident containment. Because they are capable of handling armed conflict and other emergencies, the Joint CBRN Defence Task Force enhances NATO’s preparedness to respond to an emerging biological crisis by supporting military and civilian prevention and decontamination efforts.\textsuperscript{90} On a broader level, NATO manages a NATO Response Force (NRF) to be deployed during peaceful operations and

national emergencies, which can supplement biological incident responses but does not specialize explicitly in BW crises.\textsuperscript{91}

\textbf{NATO Crisis Management Case Studies}

\textit{The Skripal Poisoning}

Putting aside the differences in efficacy, mechanisms, and lethality, CW and how governments handle their threat can serve as an indicator to preparedness for a biological attack. Of particular interest, the 2018 poisoning of former Russian agent Sergei Skripal in the UK demonstrates the difficulty in containing and responding to a chemical or biological threat. Though the Russians deny involvement, evidence suggests Russian GRU agents poisoned Skripal and his daughter in an isolated attack. In 2020, the leader of the emergency unit responsible for hazardous situations, known as the National Ambulance Resilience Unit, Nick Spence presented post-mortem thoughts on the British efforts to contain the attack. Authorities were notified when two people, Skripal and his daughter, collapsed on a park bench. This was treated as a standard incident as there was no reason to suspect use of a CW. Only after the Skripals were treated in the hospital did emergency services learn that they had encountered the CW Novichok\textsuperscript{92}, launching a wider effort to track down equipment used for the Skripals and exposed patients. Months later, a second incident occurred when two British nationals were accidentally poisoned after finding the disposed poison, leading to one death. The British response involved extensive decontamination, tracking efforts to find exposed individuals, and modifying protocol to be wary of further incidents. Based on the response, Spence highlights issues in the UK’s response, especially with communication, operations, and resources. Specifically, response teams were blocked from important information regarding the investigation that hindered their ability to fully respond. He also notes issues with


\textsuperscript{92} Novichok is a group of Russian nerve agents designed to avoid detection and defeat NATO protective gear. The agent is highly lethal by causing paralysis and respiratory and cardiac arrest. It was banned by the OPCW in 2018.
fueling a longer-term response and accessing supplies as the threat dragged on for months following the initial incident.⁹³

The British succeeded in limiting the breadth of the attack, but revealed potential weaknesses in a state’s response to a biological or chemical threat. Concerns revolved around sustaining the response and investigation, as well as failures in operational communication. The Skripal poisoning only involved the UK but demonstrates the types of issues that can arise while managing a burgeoning crisis, raising questions about NATO’s preparation for a biological incident. For instance, NATO may or may not be equipped to support a future incident, which could be remedied by allies agreeing to pool medical and personnel resources. As for operational concerns, it is unclear whether NATO has an official plan describing how it intends to respond to an attack should there be a broader threat to allied countries. NATO centers dedicated to biodefense maintain rapid testing and detection methods, which can be used in a scenario like that of the Skripals, but there is no published material suggesting NATO intends to respond as a unit on the ground to a larger threat.⁹⁴

*The COVID-19 Pandemic*

Early in the COVID-19 pandemic, NATO was slow to formulate an overarching strategy for combatting the spread of the disease, but unity and plans have steadily strengthened. With the first outbreaks in 2020, there was little NATO solidarity. Data demonstrates that a total of 48 measures were taken internationally to support Italy with their severe outbreak, of which only 7 were directed by NATO.⁹⁵ China, on the other hand, outperformed NATO with 13 actions of solidarity. For example, China sent 3.5 million masks to Italy early in the crisis, compared to 330,000 from NATO, highlighting the strength of Chinese “mask diplomacy” compared to NATO’s emergency preparations. This information may represent a lack of cooperation as states

---


⁹⁴ Spence, “Salisbury Nerve Agent Attacks and Response.”

prepared their own response, a lack of solidarity as an alliance, or a lack of preparedness for response to a biological threat. Furthermore, NATO countries eventually joined the global call to action and have since set up a trust fund for and donated crucial medical supplies to NATO and non-NATO states alike. Medical resource pooling highlights the international cooperation necessary to successfully combat any biothreat, including naturally-occurring pandemics, and suggests individual states retain capabilities to respond to a biological threat, though their deployment may be sluggish.

Finally, amidst the burgeoning pandemic, NATO adjusted plans for the Defender 20 exercise tasked with practicing the deployment of 20,000 US soldiers and related actions. Despite increasing public health concerns that encouraged social distancing, the exercise continued on a pared-down level. Allies cut numerous linked exercises and minimized the number of troops deployed.96 As for on-the-ground regulations, troops were required to abide by host nation public health guidelines, but NATO did not propose an allied position on key regulations.97 NATO did not plan a unified response for matters such as whether or not troops would be required to wear masks, an issue infused with domestic controversy for states such as the US. The exercises took place in Europe and therefore mask regulation may fall on the EU, but the combination of multinational forces from states within and outside the EU deems the question a NATO issue as well. Mask-wearing exposed a flaw in coordination issues on a larger scale when paired with issues such as disorganized travel bans, challenging the strength of alliance unity and interest in coordinating responses on an international level. The COVID-19 pandemic does not represent an urgent military threat that required NATO to quickly deploy, but raises questions about the ability to respond to a military threat with a biological threat raging.

Where Russia Stands

The modern Russian biothreat compounds issues arising from the Soviet era with the technologies and scientific advances of the 21st century to create complex issues ranging from assassination to biosafety. By considering the program and military doctrine that produced the new Russian state, this section will analyze the current threat on various levels and test how they apply to NATO.

*The Soviet Union: First Program (1890-1970)*

Russia’s experience with BW programs began in the early 20th century with a peaceful program to fight naturally occurring threats. Like many other countries, Russia eagerly explored the rising field of bacteriology, setting up the Imperial Institute of Experimental Medicine in 1890 to research vaccines.98 Between 1890 and the end of WWI, the Russians experienced severe disease outbreaks, especially typhus, with deaths exceeding those from the Sino-Japanese War, WWI, and the civil war in 1918 combined, reinforcing the importance of perfecting biological defenses.99 By 1928, the Soviets launched their first offensive and defense BW programs to study weaponization of specific agents or decontamination methods and vaccine development, respectively.

The Soviet BW infrastructure continued to grow until WWII when German forces invaded the Soviet Union in 1941, forcing Soviet weaponeers to evacuate their facilities and flee. There are numerous alleged uses of BW during the German invasion of the Soviet Union. As the Germans were about to capture Moscow, soldiers suddenly fell ill with tularemia, a disease commonly found in Eastern Europe that causes flu-like symptoms, ulcers, enlarged spleen and liver, and in serious cases pneumonia.100 Soviet BW leaders have claimed the outbreak was caused intentionally, though limited evidence to this claim exists. Whether or not the outbreak was an intentional attack

---

or a natural outbreak is unknown, but nonetheless the outbreak served as a hit to the German forces that may have prevented them from capturing Moscow. This incident demonstrates the military importance of biodefense for manmade and natural events. Moreover, the Soviets are believed to have deployed a sabotage team in Ukraine during WWII to purposefully spread typhus among German camp guards, potentially killing as many as 120. After the war, the Soviet program shifted to focus on matching the West’s BW capabilities. This early phase program continued until the 1960s, when it began to deteriorate due to focus on nuclear weapons and a lack of scientific advancement following a state-sponsored campaign enforcing false science that stunted growth in the life sciences.


The Soviets reinvigorated their BW program in the 1970s following major advances in genetic engineering despite having just committed to the BWC. Specifically, scientists were able to gain funding and approval from the government by promising that genetic engineering could provide them with new BW with antibiotic or vaccine resistance, which offered a significant military advantage. Furthermore, the Soviet military reinforced the false belief that the US still maintained a secret BW program, thereby ensuring state support. However, the new program was launched while negotiating the BWC, requiring any offensive activities to compartmentalize to prevent security leaks. To maintain secrecy, the Soviets created Biopreparat, a massive organization working under the guise of a civilian pharmaceutical company to develop and produce next-generation BW. Biopreparat served as the central hub for the offensive BW program and was run by Dr. Ken Alibek, formerly Kanatjan Alibekov, as the deputy chief, who defected to the US in 1992 and proved an invaluable intelligence source. Until 1992, the US and Western allies knew nearly nothing regarding the expansive program. Following the collapse of the Soviet Union, President Boris Yeltsin acknowledged the expansive Soviet BW program and pledged to

---


dismantle it completely. Despite his best efforts, there was significant resistance from the military. Instead of cooperating with Yeltsin, military leaders refused orders, hijacked committees tasked with shutting down facilities, and used false intelligence of an offensive US program as an argument to keep theirs.\textsuperscript{103}

*The Soviet Union and Russia: Modern Insinuations (1992-2021)*

As of 2020, there is no publicly available information regarding the status of Russia’s BW program over the past 30 years. Russia has participated in confidence-building measures (CBMs) and international disarmament measures, suggesting they have terminated the program and destroyed any stockpiled weapons. However, their disclosed information does not match US intelligence gathered from HUMINT sources, suggesting they did not fully reveal the extent of the program through CBMs. Furthermore, they refuse to allow international scientists to visit facilities and maintain extreme secrecy, lack of transparency, and ambiguity in reports.

*Development of Soviet Biological Weapons Doctrine*

Repeatedly, decisions to continue and strengthen an offensive program were made on the basis of US and Allied capabilities. During the 1960-70s, Soviet leadership relied on the ‘correlation of forces,’ or assessments of the military, economic, and foreign policy power of other countries compared to the Soviet Union. Soviet leaders believed the correlation of forces favored the US over the Soviet Union, suggesting they held greater power and were more likely to succeed in a conflict. Also in this period, President Nixon’s decision to renounce the American offensive BW program triggered speculation among Soviet leaders that the US was secretly conducting offensive research. In the early 1990s, a team of Soviet scientists visited US laboratories as part of a confidence building measure, which they used as false evidence that the US maintained an offensive program. Combining long-standing distrust of the West with doctored evidence supporting their concerns, the Soviets were certain the US and its allies posed a significant biological threat.

Soviet military doctrine demonstrates the intensive strategizing and paranoia directed towards the use of BW and provides insight into how Russia may invoke BW in a future conflict. Of the three levels of warfare, tactical, operational, and strategic, Soviet BW focused mostly on operational and strategic level of warfare, assuming limited tactical relevance. Historically, strategists considered BW as a tool for causing mass chaos and weakening enemies during battle, but drifted away from this perception as difficulties with precision targeting of enemy troops mounted. On the operational level, Soviet bio-weaponeers prepared weapons capable of incapacitating the enemy and their ability to make war, specifically by sickening soldiers, reinforcements, and individuals involved in fueling war efforts via supply chains. Without the ability to restock or bring in more troops, the enemy was expected to weaken to a Soviet offensive. Other operational goals may have included capturing important facilities, air bases, or ports, where BW could be used to break down enemy defenses in these areas. As for strategic use, BW would have been deployed against surviving enemy populations after a nuclear strike. A 1981 US Federal Emergency Management Agency (FEMA) report tabulated percentages of the US population that would be killed, severely injured, or relatively healthy following a nuclear strike and found approximately 37% would fall into the last category; Soviet BW aimed to instigate a contagion to wipe out or significantly weaken this remaining population.104

The Soviet Union’s doctrine for BW surrounded concerns about war with NATO. Two American researchers studying Soviet BW, Milton Leitenburg and Raymond Zilinskas, interviewed former Soviet officials and scientists to question the role of BW in Soviet military planning. They found three common answers: war against NATO, war against China, or no practical purpose. However, the latter two can be nixed. First, the authors refute war with China as a leading focus. Poor relations with China emerged in the late 1960s, but the Soviet program existed long before that, indicating a different target. Alternative theories argued Soviet BW were

not developed for the battlefield, but as a deterrent. Scientists arguing for this theory frequently returned to the issue of NATO or China when questioned, weakening the argument against battlefield use.  

In addition to interviews with involved scientists, research on the types of weapons developed indicates the intended use and supports the theory that Soviet doctrine was NATO-centric. The Soviets gave extensive focus to strategic weapons, namely weaponized smallpox, after the relaunch of the program in 1972. Ken Alibek connects the increased focus on smallpox with the WHO’s official announcement that the virus had been eradicated as of 1977. Without a natural threat of smallpox, governments ended vaccine programs for the disease, leaving large swathes of NATO populations vulnerable to a Soviet attack. As an example of Soviet logic, smallpox could be utilized after a nuclear attack, where survivors would have weak medical infrastructure and be unable to rapidly produce smallpox vaccines. Without defenses, this type of attack could completely destroy the remaining populace if large portions were not already immune to the virus. Throughout the remainder of the program, the Soviets maintained large stockpiles and allegedly filled ICBMs with smallpox. Based on the classification of smallpox as a strategic weapon and the focus on ICBMs, Soviet military planners focused primarily on the US or a larger NATO threat. Significant controversy exists regarding whether or not ICBMs with BW were ever created, as sources on the biological side suggest they prepared agents for ICBMs, but those involved with the missiles claim there were never plans to use a BW-loaded ICBM. Regardless of the role of dissemination methods, the use of smallpox itself points to a Western enemy. Smallpox would not be an ideal weapon to use against China because an outbreak could easily spread over the shared border between China and the Soviet Union and endanger Soviets. NATO countries, though, were sufficiently distant to provide protection. The study fails to address the toll on

---

neighboring Warsaw Pact countries, but the Soviet Union could have ensured their safety through other methods such as vaccine and medical countermeasure availability.

*Does Russia Still Have Biological Weapons?*

The Soviet Union’s offensive BW program as described existed from 1972 to 1992, when President Yeltsin banned further research and revealed the program to the world. However, based on his personal experience on an inspection trip in the US and observations he made following his defection, Alibek suggests the Russian offensive program, though not the weapons stockpiles, likely continues to exist. The former deputy chief of Biopreparat describes his experience inspecting four US facilities the Soviets believed were involved in an offensive American BW program as of 1991. Specifically, the Soviets visited the US Army Medical Research Institute of Infectious Diseases at Fort Detrick in Maryland, a former BW and CW test site at Dugway Proving Ground in Utah, a former CW storage facility at Pine Bluff Arsenal in Arkansas, and a Salk Institute vaccine plant in Pennsylvania. Alibek portrays the examined facilities as run down and discusses how other members of the inspection team desperately searched for evidence of any offensive activity without success, going to the lengths of checking above ceiling tiles for hidden proof. However, upon returning home in 1992 to the newly created Russia under President Yeltsin, military officials demanded the team provide a falsified report claiming the Americans developed offensive weapons in hopes of securing continued support for a continued Russian BW program. At this point, Alibek resigned and soon after defected to the US. This experience establishes the connection between Western capabilities and Russian intentions; even without proof that a biological threat existed, the Soviet and succeeding Russian military persistently fought to maintain their program despite no apparent threat. Though this incident occurred nearly 30 years ago, it is unclear if Yeltsin managed to overpower the military generals and many believe he failed, which would have lasting impacts on the state of a modern program.110

---


110 Tucker, “Biological Weapons in the Former Soviet Union: an Interview with Dr. Kenneth Alibek.”
In addition to his personal experience with inspections, Alibek speculated on the existence of an offensive program in the early 2000s. While he believes it likely that Russia destroyed stockpiles of weapons, the infrastructure in place indicates ongoing R&D or ease of mobilization with dual-use technology. Multiple facilities are still controlled by the state and those that are not have contracts with the army. Moreover, in the 1990s, prominent facilities were still directed by Cold War leaders, when the program was supposedly transitioning to civilian work, some of whom were given military promotions, indicating continued leadership.  

One such figure was General Valentin Yevstigneyev, who Alibek suggests continued to lead a high-level offensive facility. In a 1999 interview with a Russian security-focused NGO, General Yevstigneyev explained the fate of the Soviet BW program and highlighted their continued work on biological defenses for diseases such as Hepatitis B. Alibek reasserts the ease of transitioning between a civilian and military facility because of dual-use technology. To this point, General Yevstigneyev is asked about the timeframe needed to complete this transition if Russia wished to revert to mass production. He stresses the importance of genetic engineering in providing efficient weapons with “minimal investment,” implying the infrastructure and knowledge for offensive weapons exists and therefore Russia could mobilize quickly. Considering Alibek’s claims in context of General Yevstigneyev’s insinuations leads to the conclusion that it is possible Russia maintained the capability to carry out offensive activities despite Yeltsin’s order to end offensive programs.  

When questioned about the offensive BW program, General Yevstigneyev focuses on the stocks of potential BW pathogens that Russia legally maintains and their potential for weaponization, as well as some historical tests and operational munitions. Despite his candor relating to previous offensive tests and weapons, one interesting diversion implies Russian intention to develop BW, especially without inhibition from international influence.  

---

111 Alibek, “Fortress America,” *Biohazard.*  
113 “Yevstigneyev On Russian Biological Weapons,” *Yaderny Kontrol.*
Yevstigneyev: We pose no threat to anyone and there are no traces of our BW offensive program. We can be suspected solely on the basis of intention.

Interviewer: What do you mean by ‘intention’?

Yevstigneyev: We still have no final agreement with the West on what to call biological weapons, what equipment and technology should be regarded as potentially capable of BW production, or what should be banned under future Conventions. As to the level of information transparency about current activities of our laboratories required by foreign inspectors, no solution has been found yet.

Furthermore, through stating “there are no traces of our BW offensive program,” General Yevstigneyev implies there could be a hidden program. Throughout the interview, he campaigns for a Soviet-style program based on the belief that the military alone can protect the populace from an impending threat. Considering President Yeltsin’s weak control over the military and the Generals’ significant power, if the military wished to keep an offensive program, they likely would have found a way. Alibek believes the Generals converted any offensive programs to defensive in name only, leaving BW development and research unscathed. However, as inspections have never been allowed in Russia despite confidence-building measures, official proof does not exist.

**Putin’s Biological Aspirations**

In an essay published during the 2012 presidential election, Putin recommends the production of genetic weapons because they “will be more acceptable in terms of political and military ideology.” Presumably, genetic weapons refer to weapons targeting individuals based on their ethnicity or genetic traits. Putin also expects genetic weapons to rival nuclear weapons in their strength, warning that they will be highly dangerous, yet the idea that they will be ‘more acceptable’ suggests he views these weapons as an alternative that could be practically employed in a conflict with less international blowback. The BWC should cover any possible genetic weapon due to a clause asserting that provisions in the Convention apply to new and upcoming

---

technologies, but Russia may disagree as to whether or not it is valid with a completely new weapon type. Regardless, whether or not Russia would abide by the BWC’s ruling is unclear.

In concept, genetic weapons seek to target individuals based on their DNA, which may or may not pose a threat to NATO. The primary concern regarding genetic weapons would be their ability to target individuals of a specific race or ethnicity, providing the tools necessary for ethnic cleansing or advanced eugenics. However, NATO benefits from the fact that NATO-country Europeans are genetically incredibly similar to ethnic Russians, denying them genes to target without traits exclusively found in non-Russian Europeans. If Russia chose to employ such a weapon, they would risk sickening their own population, decreasingly the likelihood and overall risk of a genetic weapons attack. Even so, Russia’s bold decision to research and potentially develop genetic weapons highlights the weakness of the BWC and the perils of modern biotechnology when applied to weapons development, proving a greater danger to NATO.

Poisonings – a One Off or a Pattern?

Despite the Soviet Union’s focus on BW as a strategic or operational weapon, modern Russia’s behavior raises questions of other potential uses. In recent decades, Russia carried out multiple attacks involving CBRN weapons. In 2006, a former state security (FSB) agent residing in the UK, Alexander Litvinenko, was assassinated using the radiological material polonium-210. The murder has been connected to an FSB and an ex-KGB officer. Polonium-210 is a radiological weapon, which are generally considered WMDs, though the international limitations on them do not ban usage but rather bar states from supporting proliferation. As for chemical weapons, Russia has carried out two high-profile assassination attempts in 2018 and 2020, targeting former KGB agent Sergei Skripal in the UK and political dissident Alexei Navalny. Both individuals were poisoned with Novichok despite Russia being a signatory to the CWC and claiming to have destroyed all CW stockpiles as of 2017. In the biological realm, the Soviet Union

---

aided the Bulgarian intelligence service in assassinating prominent dissident and journalist Georgi Markov using ricin, a biotoxin isolated from the castor oil plant. Interestingly, this murder used an umbrella to shoot a capsule of ricin into the victim’s leg. This device was developed by the Soviet Union and their involvement in that attack has since been confirmed through defecting Soviet intelligence agents.

As discussed, the Soviet Union and feasibly Russia primarily devote their BW program towards strategic or operational capabilities; however, numerous important understandings are found by examining the instances where Russia or the Soviet Union employed CBRN weapons as tools for assassination. First, it is abundantly clear that Russia frequently ignores international treaty obligations, including the BWC and CWC. The BWC designates ricin as an illegal toxin, but the KGB still used it in the Markov assassination. CW have been used twice in assassination attempts. Second, Russia shows little concern for international disapproval. Following the Skripal assassination attempt, the US and its allies approved expansive sanctions with the condition that they cannot be revoked without Russian assurances to cease all illegal activity and allowing inspectors to confirm treaty compliance. Even so, Russia attempted to kill Navalny just two years later, demonstrating the limited effect of economic levers and international disapproval on Russian behavior. This lack of concern suggests Russia does not fear Western actions or feel as though they can be held accountable. Finally, Russia has become less careful with their assassination efforts, which if expanded to include BW, could present a serious risk of contagion. The Skripal case validated this concern when assassins improperly disposed of remaining Novichok, which eventually contaminated other unrelated objects and led to the death of one and severe illness of another innocent British citizen. In a case involving a pathogenic BW, the weapon could self-replicate and infect uninvolved individuals at random, broadening the impact of an assassination from targeted state enemies or public officials to the general populace. The circumstances

---

117 Shoham, “Russia's Toxic Legacy.”
highlighted vary from a BW assassination attempt, they suggest Russia could pose a significant threat in small-scale attacks in addition to a strategic or operational level of war.

**Russia and International Accountability**

The core issue of the security dilemma stems from not understanding an enemy’s capabilities and therefore overestimating the necessary defenses, sending off a spiral of insecurity and arms races. In the growing liberal international system, arms treaties target this insecurity by establishing mutual assurances to limit such destabilizing behavior. However, in order for states to successfully pursue security through treaties, they must trust that the system will find and root out bad actors who seek to disrupt a secure environment. The fact that Russia shows little respect for the international system exposes weakness in the BWC, but more importantly, wields the power to cause international insecurity.

The Soviet Union held a crucial role in negotiating the BWC, yet demonstrated blatant disregard for its provisions by simultaneously reinvigorating an offensive program. Modern Russia follows this pattern, questioning the value of multilateral arms control measures between Russia and NATO. The BWC was signed by the Soviet Union in 1972, but was partially invalidated before entering into force in 1975 because of Soviet proliferation efforts. With the advent of genetic engineering, Soviet bio-weaponeers revived the dying BW program around 1972. The program went undetected for years and only was fully revealed by President Yeltsin in 1992, stupefying Western intelligence services. Furthermore, confidence-building measures with Russia have been unsuccessful.\(^{118}\) Russian scientists toured US facilities in the 1990s, but have not opened to inspections themselves. This flaw demonstrates a key weakness in the BWC, as there is no protocol for accusing a state of maintaining a BW program or inspecting claims. Without faith that Russia holds up the BWC or protocols to ensure their faithfulness to the treaty requirements, the BWC is largely spineless. Furthermore, Russian actions risk worsening the international security climate; other states cannot trust Russia to uphold its obligations, leaving states vulnerable to attack. When

states feel vulnerable, they are likely to seek arms and thereby propagate the security dilemma. In the European context, Russia may or may not pose a biological threat, but without any evidence suggesting they are innocent NATO countries cannot define their vulnerabilities and fine-tune the specific defenses they must build. This insecurity could be bypassed with simple inspections of Russian facilities, but without them, NATO must continue to view Russia as a viable BW threat.

**Russian Scientists and Proliferation**

After decades cultivating the skills, knowledge, and infrastructure to organize a lethal BW program, the collapse of the Soviet Union presented a new proliferation concern that their bio-weaponeers’ tacit knowledge or infrastructure may be used by other international actors. Recently, states have increasingly worried over the threat of terrorists using BW. Production would require an advanced understanding of scientific methods but one would only need basic, widely-available supplies. The Soviet Union exemplifies this concern. As the Russian government began to cut spending on BW programs in the 1990s, the relatively autonomous branches of the program began to sell services and potential weapons on the black market. They even went so far as agreeing to sell Iraq an industrial fermenter, a key piece of equipment for weapons production. The fermenter could not have peaceful applications based on Iraq’s life science industry and was certainly intended to produce BW. Individual scientists were sought out for their services – Ken Alibek recalls being approached by South Korea, France, and Israel to lead biodefense research and knew of others who worked for North Korea, Iran, and Iraq.

**Biosafety in Russia**

In 1979, a BW facility at Sverdlovsk that produced anthrax accidentally leaked the pathogen into the city air without noticing the failure for hours. According to Alibek, a filter in an exhaust pipe needed to be replaced, a routine fix, but the employee working failed to note the defective filter before finishing his shift. Once the production machines were turned on, anthrax spread throughout the city and sickened hundreds, killing somewhere between 100 and 1000 people.

---

people. The catastrophe at Sverdlovsk was helpful for Western intelligence services as it provided evidence that a Soviet BW program existed. While the event may have only impacted Russians and did not create an international issue, it demonstrates how easily a mass casualty event could occur with BW. If Russia maintains their program and conducts research on dangerous pathogens, a simple mistake could launch the next pandemic with the risk to spill over into other states. Genetic engineering amplifies this risk, as Russian research likely examines applications of genetic engineering to produce superbugs that are highly contagious or antibiotic-resistant. Without inspections or international regulations, it is difficult to predict what precautions Russian laboratories or production plants take, leaving the possibility for simple mistakes to cause mass casualty events globally.  

Disinformation

Generic disinformation represents one of the largest challenges facing NATO, but also exists in the realm of BW. During the Cold War, the Soviet Union invented and spread false stories of US BW development and deployment. These falsehoods accused the US of producing and accidentally disseminating HIV, researching weapons to target specific ethnic minorities, and releasing numerous diseases throughout Central America. More recently, Russia, along with other actors such as China and Iran, has produced disinformation suggesting the US purposefully created the natural virus responsible for the COVID-19 pandemic. These accusations, while directly lobbed at the US, seek to damage the West’s credibility as a whole, endangering NATO’s international relationships as foreign governments begin to question their actions and involvement due to fear from false information. 

Disinformation poses a unique threat to NATO because of the impact it may have on deteriorating norms and international law. As false stories of Western BW are constructed and accepted as truth, countries may feel emboldened to skirt international law to research and develop

---

120 Alibek, “Accident at Sverdlovsk,” Biohazard.
their own BW programs, heightening a biological security dilemma. International norms rely on the public holding their leaders accountable for taboo behavior, but if they believe falsehoods that the US and other Western countries are arming with BW, they may be less inclined to argue against weapons development on moral grounds. Regardless of the mechanism, disinformation inherently weakens resolve against BW and general international security, posing a significant risk to NATO without any strong methods for protection.

The Gap Between Russia and NATO: Potential Threats

The Intelligence Gap

Though known issues exist with BW proliferation and there are numerous scenarios that can be drawn up to predict potential threats to NATO, definitive concerns cannot surface without proper intelligence; this is a longstanding issue with BW in general. Throughout the Cold War, NATO was mostly oblivious to Soviet threats. In the thirty years since the collapse of the Soviet Union, NATO’s relationship with Russia has oscillated between aspiring for friendship and disagreeing on crucial international matters such as the war in Ukraine or Syria. In a period of distrust and tense relations, NATO must be warier of Russian capabilities and threats, but the extent to which NATO needs to be concerned remains uncertain without intelligence. While Russia may house a BW program with potential to threaten NATO, they may not harbor malicious intentions. Intelligence serves the crucial role of preventing an escalation based on unnecessary distrust if Russia does not have BW capabilities, but gives NATO the time and space to prepare defenses if necessary.

As discussed, NATO’s current focus revolves around detection capabilities such as sensors, which can identify an imminent threat by sampling the air or water for known biological or chemical agents. However, relying on sensing serves as a reactionary effort, not a preventive defense because a threat found using sensors has already spread and must be contained after the population may have been exposed. COVID-19 provides a useful example. The pandemic proved a significant threat by January 2020, but lockdowns, mask mandates, and intensified sanitation
efforts did not emerge for months in many countries; this lag permitted the spread of the virus and exponential growth for months following. On a basic level, states could not respond to COVID-19 because of mask, hand sanitizer, and medical equipment shortages. Importantly, there is no practical difference between a natural pandemic and a widespread BW attack. If preparations failed to handle COVID-19, there should be no reason to believe NATO is equipped with the supplies or protocols necessary to contain a BW attack, which could be worse than a natural pandemic if the agent has been genetically engineered.

Building on the role of information in preparing for an attack, the danger of a BW attack depends on the specific agent used, immunity to an agent, and how it is employed, which can be mitigated using intelligence. In the face of an attack, little can be done to slow the spread to the extent of protecting the general populace without immunity or the capability to quickly mobilize vaccine development and distribution. However, with appropriate intelligence, a worried state could produce and stockpile vaccines or medical countermeasures to quickly respond to an outbreak. Biological threats are unique because each pathogen or toxin requires a different course of treatment, so intelligence plays a key role in helping states identify what medical countermeasures to develop to prepare a response to the specific threat. Lack of intelligence slows down a state’s response and defense efforts, so if NATO fails to seek up-to-date information on the state of Russia’s BW program, they inevitably risk the lives of citizens as they scramble to react only after an attack has occurred.

On the Battlefield

Despite limited information on Russian BW strategy, inferences from Soviet policy uncover potential strategic use of BW against NATO and therefore NATO weaknesses. As an operational weapon, Soviet strategy invoked BW as a tool to weaken an enemy in an armed conflict by halting supply lines and sickening soldiers. Applied to the modern context, operational use would imply a conventional war between Russia and NATO countries. Based on geographical confines and contemporary politics, such a war would likely occur in Eastern Europe, as a
continuation of the current Ukrainian conflict or a new issue in the Baltics. Ukraine currently is a NATO partner but not an official member. While they have sought membership, entry into the alliance is unlikely in the near future, especially due to the ongoing ground war with Russia following the 2014 annexation of Crimea. Regardless, NATO continues to show significant concern over the conflict and steadfastly supports Ukraine through verbal, material, and financial support. As we enter the seventh year of this conflict, Russia may consider use of a BW if they wished to break the stalemate. By employing a BW, Russia could advance deeper into Ukraine and gain control of vital natural resources, such as a monopoly on Ukrainian gas.

In recent years, NATO countries contributed financially to the Ukrainian effort and trained Ukrainian forces to fight against Russia; with such a background, it is difficult to imagine a situation where NATO does not involve itself should a biological conflict occur. For example, NATO states could provide anything from basic supplies and medical countermeasures to protection equipment and reinforcements. Furthermore, NATO maintains units trained specifically to counter CBRN threats through detection, surveillance, diagnostics, and containment, which could be shared with a struggling Ukraine. Finally, NATO indicated a willingness to share advisors and experts with a member state in need, which may apply to Ukraine during a biological incident. Ukraine currently only connects with NATO due to long-term cooperation and collaboration, but NATO does now include states sharing borders with Russia, increasing the threat of a biological attack through a conventional attack.

The Baltic states and Poland have deep history with Russia and the Soviet Union, leading to Russian concerns of NATO involvement in their backyard. Again, in an operational conflict, NATO would be poised to support defense efforts through providing supplies and offering additional protection. It is unlikely, however, that Russia would instigate a conflict with directly NATO; a more realistic scenario could involve Russia accidentally releasing a BW they are researching and developing, which could spread to nearby states. Furthermore, NATO must prepare to contain a propagating BW threat, as the close proximity of states likely threatened by Russia to other NATO states would worsens the impact of an initial attack.
Operational use of BW primarily presents a threat to NATO militaries and war efforts and requires a strong biodefense response. The status of NATO biodefense sector remains uncertain, but publicly available information demonstrates a concerted focus on detection and surveillance capabilities. In a conventional conflict, advanced sensing technologies provide NATO the ability to catch a potential threat quickly, leading to a quicker response. As was demonstrated through the sluggish rollout of COVID regulatory efforts and lockdowns, a quick response can prevent spread of infectious disease, reducing a potentially catastrophic attack to a manageable one. Furthermore, sensing capabilities are practical to implement in conventional conflict because of the limited scale of their employment. However, surveillance methods only allow for rapid detection; NATO still must remain capable of rapidly responding. In an operational theater, NATO could expect BW to be utilized in a manner that primarily impacts troops. Therefore, troops need to have access to defenses against a quickly detected threat such as PPE or medical countermeasures, such as vaccinations to prevent infection or medications and treatments.

Soviet doctrine designated strategic BW as a tool to wipe out populations surviving a nuclear strike or significantly overwhelm the medical infrastructure, weakening the state overall. Nonetheless, it is incredibly difficult to imagine a situation where modern Russia would resort to nuclear weapons in a conflict with NATO states due to NATO’s well-prepared and highly capable nuclear deterrent. Use of nuclear weapons would inevitably lead to a NATO retaliation on Russian territory. Moreover, strategic application of BW inherently seeks to attack the populace, whereas nuclear doctrine may only seek to damage NATO states’ military industrial complex with civilian casualties being a secondary consequence. The potential for a strategic BW attack remains low without any clear goal to attack civilians, which may provide some comfort to NATO states.

*Individual Uses*

With Russia repeatedly carrying out and supporting assassination attempts in NATO countries, it is possible this trend could evolve to target outside politicians and leaders. Russia’s brazen attitude towards crossing boundaries in their development and use of banned weapons suggests there is a possibility for use of a BW in assassinations. Though they have not yet targeted
NATO-country leaders or public figures, the potential for a BW attack on such individuals exists. As demonstrated in the cases of Litvinenko and Skripal in the UK, CBRN weapons prove dangerous for small-scale use because of sloppy tradecraft endangering the broader public. If Russia were to target an individual in a NATO country with a pathogenic BW, unless extreme precaution was taken or the threat was detected quickly, it is probable that the isolated attack could launch a local public health crisis.

The other potential use of a biological agent on a small scale could involve bioregulators or toxins. These are nonpathogenic and present less of a threat to the public but can provide more immediate effects and serve as better assassination tools. For example, use of a bioregulator that impacts blood pressure or heartbeat as a weapon could quickly cause respiratory and cardiac failure, leading to death within minutes. Bioregulators and toxins attack the body quickly and effectively, raising their value as an assassination weapon compared to slow-acting pathogens. The Soviet Union reportedly researched non-pathogenic BW such as toxins that could be produced in bacteria, creating a novel dissemination system. Additionally, as seen with the Markov assassination, the Soviets employed the toxin ricin to attack an individual, setting the stage for further use.

The International Scene

As demonstrated, Russia proves a legitimate threat to NATO in terms of BW use in a conflict. They also risk weakening international norms and the strength of international agreements, further endangering NATO to other actors. For decades, the Soviet Union modeled hegemonic power for states under their influence, which Russia has inherited. By choosing to flaunt international regulations against the proliferation of BW, Russia tacitly accepts other state and nonstate actors developing BW. Should broader proliferation occur, NATO could face a heightened risk for terrorist attacks, especially considering the increase of both domestic and anti-West terror in recent decades. Once the technology and methods involved in BW production spread, the feasibility of their use increases and actors may choose to invest in the weapon after seeing others’ success. In general, NATO cannot negotiate with a nonstate actor effectively to
remove BW from the international scene, but they can work with Russia to prevent norm degradation from reaching the point where proliferation is tolerated. Moreover, Russia’s influence in the world exceeds just symbolic influence over likeminded states. Russia holds elevated positions in international fora, such as a permanent seat in the UNSC. With veto power, Russia could derail nonproliferation efforts touted by NATO. This possibility becomes more likely when considering the mindset Russia holds towards NATO and BW: they firmly believe the West still maintains BW programs secretly and wants sole control of the weapons to weaken Russia relative to their power. As long as Russia believes NATO possesses malicious intent in any efforts to rid the world of BW, they wield the power to interfere in and weaken European and broader global security.

**Policy Recommendations**

1. *Improve intelligence collection, analysis, and sharing*

   NATO can best assess the threat of Russian BW by reforming intelligence collection methods to more appropriately estimate the extent of the threat. Numerous issues exist within the current intelligence infrastructure that have previously allowed threats to slip through the cracks or be underestimated by passive analysts. NATO must find better methods to collect, analyze, and share intelligence that will support alliance-wide research and preparations.

   At the state level, NATO states must strengthen intelligence collection methods to determine the potential adversary’s intentions; this requires more HUMINT or advanced surveillance. HUMINT has repeatedly proven the most fruitful method for collecting intelligence on BW because it uncovers perspectives on what the weapon’s intended use is, as well as the reasons behind weapons development. On a basic level, strengthening HUMINT requires finding new sources, which proves difficult as the most notorious sources in the past have involved high-level defectors. For decades, NATO was unaware of the existence of numerous Soviet BW facilities because of intense regimes of secrecy. The covert nature of BW programs suggests that finding the perfect source will remain a barrier to effective HUMINT. Furthermore, improving
HUMINT presents a difficult challenge due to a source’s fear of retaliation, a valid concern following the recent CW attack on Sergei Skripal. To attract sources, states need to be creative in how they ensure the source’s safety. Despite the difficulty in tangibly changing HUMINT, states must provide this branch of intelligence with more resources. As for surveillance, NATO must find innovative ways to detect BW development in addition to just usage, supporting efforts to snuff out threats before they emerge.

2. Revitalize research

Connecting to intelligence, NATO should expand its support for basic and applied scientific research to thoroughly understand the biology behind a BW in addition to just the military applications. NATO’s Science for Peace and Security encourages broad participation in scientific research, though it is unclear to what extent these programs divert resources and attention to BW. NATO needs to prioritize research as it relates to biological security, especially in wake of the COVID-19 pandemic that demonstrated NATO members’ inability to contain biological crises. NATO must gain a stronger understanding of BW science to practice applying these concepts to a military response. NATO vows to only conduct defensive work and to not employ an offensive weapon, but forces still need to train to master an appropriate response, whether containing a spreading pathogen or maintaining operational war capabilities during an attack. By conducting broad research to understand the nature of BW, NATO will be able to effectively plan for a wide range of threats and therefore productively manage a burgeoning crisis.

3. Work with Russia to maximize preparations

Outside of the BWC and broader counter-CBRN actions in the UN, NATO has not directly worked with Russia to address concerns of BW. The BWC presents significant concern because of its systemic ineffectiveness and should remain a focus for future BW arms control, but NATO should work directly with Russia in other venues to directly address concerns of Russian BW. While Russia relies of secrecy and likely would not endanger their program through disclosing classified information, working with Russia to begin inspections in both NATO states and Russia may help NATO target defensive efforts. Even through understanding the types of scientific
abilities Russian agencies or companies possess and the type of research they conduct, NATO can focus on improving defenses related to areas of actual concern instead of vague predictions. Previous inspection attempts have failed after Western countries allowed inspections by Russian teams but the effort was not reciprocated by Russia. To ensure cooperation, inspections could occur simultaneously and therefore prevent Russian cheating. For objectivity, NATO could request an external committee conduct inspections. Regardless, NATO must work with Russian under the assumption they will attempt to cheat, but accept any gains possible. The goal of rooting out the entirety of an offensive weapons program is not achievable, so it is necessary to shift expectations to consider any progress in negotiating directly with Russia a success.

Furthermore, in working with Russia to address proliferation or use of BW, NATO must draw a line in the sand and invoke a clear doctrine demonstrating what NATO will and will not allow on the international scene. In recent years, Russia has become more reckless in their methods to handle state enemies. Specifically, they have recklessly carried out high-profile assassination attempts with weapons that can cause harmful effects to a community. When possible, NATO ensure that what actions they deem irrefutably unacceptable are abundantly clear as well as the consequences of crossing this line. Though all BW attacks are banned by the Geneva Protocol and the BWC and norms provide restraints on usage, NATO must clarify how they intend on responding to a threat to deter Russian aggression. For instance, overtly stating that assassination attempts in NATO countries with BW will result in significant consequences has the potential to constrain Russian aggression. Though this doctrine should not be negotiated, it is important that such concerns are vocalized between NATO and Russia to prevent future miscommunication or escalation.

4. Prepare medical infrastructure and watch for the worst

The weak response to the COVID-19 pandemic has highlighted that NATO countries are not capable of responding to an emergent biological threat. Though the pandemic occurred naturally and was not a manmade BW, the mechanisms and equipment needed to appropriately contain the threat are identical. In the event that NATO cannot successfully deter a Russian BW
attack or another incident mirrors the effects of a BW attack, NATO must quickly mobilize to deliver supplies, increase surveillance, and respond as necessary to the attack. Because the Alliance has numerous members with well-developed health infrastructure, NATO could consider building stockpiles of medical supplies to roll out to the impacted area quickly, supporting quick containment efforts. By increasing surveillance, members can react quickly once impacted by a BW and take necessary policy steps such as requiring lockdowns. On the public health side, states must be capable of responding quickly to effectively contain a BW, as pathogenic BW will replicate and spread rapidly, widening the disaster instead of fighting it. However, if Russia or another actor perpetrates a biological attack, NATO must prepare to respond on a military level to deter future usage of BW. Without a clear, pre-determined doctrine centered on biological warfare, NATO may falter in their response, reveal Alliance weakness and possibly alert other actors that they can perpetrate an attack on NATO soil. Therefore, preparations must include both material preparations to actively address the fallout from an attack as well as policy considerations to ensure a cohesive and strong response.

**Conclusion**

Biological weapons are unique weapons with the ability to kill indiscriminately with power continuing to grow as modern biotechnology presents a potential bio-weaponeer with stronger, more efficient, and more discrete weapons. NATO remains vulnerable to a biological attack. NATO must address their unfocused direction, subpar intelligence, and inconsistent preparation. Russia’s ability in biotechnology, lack of commitment to international agreements, and hostile action throughout the continent makes this a significant security problem that must be addressed. To counter this threat, NATO must reform their current policies and procedures to focus on better intelligence and research, address weak international regulations, and prepare for
a biological incident, natural or manmade. The threat of biological weapons will grow in the future and failure to address these issues is a risk too great to ignore.

Bibliography


NATO’s Comprehensive, Strategic-Level Policy for Preventing the Proliferation of Weapons of Mass Destruction (WMD) and Defending against Chemical, Biological, Radiological and Nuclear (CBRN) Threats § (2009).


