

Biological Terrorism and the Production of Epidemics

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Abstract:

The increasing threats of terrorism have necessitated mechanisms for assessing the risks posed by various microorganisms as biological weapons, coupled with an understanding of the historical development of biological agents and their optimal use.

Bioterrorism involves the deliberate release of viruses, bacteria, fungi, or infectious agents to cause disease or death in humans, animals, or plants. Its primary aim is to induce societal disruption, economic losses, and systemic chaos. The success of bioterrorism is often measured not by the number of casualties but by the extent of panic, confusion, and economic collapse it generates within societies and governing institutions.

This paper examines the concepts of biological warfare, its evolution, usage levels, and strategies for controlling its spread. It also explores the development of scientific and technological mechanisms to enhance diagnostic and therapeutic capabilities, as well as training and education initiatives to improve societal resilience against disease outbreaks and potential bioterrorism attacks.

Keywords: Biological crime; bioterrorism; biological weapons; biological warfare.

1.Introduction:

Bioterrorism represents a silent war that employs biological weapons primarily composed of microorganisms or chemical agents designed to spread infectious diseases, causing illness or death in humans, animals, or plants. It relies on the deliberate release of viruses, fungi, or bacteria to achieve its objectives. Unlike conventional warfare, biological warfare does not result in explosions, destruction of buildings, or material devastation. Instead, its primary targets are humans, animals, or plants, with the latter often serving as intermediaries to reach human populations through zoonotic transmission pathways.

Biological warfare is the most heinous form of warfare, as the adversary is invisible and often unidentified, causing inevitable harm or even death through surprise outbreaks of infectious diseases that trigger fear, panic, and social disruption.

Bioterrorism Empowered by Globalization and Scientific Progress

Technological globalization and scientific advancements have granted bioterrorism a silent power that operates surreptitiously, concealing the identity of its perpetrators. Bioterrorism not only expands the scope and impact of terrorist operations but also inflicts compounded harm on human lives, animals, and potentially plants. This results in inevitable disruptions to economic dynamics, societal continuity, and political stability, creating widespread panic and societal destabilization. The simultaneous outbreak of epidemics and mortality within communities induces shockwaves that reverberate across social, economic, and political domains.

Research Problem: Based on the aforementioned context, the central issue of this study revolves around exploring the interrelationship between terrorism, biological weapons, and the creation of epidemics. This inquiry can be framed through the following question:

How are epidemics created?

Has conventional terrorism succeeded in acquiring biological and chemical weapons?

What are the implications for humanity's future in light of scientific advancements in biology?

Rationale for the Study

The selection of bioterrorism and epidemic creation as the subject of this research stems from its significant scientific, practical, and contemporary relevance. This topic addresses major humanitarian issues that are reshaping the trajectory of human existence. The international crimes committed by many technologically advanced states in the field of biological sciences have prompted a focus on studying the origins of biological warfare, efforts to create epidemics, and the pursuit of acquiring and developing such capabilities.

Since World War I, numerous nations have gradually acquired scientific and technological expertise in epidemic creation. During World War II, various methods for spreading infectious diseases among humans, animals, and plants were tested. This progression underscores the need to examine humanity's responses to these crimes and to consider the role of international law and judicial systems in curbing such practices. The goal is to establish mechanisms that respect international laws, treaties, and conventions while mitigating the risks posed by biological weapons to life on Earth.

2.Methodological Framework of the Study

2.1. Core Concepts of the Study

1 - Bioterrorism (Bioterrorisme):

Bioterrorism is the deliberate release of biological agents to cause diseases and spread epidemics, resulting in human, animal, or plant fatalities. These agents may include viruses, bacteria, fungi, or toxins, either naturally occurring or laboratory-modified to enhance resistance to antibiotics and increase environmental dissemination.

The spread of biological and chemical agents can occur through air, water, or food sources. Terrorists exploit these agents due to their difficulty in detection, often manifesting symptoms only after an incubation period, which facilitates widespread transmission.

Richard Preston¹ emphasizes the delayed detection of such agents due to their incubation period, leading to increased infections and outbreaks among populations. Similarly, Al-Hassan Muhammad Ibrahim defines bioterrorism as the intentional cultivation or dissemination of pathogenic organisms (bacteria, fungi, viruses) and their toxic derivatives (toxins), or

any other harmful substances they produce, aiming to spread diseases among humans, animals, or plants, thereby eradicating them².

2 - Terrorism (Terrorisme):

The term "terrorism" is a fluid and evolving concept, lacking a fixed legal definition due to its continuous transformation. Historically, the term initially referred to government actions against workers to coerce compliance with orders and regulations. In contemporary contexts, terrorism is broadly used to describe the organized use of violence and intimidation to achieve political objectives. It often involves individual or collective assaults, sabotage, and various acts of violence perpetrated by political organizations against civilians, creating an atmosphere of fear, panic, and insecurity³.

3 - Biological Weapons:

Biological weapons are engineered using microscopic organisms such as viruses, fungi, or bacteria. These agents cause infectious diseases that can lead to death in humans, animals, or plants. Developed in specialized laboratories, biological weapons are classified as weapons of mass destruction, alongside radiological, nuclear, and chemical weapons. Due to their low production cost and ease of acquisition, they are increasingly sought after by terrorist groups.

2.2. General Framework of the Study

1 - Early Use of Biological Weapons in Warfare Among Nations:

The use of infectious diseases and epidemics as tools of warfare dates back approximately 600 years BCE. The Greek military leader Solon reportedly used the toxic juice of hellebore roots to poison rivers consumed by enemy forces and local populations, leading to their defeat. Similarly, contaminating water sources and weaponizing infected cadavers—whether human or animal—were prevalent tactics.

During the Middle Ages, military leaders recognized the potential of epidemic victims as biological weapons. A notable example occurred in 1346 during the siege of the fortified port city of Caffa in present-day Ukraine. The besieging Tatar forces catapulted plague-infected corpses into the city, transforming it into a hub of plague outbreaks. The disease spread beyond Caffa, reaching Europe and parts of Asia, marking the infamous Black Death pandemic. This historical event was detailed by Gabriel De

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Mussis⁴ in 1348–1349, describing the deliberate use of plague victims as a strategic weapon⁵.

The Europeans' intentional spread of smallpox among Native Americans in the 18th century exemplifies another instance of biological warfare. In 1763, British forces gifted Native leaders blankets contaminated with the smallpox virus, resulting in devastating epidemics that wiped out significant portions of indigenous populations⁶.

During the modern era, biological weapons have been used as tools of international terror. For example:

- In World War I (1915), the German army used anthrax (*Bacillus anthracis*) to infect Russian cavalry horses, which subsequently infected humans, causing massive fatalities.
- The German forces were also accused of deploying cholera bacteria against Italian troops.

These instances highlight the widespread use of biological agents as strategic tools in warfare, even before the scientific understanding of disease transmission and prevention had developed. It wasn't until the late 19th and early 20th centuries that advancements in epidemiology unveiled the mechanisms of disease spread, allowing nations to weaponize biological agents for geopolitical purposes in modern times.

In the 19th century, specifically between 1936 and 1946, European nations and the United States began establishing numerous laboratories and research centers specializing in epidemiology to develop biological weapons. These efforts were based on their advanced understanding of the cellular structures of viruses and their mutations, bacterial transformations, fungal behavior, and the environmental conditions conducive to their growth and interaction. Through mastery of genetic and hereditary manipulation of infectious agents capable of causing disease and death, scientifically and technologically advanced nations—particularly in microbiology and epidemiology—achieved significant progress in producing lethal biological and germ-based weapons. Alongside this, they also excelled in developing vaccines, antidotes, and related medical and paramedical supplies.

One notable incident occurred in 1979 at a Russian military biological center in the city of Sverdlovsk, where an accidental release of

anthrax spores led to 79 infections, resulting in 68 deaths. Similar events were recorded during World War II, when Japan deployed anthrax and plague against China, causing significant human casualties and widespread condemnation. Biological terrorism persisted in later years; for example, in 1993, the Aum Shinrikyo religious sect released anthrax in central Tokyo, causing widespread panic and fatalities as part of an attempt to destabilize the Japanese government and terrorize the population. Another example is the 2001 anthrax mail attacks in the United States, which targeted media outlets and members of Congress, creating significant public fear and political disruption.

Pharmaceutical companies primarily base their financial profitability on entering markets with high consumption of medications, either due to epidemics or because of the increasing number of diseases resulting from the unhealthy consumption of heavily processed and industrialized foods. This is particularly true during wars or in the creation of epidemic hotspots, especially in the context of biological warfare. Many of the advanced nations in biological sciences, biochemistry, and biomedical research have allocated significant financial resources to experimental research in these fields, particularly focusing on biological and chemical experiments.

A large number of these countries have leveraged wartime conditions to conduct biological and germ warfare experiments, including Russia, Germany, Japan, the United States, the United Kingdom, and France. These countries established laboratories and research centers to develop a variety of bacteria, viruses, fungi, and other pathogens for use as biological weapons, all while concurrently developing vaccines and medical supplies for these epidemics. Despite the secrecy and confidentiality surrounding biological experimentation and development, accidents and attacks have exposed the covert nature of biological warfare.

In 1940, Britain established a biological weapons research center, and in 1941, detonated the first germ bomb composed of anthrax on the Scottish island of Gruinard, leading to the death of thousands of animals. Britain then prohibited human habitation on the island due to the risk of disease transmission. Similarly, in 1942, the United States began developing a biological weapons research office following recommendations by a national science committee, recognizing the potential for biological germ

warfare after consulting with the U.S. Department of Defense. During World War II, Germany conducted biological warfare experiments against the Russians, Italians, and French, using anthrax, plague, and glanders against horses—accusations that have since been documented by various nations.

In 1946, the New York Times published reports about Japan's secret biological laboratories in Harbin⁷, where they conducted numerous biological experiments against China during World War II. These experiments resulted in the production of germ bombs composed of anthrax. After the war, the Soviets seized one of Japan's biological laboratories and transferred it to Russia.

3. Food Wars and Targeting Food Security:

Agricultural terrorism depends on the deliberate introduction of highly contagious animal and plant pathogens, using various biological or biochemical agents that cause severe diseases and epidemics targeting animals and plants, with the primary objective of threatening food security. Another goal is to target humans through the transmission of diseases from animals to humans after the animals have been infected by a mobile zoonotic virus, causing disruption to the ruling authority of a country and instilling social fear and panic among the population. Inflicting diseases on animals or plants has a major impact on the country's economy. Agricultural terrorism targeting livestock attracts terrorists because the biological agents causing diseases in animals are readily available. For example, vaccines for viral diseases in poultry are readily found in pharmaceutical markets, and anyone can access vaccines for diseases like Newcastle disease or Gumboro disease. If exposed to high temperatures, the virus can become active and cause illness in poultry that consume contaminated water. These two viral diseases can result in a mortality rate of up to 75%, causing significant damage to farmers and negatively impacting the national economy. A biological attack on animals with the introduction of pathogens is a wide-ranging assault, impacting animals, farmers, companies, and countries, leading to widespread panic, fear, and social instability.

Animals have often been targets of biological terrorism or biological warfare. During World War II, many of the participating countries

conducted research and developed several viruses, bacteria, and fungi as biological agents capable of being used as weapons. Germany, for example, conducted research to develop biological weapons based on foot-and-mouth disease and cattle plague, while Russia achieved its biological weapons based on African swine fever, cattle plague, and foot-and-mouth disease. Moreover, Britain, Canada, and the United States made significant advancements in the development of biological weapons, including anthrax, brucellosis, and rinderpest—diseases that affect animals but can be transmitted to humans. The purpose of these weapons was to threaten both food security by targeting livestock and public health by threatening human populations. During World War II, British researchers produced five million units of infected cattle cake filled with anthrax spores, intended to be dropped on German pastures. This kind of research and development⁸ raised considerable concern within U.S. government circles in 2005, when it was feared that foot-and-mouth disease could spread uncontrollably once introduced, creating widespread panic and constant vigilance.

The potential biological effects of agricultural terrorism have sparked international concern in both economic and political circles because many animal diseases can be manufactured, handled, and distributed easily. The spread of such diseases within farms and countries can affect international trade due to regulations that ensure food products are free from diseases and the health safety of animals traded across borders. For example, countries may implement quarantine laws when a highly contagious viral disease is detected in animals, which can result in trade bans lasting for months, or even over a year as seen with the outbreak of bovine spongiform encephalopathy (BSE) in the UK and France. This led to the halt of cattle trade and the suspension of meat and animal-based products. Similarly, the bird flu outbreak in 2003 severely affected international poultry trade, causing substantial losses for many countries and bankrupting farmers. Furthermore, as a medical anthropology professor and practicing veterinarian, I witnessed the outbreak of the contagious viral skin disease in cattle known locally as “cowpox” in Algeria in September 2023. This outbreak resulted in significant cattle losses due to the absence of vaccination and the inability to produce vaccines locally. There are various speculations regarding the origins of the outbreak, one of which suggests

that the disease spread from Libya to Algeria's Ouargla province through cross-border transmission. Some suggest that it may have been introduced to eliminate the national livestock and harm food security.

Additionally, a fungal epidemic affected prickly pear crops in Tunisia in 2024, causing substantial damage to this valuable plant species, which is crucial for the country's agricultural sector, especially in food and cosmetic product production. Tunisia is a leading exporter of prickly pear products. There are analyses suggesting that the country's prickly pear industry was targeted to control global markets for this product and its derivatives.

Starting from the concern of many countries regarding the fear of biological terrorism, a group of microbiologists and biologists in Australia created an unofficial forum for countries to compile a list of animal diseases that are included in the biological terrorism lists and are subject to export controls to ensure that exports do not contribute to the development of biological and chemical weapons. The following diseases define this list:

Food poisoning, blue tongue, avian influenza, anthrax, African swine fever, African horse sickness, brucellosis in cattle, brucellosis in sheep, brucellosis in goats, foot-and-mouth disease, contagious pleuropneumonia in goats, goat pox, sheep pox, contagious bovine pleuropneumonia, Newcastle disease in poultry, Eastern equine encephalitis, classical swine fever, cattle plague, Rift Valley fever, pseudorabies, small ruminant plague, vesicular stomatitis, tularemia, Venezuelan equine encephalitis.

4. The Geneva Protocol for the Prohibition of Chemical and Biological Weapons:

After the end of World War I, specifically in 1925, most countries signed a treaty known as the "Geneva Protocol," which stipulates the non-use of chemical and biological weapons in wars. However, many countries secretly worked on the use and development of biological weapons, especially during World War II. Among these countries was Japan, which developed a biological weapons program secretly, in violation of the Geneva Protocol. They used biological weapons against China, and also against prisoners of war by injecting them with cholera and typhus bacteria. During the Korean War, China and North Korea accused the United States

of using biological weapons. The United Nations Scientific Committee conducted an investigation in 1952 into the complaints from North Korea and China, and the results of the investigation indicated the possible exposure of populations in conflict zones to biological substances. In fact, cholera, anthrax, and plague bacteria were detected, as well as mosquitoes carrying the yellow fever virus.

In addition to the Geneva Protocol of 1925, Britain proposed a draft for a comprehensive treaty to prohibit the development, use, production, and storage of biological weapons at the end of the 1960s. This British treaty was completed for signing on April 10, 1972, and became effective on March 26, 1975, after 22 countries had ratified it. It was later signed and ratified by 165 countries. However, many countries only signed the treaty and did not ratify it, leading to the absence of an international system and effective mechanisms for verifying the compliance of all countries with the treaty. This lack of compliance became evident with the appearance of five major epidemics in the early 21st century, where humanity was widely exposed to some of the deadliest pandemics: the SARS virus in 2002, avian influenza in 2003, swine flu in 2009, the Ebola virus in sub-Saharan Africa in 2013, and the COVID-19 pandemic in 2019. Despite many countries signing this treaty to prohibit the use, development, and creation of biological weapons, many of them, under the guise of self-defense and in response to any attack by an unknown enemy, retain and currently operate research programs to discover and develop biological and germ warfare weapons.

5. Characteristics of Biological Weapons:

Biological weapons are colorless, odorless, and inexpensive to produce, which is why many developed countries do not hesitate to manufacture them. They can be prepared in many forms, such as explosive devices, sprays, or germ-contaminated liquids that can be placed in food or drink. They can also be in the form of gases, which are easy to spread through the air. When released, attention must be given to wind direction and strength to target the desired location and spread the germs. One of the dangers of biological weapons that makes them even more dangerous is that they affect unintended living beings, whether humans, animals, or plants, through military biological attacks. Additionally, during the spread of

biological weapons and the infection of living beings, it becomes difficult to distinguish between epidemic cases and similar diseases with the same symptoms, except through laboratory tests, which adds to the complexity and danger of biological weapons.

With advancements in science and research in the field of genetic engineering, the danger of biological weapons has increased due to their ability to create mutations in viruses or alter them to enhance their ability to spread an epidemic, making it harder to combat and more expensive to control in all directions. The ability of viruses to mutate into new strains complicates the production of vaccines against the epidemic, thus making humanity vulnerable to both health and environmental dangers. Fungi are among the diseases that contaminate the air and can be spread by wind to distant locations, greatly increasing the spread of infections and diseases. The epidemic can also take the form of bacteria that can spread lethally through drinking water, whether for humans or animals. The bacterium that causes tetanus is one of the most potent toxins that leads to certain death. The target can be humans, animals, or both, by spreading an infection that affects animals and can be transferred to humans, such as brucellosis, pulmonary tuberculosis, avian influenza, or rabies—all of which are diseases that can spread from animals to humans. This is the danger of deadly biological weapons, which may lead to severe disruption and destabilization in the communities targeted by those who use biological weapons.

6.Conclusion:

Biological terrorism, whether carried out by states or groups, is one of the trends that falls within the scope of international crimes aimed at undermining both local and international public order. It works to weaken the foundations of peace, individual freedom, and the right to live in safety. Biological terrorism is considered a type of silent, destructive war against humanity, capable of demolishing social stability and spreading panic and fear among communities. It can turn the production of epidemics into a killer of life, crossing over species in its targets. It specifically targets humans by using animals infected with the epidemic, which then becomes the vector transferring the disease from animal bodies to human bodies.

This epidemic industry, whether fungal, viral, or bacterial, requires serious consideration of ways to prevent, protect, and strengthen defenses, as well as mechanisms for confrontation, eradication, and deterrence. Entering into a battle with epidemics is extremely costly, and the compounded losses affect social stability, leading to disruptions in both local and global economies, with indicators of decline and even stagnation, as seen during the COVID-19 pandemic and its impact on global economies. The political instability caused by such outbreaks can shift from focusing on development, growth, and profitability to emergency response strategies. This reduces the ability of countries to achieve growth and social welfare projects.

The cost of prevention alone is exorbitant when epidemic cases in animals or humans are detected, and efforts to contain them must be undertaken. For example, the 2006 outbreak of foot-and-mouth disease in Algeria, which spread across the entire Algerian territory, particularly the Tell and Plateau regions, had high treatment and prevention costs. It resulted in significant losses in livestock, particularly cattle, and affected the profitability of farmers. It also imposed a substantial financial burden on the Algerian state's public treasury.

Based on the problems caused by biological terrorism, we must seriously consider preventive measures and research to develop ways to confront it and handle it if it occurs. There are several measures we propose as a result of this study for preventing biological terrorism and hierarchical mechanisms for combating and dealing with it when it occurs, especially in infected environments. These measures include:

- Establishing a strategic reserve of materials counteracting the effects of biological weapons, such as vaccines, serums, antibiotics, and supplies to prevent these epidemics, whether on a global level through organizations like the World Health Organization or at the national level to protect the country and its population from outbreaks.
- Preparing at the national level to build shelters equipped with air filtration systems to purify the air from germs and infrared burners to kill harmful microorganisms.

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- Training and educating the population in areas targeted by biological weapons on how to prevent, protect, and coexist with epidemic conditions.
- Isolating infected individuals, attempting to treat them, and containing and sealing off infected areas by preventing movement between regions, imposing quarantines, and wearing protective masks to break the transmission chain of viruses through the air.
- Preparing sufficient stocks of biological disinfectants and working on eliminating insects and mosquitoes in case of a biological attack, as some biological attacks rely on insects to spread the disease.
- Conducting periodic inspections of water sources to ensure they are not contaminated and are safe for consumption.
- Monitoring and regularly checking the air quality in cities using mobile sensitive detection devices, in vehicles either dedicated to this purpose or on bicycles used for the same purpose.

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