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# The Perspective of Bioterrorism in Asymmetric Warfare and Countering Bioterrorism

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A R T I C L E I N F O

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A B S T R A C T

The aim of this research is to analyse the Definition and Basic Concepts, Threat Assessment, Dynamics of Bioterrorism Threats, Motivating Factors Driving the Use of Bioterrorism in Asymmetric Conflicts, Legal Perspectives, Impacts and Threats of Bioterrorism in Asymmetric Warfare, and Strategies and Efforts to Counter Bioterrorism. The methodology used in this research is qualitative descriptive with data collection through journals and other publications related to bioterrorism. The research findings indicate that Bioterrorism is the use of biological agents or toxins to cause disease or death in humans, animals, or plants, with the aim of instilling fear, disrupting daily life, or achieving political or ideological goals. These attacks exploit the biological properties of agents such as bacteria, viruses, fungi, or natural toxins, requiring a deep understanding of agents, spread, health impacts, public policies, and national security strategies.

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## INTRODUCTION

The world has entered the digital era, marked by the Fourth Industrial Revolution, characterized by increased connectivity, interaction, and blurred boundaries between humans, machines, and other resources converging through technology and information. This facilitates everyone in seeking, using, receiving, processing, disseminating specific information, enabling the global community to access information from various communication systems. Undoubtedly, the digital age also aids in the spread of radical terrorism ideologies. Terrorism involves organized violence, positioning violence as consciousness, a method of thinking, and a tool for achieving goals (Wahid, 2004). Terrorism entails crimes with the aim of intimidating or coercing civilians or governments to achieve political or social objectives, potentially resulting in murder and suffering of innocent individuals (Jay, 2016).

The advancement of modern technology has undeniably expanded the scope of terrorism, with perpetrators believing that the greater the terror victims, the greater the impact of terrorism (Achmad Jainuri, 2016). Conventional terrorist attacks such as bombings, shootings, or threats are actions commonly taken by terrorist groups and have evolved or escalated to a more lethal level, known as bioterrorism. The law number 5 of 2018 regarding the establishment of government regulations replacing law number 1 of 2002 concerning the eradication of terrorist acts has become law. Article 1 paragraph 2 defines terrorism as acts involving violence or threat of violence causing widespread terror or fear, potentially resulting in mass casualties, and/or causing damage or destruction to vital strategic objects, the environment, public facilities, or international facilities with ideological, political, or security disruption motives.

According to the US Department of Labor, Bioterrorism is the deliberate use of microorganisms to cause illness or death in humans, plants, and animals (US Department of Labor, 2021). Naturally, biological agents exist in nature and can be found directly or indirectly. Biological agents include bacteria, protists, fungi or molds, even plants, and animals themselves. The concern here is when biological agents that cause disease are intentionally used by certain parties, resulting in many casualties. When microscopic or macroscopic biological agents causing diseases are intentionally used to infect many victims, it is termed as bioterrorism. A pandemic resulting from bioterrorism, if not managed properly, would be highly dangerous to humanity. Public health levels would decline, and life expectancy would decrease due to the spread of biological agents infecting humans, leading to sickness and death, ultimately contributing to extinction. Additionally, pandemics or outbreaks resulting from bioterrorism activities could also destabilize a country; if the number of sick individuals increases significantly, it would overwhelm a country's healthcare facilities, leading to increased mortality rates. There is also the possibility of genetic modification of biological agents to make them more dangerous. Bioterrorism poses a threat to a nation and its security, including Indonesia.

Bioterrorism and asymmetric warfare have become the main focus in the global security agenda in the contemporary era. These unpredictable and often complex threats demand innovative and collaborative strategies from involved parties to maintain national and international security. One crucial aspect of these efforts is the effective exchange of intelligence information among countries and relevant institutions. Several reasons underpinning bioterrorism within asymmetric warfare include first, Power Asymmetry. In asymmetric warfare, there is an imbalance of power between the involved parties (National Intelligence University, 2015). Bioterrorism is often used by militarily or economically weaker parties to significantly impact stronger parties, given the relatively accessible and affordable biological technology.

The second reason is non-conventional goals. Parties engaged in asymmetric warfare may have non-conventional goals, such as instilling fear, influencing public opinion, or creating political instability, achievable through bioterrorism attacks (Von Hippel, 2008). Third, Response Imbalance. Responding to bioterrorism attacks can be challenging and disproportionate, especially if the attacked party lacks adequate preparation or capability to address biological threats (National Research Council, 2007). The fourth reason is the use of alternative tactics and strategies. Bioterrorism can be used as an alternative tactic or strategy in asymmetric warfare to overcome resource limitations or military capabilities of weaker parties (Davis, 2003). Bioterrorism, defined as the deliberate release of biological agents to cause harm or instill fear in populations, has emerged as a significant threat in contemporary security landscapes. This threat is particularly pronounced in the context of asymmetric warfare, where non-state actors or weaker parties seek to exploit vulnerabilities and create disproportionate impacts using biological weapons. Understanding the dynamics of bioterrorism within the framework of asymmetric warfare is crucial for developing effective countermeasures and safeguarding national and global security (National Counterterrorism Center, 2020).

The law number 5 of 2018 provides a comprehensive explanation of what actions are considered terrorist acts. However, the law number 5 of 2018 still does not specifically regulate (limit) bioterrorism crimes, especially the procedures for preventing bioterrorism, the coordination flow of state agencies to address bioterrorism, and others. The law only explains some aspects of biological agents that have the potential to be used as tools for violence, which can be classified as terrorist acts. The urgency of this research is to analyze the basic concepts, factors influencing the use of bioterrorism in asymmetric conflicts, legal perspectives and regulations, dynamics, impacts, and strategies to counter the threat of bioterrorism against national defense (Hariyanto, 2022).

## LITERATURE REVIEW

### National Values

National values are a set of values that become the basis for a nation in upholding identity, culture, and unity. National values are closely related to the spirit of nationalism, patriotism, national ethics, and a sense of brotherhood among fellow citizens. According to Soekanto (2000), national values have a very important role in shaping people's attitudes and behaviors in the life of the nation and state. National values become the moral foundation that binds all citizens in maintaining national unity and unity.

### Basic Education for State Defense

Basic state defense education is an educational program that aims to provide an understanding to the public about the importance of state defense awareness and increase love for the motherland. This program includes increasing knowledge related to the nation's history, culture, and values as well as skill training to increase readiness in maintaining national security and defense (Nata et al., 2017). According to Nindia L. Harahap and Anish A. Kurniawan in their book "State Defense Education in the Perspective of Indonesian Citizenship" (2019), basic state defense education is an integral part of the national education system which aims to shape the attitudes and behaviors of citizens who love and obey the state and have integrity and pride in the identity of the Indonesian nation. In its implementation, the basic state defense education program can be carried out through various activities such as learning national history, scouting activities, military skills training, and understanding of state ideology. Through state defense education, it is hoped that the community can have an awareness of the importance of roles and responsibilities as good citizens and can contribute to maintaining the sovereignty and integrity of the state.

## METHODOLOGY

This research is descriptive with a qualitative approach, where initially the author explained about national values. After that, the author discussed the perspective of bioterrorism in asymmetric warfare and countering bioterrorism. Furthermore, the author describes every subtheme about bioterrorism. The research methods used are literature study and secondary data analysis. Data is taken from various sources in the form of library materials, consisting of previous research, scientific journals, books, government reports, official news, and information from trusted and relevant websites related to the bioterrorism.

Data analysis techniques use theories from Milles, Huberman and Saldana (2014), namely *data collection*, data *condensation*, presenting data (*data display*), and drawing conclusions or verification (*conclusion drawing and verification*). The validity test of the data used is *Credibility* (Internal Validity), *Transferability* (External Validity), *Dependability* (Reliability) and *Confirmability* (Objectivity) carried out at each stage it is described in the following research design:

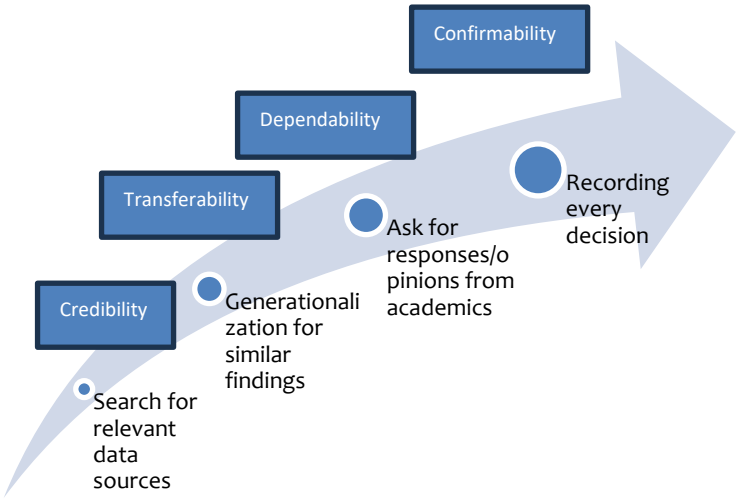


**Figure 1. Research Design**

Source : Processed by the author, 2024

The analysis was carried out to obtain the accuracy of the research results and the approach used by researchers is really consistent if used by other researchers in different topics (Gibbs, 2007 and Creswell, 2017).

## RESEARCH RESULT AND DISCUSSION

### Definition and Basic Concept

Bioterrorism can be defined as the intentional use of biological agents or toxins to cause disease or death in humans, animals, or plants. Bioterrorist attacks can be carried out in various ways, including releasing biological agents into the environment, contaminating food or water sources, or using biological agents in direct attacks on individuals or populations. The primary aim of bioterrorism is to instill fear, disrupt daily life, or achieve specific political or ideological goals. Bioterrorism refers to the deliberate use of biological agents or toxins to cause harm or death to human, animal, or plant populations. It is a form of terrorist attack that exploits the biological properties of the agents used, such as bacteria, viruses, fungi, or natural toxins, to instill fear, disrupt daily life, or achieve specific political goals. This definition encompasses fundamental aspects of bioterrorism, including biological agents, methods of dissemination, impacts on populations, and efforts in prevention and response. A comprehensive understanding of bioterrorism requires exploration of various perspectives involving fields such as biology, medicine, national security, and public policy.

The first perspective in explaining bioterrorism is from a biological standpoint. Biological agents used in bioterrorist attacks can come in various forms, ranging from pathogenic bacteria like Bacillus anthracis (the cause of anthrax) to viruses like Variola virus (the cause of smallpox). A deep understanding of the properties of these biological agents, including their methods of spread, disease symptoms produced, and detection methods, is crucial in prevention and response efforts against bioterrorism attacks.

From a medical perspective, bioterrorism has significant impacts on human health. Attacks with biological agents can cause serious and deadly diseases, requiring intensive medical care. Additionally, the psychological effects of bioterrorism attacks need to be considered, such as mass fear, anxiety, and psychological trauma on victims and affected communities. In terms of national security, bioterrorism poses a serious threat that requires effective prevention, detection, and response strategies. Security measures such as monitoring dangerous biological agents, early detection training, and inter-agency coordination are key in addressing the potential threat of bioterrorism attacks. Public policy aspects are also highly relevant in the context of bioterrorism. Developing effective policies for prevention, response, and post-attack recovery requires collaboration between government, healthcare institutions, academia, and civil society. Additionally, a comprehensive approach considering legal, ethical, and human rights aspects is needed in designing strategies to address bioterrorism.

Bioterrorism in asymmetric warfare can be defined as the intentional use of biological agents or toxins by conflicting parties to cause damage or death to opposing populations with the aim of instilling fear, disrupting daily life, or achieving specific political or ideological goals. This definition reflects the strategic dimension of bioterrorism use in asymmetric conflict situations, where parties with fewer resources or military strength may use biological strategies to harm or threaten opponents.

The Basic Concepts of Bioterrorism in Asymmetric Warfare can be explained as follows:

Biological Agents and Toxins:

The basic concept of bioterrorism in asymmetric warfare involves a deep understanding of the types of biological agents or toxins that can be used in attacks. These include pathogenic bacteria like Bacillus anthracis (the cause of anthrax), viruses like Variola virus (the cause of smallpox), fungi, and natural or synthetic toxins. The selection of these agents is usually influenced by their potential to cause serious damage or death, their ability to be effectively disseminated, and their availability or accessibility to those employing bioterrorism strategies (Cole, 2009).

Dissemination of Biological Agents:

The concept of disseminating biological agents in asymmetric warfare involves understanding how these agents can be spread to achieve maximum impact. Dissemination methods can include releasing biological agents into the air (aerosols), contaminating food or water sources, direct contact with infected individuals, or using vectors such as mosquitoes or rodents. Understanding these dissemination methods is crucial in designing prevention and response strategies against bioterrorism attacks (Miller, 2002).

Impact on Populations:

The concept of impact on populations in asymmetric warfare involves understanding the effects of bioterrorism attacks on public health and safety. Attacks with biological agents or toxins can cause rapidly spreading and deadly diseases, disrupt healthcare systems and community infrastructure, and create serious psychological impacts such as mass fear and anxiety (Tucker, 2006).

Motivations and Strategies:

The concept of motivations and strategies in using bioterrorism in asymmetric warfare involves understanding the reasons behind the selection of biological strategies by parties with limited military strength. These motivations can stem from political, economic, psychological, or national security goals. Strategies for using bioterrorism can include direct attacks on opposing populations, attacks on healthcare infrastructure or food supplies, or using bioterrorism threats as political leverage (Preston, 2002).

In analyzing Bioterrorism in Asymmetric Warfare, several perspectives are considered (Miller, 2002):

1) Political and Ideological Perspective: In this context, the analysis of bioterrorism in asymmetric warfare takes into account the political and ideological motivations behind the use of biological strategies. Case studies such as the 2001 anthrax attacks in the United States provide insights into how terrorist groups or individuals can employ bioterrorism to achieve specific political objectives.
2) National Security Perspective: From a national security standpoint, analyzing bioterrorism in asymmetric warfare involves understanding the threats faced by nations or armed groups from the use of bioterrorism by their adversaries. Case studies, such as the bioterrorism threat from Saddam Hussein's regime in Iraq, illustrate how biological strategies can be used as instruments of power in political confrontations.
3) Public Health and Environmental Perspective: In this perspective, analyzing bioterrorism in asymmetric warfare entails understanding the health and environmental impacts of bioterrorism attacks. This includes addressing diseases caused by biological agents or toxins, efforts to prevent disease spread, and post-attack rehabilitation.
4) Economic and Social Perspective: From an economic and social viewpoint, analyzing bioterrorism in asymmetric warfare encompasses the economic impacts of bioterrorism attacks on sectors such as healthcare, agriculture, and tourism. Additionally, the analysis covers social impacts like public fear and anxiety, as well as changes in behavior and policy responses to bioterrorism threats.

## A. Threat Assessment

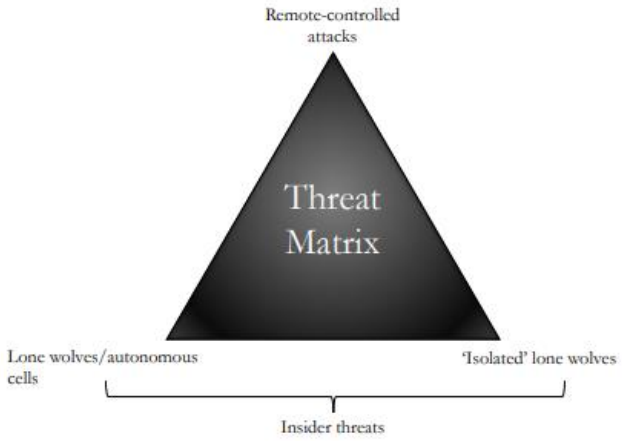


**Figure.2 Threat Matrix**
Source : Dass, 2021

Threat matrices are strategic tools used in security and defense contexts to assess and categorize potential threats based on various parameters. In the context of bioterrorism within asymmetric warfare and countering bioterrorism, threat matrices play a crucial role in understanding the landscape of risks posed by different types of actors and scenarios. Threat Matrix Components:

1. **Remote Controlled Attacks**
   Remote controlled attacks refer to acts of terrorism or violence orchestrated and executed from a distance, often using technology such as drones, cyber tools, or remotely triggered explosives. These attacks can be coordinated by organized groups, state actors, or individuals with technological expertise. In the context of bioterrorism, remote controlled attacks may involve the use of unmanned aerial vehicles (UAVs) or cyberattacks targeting critical infrastructure to disseminate biological agents or disrupt response systems.
2. **Lone Wolves/Autonomous Cells**
   Lone wolves are individuals who operate independently without direct affiliation to established terrorist organizations or groups. They often act based on their own radicalized ideologies or personal grievances. Autonomous cells, on the other hand, are small, self-sufficient groups that operate independently but share a common ideology or goal. Both lone wolves and autonomous cells pose challenges to traditional security measures due to their decentralized nature and ability to carry out attacks with limited detection.
3. **Isolated Lone Wolves**
   Isolated lone wolves represent a subset of lone wolves who are particularly difficult to detect or monitor due to their minimal interactions with external networks or individuals. They may exhibit signs of radicalization or intent to commit violence but operate in isolation, making them elusive targets for intelligence and law enforcement agencies. Isolated lone wolves often rely on self-radicalization through

online propaganda and may possess technical skills to carry out sophisticated attacks.

4. **Insider Threats**
   Insider threats involve individuals or entities within an organization or security apparatus who misuse their privileged access to facilitate or enable acts of terrorism or sabotage. In the context of bioterrorism, insider threats could include rogue scientists or employees with access to sensitive biological materials or research facilities. Insider threats are particularly concerning as they bypass external security measures and exploit internal vulnerabilities.

**Structured Analysis of Threat Matrix Components:**

1. **Remote Controlled Attacks**
   Remote controlled attacks present a significant threat in bioterrorism scenarios due to their potential for large-scale impact and difficulty in attribution. For instance, the use of UAVs equipped with biological payloads could target densely populated areas or critical infrastructure, causing mass casualties and disrupting public health systems (Smith et al., 2020). Cyberattacks targeting bioinformatics databases or biomanufacturing facilities could also result in the theft or manipulation of sensitive biological data or materials (Jones & Brown, 2019).
2. **Lone Wolves/Autonomous Cells**
   Lone wolves and autonomous cells add complexity to bioterrorism risk assessments as they operate with varying degrees of sophistication and connectivity. A lone wolf with a background in microbiology, for example, could develop and disseminate a biological agent without external support, making detection and prevention challenging (Anderson, 2018). Autonomous cells, although smaller in scale, can leverage collective expertise and resources to orchestrate coordinated bioterrorism campaigns targeting multiple locations simultaneously (Wilson & Johnson, 2017).
3. **Isolated Lone Wolves**
   Isolated lone wolves pose a unique challenge as they may exhibit minimal outward signs of radicalization or intent to commit bioterrorism. Their ability to operate under the radar and evade traditional surveillance methods requires enhanced intelligence gathering and proactive monitoring of online extremist activities (Garcia & Smith, 2021). Detecting isolated lone wolves often relies on early warning indicators such as changes in behavior, online interactions, or acquisition of suspicious materials.
4. **Insider Threats**
   Insider threats in the context of bioterrorism highlight the vulnerabilities within research institutions, pharmaceutical companies, and government agencies involved in biodefense. A rogue scientist with access to high-containment laboratories could steal or mishandle dangerous pathogens, leading to accidental or deliberate releases (Miller & White, 2016). Insider threats necessitate stringent security protocols, background checks, and

ongoing monitoring of personnel with access to sensitive biological materials.

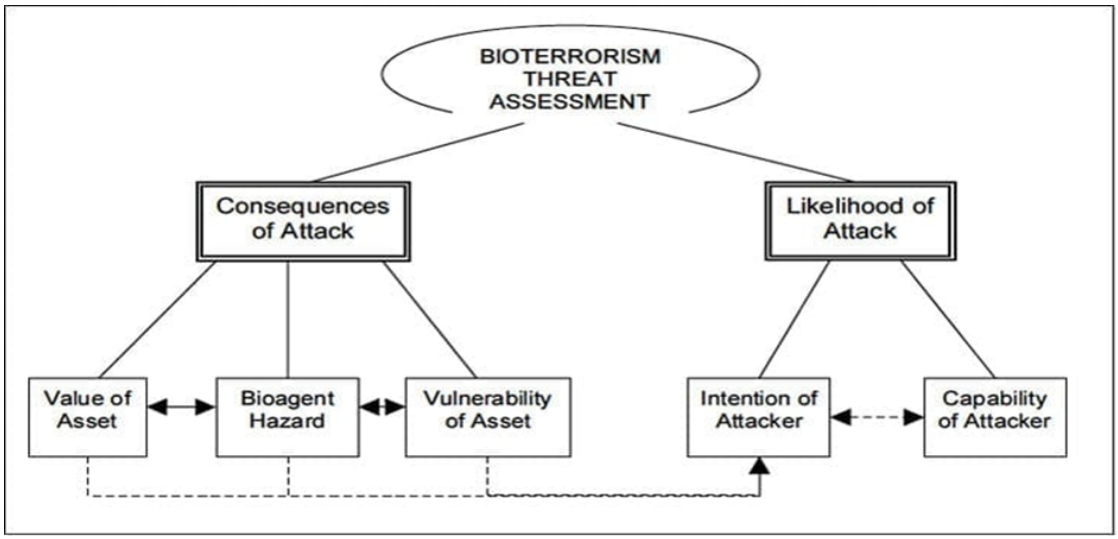


**Figure.3 Bioterrorisme Threat Assessment**

Source : Dass, 2021

Bioterrorism threat assessment is a critical process that involves evaluating the potential consequences of attacks and assessing the likelihood of such attacks occurring. This assessment framework encompasses various factors, including the value of assets at risk, the hazard posed by bioagents, the vulnerability of assets to attacks, the intentions of potential attackers, and their capabilities. The consequences of bioterrorism attacks are multifaceted and can have far-reaching impacts on different aspects of society and security. One key aspect is the value of assets that could be affected by a bioterrorism incident. This includes not only the economic value of physical assets such as infrastructure, but also the value of human lives, public health systems, and societal stability. For example, an attack targeting a major city's water supply with a biological agent could not only cause widespread illness and loss of life but also disrupt essential services, leading to economic losses and social unrest (Smith et al., 2019).

Another crucial factor in assessing consequences is the hazard posed by the bioagent used in an attack. Different bioagents vary in their virulence, transmission routes, and potential for mass casualties. Assessing the hazard level of bioagents involves understanding their epidemiology, pathogenicity, and availability. For instance, highly contagious and lethal pathogens like anthrax or smallpox pose a significant hazard due to their ability to spread rapidly and cause severe illness (Jones & Brown, 2018). Evaluating the potential consequences requires a detailed understanding of the bioagent's characteristics and the likely impact on human health and critical infrastructure.

The vulnerability of assets to bioterrorism attacks is another critical aspect of threat assessment. Vulnerability assessment involves identifying weaknesses in security protocols, response mechanisms, and infrastructure that could be exploited by attackers. This includes gaps in surveillance systems, insufficient biosecurity measures in laboratories or healthcare facilities, and weaknesses in supply chain security for critical resources like vaccines or medical supplies. Assessing vulnerability requires a comprehensive review of security protocols, risk management strategies, and contingency plans to mitigate potential vulnerabilities and enhance resilience (Garcia & Smith, 2020).

Assessing the likelihood of bioterrorism attacks involves analyzing the intentions and capabilities of potential attackers. The intention of attackers refers to their motivations, goals, and ideologies that may drive them to use bioterrorism as a tactic. This can range from political ideologies seeking to disrupt governance systems or achieve specific policy goals to extremist ideologies aimed at causing fear and instability. Understanding the intention of attackers requires intelligence gathering, threat assessments, and monitoring of extremist activities and networks (Anderson & White, 2017).

The capability of attackers relates to their technical expertise, access to resources, and operational capabilities to execute bioterrorism attacks successfully. This includes factors such as access to bioagents, knowledge of bioweapons development, proficiency in delivery mechanisms, and evasion of detection and response measures. Capability assessment involves evaluating the technical sophistication of potential attackers, their level of training, access to illicit networks or state sponsors, and past incidents or attempts. Assessing capability requires a combination of intelligence analysis, surveillance, and collaboration between security agencies and international partners (Wilson et al., 2021).

**The Dynamics of Bioterrorism Threat**

Bioterrorism involves the intentional use of biological agents such as bacteria, viruses, or toxins to cause disease or death in humans, animals, or plants as a form of attack or threat. Throughout history, there have been various cases of bioterrorism, each with different methods and motivations. Some notable examples include:

During the Peloponnesian War in 430-426 BC, there was an incident of suspected Salmonella enterica infection, believed to have been initiated by Sparta poisoning water reservoirs with the bacteria (Papagrigorakis et al., 2013).

1) In 1993, the Aum Shinrikyo group in Japan carried out a sarin gas attack mixed with Anthrax.
2) In 1763, during a conflict with the Pontiac Indian tribe, General Jeffrey Amherst used smallpox virus as a bioterrorism tactic.
3) The 2001 anthrax attacks in the United States involved the use of powdered anthrax spores sent through mail envelopes (Soeliongan, 2020).
4) The Hittites were documented as early users of biological weapons, using infected sheep (possibly with tularemia) to weaken their enemies.

5) In the 14th century BC, Scythian archers were known to dip their arrows in decomposing corpses and human blood.
6) The Black Death outbreak in the 14th century involved alleged bioterrorism by Genoese forces in Kaffa (now Crimea, Ukraine) during a conflict with Tartar forces.
7) During the Middle Ages and Renaissance, bioterrorism often involved poisoning food or drinks. Agathocles of Syracuse in the 4th century BC is a famous example.
8) In World War I and II, several countries developed biological weapons secretly as part of their military programs, such as Japan's Unit 731 during World War II.
9) Chemical weapons like Yellow Rain were used in conflicts like the Vietnam War, causing severe health effects.
10) During the Cold War, both NATO and the Warsaw Pact developed biological weapons as part of their strategies, although organized biological weapon dissemination was generally avoided.
11) Each of these incidents illustrates the historical and varied nature of bioterrorism, highlighting different motivations and methods used throughout different periods.
12) Bhagwan Shree Rajneesh Attack 1984/Oregon saw 751 people poisoned, with no fatalities. A group of followers of the Bhagwan Shree Rajneesh religious sect in 1984 in Oregon was reported to have infected door handles and salad bars in a restaurant, as well as other public places, with the Salmonella Typhimurium bacterium. It is known that this action was taken to take over the city's government by influencing the outcome of a local election, making it a bioterrorism attack in American history at that time that miraculously resulted in no deaths.
13) Aum Shinrikyo 1995/Tokyo, Japan saw 13 deaths and thousands injured. A religious sect in Japan, Aum Shinrikyo, spread sarin gas in the Tokyo subway station, and they also produced biological weapons and attempted to use them. Some members of the sect are noted as scientists and technicians in microbiology who have tried to create weapons using anthrax, botulinum toxin, and even Ebola.
14) Additionally, the Anthrax Attacks in 2001. One of the most famous cases of bioterrorism was the anthrax attack in 2001 in the United States. Letters containing anthrax were sent to several individuals and government institutions, resulting in several deaths and infections.
15) ISIS and the Use of Chemical Weapons. Terrorist groups like ISIS have been known to use chemical weapons such as chlorine and other chemical compounds in their attacks, although not specifically as traditional biological weapons.
16) COVID-19 Pandemic. Today, the threat of bioterrorism has once again become a real concern. The World Health Organization (WHO) has stated that this virus falls under the pandemic category, where an outbreak of a disease spreads across multiple countries globally or beyond local boundaries and can affect many people. Currently, 185 countries are

confirmed to be affected by this virus, including Indonesia. As of now, data from Johns Hopkins University and Medicine shows that there have been 90,976,653 confirmed cases of Covid-19 worldwide. Although the COVID-19 pandemic is not caused by bioterrorism, this virus demonstrates the significant potential of biological threats that can be caused by bioterrorism attacks involving modified viruses or other pathogens.

These cases reflect various methods and motives behind bioterrorism attacks throughout history. Technological advancements, biological knowledge, and geopolitics have influenced how these attacks occur and are managed by the involved parties. In the context of asymmetric warfare, the view of bioterrorism has a unique and complex dimension. Asymmetric warfare refers to conflicts where the parties involved have an imbalance of power, resources, or strategies.

**Motivating Factors Driving the Use of Bioterrorism in Asymmetric Conflicts**

To elucidate the motivating factors driving the use of bioterrorism in asymmetric conflicts, we need to understand the context of asymmetric conflicts themselves and the dynamics of motivation behind the use of bioterrorism strategies. Asymmetric conflict is a situation where warring parties have significant differences in resources, military capabilities, or societal support. In this regard, the use of bioterrorism can be a strategic choice for parties facing limitations in conventional resources or military strength to achieve specific goals.

The first perspective to consider is political motivation. Parties using bioterrorism in asymmetric conflicts often have political or ideological goals that are difficult to achieve through conventional means. For example, rebel groups or terrorists may use bioterrorism to instill fear among the population or compel the government to enact desired policy changes (Carus, 2001). In addition to political motivation, economic factors can also drive the use of bioterrorism in asymmetric conflicts. For instance, extremist groups with limitations in funds and military resources may see bioterrorism as a relatively inexpensive yet effective alternative to achieve their goals (Freilich, 2013).

Furthermore, psychological and ideological aspects are also crucial in understanding the motivation for using bioterrorism. For example, radical or fanatic groups may view bioterrorism as a way to demonstrate their power or dissatisfaction with the government or other entities they consider as enemies (Post, 2007).

From a national security perspective, the motivation for using bioterrorism in asymmetric conflicts can also be understood as part of a strategy to achieve specific security or political goals. For instance, countries involved in asymmetric conflicts with stronger adversaries may use bioterrorism as an instrument to undermine enemy morale or influence power dynamics on the battlefield (Dupont, 2009). One of the most notable case studies is the anthrax bioterrorism attack in 2001 in the United States. This attack involved sending letters containing anthrax powder to several individuals and institutions, resulting in five deaths and dozens of infections. Although the perpetrators of

this attack have not been definitively identified, this incident demonstrates the serious potential of bioterrorism in creating fear and causing mass casualties (Cole, 2009).

In addition to the anthrax attacks in 2001, there have been threats of bioterrorism expressed by states or armed groups in the context of regional or global conflicts. One example is the threats made by Saddam Hussein's regime in Iraq against the United States and other countries using biological weapons such as anthrax and botulinum toxin. Although there is no concrete evidence that these biological weapons were actually used in the conflict, these threats reflect how states can use bioterrorism threats as instruments of power and strategy in political confrontations (Tucker, 2006).

**Legislative Perspectives**

Indonesia has several legal regulations governing the issue of bioterrorism, including:

1. Law of the Republic of Indonesia Number 6 of 1998 concerning the Ratification of the Convention On The Prohibition Of The Development, Production, Stockpiling And Use Of Chemical Weapons And On Their Destruction. This law was enacted in 1998 by the government of the Republic of Indonesia following the Chemical Weapons Convention, which prohibits the production, stockpiling, and use of chemical, biological, nuclear, and precursor weapons. The convention is managed by the Organisation for the Prohibition of Chemical Weapons (OPCW) in The Hague, Netherlands, and came into force in 1997. This law regulates the prohibition of the large-scale use, development, production, stockpiling, and transfer of chemical and biological weapons. Indonesia is one of 165 countries that signed and ratified this convention, thus having an obligation to comply with its provisions.
2. Presidential Decree Number 58 of 1991 concerning the Ratification of the Convention On The Prohibition The Development, Production And Stockpiling Of Bacteriological (Biological) And Toxin Weapons And On Their Destruction. This presidential decree was issued following the ratification of the Biological Convention Weapon (BWC) in Moscow. The BWC is a convention that obliges its member states to disarm biological weapons and prohibit the development of biological agents that can be used as weapons of mass destruction. This convention has been ratified by more than 183 countries worldwide and is considered to establish strong global norms against biological weapons. The BWC regulates various aspects, including the prohibition of development, production, stockpiling, transfer, and assistance in biological weapons, as well as the right to request the United Nations Security Council to investigate suspected violations of the BWC.

3. Presidential Instruction Number 4 of 2019 on Enhancing Capabilities in Preventing, Detecting, and Responding to Disease Outbreaks, Global Pandemics, and Emergencies of Nuclear, Biological, and Chemical Nature.
   Presidential Instruction Number 4 of 2019 is a regulation that deals with the coordination of government agencies in the Republic of Indonesia in the event of a global pandemic or outbreak that could affect public health. However, clear instructions on coordination steps to be taken by government agencies in the event of a non-natural outbreak are not found. According to Presidential Instruction (Inpres) Number 4 of 2019 on Enhancing Capabilities in Preventing, Detecting, and Responding to Disease Outbreaks, Global Pandemics, and Emergencies of Nuclear, Biological, and Chemical Nature, the Minister of Finance is instructed to support budget allocation for various activities aimed at preventing, detecting, and responding to various diseases or events that could potentially cause public health emergencies. Thus, it can be carefully observed that the provision and use of financial resources to be regulated and managed in dealing with health emergencies focus solely on the government's performance in fulfilling its constitutional rights to govern in efforts to prevent and sustain until the emergency ends.
   This indirectly overlooks the fulfillment of the human rights of those directly affected, neglecting every need and aspect of livelihood necessary for each individual that should be included in the government's priority scale based on the principle of proportionality by balancing government policy implementation and meeting the moral and material needs of its people, which clearly includes the fundamental right to life. Furthermore, the next sector most crucial and vulnerable to bioterrorism threats is public health, becoming the primary sector experiencing severe impacts due to biological agent attacks. In Presidential Instruction Number 4 of 2019, instructions are also given to the Minister of Health to review and improve legislation and policies in the health sector related to enhancing global health resilience and financial support, so that the provisions of Health Quarantine in Law Number 6 of 2018 can be critically assessed wisely based on the current situation in Indonesia. This instruction does not mention the criteria for what constitutes a Natural disaster or Human-made Natural disaster, which should be clearly delineated as handling outbreaks caused by these two factors would undoubtedly differ. This instruction only emphasizes rules regarding health quarantine during a pandemic but does not explain specific pandemic mitigation strategies based on their causes. The lack of specificity in rules and mitigation strategies can lead to failure in mitigation efforts that could threaten Indonesia's sovereignty and the safety of its people.

4. Law Number 5 of 2018. Article 10A paragraph (1) "Any person who unlawfully brings into the territory of the Unitary State of the Republic of Indonesia, manufactures, receives, obtains, delivers, controls, carries, possesses, keeps in stock, transports, conceals, or removes from the territory of the Unitary State of the Republic of Indonesia chemical weapons, biological weapons, radiological weapons, microorganisms, nuclear, radioactive or their components, with the intention of committing a Terrorist Act shall be punished with a minimum imprisonment of 3 (three) years and a maximum of 20 (twenty) years, life imprisonment, or death penalty."

Article 10A paragraph (2) "Any person who intentionally trades potential Explosive Materials or trades chemical weapons, biological weapons, radioiogi, microorganisms, nuclear, radioactive materials or their components to commit a Terrorist Act as referred to in Article 9 or Article 10 shall be punished with a minimum imprisonment of 2 (two) years and a maximum of 7 (seven) years."

Based on the formulation of the above Articles, it can be understood that the regulation on bioterrorism in Law Number 5 of 2018 is still very narrow, in other words, not specifically regulated (limitative). Thus, bioterrorism in Indonesia based on the formulation of Article 10 A paragraphs (1) and (2) above can be categorized as the use of "biological weapons" as written in bold. If the use of biological weapons is analyzed, it can be classified as follows:

a. Developing a biological agent with high infection and mortality capabilities (biological agent category) with the aim of spreading disease, causing public panic thus disrupting national security stability;
b. Owning and storing biological agents that can cause health disturbances, if intentionally released into the environment whether with moderate damage (category B) or high damage (Categories A and C);
c. Intentionally sending biological agents into the territory of the Republic of Indonesia with the aim of spreading disease-causing pathogens;
d. Intentionally selling various types of pathogens (Categories A, B, and C) intended for use in a terrorist act.
e. Intentionally releasing pathogens or secondary metabolic products of pathogens (toxins) into the environment to spread disease among the community and also disrupt land and security systems.

Indonesia is a legal state. This is stated in the 1945 Constitution of the Republic of Indonesia Article 1 paragraph 3. Supervision and handling of biological attacks must be clearly done under legal auspices. Clear protocols for monitoring and handling biological attacks must be clearly stated under clear law so that public safety can be free from negative impacts and national security defense maintained. Indonesia itself has several regulations related to public health, namely Law Number 6 of 2018 concerning Health Quarantine, Law Number 4 of 1984 concerning Infectious Disease Outbreaks, and Law Number 36 of 2009 concerning Health, Ministry of Defense Regulation Number 20 of 2014 concerning National Defense Health System, Ministry of Defense Regulation Number 5 of 2015 concerning Mitigation of Biological Agent Hazards from Health Aspects in the Ministry of Defense and TNI Environment, as well as

Ministry of Health Regulation Number 82 of 2014 concerning Mitigation of Infectious Diseases. Meanwhile, in Law Number 5 of 2018 concerning Counterterrorism. In Law Number 5 of 2018 Article 10A paragraph 1, it discusses bioterrorism actions whereby perpetrators of terrorism will be sentenced to imprisonment up to the death penalty. The laws in Indonesia only address terrorism actions and their punishments, but do not directly address bioterrorism comprehensively.

Indonesia also has Presidential Decree Number 58 of 1991 regarding the ratification of the Convention on the prohibition the development, stockpiling of bacteriological and toxin weapons on their destruction. However, Indonesia does not yet have a specific institution working on bioterrorism or biological agents causing outbreaks. Currently, institutions related to this are more focused on the Ministry of Health and BNPB. There should be a specific institution or body handling infectious diseases and biological weapons on a national scale. The formation of a specialized institution or body for infectious disease management needs to be done so that protocols for monitoring and mitigating outbreaks in Indonesia can be clearly established. When these protocols are established, prevention and handling of outbreaks in Indonesia will be under one command, clear, directed, and national resilience will be maintained. Of course, this institution needs clear legal basis and protection under the law in its work.

**Bioterrorism's Impact and Threat in Asymmetric Warfare**

The health sector is profoundly affected by biological weapons attacks. Intentionally released biological agents can easily infect various life forms, including humans, animals, and plants. When a biological agent infects humans, it adversely affects their health. Initial symptoms of a biological agent infection emerge, and if not promptly addressed, the condition worsens, potentially leading to fatalities. Inadequate handling of an outbreak can result in numerous casualties, epidemics, and even pandemics. Moreover, during an outbreak, healthcare workers are highly susceptible to infection, and mishandling can lead to significant casualties among them. If a large number of healthcare workers fall ill or perish, the healthcare sector can become incapacitated (HHS, 2021).

Outbreaks also have adverse environmental impacts, such as contamination and environmental pollution. When the biological agent causing the outbreak is released into the environment, it can contaminate water, air, or soil, depending on the type of biological agent. Uncontrolled contamination renders the environment uninhabitable due to the associated risks (HHS, 2021). Additionally, medical equipment waste generated during outbreak management can harm the environment; for instance, medical mask waste polluting rivers and seas. Improper management of medical waste poses environmental contamination risks (idntimes, 2021).

Terrorist activities, including bioterrorism, generally create terror and anxiety in society. Outbreaks induce psychological distress in affected and unaffected populations alike. Prolonged outbreaks lead to emotional stress and behavioral changes in individuals (Stein, et al., 2004). Outbreaks resulting from bioterrorism activities can significantly impact a country's economy. Targeted bioterrorism aimed at damaging food crops or livestock will deplete human food stocks. Diminished food stocks will reduce food commodities available for production and sale to the public, hindering economic activities. Outbreaks resulting from bioterrorism activities have the potential to alter social and cultural conditions in society. Whether intentional or accidental, an outbreak prompts several societal changes, such as social restrictions. Social restrictions imposed due to outbreaks alter societal functioning. The COVID-19 outbreak forced society to adapt and rely more on technology than conventional methods.

**Strategy and Efforts to Combat Bioterrorism**

Biodefense, also known as defense against biological weapons or agents that can spread in society, encompasses efforts to protect against biological weapon attacks. According to the Oxford Dictionary, biodefense is a defensive effort aimed at safeguarding against biological weapon assaults (Oxford Learner's Dictionaries, 2021). Biodefense can also be understood as all efforts and methods to prevent, detect, and manage biological weapon attacks (Merriam Webster, 2021). It is defined as an effort to protect individuals from bioterrorism threats, including prevention through medicines or vaccines, research, and healthcare facility readiness for biological defense (Infectious Diseases Hub, 2018). Furthermore, biodefense is seen as a defensive effort to prevent, detect, and manage biological weapon attacks for individual protection.

The national biodefense strategy in the United States primarily focuses on raising awareness of risks as foundational information for decision-making and policy across all biological defense sectors. Additionally, the U.S. biodefense strategy ensures the readiness of biodefense companies to prevent biological incidents, strives for biodefense company readiness to reduce the impact of biological incidents, enables rapid response to limit the impact of biological incidents, and facilitates recovery to restore society, the economy, and the environment after a bio incident (US Public Health Emergency, 2021). In its implementation, the United States utilizes the National Notifiable Diseases Surveillance System (NNDSS) for disease monitoring and reporting. Monitoring cases is fundamental to public health practices, helping understand disease spread and take appropriate actions to control outbreaks. Case monitoring ranges from local to national levels, gathering information on disease cases or individuals requiring special attention threatening the U.S. Monitoring cases not only focuses on biological weapons but also covers natural infectious diseases, foodborne outbreaks, and non-infectious conditions like heavy metal poisoning. Each health department provides information to the CDC regarding these conditions, allowing the CDC to analyze and track cases for national interest. The CDC monitors around 120 serious diseases and conditions nationally. The data collected helps public health officials understand where cases are developing,

their prevention, and which groups are most vulnerable. It includes information on who is affected, where they contracted the disease, and how they were infected (CDC, 2021).

Furthermore, the vulnerability of biological agent misuse as a terror tool is an international concern, particularly regarding Human Rights issues due to its disruptive impact on state Human Rights fulfillment. Its consequences significantly affect public health, threaten national security, lead to economic collapses, and can even cause large-scale depopulation if left uncontrolled. With its wide-reaching infection spread, bioterrorism poses a threat to all living beings. In the context of asymmetric warfare, the strategy and efforts to combat bioterrorism involve a multidimensional approach that encompasses various aspects of defense, prevention, and response. Here are the key points related to this topic:

1) Multilayered Defense: Combatting bioterrorism in asymmetric warfare requires a multilayered defense strategy. This includes strengthening border security, enhancing intelligence gathering and analysis capabilities, and developing rapid response protocols.
2) Preventive Measures: Preventive measures are crucial in deterring bioterrorist threats. This involves surveillance and monitoring of potential threats, securing biological agents and facilities, and implementing stringent biosecurity protocols.
3) Public Health Preparedness: A robust public health infrastructure is essential for combating bioterrorism. This includes early detection systems, effective communication channels for public health alerts, and coordinated response plans involving healthcare professionals and agencies.
4) International Cooperation: Given the global nature of bioterrorism threats, international cooperation is vital. This involves sharing intelligence, coordinating response efforts, and establishing partnerships to address common challenges and vulnerabilities.
5) Research and Development: Continuous research and development are necessary to stay ahead of evolving bioterrorism threats. This includes advancements in bioinformatics, development of countermeasures such as vaccines and therapeutics, and improving diagnostic capabilities.
6) Legislative and Policy Frameworks: Strong legislative and policy frameworks are needed to support bioterrorism countermeasures. This includes laws regulating the possession and handling of biological agents, emergency response protocols, and international treaties addressing bioterrorism.
7) Public Awareness and Education: Public awareness campaigns and education programs play a vital role in combating bioterrorism. This involves educating the public about bioterrorism risks, promoting vigilance, and encouraging reporting of suspicious activities.

8) These strategies and efforts work together to enhance resilience and preparedness against bioterrorism within the context of asymmetric warfare, where unconventional threats pose unique challenges to national security and public safety.

## CONCLUSIONS AND RECOMMENDATIONS

The concept of bioterrorism in asymmetric warfare involves the intentional use of biological agents or toxins by conflicting parties to cause harm or death to opposing populations with the aim of instilling fear, disrupting daily life, or achieving specific political or ideological goals. This includes understanding the types of biological agents used, such as pathogenic bacteria like Bacillus anthracis or viruses like Variola virus, and their dissemination methods like aerosols, contamination of food or water sources, or direct contact. The impact on populations encompasses rapidly spreading diseases, disruptions in healthcare and infrastructure, and psychological effects. Motivations for using bioterrorism can range from political leverage to ideological beliefs. Analyzing bioterrorism in asymmetric warfare involves considering political, national security, public health, environmental, economic, and social perspectives to develop effective prevention and response strategies

Threat matrices are essential tools in security and defense contexts for categorizing potential threats based on parameters such as remote-controlled attacks, lone wolves/autonomous cells, isolated lone wolves, and insider threats within the framework of countering bioterrorism in asymmetric warfare. Remote-controlled attacks, facilitated by technology like drones or cyber tools, can disseminate biological agents or disrupt response systems, posing significant challenges in attribution and impact assessment. Lone wolves and autonomous cells, operating independently or in small groups, present detection challenges due to their decentralized nature and varying degrees of sophistication, potentially leading to sophisticated bioterrorism campaigns. Isolated lone wolves, exhibiting minimal signs of radicalization but possessing technical skills, require proactive monitoring and intelligence gathering to detect their activities. Insider threats within organizations or security apparatuses highlight vulnerabilities in safeguarding sensitive biological materials, necessitating stringent security protocols and ongoing personnel monitoring. Bioterrorism threat assessment involves evaluating consequences, hazard levels of bioagents, asset vulnerabilities, attacker intentions, and capabilities to develop effective prevention and response strategies

Bioterrorism involves intentionally using biological agents like bacteria, viruses, or toxins to cause harm or death in humans, animals, or plants, either as an attack or threat. Historical instances include suspected Salmonella enterica poisoning during the Peloponnesian War, the Aum Shinrikyo group's sarin gas and Anthrax mix in 1993, and the 2001 anthrax attacks in the United States. Other examples range from using smallpox in conflicts to poisoning food or drinks in ancient times and developing biological weapons in World Wars. Modern incidents like the Bhagwan Shree Rajneesh attack in 1984, Aum Shinrikyo's actions in 1995, and ISIS's use of chemical weapons demonstrate evolving tactics. The COVID-19 pandemic, though not bioterrorism, underscores the potential

impact of biological threats. These cases highlight varied methods and motivations in bioterrorism throughout history, shaped by technological, scientific, and geopolitical factors.

The use of bioterrorism in asymmetric conflicts is often driven by a complex interplay of political, economic, psychological, ideological, and national security factors. Asymmetric conflicts, characterized by significant disparities in resources or military capabilities among warring parties, can lead to the strategic adoption of bioterrorism tactics. Politically motivated groups, such as rebel factions or terrorists, may employ bioterrorism to instill fear, coerce policy changes, or demonstrate power. Economic constraints can also incentivize extremist groups to opt for bioterrorism as a cost-effective method to achieve their objectives. Additionally, psychological and ideological motivations play a role, as radicalized entities may view bioterrorism as a means to express grievances or challenge perceived adversaries. From a national security perspective, bioterrorism can be seen as a tool to influence enemy morale, shift power dynamics, or exert pressure in asymmetric conflicts. The anthrax attacks in 2001 in the United States serve as a stark example of how bioterrorism can create widespread fear and casualties, showcasing the grave consequences of such tactics in modern warfare and political confrontations.

Indonesia has several legal regulations governing bioterrorism, including Law Number 6 of 1998 ratifying the Chemical Weapons Convention, which prohibits chemical, biological, nuclear, and precursor weapons. Presidential Decree Number 58 of 1991 ratifies the Biological Weapons Convention, aiming to disarm biological weapons and prohibit their development. Presidential Instruction Number 4 of 2019 addresses disease outbreaks and pandemics but lacks specific guidance on non-natural outbreaks. Law Number 5 of 2018 penalizes bioterrorism-related actions but lacks comprehensive bioterrorism regulation. Indonesia has ratified international conventions but lacks a dedicated institution for bioterrorism, focusing on health and disaster agencies instead. Establishing a specialized institution with clear legal mandates is crucial for effective monitoring and mitigation of bioterrorism threats in Indonesia.

Bioterrorism's impact in asymmetric warfare extends far beyond immediate health concerns, profoundly affecting multiple facets of society. Deliberate release of biological agents poses grave risks to human health, causing illness and fatalities if not swiftly addressed. Inadequate response can lead to widespread casualties, epidemics, and strain on healthcare systems, especially endangering frontline workers. Environmental repercussions are substantial, with contamination of water, air, and soil amplifying risks and rendering habitats uninhabitable. Mismanagement of medical waste during outbreaks further exacerbates environmental concerns. Beyond physical ramifications, bioterrorism instills fear and anxiety, triggering psychological distress and societal upheaval. Economic repercussions are significant, disrupting food supplies and hindering economic activities. Social and cultural norms undergo shifts, with outbreaks necessitating social restrictions and prompting adaptation to new technological reliance, as seen in the COVID-19 pandemic.

Biodefense strategies against bioterrorism encompass a comprehensive approach aimed at protecting society from biological weapon attacks. These efforts involve prevention through vaccines and medicines, robust research, and preparedness of healthcare facilities. In the United States, the national biodefense strategy focuses on risk awareness, biodefense company readiness, rapid response capabilities, and post-incident recovery. Utilizing systems like the National Notifiable Diseases Surveillance System (NNDSS) aids in disease monitoring and response, crucial for public health management. The global concern over bioterrorism's disruptive impact on human rights, public health, national security, and economic stability underscores the need for a multidimensional defense strategy. This approach includes bolstering border security, enhancing intelligence capabilities, strengthening public health infrastructure, fostering international cooperation, advancing research, implementing legislative frameworks, and promoting public awareness and education. These efforts collectively aim to enhance resilience and readiness against bioterrorism threats within the complex landscape of asymmetric warfare.

## ADVANCED RESEARCH

Utilizing systems like the National Notifiable Diseases Surveillance System (NNDSS) aids in disease monitoring and response, crucial for public health management. The global concern over bioterrorism's disruptive impact on human rights, public health, national security, and economic stability underscores the need for a multidimensional defense strategy.

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