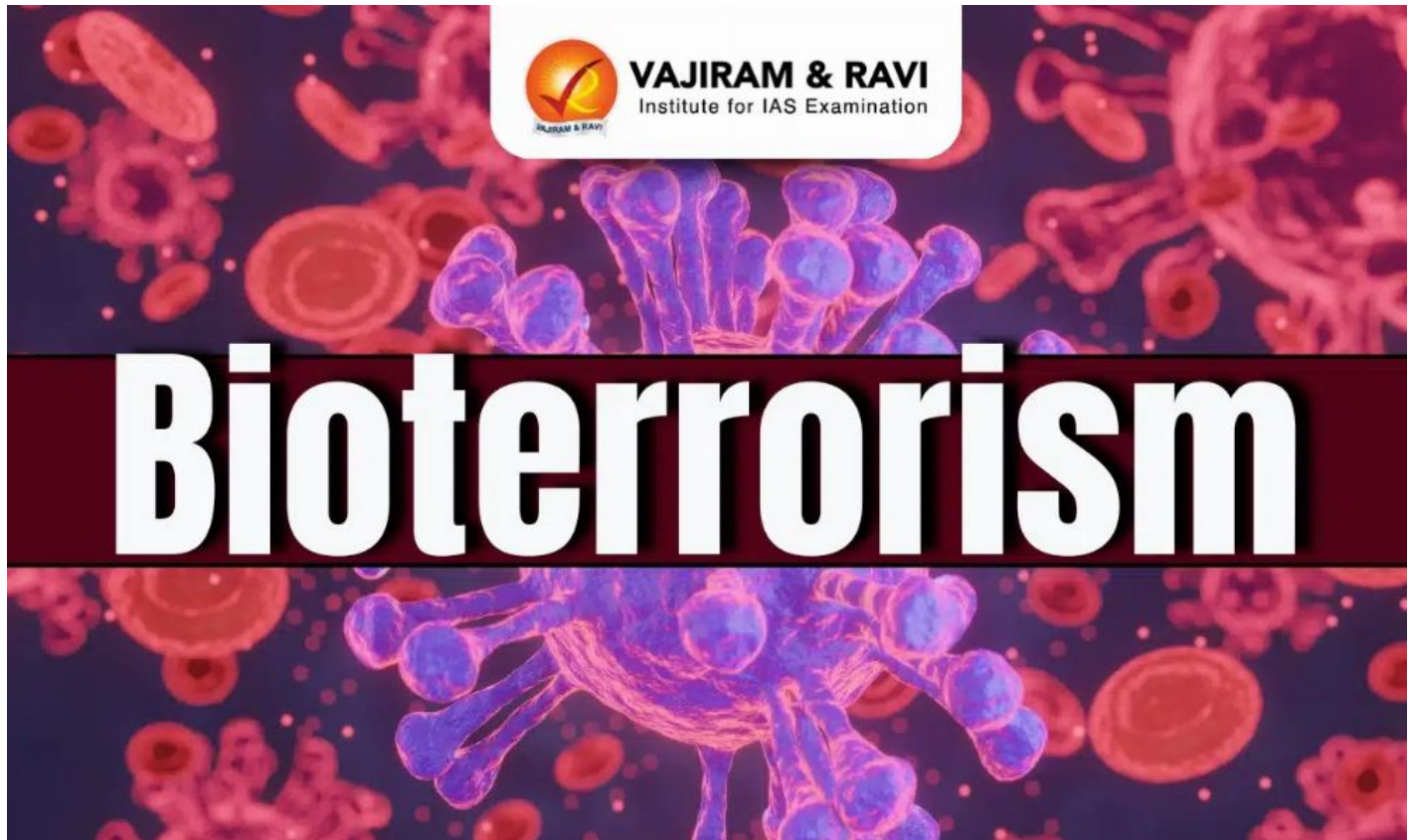


Bioterrorism, Meaning, Classification, Modes, Reasons, Framework

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Bioterrorism has emerged as one of the most serious non-traditional security threats of the 21st century, where dangerous biological agents can be deliberately used to cause mass casualties, public panic, economic disruption, and national instability.

Bioterrorism Meaning

Bioterrorism is the **intentional release or threat of releasing biological agents** such as viruses, bacteria, fungi, or toxins **to cause illness, death, or severe economic disruption.**

According to Interpol, Bioterrorism is the intentional release of biological agents or toxins for the purpose of harming or killing humans, animals or plants with the intent to intimidate or coerce a government or civilian population to further political or social objectives.

Bioterrorism Agents Classification

The **US Centres for Disease Control and Prevention (CDC)** provides the most widely used classification of bioterrorism agents into three categories, based on ease of dissemination, mortality potential, and public health impact.

- **Category A** agents are the highest priority. They are easily disseminated, carry high mortality rates, and can cause major public health disruption. **Key agents** include Anthrax (*Bacillus anthracis*), Smallpox, Plague, Botulism, Tularemia, and Viral Haemorrhagic Fevers such as Ebola and Marburg.
- **Category B** agents are moderately easy to disseminate, carry lower mortality, but require enhanced surveillance capabilities. **Key agents** include Brucellosis, Ricin toxin, Salmonella, Glanders, and Q fever.
- **Category C** agents are emerging pathogens with future weaponisation potential. **Key agents** include Nipah virus, **Hantavirus**, and drug-resistant tuberculosis strains — particularly relevant for India given the country's Nipah outbreaks in Kerala (2018, 2023) and its persistent TB burden.

Modes of Delivery of Bioterrorism Agents

Bioterrorism agents can be released or spread through several methods:

- **Aerosol Release:** Pathogens are dispersed into the air in the form of fine particles. These particles can be inhaled unknowingly, affecting large populations quickly, especially in crowded urban areas or enclosed spaces such as metro systems and buildings. Because it allows silent and widespread transmission, aerosol dissemination is considered the most efficient mode of biological attack.
- **Contamination of food and water supplies:** Pathogens or toxins are introduced into public food distribution systems, restaurants, or drinking water sources.
- **Vector-based:** Insects or animals are used to transmit disease-causing organisms. Mosquitoes, fleas, or other carriers can be infected and released to spread diseases such as plague or viral infections across regions.
- **Human-to-human transmission:** Highly contagious agents like smallpox or viral haemorrhagic fevers can spread rapidly through direct contact, respiratory droplets, or bodily fluids.

Bioterrorism Historical Incidents

Both state-sponsored programmes and non-state actors have attempted or used biological agents, highlighting the seriousness and complexity of this threat.

- **Unit 731 (Japan, 1932-1945):** Unit 731 was a secret Japanese military unit that conducted biological warfare and human experiments in Manchuria using diseases like plague, cholera, and typhoid.
- **Sverdlovsk Anthrax Leak (1979, USSR):** An accidental release of anthrax spores from a Soviet military facility linked to the Biopreparat caused at least 66 deaths. The incident revealed the existence of a large covert biological weapons programme, despite the USSR being a signatory to the Biological Weapons Convention (BWC).
- **2001 Anthrax Attacks (USA):** Weaponised anthrax spores were sent through postal letters to media offices and US senators. This caused 5 deaths and 17 infections, along with widespread panic and major disruption.

Bioterrorism Reasons

Bioterrorism is considered attractive to some actors because it is cheap, hard to detect, and capable of causing maximum fear and disruption with minimal resources.

- **Low Cost, High Impact:** Biological weapons are often called a “poor man’s atomic bomb” because they are much cheaper than nuclear or chemical weapons, but can still affect large populations and cause serious disruption.
- **Invisible and Delayed Effects:** Biological agents take time to incubate, allowing attackers to disperse and escape long before the first symptoms appear or the attack is recognized.
- **Dual-Use Technology:** Rapid advancements in synthetic biology, genetic engineering, and DIY CRISPR kits make it easier to create or modify lethal pathogens for malicious use.
- **Massive Psychological Panic:** Unlike conventional warfare, the fear of contamination, isolation, and invisible threats causes widespread societal paralysis and economic destabilization.

Bioterrorism International Legal and Institutional Framework

The global response to bioterrorism is based on several international laws, treaties, and institutions that aim to prevent the development and spread of biological weapons and improve outbreak response. However, these systems also have important limitations.

Biological Weapons Convention (BWC), 1972

- The Biological Weapons Convention bans the development, production, stockpiling, and transfer of biological weapons.
- It is the foundation of global biosecurity law, and **India is a party to it.**
- However, its biggest weakness is that it has **no verification system**, meaning there are **no strong inspections** to check whether countries are secretly developing biological weapons.

UN Security Council Resolution 1540 (2004)

- United Nations Security Council Resolution 1540 is a legally binding global rule that stops non-state actors like terrorist groups from acquiring weapons of mass destruction, including biological weapons.
- It requires all countries to make laws to prevent the spread of such weapons.
- India has complied by submitting national implementation reports.
- However, enforcement depends on national capacity, which varies across countries.

WHO International Health Regulations (2005)

The International Health Regulations is designed to help countries detect and respond quickly to disease outbreaks. Countries must report serious health events that could spread internationally within 24 hours.

Although not created specifically for bioterrorism, it is the most important global system for outbreak response. However, during COVID-19, delays and non-compliance exposed weaknesses in global coordination and transparency.

Australia Group (India Joined in 2018)

The Australia Group is an informal group of countries that controls the export of materials and technologies that could be misused for chemical or biological weapons.

India became a member in 2018, strengthening its role in global non-proliferation efforts. However, it is **not legally binding**, so compliance depends on voluntary cooperation among members.

Cartagena Protocol on Biosafety (2000)

- The Cartagena Protocol on Biosafety focuses on the safe handling and movement of genetically modified organisms (GMOs).
- While mainly environmental in nature, it also helps regulate dual-use biological materials that could potentially be misused.
- India has ratified this protocol, supporting safer biotechnology practices.

India's Domestic Framework

India does not have a specific Bioterrorism Prevention Act, unlike countries such as the United States. However to strengthen preparedness against biological threats, India has introduced several legal, institutional, surveillance, and disaster management initiatives aimed at improving biodefence capacity and public health response.

- **Epidemic Diseases Act, 1897:** The Epidemic Diseases Act, 1897 allows governments to take special measures during epidemics, such as quarantine and restrictions, but it is mainly designed for natural outbreaks, not deliberate bioterror attacks, making it limited for modern threats.
- **Disaster Management Act, 2005:** The Disaster Management Act, 2005 empowers the government to manage disasters, including Chemical, Biological, Radiological, and Nuclear (CBRN) emergencies through NDMA. However, the guidelines are mostly advisory in nature, meaning implementation depends on states and coordination is often weak.
- **Biological Diversity Act, 2002:** The Biological Diversity Act, 2002 focuses on conservation and fair use of biological resources. It does not directly deal with biosecurity or bioterrorism, so its relevance is indirect and limited.
- **Draft Biosafety Guidelines:** India has draft guidelines for Biosafety Level (BSL) laboratories, which set standards for handling dangerous pathogens. However, these are not yet legally binding, which is concerning given the growth of private biotech labs.
- **Defence Research and Development Establishment (DRDE):** The Defence Research and Development Establishment under DRDO works on detecting biological threats and developing protective equipment for armed forces, especially for CBRN defence.
- **National Institute of Virology (NIV), Pune:** The National Institute of Virology is India's top virology institute and operates the country's only BSL-4 lab. It handles dangerous viruses like Nipah and acts as a key reference centre for emerging infections.
- **National Centre for Disease Control (NCDC):** The National Centre for Disease Control manages disease surveillance through the Integrated Disease Surveillance Programme (IDSP). It is the main early warning

system for outbreaks, though reporting gaps remain at district levels.

- **National Disaster Management Authority (NDMA):** The National Disaster Management Authority coordinates responses to CBRN emergencies and issues national guidelines, but its role is more coordination-based than operational.
- **Intelligence and Security Agencies:** RAW and NTRO monitor external and technical threats. National Security Guard (NSG) has a specialised CBRN response unit for emergency decontamination and response

Way Forward

Although India has not faced any officially confirmed large-scale bioterrorism attack, its high population density, porous borders, expanding biotechnology sector, and public health challenges make stronger biodefence preparedness essential.

- **Legal and Policy Reforms:** India needs a dedicated National Biodefence and Biosecurity Act to unify fragmented laws, strengthen biosurveillance, regulate dual-use research, and create a clear emergency response system.
- **Mandatory Biosafety Framework:** Draft Biosafety Guidelines should be made legally binding for all laboratories to ensure strict and uniform biosafety standards across the country.
- **Global Legal Push:** India should push for strengthening the Biological Weapons Convention by adding a verification and inspection mechanism for better global accountability.
- **Institutional Strengthening:** A National Biodefence Coordination Centre under NSCS should integrate health, defence, and intelligence agencies for a unified response.
- **Expansion of Laboratory Network:** India must expand BSL-3 and establish multiple regional BSL-4 labs to improve detection, research, and containment capacity.
- **Training and Preparedness:** Regular Chemical, Biological, Radiological, and Nuclear (CBRN drills) involving NDRF and NSG should be conducted to improve real-time response capability.
- **Modern Surveillance System:** IDSP should be upgraded with digital reporting, AI-based detection, and mandatory reporting from private healthcare institutions.
- **One Health Approach:** India should integrate human, animal, and environmental health surveillance to detect outbreaks early and prevent zoonotic threats.
- **International Cooperation:** India should strengthen coordination through Quad Health Security, BIMSTEC, and INTERPOL CBRN programmes for better intelligence sharing.
- **Research and Stockpiling:** India should maintain a national stockpile of vaccines and antidotes and regulate dual-use biotechnology research through strict oversight.

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