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# Bioterrorism: A New Threat to Humanity

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## ABSTRACT

*The world's events over the past 20 years suggest that the threat posed by biological warfare is a harsh reality rather than a myth. It is abundantly clear that there is a need to improve clinical and public health understanding of highly contaminative diseases in light of the outbreaks caused by recently reviewed and resurgent pathogens, as well as the possibility that these pathogens could be used as bioterrorism agents. Not the usually understood terrorism but a different threat that is more lethal and not well known to mankind. This study provides a brief introduction to bioterrorism, the use of agents, and the extent of its cancellation, along with a pertinent note on India's current situation in terms of laboratory response networks, oversight systems, and readiness requirements. The events of the past 20 years in many parts of the world demonstrate that biological warfare is a serious and genuine threat. A number of outbreaks caused by recently discovered and resurgent pathogens, as well as the possibility of high-risk viruses being utilised as bioterrorism agents, demonstrate the significance of improving clinical and public health capability in handling highly infectious diseases. With a focus on India's current state of laboratory reaction networks, surveillance systems, and preparation, this review piece offers a succinct summary of bioterrorism, the agents employed, and countermeasures.*

**Keywords:** Biological Counterterrorism, Bioterrorism, Health Sector.

## I. INTRODUCTION

The use of bacteria, viruses, or other germs to cause disease or death in individuals or pets is known as bioterrorism. The CDC (Centres for Disease Control) provides an overview of the different bioterrorism agents categorised by type, along with information on how to prepare for bioterrorism. Diseases Caused by Bioterrorism A list of diseases that could be used in a bioterrorism incident is broken down into groups based on how easily they spread and how serious of an illness or death they can cause. bioterrorism Health Professional Information bioterrorism surveillance systems, laboratory testing, infection control, and employable presentations and posters.

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Unlike other forms of terrorism (nuclear, chemical, or radiological), bioterrorism is distinct. The incident places a heavy burden on the public health and healthcare systems of the populace because, in the end, the public health system will be the one to help lessen and mitigate the effects of a bioterrorism attack. A coordinated and concerted effort by various agencies, including the intelligence agency, the host, the BSF, the SSB, litigation compulsion machinery, health departments (particularly through watch, laboratory response netting, and activity of medical and paramedical faculties), civil administration, etc., is required to perceive the bioterrorism question.<sup>4</sup>

## **II. AGENTS OF BIO TERRORISM**

While conventional weapons like firearms and explosives are still thought to be the most likely means by which terrorists could threaten civilians, numerous recent reports indicate an increasing risk and likelihood of biological or reagent weapons being used. Indeed, a number of countries and terrorist organisations have been actively investigating the use of biological and chemical agents as small- and large-scale weapons. While small-scale bioterrorism incidents are more likely to be defeated due to their lower levels of complexity, public health organisations still need to be ready for the possibility of a large-scale incident that could undoubtedly have disastrous effects on public health. The report's selection and prioritisation of the potent biological terrorism agents were based on the likelihood that their use would result in an overwhelming and unintentional impact on public health, not on the likelihood that they would be used. Historically, the majority of assessments of potential risk agents for biological warfare or terrorism have been predicated on infantry tactics and numerical protection standards.

But civilian populations differ from marine populations in a number of ways, such as a greater diversity of age groups and health conditions, making it impossible to simply adapt military biological threats to civilian life. These variations, along with others, could significantly worsen the effects of a biological attack on the large population. Additionally, as evidenced by the 1984 intentional Salmonella contamination of salad bars in the Dalles, Oregon, civilians may be more vulnerable to food- or water-borne terrorism. Even though American food and water systems are among the safest in the world, the occurrence of nationwide outbreaks caused by unintentional food or moiré contamination highlighted the continued need for caution when it comes to buckler food and water supplies. Ultimately, choosing and concentrating multiagency

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<sup>4</sup> Bioterrorism. Retrieved on March 1, 2024, from <https://www.health.state.mn.us/diseases/bioterrorism/index.html>.

efforts to protect civilian populations from bioterrorism requires careful consideration of numerous other factors.

The highest priority for preparedness is being given to Category A agents. Health preparedness activities for Category B will concentrate on deficiencies that have been identified, like enhancing communication and stepping up laboratory diagnostic or surveillance capabilities. As more useful data on the epidemiology and pathogenicity of Category C agents becomes available, their potential to endanger sizable populations will be further evaluated. Furthermore, specialised epidemiological and laboratory surge occupation will be preserved to support investigations into outbreaks that occur spontaneously as a result of Category C “emerging” agents. For many Category B and C agents, connections made with well-established programmes for food safety, newly emerging infections, and unexplained illnesses will strengthen overall efforts to prepare for bioterrorism. The agent categories listed above shouldn’t be viewed as restrictive. Biologic agents ought to remain a top priority for preparedness initiatives. Every phylum may have different agents as new data becomes available or as evaluation techniques evolve. As populations lose their innate or vaccination-induced immunity to these agents, new agents may be introduced into the population as a result of disease eradication and elimination efforts.<sup>5</sup>

On the other hand, unhesitating agents may lose their priority status as the acknowledged public health and epidemic deficiencies to these agents are addressed (for example, once adequate supplies of smallpox vaccine and modified diagnostic capabilities are established, their rating in the uncommon readiness indispensable category and overall rating in the venture-matrix appraisal process would both decrease). A regularised and reproducible evaluation preserver like the one described above will continue to be used to assess and prioritise currently recognised biologic critical agents as well as new ones in order to meet the ever-veer response and preparedness defiance presented by bioterrorism.

In 1999, as part of a Congressional initiative to improve general health preparedness for biological terrorism responses, the Centres for Disease Control and Prevention (CDC) was named the principal agency for comprehensive general health planning. In order to support various areas of drop cap preparedness activities, such as planning, better supervision and epidemiologic capabilities, rapid laboratory diagnostics, improved communications, and stockpiling of galenic therapeutics, a Bioterrorism Preparedness and Response Office has been

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<sup>5</sup> Public Health Assessment of Potential Biological Terrorism Agents . Retrieved on March 1, 2024, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2732458/>.

established. But in order to focus these preparations, it was necessary to formally identify and rank the biological agents that the efforts should be directed against.

Human disease can be caused by a wide range of biological agents, not all of which have the capacity to significantly impact public health and iatric infrastructures. Numerous agents have been ceremoniously evaluated by the military for their strategic suitability in the field. Furthermore, the Working Group on Civilian Biodefense has identified a number of biologic agents as possible high-bump agents against scorpion populations, based on progress supported by an expert partition consensus. In order to provide a reviewable and repeatable method for standardising assessments of biological threats, a mode for charged possibility biological threatening agents was sought after to direct public health bioterrorism preparedness and response activities.

In A gathering of general experts was called in June 1999 with the following goals in mind:

- 1) to revisit commonly used standards for determining which biological agents pose the greatest risks to civilians; and
- 2) to examine the trend of previously identified biological threats and use these standards to determine which should be further assessed and given priority for public health preparations.

This recital outlines the general process for selecting and ranking biological agents for public health preparation initiatives. Finding these precursor agents will make it easier for federal agencies, rank and territory emergency room response and inn health agencies, and the iatrical commonness to coordinate their efforts.

### **III. ROUTES OF BIO TERRORISM**

The main pathways by which biological weapons enter the human body are through ingestion, skin/pituitary membrane brushing, and the gastrointestinal tract. Release techniques could include aircraft-deployed bomblets or the practice of spraying words affixed to tall buildings or aircraft. Aerosolizing and diversifying over wide geographic regions is possible for the agents of viral encephalitis, carbuncle, plague, undulant fever, and viral hemorrhagic fevers. Other approaches include express rescue operations or the intentional infiltration of diseased animals, vectors, and pests through international borders. Unquestionably, some nations have developed more advanced techniques for forward detection and sematic defence against biological sword attacks. One such example is the US's Bio Watch programme, which employs a series of pathogen detectors collocated with air nature monitors. These detectors collect airborne particles onto filters, which are then manually collected at regular intervals and subjected to

polymerase chain reaction (PCR) techniques for the purpose of analysing them for possible biological weapon pathogens. It is anticipated that this system will offer early notification of a pathogen release, notifying authorities prior to victims exhibiting symptoms and facilitating the delivery of usage prior information. Nonetheless, it's possible that the implementation of this bioterrorism detection system is not a reaction to the present decline. The most important step in the event of a bioterrorist attack is to identify the incident. It can be very challenging to pinpoint the beginning of a disease or even the occurrence of something unusual, especially if there are few initial circumstances. Any significant or minor outbreak of a disease should be considered a possible bioterrorist attack. Physicians working in family practice, secluded practices, and hospital outpatient departments (OPDs) may act as a vital party in the event of a potential bioterrorism attack. Knowledge of the top priority infectious agents can speed up diagnosis and initial treatment, resulting in a successful public health response to such an attack. An epidemiologist monitoring hospital admissions, a hospital laboratory examining unusual organism strains, or even chemists dispensing more antibiotics than usual could be the first to notice. It might be challenging to elevate a naturally occurring, viral disease outbreak to the status of a bioterrorist attack.

A bioterrorist attack may be suspected in the event of one or more of the following: a single case of smallpox, anthrax inhalation, skip carbuncle (with no known risk factors compatible with naturally-occurring disease), viral hemorrhagic fever (in a subject without an international parturition chronicle), multiple cases of pneumonic talarise, pulmonic tularaemia (with at least one elaboratory settle circumstance, no assumed accordant risk factors and occurring in a transitory time end), or a higher than expected number of unexplained illness and mortality in a short-lived era limit within a decided geographic rank.

#### **IV. BIO TERRORISM AROUND THE WORLD**

Bovine and avian influenza (H5N1) in Hong Kong, ebola hemorrhagic fever in central Africa, and implications of the Nipah virus (NiV) in Malaysia and Singapore prompt national and international response. Bioterrorism concerns were brought up during the ebola and harass investigations, but these were not substantiated by later research. An important lesson has been learned from our investigations into these outbreaks. Several factors, including the availability of multiple agents and methods of surrender, flexible incubation periods, high fatality rates, and the possibility of agent dispersal due to travel during the incubation period, are considered to be responsible for biological weapons.

The deliberate release or denial of the release of biologic agents (viruses, bacteria, fungi, or their toxins) with the intent to cause disease or death in the human population, food production, or livestock in order to terrorise the civilian population or subvert the authority is known as bioterrorism. But sometimes it can be difficult to distinguish or prioritise a bioterrorist attack over a natural disease outbreak. Numerous significant illicit drugs and vaccines may not be profitable in the event of a bioterrorism attack or have limited shelf lives that prevent stockpiling. As of right now, biological weapons notices are known to exist in at least 17 nations. Microbes and technology seem to have transferred into terrorist groups after the fall of the former Soviet Union.<sup>6</sup>

### **(A) Bio Terrorism in India**

Bioterrorism experts suggested that India expand its disease surveillance network and its ability to detect bioterrorism. It is important to make sure that bioterrorist attacks are not categorised as an emerging epidemic disease or ignored as natural complaint outbreaks or outbreaks of unknown fountains. At a comparison on pathogens of biological warfare at the National Institute of Communicable Diseases in New Delhi, Colonel Ananta Subramanian Nagendra, head of microbiology at the Forearmed Farce Medical College in Pune, stated that while there is no proof that biologic warfare attacks have been carried out against India, all the conditions are very much met. Indian defence and meteorological experts have been following the accusations of biological warfare closely for a considerable amount of time. Scrub camp fever insurrection in north-eastern India raised suspicions during the 1965 Indo-Pakistan war. India's defence and intelligence agencies responded quickly to the 1994 outbreaks of bubonic trouble in Beed and pulmonic trouble in Surat, which resulted in multiple fatalities and significant economic damage. These incidents are well-known in the field of biologic warfare. The National Institute of Communicable Diseases' director, Dr. Kamal Datta, made references to a few "suspicious" outbreaks during the conference, including the 1996 Delhi dandy fever outbreak (10,252 cases; 423 deaths) and the unidentified encephalitis outbreak (66 cases; 45 deaths) in Siliguri, eastern India.

The two outbreaks have alarmed Indian scientists. Researchers from the All India Institute of Medical Sciences and the institute performed molecular characterization on the dengue-2 poison samples. Dr. Syed Pasha of the previously mentioned organisation stated, "We compared the 1996 samples with 1967 samples and found that there is roughly 10% difference and nearly

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<sup>6</sup> "Bioterrorism: A Public Health Perspective." Retrieved on March 1, 2024, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4921253/>.

30 mutations.” “The 1996 separate is genotype 4 and is more bitter than the earlier segregate, which was genetic constitution 5.” “There has never been a major disruption like the 1996 dengue haemorrhagic medical outbreak, which affected every region of the nation and resulted in a large number of cases at one time,” Mr. Datta stated. Is it from a place other than India? Still, we are not entirely certain. The Indian Veterinary Research Institute’s director, Dr. Mahendra Yadav, stated, “We cannot even rule out that possibility.” Regarding the beginnings of the 1994 harassment incidents, Indian defence and energy experts are not even certain. “The strains of *Yersinia pestis* that are spreading throughout established plague foci in India are significantly less virulent and precisely different from the samples we have collected from the plague outbreak region,” stated Dr. Harsh Batra, joint director of the Defence Research and Development Establishment, who oversaw the discussion on plague outbreaks.<sup>7</sup>

### **(B) Bio terrorism in USA**

An intentional threat of mass casualties, internal instability, and damage to vital infrastructure characterises a bioterrorist attack against the United States. The DHS Bio Watch Programme, which was founded in 2003, alerts more than 30 major American cities in advance of a bioterrorist attack. Decision makers can project an efficient, coordinated, and timely response with the aid of this early warning. The DHS Countering Weapons of Mass Destruction Office is in charge of overseeing Bio Watch.

More than thirty jurisdictions receive melody-oversee, analysis, notification protocols, and endanger assessment services from the Bio Watch Programme. This programme has the ability to minimise the devastating impact of a biological attack. A vast network of stakeholders from the fields of environmental health, emergency management, law enforcement, laboratories, and public health are embarrassed by Bio Watch. These stakeholders work together to perceive and bound a unified response to a bioterrorism attack.

DHS is always refining its plan as terrorism changes to stay one step ahead of the adversary. The goal of DHS’s current bio detection technology upgrade efforts is to better connect the dots between federal, state, and sectional operators, provide real-time data throughout the Homeland Security enterprise, and accurately identify a wider range of bioterrorism threats. Americans will feel safer as a result of this upgrade to a durable, effective bio detection skill, which will enable first responders and settlement creators to respond more quickly to the hits. The “Bioterrorism Act of 2002” was passed by the US Senate in order to fortify the biodefense area.

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<sup>7</sup> “India Wakes Up to Threat of Bioterrorism.” Retrieved on March 1, 2024, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1121283/>.



This law focuses on protecting drugs, food, and water from biological agents and toxins, and it establishes the fundamentals of a nation's readiness against bioterrorism. In India, we are still awaiting a bioterrorism law, though.<sup>8</sup>

## **V. PREVENTION OF BIO TERRORISM**

When talking about the foreign policy ramifications of bioterrorism, one of the problems is that our love of acronyms sometimes leads to the creation of a “elements soup” that confuses the issues. Instead of taking ownership of the crucial competition between biological, chemical, and nuclear assaults, we have repeatedly lumped them all together into groups like “CBRN” or “WMD.” The way these distinctly different attack types are combined lexically gives the impression that bioterrorism is just one more variation on a basic theme. Discussions about biological terrorism have frequently mimicked those about reactions to nuclear or chemical terrorism, as though these multiple threats were merely different iterations of the same basic weapon. On the other hand, biological terrorism differs significantly from nuclear and synthetic terrorism in terms of product, attack strategy, containment, readiness, and protection.

There is no way to know how probable it is that terrorists will use biological weapons against us, and there is no proof that states such as Washington State are under attack from bioterrorism. We are aware, nevertheless, that the ability to create and tailor harmful biologic agents may be useful to those who are willing to use them. Since there might be harsh repercussions for such an attack, it's important to react as soon as you can. Tight regulations in the health system are the biggest line of defence against bioterrorism. Congress authorised the Centres for Disease Control and Prevention (CDC) to lead the nation's efforts to strengthen public health infrastructure in order to combat the threat of bioterrorism. In 1999, the CDC launched the Bioterrorism Preparedness and Response Programme in response to this commission. Washington's capacity to detect, communicate, and react to possible bioterrorism incidents is inadequate under this programme.<sup>9</sup>

## **VI. STEPS TO PREVENT BIO TERRORISM AT A PERSONAL LEVEL**

A lot of the same precautions you would take for your family and yourself in case of a natural disaster, like a flood or storm, would also be beneficial in case of a bioterrorism attack. Making emergency kits for your house, place of employment, and your kids' school, for example, and assembling a device for moving in with family members following a mishap are easy things

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<sup>8</sup> Bioterrorism: Health sector alertness. Retrieved on March 1, 2024, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3633289/>.

<sup>9</sup> “Intersectoral and International Cooperation on Combating Bioterrorism.” Retrieved on March 1, 2024, from <https://2001-2009.state.gov/oes/rls/rm/56614.htm>.

you can do. It is important to acknowledge, though, that certain precautionary measures or protocols that may be helpful in certain emergency scenarios may not be applicable in the unique circumstances of bioterrorism. Terrorism involving explosives or chemicals is not the same as bioterrorism. Local health departments play a crucial role in protecting the community from infectious disease outbreaks, whether they are caused by terrorist acts or other causes. If you require any additional care related to bioterrorism that is relevant to your participation, they can help.

Gas masks are not very effective against biological agents. Furthermore, a qualifier mask would only keep you safe if you used it as soon as an attack happened. Regretfully, it is most likely to be done “secretly,” or without anyone’s knowledge, when a biological substitute is let go. In other words, you wouldn’t know when to put on your mask in advance. Maskers need to be custom fitted to the wearer and workers need to be trained in their jobs for them to function properly. When buying gas masks online or from an Army surplus store, there is no guarantee that the product will work. The fact that the hide may be hazardous is more significant. Inappropriate use may cause unintentional suffocation.

When the attack is re-examined days or even weeks after the deputy for bioweapons was released, it is too late to put on a mask. When it comes to chemical swords, paper masks provide little to no protection. More broadly, it might be crucial to avoid breathing in hazardous materials in some disaster scenarios. To make matters worse, an explosion could release poisonous fumes or tiny fragments of debris that could harm your ancient. In these circumstances, it could be beneficial to wear a frank mask. Be ready to create; put your mouth and nose apart from the music with whatever you have on hand. There are few reliable facts and differing opinions regarding the types of barriers that function best. In an emergency, anything that fits comfortably over your mouth and nose, such as a thick cotton material, can help filter pollutants. Additionally, a range of facemasks that are instantly effective can be found in hardware stores. These masks are rated according to the smallest particle sizes they can filter out of a business planting. You need to decide for yourself and your family what is best for them right now. It is crucial that the mask or other material firmly clings to your face so that the majority of the air you release passes through the masquerade rather than around it. Make every effort to ensure that children have the best possible adaptation. Facemasks made of simple materials can filter out some of the germs or flying particles that you might breathe in, but they won’t likely be able to protect you from chemical gases. In an emergency, covering your mouth and nose with something is still preferable to doing nothing. One kind of basic, low-cost fake mask that is frequently mentioned in emergency preparedness literature are N95 masks. The

N95 mask has a completely high percolate ability, which is a measurement of the amount of material that can pass through the paper in a laboratory setting. In hospital settings, where health care professionals have time to ensure proper mask fit, N95 masks offer powerful infection prevention. It is not entirely true that a N95 mask would be any more protective or effective than other paper masks in the event of a bioterrorist attack than an undershirt wrapped around the mouth and meet. However, manufactured masks might be more convenient and comfortable. In the unlikely event that bioterrorism is suspected, antibiotics may be advised; however, no antibiotic is 100% effective against all illnesses. There is no weak pill that can protect against every kind of biological weapon attack. It is crucial to remember that antibiotics can become ineffective if they are used improperly or are hoarded and stored for later. Antibiotics have a short shelf life, can become less effective, cause side effects, and should only be used when absolutely necessary. Above all, improper use of antibiotics can result in drug resistance, which renders the medications ineffective when needed. The CDC offers additional information on antibiotic resistance. Although covering one's windows with plastic and duct tape in the event of a bioterrorism attack is considered a viable option, it is more likely that terrorists will "hide" their act, meaning they won't disclose the attack either before or after it happens. This indicates that you would not have known in the past how to cover your windows to keep masked air from escaping you. Moldable sheeting and duct tape can slow down mien movement from the outside inward, but they cannot stop it. Be advised that certain non-electric space heaters can produce dangerous levels of carbon monoxide when used inside drainage trap off areas.<sup>10</sup>

## VII. CONCLUSION

Bioterrorism is distinct from other terrorist symbols, such as those that are synthetic, radioactive, or nuclear. The race's infamous health and healthcare system is actually subject to an especially strict requirement because the public health system will ultimately be required to atone for and lessen the effects of a bioterrorism attack. Coordinated and concerted efforts from various agencies, including the intelligence commission, army, BSF, SSB, law enforcement apparatus, health departments (particularly through watch, elaborate response networks, and alertness of medical and paramedical faculties), polite administration, etc., are precisely necessary to experience the blame of bioterrorism.<sup>11</sup>

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<sup>10</sup> "Office of Resiliency and Health Security—ORHS—1400. Bioterrorism FAQ | Washington State Department of Health." Retrieved on March 1, 2024, from <https://doh.wa.gov/emergencies/be-prepared-be-safe/bioterrorism-and-terrorism/bioterrorism-faq>.

<sup>11</sup> Detecting Bioterrorism | Homeland Security. Retrieved on March 1, 2024, from <https://www.dhs.gov/biowatch-program>.