Scholarly Research Journal for Interdisciplinary Studies,
Online ISSN 2278-8808, SJIF 2021 = 7.380, www.srjis.com
PEER REVIEWED & REFEREED JOURNAL, MAR-APRIL, 2021, VOL- 8/64

IMPACT OF BIOCHEMICAL TERRORISM ON ECOLOGY & HUMAN HEALTH (A GEOGRAPHICAL STUDY)

Prakash Vir Singh, Ph. D.

(Sr. Asst. Professor), Deptt. of Geography, Tilak P.G. College, Auraiya, U.P, India

(Affiliated to C.S.J.M. University, Kanpur, INDIA) E-Mail ID- pvskabirpanthi@yahoo.com,

Paper Received On: 21 APRIL 2021

Peer Reviewed On: 28 APRIL 2021

Published On: 1 MAY 2021

Content Originality & Unique: 93%

Abstract

Indeed, terrorism is not an end but rather a modus operandi. It is not a new phenomenon; it has long been a method of violent action by organisations and individuals attempting to achieve political goals. Terrorism is a serious threat to the security of every nations of the world. The vulnerability of societies to terrorist attacks results in part from the proliferation of chemical, biological, geophysical and nuclear weapons of mass destruction, but it is also a consequence of the highly efficient and interconnected systems that we rely on for key services such as transportation, information, energy, and health care. Evaluation of this vulnerability has focused on the role public health will have detecting and managing the probable covert biological terrorist incident with the realisation that some nation and state infrastructure is already strained as a result of other important public health problems. The plan contains recommendations to reduce vulnerability to biological and chemical terrorism, preparedness, planning, detection and surveillance, laboratory analysis, emergency response and communication systems.

This paper thus describes many ways in which science and technology can contribute in making the Human health and Ecosystem safer against the threat of catastrophic terrorism. The report identifies key actions that can be undertaken now, based on knowledge and technologies in hand, and equally important to describes key opportunities for reducing current and future bio-chemical terror risks even further through longer-term research and development activities.

***Keywords**: Terrorism, Vulnerability, Preparedness, Technologies, Response*

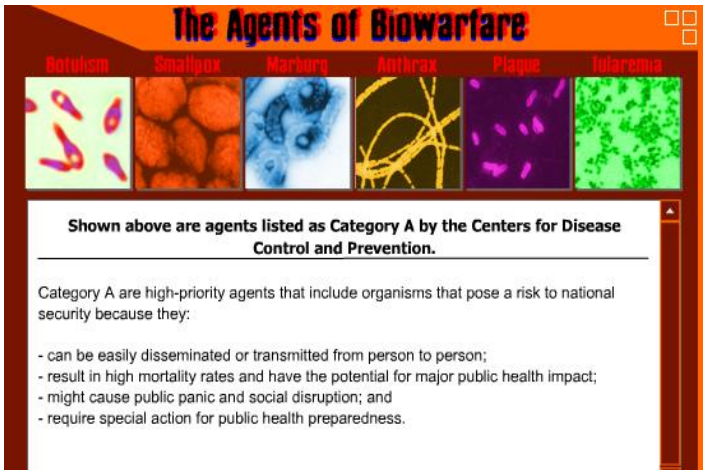
INTRODUCTION

There are perhaps hundreds of different definitions of terrorism, all of which tend to reflect the political world-view of the definer. The same act of violence can be classified differently, depending on the identities of the perpetrators. Groups that engage in identical

behaviour might be considered by their sympathizers as *freedom fighters*, and by their enemies as *terrorists*. In this respect, it is the intentional harming of civilians, which is at the core of terrorism, that makes this modus operandi illegitimate, even if it is meant, prima facie, to achieve justified objectives. This definition makes a distinction between an action intended to harm civilians and one intended to harm military and security personnel. The latter is defined as a guerilla or insurgency action, even though the perpetrator might use the same modus operandi (shooting, suicide bombing, or rocket fire). Thus, in seeking to achieve the same political objectives, an organization or perpetrator might carry out a "terrorist" attack on one occasion and a "guerilla" attack on another. The possibility of biological or chemical terrorism should not be ignored, especially in light of events during the past 10 years (e.g., the sarin gas attack in the Tokyo subway and the discovery of military bio-weapons programs in Iraq and the former Soviet Union. The public health infrastructure must be prepared to prevent illness and injury that would result from biological and chemical terrorism, especially a covert terrorist attack. As with emerging infectious diseases, early detection and control of biological or chemical attacks depends on a strong and flexible public health system at the local, state, and national levels.

Combating biological and chemical terrorism will require capitalizing on advances in technology, information systems, and medical sciences. Preparedness will also require a re-examination of core public health activities (e.g., disease surveillance) in light of these advances. Preparedness efforts by public health agencies and primary health-care providers to detect and respond to biological and chemical terrorism will have the added benefit of strengthening the capacity for identifying and controlling injuries and emerging infectious diseases.

NATIONS VULNERABILITY TO BIO-GEOCHEMICAL TERRORISM



As the term implies, terrorism does in fact aim to "terrorize" its target population. While terrorist attacks are ordinarily limited in terms of resulting fatalities, their effect does not stop with the physically harmed crowd. A message of intimidation and fear is passed to the general public through the terrorist act itself

and the resulting media coverage. Video cassettes edited by terrorist organizations, false alarms of possible follow-up attacks, and other methods adopted by terrorist groups, all contribute to a general sense of anxiety and fear. One of the most crucial elements in this campaign of psychological warfare is mass media. Terrorist groups rely on mass media to transfer their messages of fear and intimidation to the public. This fear can be understood in two different spheres: rational fear and irrational anxiety. Rational fear is a natural response to the perceived risk of getting physically injured in a terrorist attack, no matter how remote the probability. To a certain degree, such "rational fear" is actually positive in that it encourages public vigilance and awareness of one's immediate surroundings, thus allowing citizens themselves to help in thwarting attacks. A vigilant civilian is an important arm of the security apparatus. Terrorist incidents in some countries and elsewhere involving bacterial pathogens, nerve gas, and a lethal plant toxin (i.e., ricin), have demonstrated that such countries are vulnerable to biological and chemical threats as well as explosives. In general, chemical attacks are mostly limited in scope, while biological attacks can be unlimited, especially if the bio-agents are contagious. Nuclear attacks are unlimited, with far-reaching ecological impact, while radiological attacks are likely to be limited in scope. "The dirty bomb," for example, is an explosive device in the immediate vicinity of radiological material. When the explosives are detonated, the radiological material is spread across the target area. Recipes for preparing "homemade" agents are readily available, and reports of arsenals of military bio-weapon raise the possibility that terrorists might have access to highly dangerous agents, which have been engineered for mass dissemination as small-particle aerosols. Such agents as the variola virus, the causative agent of smallpox, are highly contagious and often fatal. Responding to large-scale outbreaks caused by these agents will require the rapid mobilisation of public health workers, emergency responders, and private health-care providers. Large-scale outbreaks will also require rapid procurement and distribution of large quantities of drugs and vaccines, which must be available quickly. The toxic, explosive, and flammable properties of some chemicals make them potential weapons in the hands of terrorists. Many such chemicals (e.g., chlorine, ammonium nitrate, and petroleum products) are produced, transported, and used in large quantities. Chemical warfare agents (such as nerve and blister agents) developed to have extremely high toxicities have been incorporated into a variety of military weapons. These chemical weapons could become available to terrorists through purchase or theft. Some of the chemical agents themselves are not difficult for individuals or organized groups to make.

In principle a number of technologies can be brought to bear for the rapid detection and characterization of a chemical attack or for detecting explosives before they are used. Large investments have been made in research on sensor technologies, but to date the number of effective fielded systems developed remains comparatively small. If sensor research is to move forward efficiently, mechanisms to focus and exploit the highly fragmented array of existing research and development programs will be needed.

A new program should be created to focus and coordinate research and development related to sensors and sensor networks, with an emphasis on the development of fielded systems. This program should build on relevant sensor research under way at agencies throughout the federal government.

Research programs on sensor technologies are needed to continue the search for promising new principles on which better sensors might be based. For example, mass spectroscopy offers the possibility of very rapid and specific identification of volatile agents. Also, basic research on how animals accomplish both detection and identification of trace chemicals could yield new concepts that allow us to manufacture better sensor systems and reduce our dependence on trained dogs, which currently are the best broad-spectrum high sensitivity sensory systems.

Toxic chemicals (or infectious agents) could be used by terrorists to contaminate food production facilities or water supplies.

PREPAREDNESS ACTIVITIES

Once a release of toxic chemicals occurs, proper protection of people and buildings can do a great deal to reduce injury and facilitate cleanup and recovery.

Universities, companies, and federal agencies need to work together to advance filtering and decontamination techniques by both improving existing technologies and developing new methods for removing chemical contaminants from air and water.

Research is especially needed on filter systems capable of treating large volumes, novel media that can help prevent toxic materials from entering facilities through ventilation equipment and ducts, and methods to contain and neutralize clouds of airborne toxic materials. In addition, exploratory programs should be initiated in new approaches to decontamination, including hardened structures, protective systems for microelectronics and other

expensive equipment, and environmentally acceptable ways of disposing of contaminated material that cannot be cleaned. New technologies that offer significant advances should be constantly evaluated. But the process of evaluating different sensor systems, for example, is difficult because their effectiveness depends on the operational environment and on who will be using them.

Early detection of and response to biological or chemical terrorism are crucial. Without special preparation at the local and state levels, a large-scale attack with variola virus, aerosolized anthrax spores, a nerve gas, or a food-borne biological or chemical agent could overwhelm the local and perhaps national public health infrastructure. Large numbers of patients, including both infected persons and the "worried well," would seek medical attention, with a corresponding need for medical supplies, diagnostic tests, and hospital beds. Emergency responders, health-care workers, and public health officials could be at special risk, and everyday life would be disrupted as a result of widespread fear of contagion. The suggested actions include support for all phases of countering terrorist threats— intelligence and surveillance, prevention, protection, interdiction, response and recovery, and attribution—as well as ways to improve our ability to perform analysis and invent new technologies. For example, the nuclear threat must be addressed at the earliest stages, when intelligence and surveillance based on international cooperation are critical for preventing the manufacture and use of nuclear weapons by terrorists. For biological threats, the situation is reversed: An attack is relatively easy to initiate and hard to prevent, but there are many opportunities for technological intervention to mitigate the effects. In other cases, such as an attack on the electrical power system, it is possible both to make the attack more difficult and to ameliorate its effects after it has been initiated.

The epidemiologic skills, surveillance methods, diagnostic techniques, and physical resources required to detect and investigate unusual or unknown diseases, as well as syndromes or injuries caused by chemical accidents, are similar to those needed to identify and respond to an attack with a biological or chemical agent. However, public health agencies must prepare also for the special features a terrorist attack probably would have (e.g., mass casualties or the use of rare agents). Terrorists might use combinations of these agents, attack in more than one location simultaneously, use new agents, or use organisms that are not on the critical list (e.g., common, drug-resistant, or genetically engineered pathogens). Lists of critical biological and chemical agents will need to be modified as new information becomes available. Potential biological and chemical agents are numerous, and the public health infrastructure must be

equipped to quickly resolve crises that would arise from a biological or chemical attack. However, to best protect the public, the preparedness efforts must be focused on agents that might have the greatest impact on health and security, especially agents that are highly contagious or that can be engineered for widespread dissemination via small-particle aerosols. Preparing the nation to address these dangers is a major challenge to public health systems and health-care providers. Early detection requires increased biological and chemical terrorism awareness among front-line health-care providers because they are in the best position to report suspicious illnesses and injuries. Also, early detection will require improved communication systems between those providers and public health officials. In addition, state and local health-care agencies must have enhanced capacity to investigate unusual events and unexplained illnesses, and diagnostic laboratories must be equipped to identify biological and chemical agents that rarely are seen in some countries. Fundamental to these efforts is comprehensive, integrated training designed to ensure core competency in public health preparedness and the highest levels of scientific expertise among local, state, and national partners.

STRATEGIC PLAN

The strategic plan is based on the following five focus areas, with each area integrating training and research:

- preparedness and prevention;
- detection and surveillance;
- diagnosis and characterization of biological and chemical agents;
- response;
- communication

Preparedness and Prevention

Detection, diagnosis, and mitigation of illness and injury caused by biological and chemical terrorism is a complex process that involves numerous partners and activities. Meeting this challenge will require special emergency preparedness in all cities and states. This plan will provide public health guidelines, support, and technical assistance to local and state public health agencies as they develop coordinated preparedness plans and response protocols. It also will provide self-assessment tools for terrorism preparedness, including performance standards, attack simulations, and other exercises. In addition, this will encourage and support applied research to develop innovative tools and strategies to prevent or mitigate illness and injury caused by biological and chemical terrorism.

Detection and Surveillance

Early detection is essential for ensuring a prompt response to a biological or chemical attack, including the provision of prophylactic medicines, chemical antidotes, or vaccines. This plan will integrate surveillance for illness and injury resulting from biological and chemical terrorism into the disease surveillance systems, while developing new mechanisms for detecting, evaluating, and reporting suspicious events that might represent covert terrorist acts. As part of this effort, the state and local health agencies will form partnerships with front-line medical personnel in hospital emergency departments, hospital care facilities, poison control centres, and other offices to enhance detection and reporting of unexplained injuries and illnesses as part of routine surveillance mechanisms for biological and chemical terrorism.

Diagnosis and Characterization of Biological and Chemical Agents

It will create a multilevel laboratory response network for bioterrorism which links clinical labs to public health agencies in all states, districts, territories, and selected cities and counties and to state-of-the-art facilities that can analyze biological agents. This lab will provide around-the-clock diagnostic confirmatory and reference support for terrorism response teams. This network will include the regional chemical laboratories for diagnosing human exposure to chemical agents and provide links with other departments (e.g., Environmental Protection Agency, which is responsible for environmental sampling).

Response

A comprehensive public health response to a biological or chemical terrorist event involves epidemiologic investigation, medical treatment and prophylaxis for affected persons, and the initiation of disease prevention or environmental decontamination measures. This plan will assist state and local health agencies in developing resources and expertise for investigating unusual events and unexplained illnesses.

Communication Systems

Effective communication with the public through the news media will also be essential to limit terrorists' ability to induce public panic and disrupt daily life. During the next 5 years, this plan will work with state and local health agencies to develop

a) a state-of-the-art communication system that will support disease surveillance;

b) rapid notification and information exchange regarding disease outbreaks that are possibly related to bioterrorism;

c) dissemination of diagnostic results and emergency health information; and

d) coordination of emergency response activities.

Through this network and similar mechanisms, the strategy will provide terrorism-related training to epidemiologists and laboratory in-charges, emergency responders, emergency department personnel and other front-line health-care providers, and health and safety personnel.

IMPLEMENTATION

Implementation will require collaboration with state and local public health agencies, as well as with other persons and groups, including:

- public health organizations,
- medical research centres,
- health-care providers and their networks,
- professional societies,
- medical examiners,
- emergency response units and responder organizations,
- safety and medical equipment manufacturers,
- office of Emergency Preparedness and other Department of Health and Human Services agencies,
- other agencies, and
- International organizations.

ULTIMATE OUTCOMES

- The public health agencies and health-care providers will be prepared to mitigate illness and injuries that result from acts of bio-geochemical terrorism.
- Public health surveillance for infectious diseases and injuries; including events that might indicate terrorist activity; will be timely and complete, and reporting of suspected terrorist events will be integrated with the evolving, comprehensive networks of the national public health surveillance system.
- The national laboratory response network for bioterrorism will be extended to include facilities in all countries. The network will include the environmental health laboratory for chemical terrorism.
- The public health departments will be equipped with state-of-the-art tools for rapid epidemiological investigation and control of suspected or confirmed acts of biological or chemical terrorism, and a designated stock of terrorism-related medical supplies will be available through a national pharmaceutical stockpile.

- A cadre of well-trained health-care and public health workers will be available in every corners of the region. Their terrorism-related activities will be coordinated through a rapid and efficient communication system that links various public health agencies and their partners.

CONCLUSION

Thus, the latest threats and use of bio-geochemical agents against civilians have exposed the nation's vulnerability and highlighted the need to enhance our capacity to detect and control terrorist acts. A country must be protected from an extensive range of critical bio-geochemical agents, including some that have been developed and stockpiled for military use. Even without threat of war, investment in national defence ensures preparedness and acts as a deterrent against hostile acts. Similarly, investment in the public health system provides the best civil defence against bioterrorism. Tools developed in response to terrorist threats serve a dual purpose. They help to detect rare or unusual disease outbreaks and respond to health emergencies, including naturally occurring outbreaks or industrial injuries that might resemble terrorist events in their unpredictability and ability to cause mass casualties (e.g., a pandemic influenza outbreak or a large-scale chemical spill). Terrorism-preparedness activities described in the strategic plan, including the development of a public health communication infrastructure, a multilevel network of diagnostic laboratories, and an integrated disease surveillance system, will improve our ability to investigate rapidly and control public health threats that emerge in the forthcoming century.

REFERENCES

Ashraf H. European dioxin-contaminated food crisis grows and grows [news]. Lancet 1999;353: 2049.

Davis, CJ. Nuclear blindness: an overview of the biological weapons programs of the former Soviet Union and Iraq. Emerg Infect Dis 1999; 5:509-12.

Ganor B. The democratic dilemma in counter-terrorism: efficacy vs. democracy and individual rights. In: Ganor B, Azani A, eds. Trends in international terrorism and counterterrorism. Herzliya, Israel: Interdisciplinary Centre Publishing House; 2007. p. 9.

Okumura T, Suzuki K, Fukuda A, et al. Tokyo subway sarin attack; disaster management, Part 1: community emergency response. Acad Emerg Med 1998; 5:613-7.

Stern J. Getting and using the weapons. In: Howard R, Sawyer R, eds. Terrorism and counterterrorism – understanding the new security environment. New York: McGraw- Hill; 2004. p. 189–191.

Torok TJ, Tauxe RV, Wise RP, et al. Large community outbreak of Salmonellosis caused by intentional contamination of restaurant salad bars. JAMA 1997; 278:389-95.

Tucker JB. Chemical/biological terrorism: coping with a new threat. Politics and the Life Sciences 1996; 15:167-184.

Uncle Fester. Silent death. 2nd ed. Port Townsend, WA: Loompanics Unlimited, 1997.