

Bioterrorism and the Three W's:

What is it, What is being done about it, and What can be done better?

Author: Tommy L. Smith

American Military University

Created December 19, 2017

Published February 12, 2018 by *Analyst Avenue*



Contents

Introduction.....	3
Bioterrorism and its Many Forms	4
Common Targets for Bioterrorism.....	6
Difficulties in Detection.....	6
Current Methods of Monitoring, Prevention, Detection, and Testing	7
Legislation on Bioweapons.....	8
Complacency and Improvements to Existing Vulnerabilities.....	9
Conclusions and Recommendations	12
References:.....	13

Figures

Figure 1. Map depicting non-member states of the BWC	11
--	----

Introduction

On September 11, 2001, a tragedy struck the United States of America when terrorists attacked the World Trade Centers. The government and the American people were devastated. A once seemingly all-powerful nation was quickly overwhelmed by fear and destruction. This was the first time the United States had been struck so hard by a terrorist act, especially on the soil of the homeland itself. A sense of complacency was present throughout the country before this attack, allowing the nation to be caught off-guard. With the feeling of safety no longer as prominent, the mission of mitigating the effects of this disaster and securing the homeland from future attacks became a priority for the United States. As a result, later in that same year the Patriot Act was passed in an effort to deter and punish terrorist acts by reducing restrictions pertaining to law enforcement searches (Wiedemann, 2010). Then, shortly after in 2002, the Homeland Security Act was established to reduce the vulnerability to terrorist attacks in the United States (2010) – this act also spawned the Department of Homeland Security.

Despite the concentration on preventing terrorist attacks in the traditional sense, a threat exists that the nation may not really be prepared for: bioterrorism. This paper will examine what bioterrorism is, the types of bioterrorism, and the current processes in place to safeguard against and monitor bioterrorism. Additionally, this paper will provide suggestions for improvement in how bioterrorist activities are monitored and prevented.

Bioterrorism and its Many Forms

Perhaps the most publicized agency for dealing with pandemics, outbreaks, and bioterrorism (both in reality and television) is none other than the Centers for Disease Control and Prevention or CDC. According to the CDC, bioterrorism is the "deliberate release of viruses, bacteria, or other germs (agents) used to cause illness or death in people, animals, or plants" (Bannister, 2014). Not unlike controlled substances and narcotic/barbiturate medications, pathogens are classified into different groups. Classifications are based on many factors, including the ease of dispersal, historical or potential mortality rates, potential to instill fear, and the amount of special response measures needed (2014). A study concluded that there are four (4) top contenders for the most potentially dangerous bioterrorism weapon, all of which are classified as Category A (high-priority pathogens) based on the highest mortality rates, ease of dispersal, potential to cause panic, and the volume of special emergency response required (2014). These rare and deadly pathogens are:

Bacillus anthracis, more commonly known as anthrax, is caused by a microbe that lives in soil. In 2001, an anthrax attack killed five (5) people and caused 17 more to become severely ill. In some countries, it is common in farm animals and can be transferred to humans by touch or by eating undercooked meat. The raw form can also be inhaled. Contracting anthrax usually causes nausea, loss of appetite, swelling in the neck, fever, abdominal pain, bloody stool, cold symptoms, fatigue, and a variety of other symptoms, sometimes leading up to death (Kivi & Yu, 2015). To make matters worse, anthrax can live in the environment for many years (Nicolson, 2001).

Clostridium botulinum, often called botulism, is a toxin that can be transmitted through food, an open wound, or by coming into contact with contaminated soil. Unfortunately, it is

extremely life-threatening and if victims do not die, they may likely at least wind up paralyzed or have breathing difficulties. The most common culprit in unintentional botulism poisoning is from canned foods (Moore, 2016).

Francisella tularensis (subspecies *Tularensis*) is a little less-known than the first two bioagents. The most common name for it is tularemia, although different strains are sometimes dubbed with zoological terms, like "rabbit fever." It is highly infectious, which is why it is considered a potential bioterrorist threat. The John Hopkins Center for Health Security states that it takes as few as 10 organisms to be inhaled to cause serious illness or death (Dennis et al, 2014). Symptoms may include fever, headache, malaise, body aches, shortness of breath, and other symptoms similar to pneumonia (2014). Although person-to-person contact is not a transmission vector, small mammals, especially rodents, are natural carriers of the disease (2014).

Yersinia pestis is a name that might strike fear into the hearts and minds of many – but probably only if its common name of "The Plague" or "The Black Plague" were used. There are a few different forms of the plague; however, perhaps the most well-known is The Bubonic Plague. Symptoms of this disease may include fever, chills, headache, cough, muscle pain, seizures, chest pain, shock, gangrenous skin, and eventual death without treatment (Kim, 2015). Although the plague is now rare in the western hemisphere, the United States did see an epidemic in the early 1920s (2015). It is still present primarily in Africa, but even some South American countries experience bouts of the plague, where it is most often spread through fleas or rat infestations (2015).

While the aforementioned pathogens are but a few of the candidates that could be used for bioterrorist attacks, there are several more that could prove to be equally as dangerous. Some of these include other Category A agents such as smallpox, viral hemorrhagic fever, and even some Category B agents like Q fever and ricin toxin (Potential Bioterrorism Agents, 2017). Both Q fever and ricin agents can stay stable in the environment for months (Nicolson, 2001).

Common Targets for Bioterrorism

Despite being easy to access and having minimal security, farms and agricultural land are thought to be low on the priority list of bioterrorists and agroterrorists. Instead, studies suggest that the most probable target for a bioterrorist attack would be a major city or other densely crowded area (Nicolson, 2001). Venues like sports stadiums, government buildings, and transportation hubs would be effective bioterrorism targets (2001). Because certain types of bioweapons are easily made into aerosols (even Category A pathogens), ventilation systems in large buildings might be favorable, especially since in most instances, they have little or no security (2001).

Difficulties in Detection

Bioweapons are not like traditional weapons of terror (i.e. car bombs, suicide bombs, nuclear weapons, etc.), as those types of weapons can sometimes be detected before deployment or shortly after use, and many give off radiation. Biological agents, on the other hand, often go unnoticed for some time. Even though some agents can cause almost instantaneous symptoms, most of them require an incubation period of up to several days (Nicolson, 2001). This provides enough time for a bioterrorist to "strike" multiple times in multiple locations and leave the area.

Another problem lies with the medical community – even if a bioterrorist introduced biological agents into several different buildings in different towns and people began to show symptoms, it would take some time for doctors and the CDC to connect the cases and determine the cause was a biological attack (2001). This is furthered by slow incapacitating agents whose symptoms may mimic the common flu until much later. Going back to the contrast between traditional terrorism weapons and those of bioterrorism, they both instill fear; however, bioweapons do not necessarily have to kill – mass sickness does the trick.

Although the CDC does offer a few training courses for top-level biothreats such as anthrax and botulism, there simply is not enough training and awareness. Often, the first people to arrive on scene after a bioterrorism event are first responders (i.e. police, fire and medical technicians, and eventually public health officials). Currently, local and even some state labs are not equipped to test for or deal with bioterrorism agents; therefore, the timely identification of such agents is difficult.

Current Methods of Monitoring, Prevention, Detection, and Testing

A sector of the Intelligence Community (IC), sometimes referred to as Public Health Intelligence or PHI, is dedicated to the early detection of health-related events or threats (French & Mykhalovskiy, 2013, p. 174). Intelligence on potential medical threats, including pandemics and bio-terroristic pathogens, is collected from various sources, including newspapers, news stations, social networks, and internet blogs (2013, pp.174-175). As members of the PHI community, agencies such as the Centers of Disease Control and Prevention (CDC) and the World Health Organization (WHO) work hand-in-hand to combat bioterrorism. WHO is mandated under Article 5(3) of the International Health Regulations or IHR to collect information on health "events" through surveillance and assess their ability to cause international

pandemics (2013, p. 177). The CDC's Epidemic Intelligence Service (EIS) is tasked with monitoring and responding to disease outbreaks and other health-related threats in the United States (Epidemic Intelligence Service, 2017).

The Luminex 100, a machine that uses liquid-based protocols on the xMAP microsphere platform, can successfully identify anthrax, botulism, tularensis, the plague, and likely other biological pathogens (Bannister, 2014). This is perhaps the most thorough and accurate method; however, scientists and doctors may still use standard microscopic identification to detect morphological characteristic differences (2014). Testing for enzymes and staining bacteria are other, yet less-accurate testing methods (2014).

Legislation on Bioweapons

In 1972, the Biological Weapons Convention (BWC) opened the disarmament treaty for signatories. The treaty banned the development, production, and storage of all biological weapons (Bannister, 2014). The treaty was entered into force in 1975 (Disarmament, 2009). The treaty and enforcement thereof are maintained by the United Nations Office for Disarmament Affairs, Geneva Branch (2009). The majority of the countries throughout the world are now parties to the BWC. The United States signed the treaty in 1972 and it was ratified in 1975 (2009). The U.S. Senate passed the Biological Weapons Anti-Terrorism Act of 1989 in 1990, thus fully implementing the BWC and becoming a state party (1972).

Complacency and Improvements to Existing Vulnerabilities

This paper began with the recollection of the pivotal events of September 11, 2001 that changed the way the United States viewed its security and preparedness for catastrophic events. Despite the nation's focus on preventing traditional terrorist attacks, diminished focus seems to be placed on bioterrorism. A perfect example of this can be seen in the working group between the USDA, FDA, DHS, and several military agencies, called the Strategic Partnership Program Agro Terrorism Initiative. It was designed to serve as a sort of intelligence meeting between the aforementioned agencies to share resources, technology, and security and prevention practices (Lewis, 2005); however, after the working group's final summary report of 2008, the working group seems to have ceased to exist. Has the United States grown complacent because there has not been any credible bioterrorism threats to the homeland since the anthrax scare? Will another September 11th happen, but this time at the hands of bioterrorists?

Inglesby, Toole, and Henderson state that documents outlining the recommendations for medical and public health management of biological weapons are being published in a variety of places (2000). Why is the CDC not taking lead and maintaining the publication warehouse on anything related to bioweaponry? Although there have been no real bioterrorism attacks to the homeland of a measurable nature, experts agree that a highly destructive biological weapon attack is both feasible and likely (2000). Currently, technology associated with manufacturing biological weapons is inexpensive and is similar to technology used in producing vaccines (2000). Perhaps stricter monitoring by a faction of the CDC and/or WHO of microbial agents and vaccine-production supplies would aid in identifying potential bioterrorists. Although the BWC was signed and/or ratified by 185 nation-states, there are 11 nation-states that have neither signed nor ratified it. They include Chad, South Sudan, Namibia, Tuvalu, Comoros, Djibouti, Eritrea,

Israel, Kiribati, Micronesia, and Niue (Membership of...2017). A map depicting these non-member states can be viewed in *Figure 1*, located on the succeeding page. Although lack of participation in the BWC does not necessarily indicate the active biological weapons research and/or production, it should certainly warrant more careful consideration when accepting mail and shipments from those nations. It may also benefit the U.S. to develop protocols or "red flags" when checking luggage and clothing for passengers at airports arriving from those destinations.

In fact, by examining the website for the United States Department of State – Bureau of Consular Affairs, there appears to be a travel warning for U.S. citizens regarding certain destinations, one of them being Chad. As of June 6, 2017, the Department warns all U.S. citizens to use caution when traveling to Chad due to ongoing tensions and potential terrorist activity. Additionally, it expressly advises to avoid the border regions (Country Information, 2017). Aside from yellow fever warnings, there are no active alerts for Namibia. Egypt, on the other hand, is labeled with a travel warning as of July 19, 2017, warning U.S. citizens to use caution due to terrorist and violent political opposition groups (2017). South Sudan is another of the non-signatories with a travel warning, dated July 20, 2017. Although it does not specifically mention terrorist activity, it does warn that fighting, intercommunal violence, and violent crime is of particular concern (2017). The other countries on the list – Kiribati, Comoros, Micronesia, and Tuvalu – do not currently have any alerts assigned to them by the U.S. Department of State (2017). Niue, on the other hand, was not in the Department's database; however, on the Canadian Government's travel and tourism website, it lists Niue as a self-government island nation in free association with New Zealand. At the time of this writing, there are no current travel warnings in place for Niue related to terrorism (Niue, 2017).

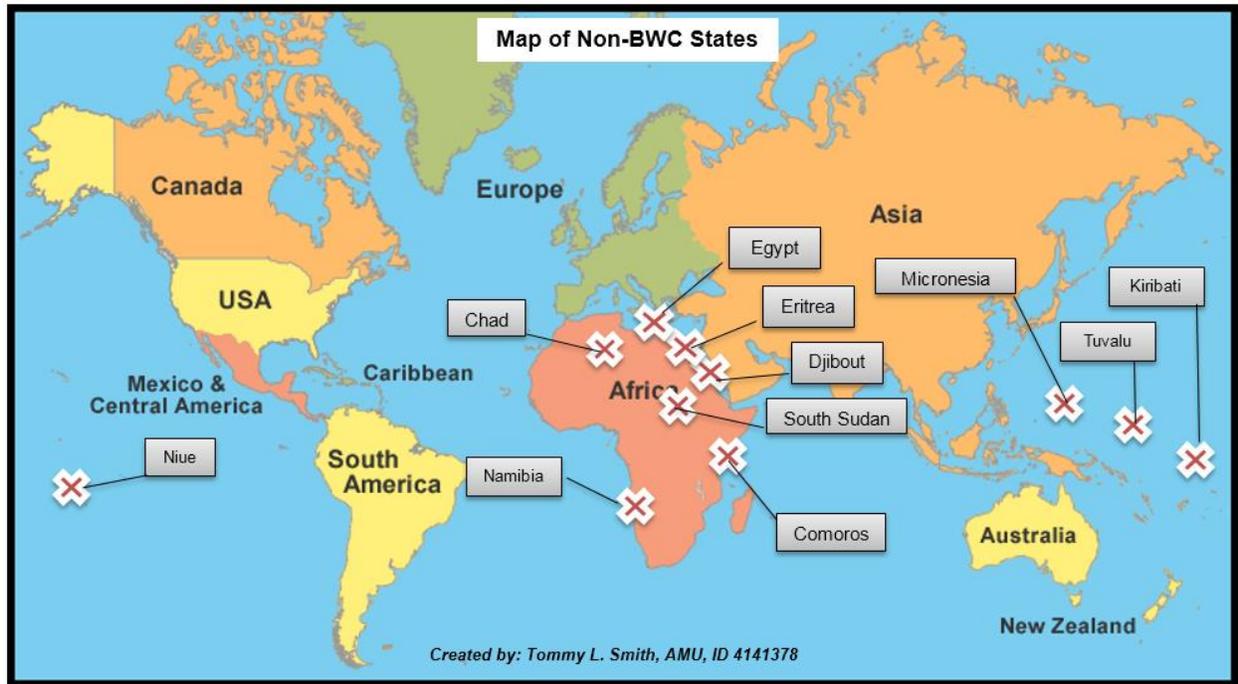


Figure 1. Map depicting non-member states of the BWC

Margaret Hamburg, a former New York City Health Commissioner and Commissioner of the United States Food and Drug Administration, writes:

The threat of bioterrorism is fundamentally different from other threats we face, such as conventional explosives or even a chemical or nuclear weapon. By its very nature, the bioweapons threat, with its close links to naturally occurring infectious agents and disease, requires a different strategy. Meaningful progress against this threat depends on understanding it in the context of epidemic disease. It requires different investments and different partners. Without this recognition, the nation's preparedness programs will be inadequate, and we may miss critical opportunities to prevent such an attack from occurring in the first place (2002).

Conclusions and Recommendations

The United States may have grown lax in its view on potential bioterrorist attacks. It is easy to see why - there have not been any of significance on U.S. soil; unfortunately, that may have been why September 11th was such a tragic incident for the country. Vigilance and preparedness are key in the fight against and to prevent terrorism – and that includes bioterrorism. Mobile technologies for field testing must be developed sooner rather than later, so intelligence and medical officials do not have to wait until a laboratory has examined RNA strands for biological agents. Moreover, thorough monitoring of sales and purchases of agents, supplies, and technology could prove beneficial in locating bioterrorists. National-states who have not signed the BWC should have all shipments, mail, and passengers flagged for caution.

On a more immediate note, there is a lack of training on the subject of bioterrorism. As previously mentioned, the CDC does offer several training classes, but mostly for Category A pathogens. State law enforcement bodies may benefit from exploring the possibility of partnering with the CDC to develop mandatory training for local officials and first responders. The more people who are able to recognize signs of a potential bioterrorism incident could potentially equate to a swifter resolution. Moreover, by being knowledgeable of bioterrorism threats, first-responders can take steps to ensure they do not contribute to the spread of the pathogen. Sadly, the nation's public health system leaves much to be desired. As Margaret Hamburg puts it, “many hesitate to call the array of health structures at the state, county, and local level a public health “system,” because years of relative neglect and underfunding have left them undercapitalized, fragmented, and uncoordinated” (2002). Many years have passed since Ms. Hamburg published her article, but are the public health systems up-to-par when it comes to encounters with bioterrorism events?

References:

- Bannister, C. (2014). 4 Types of Pathogenic Bacteria Used in Bioterrorism. Luminex Corporation. Retrieved from <https://www.luminexcorp.com/blog/4-types-of-pathogenic-bacteria-used-in-bioterrorism/>.
- Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction. (1972). Bureau of International Security and Nonproliferation. Retrieved from <https://www.state.gov/t/isn/4718.htm>.
- Country Information. (2017). U.S. Department of State – Bureau of Consular Affairs. Retrieved from <https://travel.state.gov/content/travel/en/international-travel/International-Travel-Country-Information-Pages.html>.
- Dennis, D. et al. (2014). Francisella Tularensis (Tularemia). John Hopkins Bloomberg School of Public Health, Center for Health Security. Retrieved from <http://www.centerforhealthsecurity.org/our-work/publications/francisella-tularensis-fact-sheet>.
- Disarmament. (2009). United Nations Office at Geneva. Retrieved from [https://www.unog.ch/80256EE600585943/\(httpHomepages\)/6A03113D1857348E80256F04006755F6?OpenDocument](https://www.unog.ch/80256EE600585943/(httpHomepages)/6A03113D1857348E80256F04006755F6?OpenDocument).
- Epidemic Intelligence Service. (2017). Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/eis/index.html>.
- French, M. and Mykhalovskiy, E. (2013). Public health intelligence and the detection of potential pandemics. *Sociology of Health & Illness*, 35 (2), pp. 174-187. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9566.2012.01536.x/pdf>.

- Hamburg, M. (2002). Preparing for and Preventing Bioterrorism. *ISSUES in Science and Technology*, 18 (2). Retrieved from http://issues.org/18-2/p_hamburg/.
- Inglesby, T., O'Toole, T., and Henderson, D. (2000). Preventing the Use of Biological Weapons: Improving Response Should Prevention Fail. *Clinical Infectious Diseases*, 30 (6). Retrieved from <https://academic.oup.com/cid/article/30/6/926/433565>.
- Kim, S. (2015). The Plague. *Healthline*. Retrieved from <https://www.healthline.com/health/plague>.
- Kivi, R. and Yu, W. (2015). Anthrax. *Healthline*. Retrieved from <https://www.healthline.com/health/anthrax>.
- Lewis, J. (2005). Preventing, Detecting, and Investigating Threats of Agroterrorism. The Federal Bureau of Investigation. Retrieved from <https://archives.fbi.gov/archives/news/testimony/preventing-detecting-and-investigating-threats-of-agroterrorism>.
- Moore, Danielle. (2016). Botulism. *Healthline*. Retrieved from <https://www.healthline.com/health/botulism>.
- Nicolson, G. (2001). Bioterrorism and Biological Warfare Agents. The Institute for Molecular Medicine. Retrieved from <http://www.immed.org/illness/bioterrorism.html>.
- Niue. (2017). Government of Canada. Retrieved from <https://travel.gc.ca/destinations/niue>.
- Potential Bioterrorism Agents. (2017). Communicable Disease Control and Prevention, San Francisco Department of Public Health. Retrieved from <http://sfcdcp.org/btagents.html>.
- Wiedemann, L. (2010). Homeland Security Act, Patriot Act, Freedom of Information Act, and HIM. AHiMA. Retrieved from <http://bok.ahima.org/doc?oid=106172#.Wjf10IWnGcw>.