

THE THREAT OF DOMESTIC BIOTERRORISM:
FACT OR FICTION?

STACY M. LANGSTON

APPROVED:

Larry A. Valero, Ph.D., Chair

Douglas Watts, M.S., Ph.D.

Alexandra Luce, Ph.D.

Benjamin C. Flores, Ph.D.
Dean of the Graduate School

Copyright ©

by

Stacy M. Langston

2013

THE THREAT OF DOMESTIC BIOTERRORISM:
FACT OR FICTION?

by

STACY M. LANGSTON

THESIS

Presented to the Faculty of the Graduate school of

The University of Texas at El Paso

in Partial Fulfillment

of the Requirements

for the Degree of

MASTER OF SCIENCE

THE UNIVERSITY OF TEXAS AT EL PASO

May 2013

TABLE OF CONTENTS

TABLE OF CONTENTS.....	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
1. INTRODUCTION	1
2. LITERATURE REVIEW	5
2.1 Biosecurity Policy and Programs.....	5
2.2 Domestic Terrorism	10
2.2.1 Rajneeshee 1984	12
2.2.2 Aum Shinrikyo 1990.....	14
2.2.3 Anthrax Hoax 1998.....	15
2.2.4 Amerithrax 2001	17
2.3 Biohackers.....	19
3. RESEARCH DESIGN	21
4. METHODOLOGY	23
4.1 Domestic Terrorist Group.....	23
4.2 Laboratory Setup.....	25
4.2.1 Location	25
4.2.2 Facility Setup	26
4.2.3 Laboratory Equipment	27
4.3 Acquisition of Biological Agent	29
4.4 Weaponization <i>B. anthracis</i>	31
4.5 Target Selection and Dissemination	33
5. WHAT IF... ..	37
6. DISCUSSION.....	53
7. CONCLUSION.....	58
7.1 Implications.....	58
7.2 Limitations	59
REFERENCES	60
APPENDIX.....	66
CURRICULUM VITA	68

LIST OF TABLES

Table 4.1: Laboratory Equipment and Prices	28
Table 4.2: Target Selection Matrix	34
Table 8.1: What If? Analysis Indicators	54

LIST OF FIGURES

Figure 4.1: Flow Diagram for the Process of Isolating <i>B. anthracis</i> from Soil Samples	30
Figure 4.2: Flow Diagram for the Production of Anthrax Spores	32

1. INTRODUCTION

In the 1990's three projects were undertaken to understand the use of biological agents as weapons. Under the Clinton administration the Defense Intelligence Agency initiated Project Jefferson. The purpose of the project was to replicate a genetically modified strain of anthrax bacterium that was reportedly created by Russian scientists in the early 1990's.¹ Research was conducted to determine if the strain created by the Russians was resistant to the current US anthrax vaccine. Experimentation on strains of bacteria was not the only projects being pursued by the government to understand biological weapons.

The second known project was initiated by the Central Intelligence Agency (CIA) who contracted Battelle Memorial Institute to begin Project Clear Vision. This project was aimed at reconstructing systems that could deliver biological agents. The main focus was reconstructing the Soviet-designed biological bomblet after attempts to acquire the bomblet failed.² The bomblet was tested in different atmospheric conditions to determine its performance as well as dissemination characteristics. The project was determined to be defensive and not in violation of the 1972 Biological and Toxins Weapon Convention (BWC).³

The third project was initiated by the Defense Threat Reduction Agency named Project Bacchus. Project Bacchus utilized off-the-shelf equipment to build a biowarfare production facility capable of mass producing anthrax bacterial stimulant.⁴ This project had the potential to determine the capabilities of terrorist organizations to conduct experiments and disseminate biological weapons.

¹ Jonathan B. Tucker, "Biological Threat Assessment: Is the Cure Worse Than the Disease," *Arms Control Association*. October 2004. www.armscontrol.org , 4; Judith Miller, Stephen Engelberg and William J. Broad. "US Germ Warfare Research Pushes Treaty Limits." *The New York Times*. September 4, 2001. www.nytimes.com/2001/09/04/world/us-germ-warfare-research-pushes-treaty-limits.html, 2

² Ibid., 4

³ Ibid

⁴ Tucker, "Bio Threat Assessment," 4

These three projects have been debated as violating the 1972 BWC. The information gathered through these projects however is very informative in determining adversary's capabilities to attack the U.S. using biological weapons. With current biosecurity policies such projects are no longer allowed and research laboratories that work with dangerous pathogens have to follow strict guidelines to produce vaccines and research methods of infection of these pathogens.

In an article by Jonathan B. Tucker for the Arms Control Association he describes the threat of a biological weapons attack from a terrorist organization as being more exaggerated than is actually possible.⁵ In his article he describes the cost of such programs initiated by the Bush administration to counter the threat of such attacks may be over inflated and not essential to national security. Production of vaccines and research on biological agents that may be genetically modified to become more resistant to antibiotics are essentially useless if terrorist groups are not capable of conducting such experiments or actually disseminating such agents. Spending on such programs for the detection and defense against biological weapons continues today, but is it necessary? Recently criticism has been given to several programs initiated to protect against bioweapons including the Department of Homeland Security's (DHS) three year program BioWatch Generation-3.⁶

In 2003 Boston University Medical Center (BUMC) won a bid with the National Institute of Health (NIH) to conduct research on hazardous pathogens. This facility was built in 2008 and named the National Emerging Infectious Diseases Laboratories (NEIDL) that is a seven-story,

⁵Tucker, "Bio Threat Assessment," 1

⁶. Government Accountability Office, *Biosurveillance: Observations on BioWatch Generation-3 and Other Federal Efforts*, 2012; "BioWatch Contributors Pointed to Inaccurate Readings: Documents," *NIT: Global Security Newswire*, <http://www.nti.org/gsn/article/biowatch-designers-alerted-us-inaccurate-readings/>; David William, "Early Warning on BioWatch." *LA Times*. <http://articles.latimes.com/2012/sep/23/news/sc-dc-adv-biowatch-patents-20120823> (accessed November 26, 2012).

192,000 square-foot facility.⁷ It did not become operational until April 2012 due to local opposition and is currently working at a Biosafety level 2 (BSL) on tuberculosis⁸ instead of at a BSL-4 which was originally planned. With the amount of funding of the project and the bid that won for the study of biodefense the facility is not working on any biological agents that can be used as weapons in a biological weapons attack. One other program that has been scrutinized is the DHS's BioWatch. According to the LA Times BioWatch has produced faulty alarms and even the CDC commented that it would not provide emergency medical assistance based on a BioWatch alarm.⁹

The questionable ability of a terrorist organization to produce a biological weapon that can be disseminated and the criticism for current programs aimed at early detection of biological agents, is an area for further study. There have been little or no updates to the assumptions that terrorist organizations cannot produce biological weapons or disseminate the agents in an effective manner. These assumptions need to be updated to reflect the advancement in technology and the ease of access to information describing techniques in scientific literature. Already there has been an acknowledgement that technology has advanced to a point where a certain level of education is no longer needed to conduct complex experiments.¹⁰ The Centers for Disease Control and Prevention (CDC) have two scenarios on their website as models for bioterrorist attacks, however these models are outdated, from 1999, and do not contain any of the new protocols that are being implemented today.¹¹ The models are also lacking in strategies to use in the future to prevent such an attack.

⁷ Kirk Bansak, "Biodefense and Transparency," *The Nonproliferation Review* 18, no. 2 (2011): 349-350.

⁸ "Research Information ." *Boston University Medical Campus National Emerging Infectious Diseases Laboratories*. <http://www.bu.edu/neidl/research/>

⁹ "BioWatch Contributors Pointed to Inaccurate Readings: Documents,"; William, "Early Warning on BioWatch."

¹⁰ Institute of Medicine, *Prepositioning Antibiotics for Anthrax* (The National Academic Press, 2012), 5

¹¹ Thomas V. Inglesby, "Anthrax: A Possible Case History," *Emerging and Infectious Diseases* 5, no.4 (1999): 556-560.

Designing a scenario that highlights key assumptions that are lacking in the realm of terrorists ability to use a bacteria as a weapon is the goal of this thesis. Explaining the process of how a domestic terrorist can acquire a biological agent and disseminate it using only knowledge available through internet sources and scientific and academic literature will provide a new perspective on how we perceive the capabilities of terrorist organizations and how we will act in the future with this knowledge.

2 .LITERATURE REVIEW

To fully appreciate what it means to use a biological weapon and their effects on persons it is important to understand where it all started and the reason for the policies that are currently in place. Once this appreciation for biological weapons has been achieved the explanation of why it is so tempting for domestic terrorists to use will be given. There are already several cases of domestic terrorism that have utilized biological weapons and these will be discussed in detail. One other factor that must be discussed is the individuals known as biohackers. Although they themselves are only out to seek the truth in regards to biology it is what they can offer to the non-scientific individuals that become an issue.

2.1 Biosecurity Policy and Programs

As early as 400 B.C biological weapons have been utilized by army's to defeat their enemies. It was common practice to dip swords and tips of arrows into feces or dead corpses before attacking an enemy army.¹² Another method, although not as effective, was to catapult corpses infected with the plague over the walls of castles.¹³ This was not an effective method due to *Yersinia pestis*, the etiological agent of the plague, needing a vector to be passed from one individual to the next. Fleas were the vectors and rats were the reservoir for the *Y. pestis*.

During these times the effects of the techniques used could be viewed regardless of the knowledge that microorganisms were the cause of deaths. It wasn't until the 1900's that microorganisms are identified to be the cause of diseases that are useful in warfare. It was this knowledge that led to the creation of State sponsored BW programs.

¹² Eric Croddy, Clarisa Perez-Armendariz, and John Hart. *Chemical and Biological Warfare:A Comprehensive Survey for the Concerned Citizen*. (New York , NY: Copernicus Books , 2002), 219

¹³ Croddy, *Chem and Bio Warfare*, 220; Salerno, "BW Risk Assessment,"27

State sponsored BW programs were established in Canada, Great Britain, Japan, and the Soviet Union during the 1920s and 1930s. Lenin started the BW program in in the Soviet Union during 1920 when he created Laboratory X where research on toxic biological products and poisons were carried out. In 1937 Laboratory X was transferred to the NKVD where research on biological products continued.¹⁴ Germany and France started their programs in the early 20th Century on the assumption that the Russians had been conducting similar experiments.¹⁵ The Germans conducted experiments with infecting food sources, mainly animals, with glanders (*Burkholderia mallei*) and shipping them to the Allied powers during World War I. Japan started their BW program around 1918 and was most notable in 1932 with the creation of Unit 731. Most of Japan's attacks were against the Chinese during WWII. Japanese pilots would drop crates that contained rice and fleas carrying *Y. pestis*. The rice would attract rats that would subsequently be infected with *Y. pestis* by the fleas.¹⁶

The United States started a BW program during 1942 and ended its research and development in 1969.¹⁷ The first laboratory to be built for BW research was Camp Detrick (later renamed Fort Detrick) located in Maryland. This army facility cost \$13 million and was operational in 1943. The agents being researched and developed were limited to innocuous microbes like *Bacillus globigi* and *Serratia marcescens*. Testing of the effects of different agents began in 1951 and ended in 1969 with President Nixon's National Security directive renouncing all offensive programs and production of microbial and toxin agents.¹⁸

¹⁴For more detailed information regarding the Soviet Union BW program refer to Alexander Kouzminov *Biological Espionage: Special Operations of the Soviet and Russian Foreign Intelligence*. (Mechanicsburg, PA: Grennhill Books, 2005); Salerno, "BW Risk Assessment,"27

¹⁵ Salerno, "BW Risk Assessment,"28-29

¹⁶For a complete list of BW programs and activities conducted by the Japanese see Salerno, "BW Risk Assessment,"29-30; Tom Mangold and Jeff Goldberg. *Plague Wars: The Terrifying Reality of Biological Warfare*. (New York , NY: St. Martin's Press, 1999)

¹⁷ Salerno, "BW Risk Assessment,"35

¹⁸ For a detailed explanation of the US BW program see Croddy, *Chem and Bio Warfare*, 231-233.

The first attempt to curtail the use of biological weapons on the battlefield started in 1899 with the First Hague Convention on the Laws and Customs of War which banned “the use of projectiles, the sole object of which is the diffusion of asphyxiating or deleterious gases.”¹⁹ The use of chemical weapons during WWI was in direct violation of The Hague and another attempt by states to create an international law against weapons of mass destruction (WMD) was started. The Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous, or Other Gases, and of Bacteriological Methods of Warfare of 1925 was the solution to stop the use of WMD. The 1925 Geneva Protocol prohibited the use of both poisonous gas and bacteriological weapons; however, it did nothing to stop states from acquiring and storing chemical and biological weapons and had no verification or enforcement provisions.²⁰ The remedy for this was the 1972 Biological and Toxin Weapons Convention (BWC).

The BWC was the first convention to ban an entire class of weapons, biological and toxin weapons. The BWC was open for signature in April 1972 and entered into force on March 26 1975. In 2005 there were 153 member states to the BWC, excluding the US.²¹ This convention included what was lacking in the previous attempts to curtail biological weapons, the prohibition of the “development, production, stockpiling, acquisition, or retention of biological agents or toxins.”²² The convention held review conferences in 1980, 1986, 1991, 1996, 2000, 2001, and

¹⁹ Joseph Cirincione, Jon B Wolfsthal, and Miriam Rajkumar. *Deadly Arsenals: Nuclear , Biological, and Chemical Threats*. 2nd. (Washington , D.C.: Carnegie Endowment for International Peace , 2005), 65

²⁰ Cirincione, *Deadly Arsenals*, 35.

²¹ Cirincione, *Deadly Arsenals*, 35

²² Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction *Final Declaration* (Geneva, 3-21 March 1980), Document No. BWC/CONF.I/10, p. 2.

2002. The conferences were to update the BWC and make revisions when necessary. There was still a weakness to the BWC and that was the effectiveness of verification.²³

To address the issue of verification the Ad Hoc Group was established in 1994. The Ad Hoc group negotiated mainly in four areas 1) definitions and criteria, 2) incorporation and transparency measures, 3) system of measures to promote compliance, and 4) full implementation of Article X.²⁴ The success of the Ad Hoc group was never seen due to the withdrawal of the US from the treaty in July 2001 claiming that the protocol would jeopardize the security of US biotechnical and pharmaceutical secrets.²⁵

The US witnessed its first biological attack in 2001 when letters containing anthrax were mailed and killed 5 people and sickened 17. In response to this and the September 9, 2001 attack on the Twin Towers in New York President Bush signed the “Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001” most commonly known as the US Patriot Act.

Within the US Patriot Act there is a section that deals with select agent, pathogens and toxins that present a severe threat to public health and safety, research in the US. Biological and toxin agents are restricted to certain persons for the express use for prophylactic, protective, bona fide research, or other peaceful purposes.²⁶ The follow up to the US Patriot Act that further defines select agents was the June 2002 Public Health Security and Bioterrorism Preparedness and Response Act of 2002 commonly referred to as the 2002 Bioterrorism Preparedness Act.

²³Annabelle Duncan and Kenneth G Johnson. "Viewpoint: Strengthening the BWC: Lessons from the UNSCOM experience." *The Nonproliferation Review* 4, no. 2 (1997): 49; Oliver Meier. "Verification of the Biological Weapons Convention: What is Needed." *Medicine, Conflict and Survival* 18, no. 2 (2002): 175-193

²⁴For detailed information regarding the Ad Hoc groups negotiations see Special Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, *Final Report* (Geneva, 19-30 September 1994), Document No. BWC/SPCONF/1, Part II, p.10.

²⁵Cirincione, *Deadly Arsenals*, 65

²⁶107th US Congress *Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA PATRIOT) Act of 2001*, PL 107-56. October 26, 2001

These two documents together require that participants in research with select agents must follow procedures outlining the registration, inventory, and transfer of organisms and toxins. Laboratories that possess, conduct experiments on, or transport select agents must register with the Department of Health and Human Services (HHS).²⁷

An inspection of the facility where the laboratory is located is also a requirement. Safety and security training, notification after theft, loss, or release of the listed agent in the laboratory is to be reported and records maintained. There are also mandatory Federal Bureau of Investigation (FBI) background checks for all personnel that will have access to the select agent. If any of these procedures were violated there was the penalty of a fine and/or up to no more than 10 years of imprisonment of the person violating these procedures.²⁸

The policies discussed above have gone over restrictions that were implemented to reduce the outcome of biological weapons being used against the US. There are other policies/programs that have been created to assist in response if a biological weapon is used. One such program is the creation of the National Pharmaceutical Stockpile.²⁹ The purpose of this program is to have a stockpile of vaccines, drugs and anti – toxins, controlled by the CDC, which can reach anywhere in the continental U.S. within 12 hours. This program has since been renamed the Strategic National Stockpile (SNS) but the principle and functions of the program remain the same.

Another useful program is the Laboratory Response Network that was established in August 1999. The LRN was established by HHS and the CDC in accordance with Presidential

²⁷ 107th US Congress *Public Health Security and Bioterrorism Preparedness and Response Act of 2002*, PL 107-188, June 12, 2002

²⁸ 107th Congress *US Patriot Act*; 107th Congress *2002 Bioterrorism Preparedness Act*.

²⁹ Victoria Sutton, *Law and Bioterrorism* (Durham, NC: Carolina Academic Press, 2003), 53.

Decision Directive 39 that outlined national anti-terrorism policies.³⁰ Any type of agent chemical or bacterial agent that is thought to be a result of terrorism is sent to the local LRN in the city it was located in. This ensures effective communication between those that need to be informed regarding possible terrorist attacks.

Lastly is one of the most scrutinized programs, BioWatch Generation - 3 (referred to as BioWatch). In an effort to detect biological weapons release, DHS is working with state and local officials to mitigate the effects of such attacks. This program was established to detect biological threat agents by taking air samples and providing a warning to the government and public health community. Experts have expressed their concerns that the project is designed to detect mass biological attacks and would not detect smaller localized attacks.³¹ Other criticism was given to the program after the alerts of tularemia in the Houston, Texas area.³²

2.2 Domestic Terrorism

Domestic terrorism is defined by the RAND Corporation as violence against the civilian population or infrastructure of a nation-often but not always by citizens of that nation and often with the intent to intimidate, coerce, or influence national policy.³³ According to The U.S. Code Title 18 domestic terrorism is defined as:

- “...activities that -
- (A) involve acts dangerous to human life that are a violation of the criminal laws of the United States or of any State;
 - (B) appear to be intended -

³⁰ Centers for Disease Control and Prevention, “The Laboratory Response Network Partners in Preparedness.” 2005, <http://emergency.cdc.gov/lrn/> (accessed February 19, 2013).

³¹ U.S. Library of Congress, Congressional Research Service, *The BioWatch Program: Detection of Bioterrorism*, by Dana A Shea and Sarah A. Lister. CRS Report RL32152. <http://www.fas.org/sgp/crs/terror/RL32152.html> (accessed February 12, 2013).

³²David William, “The Biodefender That Cries Wolf” *Los Angeles Times*, July 08, 2012, <http://articles.latimes.com/2012/jul/08/nation/la-na-biowatch-20120708/4> (accessed November 16, 2012)

³³ RAND Corporaton, “Domestic Terrorism” <http://www.rand.org/topics/domestic-terrorism.html> (accessed February 12, 2013).

- (i) to intimidate or coerce a civilian population;
 - (ii) to influence the policy of a government by intimidation or coercion; or
 - (iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping; and
- (C) occur primarily within the territorial jurisdiction of the United States.”³⁴

In regards to these two definitions there are common characteristics. Mainly the uses of violence with the intent to coerce, intimidate, or influence a national policy.

Focusing on the political aspect of terrorism it can be broken down into two constituent parts, seeking regime change or territorial change.³⁵ Territorial change is most often seen in nationalist organizations such as Hamas or the Quebec Liberation Front. Religious groups such as Aum Shinrikyo were seeking regime change and used biological and chemical weapons to attempt to achieve this goal.

The use of violence can be considered to be armed propaganda or armed pressure.³⁶ For propaganda these terrorist groups are looking to gain the sympathies of the persons viewing the acts. Armed pressure is attempting to achieve a change through negotiations in the form of coercion. If using biological weapons the amount of deaths can easily reach the thousands and can be considered a form of armed pressure.

If a domestic terrorist group chooses to use biological weapons to achieve their goals they could fall under the category of the copycat phenomenon.³⁷ The use of biological weapons by domestic extremist groups has risen over the years. First seen with Ranneeshee cult and poisoning the salad bar in Oregon and then later with Aum Shinrikyo and then up until 2001 with

³⁴ “Crimes and Criminal Procedures” Title 18 *U.S. Code*, Sec. 2331. definitions. 2012. Available <http://uscode.house.gov/download/pls/18C113B.txt> (accessed February 18, 2013).

³⁵ Igancio Sánchez-Cuenca and Luis de la Calle, “Domestic Terrorism: The Hidden Side of Political Violence,” *Annual Review of Political Science* 12 (2009): 32-33

³⁶ *Ibid*, 38.

³⁷ Jessica Stern, “The Prospect of Domestic Bioterrorism,” *Emerging Infectious Diseases* 5, no. 4 (1999): 519 <http://ftp.cdc.gov/pub/EID/vol5no4/ascii/stern.txt>. (accessed December 09, 2012).

the Amerithrax attacks. This same effect was seen in school shooting as explained by Loren Coleman.³⁸ In her paper she demonstrates that an increased number of shootings began after media coverage of one particular shooting. The phenomenon can be seen occurring in regards to biological weapons with the example of Larry Wayne Harris and numerous hoaxes of anthrax threats that occurred after his arrest in 1998 and its media coverage.

Biological agents are not new to domestic terrorists. They have been used many times whether successful or otherwise. Some cases that can be examined are the Rajneeshee cult in 1984, Aum Shinrikyo in the 1990's, Larry Wayne Harris, and the most recent Amerithrax in 2001.

2.2.1 Rajneeshee Cult 1984

Oregon 1984, 750 people were deliberately infected with a unique strain of *Salmonella enterica* as a test plan for an upcoming election. The bacterium was poured onto salad bar foods in The Dalles area; however, this was not the first time that The Dalles had been victim to salmonella. This was just the only time that the effects were wide spread.

Bhagwan Shree Ranjneesh was a self-proclaimed guru from India. He purchased a ranch in Wasco County and became a very charismatic leader of the Rajneeshee Cult.³⁹ The group first obtained the salmonella bacteria from a medical supplier and used their own laboratory equipment and university – trained microbiologists to culture it.⁴⁰ As a means to take over the government in Wasco County the cult attempted to test out the efficacy of their salmonella strain first by poisoning two visiting Wasco County commissioners. The cult members served cold

³⁸ Loren Coleman "The Copycat Effect" adapted from *The Copycat Effect How the Media and Popular Culture Trigger Mayhem in Tomorrow's Headlines* (New York: Simon & Schuster, Inc, 2004): 4-7.
http://www.riskinstitute.org/peri/images/file/Coleman_Copycateffect.pdf (accessed February 19, 2013).

³⁹ Jonathan B. Tucker, "Historical Trend Related to Bioterrorism: An Empirical Analysis" *Emerging and Infectious Diseases* 5, no. 4 (1999): 502-503

⁴⁰ Salerno, "BW Risk Assessment,"³⁶

beverages to the commissioners that were laced with salmonella. The second attempt to test the bacteria was by sprinkling it on food at The Dalles shopping center. Neither of these two events caused any type of recognition or symptoms of poisoning.

Originally the cult was going to contaminate the water system of The Dalles on Election Day, but these two previous attempts to poison were unsuccessful.⁴¹ For this reason the cult decided to poison the salad bar in several restaurants in The Dalles area. This method proved to be effective, much more so than the cult thought it would. As a result many health officials and investigators were brought into the county and the cult was unable to poison the water supply on Election Day. The cult participated in many other attempts in trying to sabotage the voting but none were effective and none caused as much damage as the poisoning of the salad bar.⁴²

The cult eventually succumbed to internal conflict that led to its collapse. Many of the members became informants for law enforcement and eventually this led to a raid one year later in October 1985. The Federal Bureau of Investigation (FBI) and local law enforcement found an open vial of *Salmonella enterica* Typhimurium that matched the strain that was found in the salad bar poisoning cases.⁴³ This is one case where a religious cult leader has been able to manipulate people into conducting acts that cause harm to others. One even great religious cult that utilizes biological and chemical weapons is Aum Shinrikyo.

⁴¹ Lawrence K. Grossman, "The Story of a Truly Contaminated Election," *Columbia Journalism Review* (2001): 65 <http://encore.utep.edu:50080/ebSCO-web/ehost/detail?sid=5517c92d-421c-40ed-9eee-66646e8bc833%40sessionmgr111&vid=1&hid=120&bdata=JnNpdGU9ZWhvc3QtG12ZSZzY29wZT1zaXRl#db=ufh&AN=3970003> (accessed February 24, 2013).

⁴² Ibid.

⁴³ Northwest Public Health "An Act of Bioterrorism: Oregon, 1984" Spring/Summer 2010 <http://www.nwpublichealth.org/archives/s2010/an-act-of-bioterrorism-oregon-1984> (accessed February 24, 2013)

2.2.2 Aum Shinrikyo 1990

Aum Shinrikyo was founded by Chizuo Matsumoto officially in 1987; however, it had its beginnings in 1984 as a yoga school called Aum Inc.⁴⁴ The cult had not turned to religion at this time. The focus was that of developing psychic powers by engaging in yoga. It was in 1985 that Matsumoto began his attempt at saving the world by declaring he was a sacred warrior and hero charged with this duty. In 1986 he went to India and claimed to have met sages that stated the world was heading towards catastrophe but did not have the appropriate spiritual guidance to help. It was at this time Matsumoto formed his religious organization Aum Shinsen no Kai whose goal was to restore “original Buddhism.”⁴⁵ Once Matsumoto began gathering enough followers and receiving donations from them he formed his first monastic community by purchasing plots that would be the basis for his utopia. At this point in time the cult was renamed Aum Shinrikyo, “Aum Teaching of Truth” and Matsumoto renamed himself Shoko Asahara.⁴⁶ By August 1989 the cult was granted legal recognition under the Religious Corporations Law after initially being turned down for the request.

In 1990 Asahara made the decision to create a BW program after his defeat in the parliamentary elections. The first agent that was used in testing was botulinum toxin extracted from *Clostridium botulinum*. The leader of the BW program was Seiichi Endo, a graduate level molecular biologist who had attended Kyoto University. Endo gathered soil samples where he harvested *C. botulinum* used to produce the toxin.⁴⁷ Research was conducted in the laboratory located at its Kamikuishiki headquarters at the base of Mt. Fuji that was built from funds

⁴⁴ Richard Danzig and Others, *Aum Shinrikyo: Insights Into How Terrorists Develop Biological and Chemical Weapons*, (Washington, DC: Center for a New American Security, 2011), 7-8

⁴⁵ Danzig, *Aum Shinrikyo: Bio and Chem Weapons*, 8.

⁴⁶ Ibid.

⁴⁷ Danzig, *Aum Shinrikyo: Bio and Chem Weapons*, 16; Rosenau, “Aum Shinrikyo: Why Did it Fail”, 291-292.

gathered through insurance fraud, a variety of front companies, and other criminal activities.⁴⁸ Approximately 450 metric tons of yellow liquid containing botulinum toxin was produced, however if it was weapons grade is not known. The majority of the yellow liquid was thought to be the media that was used to cultivate *C. botulinum*. There was a case of a member of the cult falling into the fermenter containing the yellow liquid; however he never showed any symptoms of botulism.⁴⁹

Attacks with botulinum toxin were carried out on two U.S. Naval bases, Narita Airport, the Japanese Diet, the Imperial Palace and the headquarters of a rival religious group, however the attacks were unsuccessful.⁵⁰ It was this failure that led Asahara to look into different agents to be used, mainly *B. anthracis*. Endo was once again the leader of this research and it is thought that he obtained Sterne or 34F2 strain which is used in vaccines of animals and livestock from Obihiro University. This presents the question of why Endo would choose a benign strain to conduct biological attacks. Attacks using the benign strain of anthrax were conducted in June and July 1993, which understandably failed. It is this failure and the previous failures at biological weapons that led to research, development, and successful dissemination of chemical weapons.

2.2.3 Larry Wayne Harris

Larry Wayne Harris was a white-supremacist and born-again Christian who predicted that biological attacks could be carried out by domestic groups. He was trained in microbiology

⁴⁸ Rosenau, "Aum Shinrikyo: Why Did it Fail", 291

⁴⁹ Danzig, *Aum Shinrikyo: Bio and Chem Weapons*, 16

⁵⁰ Danzig, *Aum Shinrikyo: Bio and Chem Weapons*, 17; Rosenau, "Aum Shinrikyo: Why Did it Fail", 292

and boasted that he worked for several laboratories including a reference lab for the CIA.⁵¹ He stated that when he worked for the CIA it was to help train Iraq microbiologists and this is when he made his self-appointed mission to warn American's of an upcoming biological attack from Iraq. None of the laboratories that Harris claims to have conducted work related to biological weapons have ever confirmed him as an employee.

Harris was arrested on May 12, 1995 for possession of *Y. pestis* and the attempt to conduct experiments using the bacteria to prepare for the imminent invasion from Iraq.⁵² He was able to obtain the three vials of the bacteria from the American Type Culture Collection by supplying the company a fake letter head of his laboratory called "Small Animal Microbiology Laboratory" with a fake approval number from the Environmental Protection Agency.⁵³ The CDC was informed of his purchase and contacted Harris about his purchase. Harris informed the CDC that he was using the research to write a survivalist book. This led to his arrest on May 12, 1995 and on April 22, 1997 he pleads guilty to one count of wire fraud and receives a sentence of 18 months of probation.

Harris then left to Las Vegas for a job testing a new device to kill microorganisms; his employer thought he was a reputable microbiologist. He told his employer and his employers friends that he worked for both the CIA and the FBI on biological defense. The device he was supposed to testing was being sold by an engineer who Harris told he would be testing the device with "military-grade anthrax."⁵⁴ The engineer, Rockwell, phoned the FBI and on February 18, 1998 Harris was arrested on suspicion of having anthrax. There was no anthrax found but he was

⁵¹ Jessica Stern, "Larry Wayne Harris the Talkative Terrorist" In *Toxic Terror* Jonathan Tucker ed (Cambridge: MIT Press, 2000), 229

⁵² *Ibid.*, 228

⁵³ *Ibid.*, 223

⁵⁴ Tucker, "Historical Trend Related to Bioterrorism, 500.

arrested for violation of his probation. A judge ruled that Harris would remain free however he extended his probation by five months.⁵⁵

His arrest in 1998 received coverage by the media and sparked a smattering of anthrax hoaxes. The number of hoaxes is not exactly known but is estimated to range in the hundreds.⁵⁶ An agency in Phoenix received an anthrax threat by mail that resulted in the quarantine of 10 people and the evacuation of several buildings. Even more letters were sent to locations around the U.S claiming to have anthrax. Federal buildings in Rochester, New York had to undergo decontamination procedures after an employee opened a letter containing an anthrax threat. Threats didn't stop until early 2000 and businesses were not the only targets, abortion clinics and even schools had received anthrax threats.⁵⁷ The hoaxes ended in 2000 but a real attack utilizing anthrax occurred in 2001.

2.2.4 Amerithrax 2001

In 2001, shortly after the attacks on 9/11, several letters were mailed to United States Senators Patrick Leahy and Thomas Daschle in the District of Columbia and to media organizations in New York and Boca Raton, Florida. Because of these mailings, 22 individuals contracted anthrax either by inhaling the spores or by absorbing the spores through the skin, known as cutaneous anthrax.⁵⁸ As a result of the mailings, over 30 postal facilities and commercial mailrooms were contaminated with the spores and 5 individuals died from inhalation anthrax.

⁵⁵ Stern, "Larry Wayne Harris," 240

⁵⁶ Anti-Defamation League. "Anthrax Hoaxes: 1998-1999"
<http://archive.adl.org/learn/anthrax/Hoaxes2.asp?xpicked=3&item=6> (accessed February 03, 2013).

⁵⁷ Ibid.

⁵⁸ United States Department of Justice, *Amerithrax Investigation Summary*, 2010. 4
<http://www.justice.gov/amerithrax/docs/amx-investigative-summary.pdf> (accessed October 14, 2012)

The first “person of interest” named by Attorney General John Ashcroft was Dr. Steven J. Hatfill a former U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) scientist and expert in biodefense.⁵⁹ With the advance of scientific breakthroughs Dr. Hatfill was cleared of all suspicions when laboratory testing determined that he did not have access to the Ames strain used in the attacks. In 2003 Dr. Hatfill sued Attorney General Ashcroft for violating his privacy and was awarded \$5.82 million in 2008 as settlement.⁶⁰

The next suspect in the case was Dr. Bruce E. Ivins who was a senior microbiologist in the Bacteriology Division of USAMRIID. Dr. Ivins was considered the nation’s foremost experts in the production and purification of *B.anthraxis*.⁶¹ According to the FBI investigation he had the opportunity, access and the ability to carry out these attacks. His motive for conducting such attacks was because his work on a vaccine was going to be halted unless he could meet potency standards set by the FDA. This purportedly would only occur in the presence of an unexpected event.⁶² One other telling piece of evidence was the language used in the letters, the “code” that was within the letters, matched notes from Dr. Ivins notebooks.⁶³

In the summer of 2008, the United States Attorney’s Office for the District of Columbia was seeking authorization from a federal grand jury to return an indictment charging Dr. Ivins in violation of Title 18, United States Code, Section 2332a (Use of a Weapons of Mass Destruction).⁶⁴ Before the process was completed Dr. Ivins overdosed on over – the – counter

⁵⁹ NRC, *Review of Scientific Approaches*, 29

⁶⁰ Ibid.

⁶¹ USDOJ, *Amerithrax*, 26.

⁶² Ibid, 39-40

⁶³ Ibid, 56-63

⁶⁴ Ibid, 1

drugs. The FBI ended its seven year investigation and officially closed the case February 19, 2010.⁶⁵

2.3 Biohackers

For the amateur scientist, biohackers, working out of their garage attempting to learn more on their own; they no longer have to work alone, or in their garage. A movement known as do-it-yourself bio (DIYbio) has brought all of these biohackers together to conduct experiments and learn science without needing a college degree to do so.⁶⁶ Ellen Jorgensen, creator of Genspace, has made it possible for everyone to learn how to conduct science experiments in a controlled laboratory just for fun.⁶⁷ In these labs it is possible to sequence your own DNA, make bacteria grow, research biofuels, all without having to worry about fulfilling grant requirements or having reasoning behind the research you are pursuing.

The skills to conduct experiments can be learned in such labs. DIYbio is happening all over the world and giving access to those who seek to learn more about biology. But like everything that is offered for good and the advancement of knowledge it can be taken advantage of. DIYbio laboratories don't conduct experiments on pathogenic bacteria, but the skills to do so can be learned in their laboratories. As Ellen Jorgensen stated in her talk on TED Talks, "we don't work with pathogens...if you work with a pathogen you're not part of the biohackers

⁶⁵ Unites States Department of Justice, *Justice Department and FBI Announce Formal Conclusion of Investigation into 2001 Anthrax Attacks*, <http://www.justice.gov/opa/pr/2010/February/10-nsd-166.html>

⁶⁶ Joe Alper, "Biotech in the Basement" *Nature Biotechnology* 27, no. 12 (2009): 1077. doi:10.1038/nbt1209-1077 (accessed January 16, 2013).

⁶⁷ Ellen Jorgensen. "Ellen Jorgensen: Biohacking –You Can Do It, Too" TED Talks. http://www.ted.com/talks/ellen_jorgensen_biohacking_you_can_do_it_too.html (accessed February 03, 2013)

community, you're part of the bioterrorist community" and she further goes on to explain how the benefits outweigh the risks such programs provide.⁶⁸

Advancements in biology are happening rather quickly and a guide on how to replicate most of these experiments can be found almost anywhere. For instance the DIYbio hackerspace BioCurious has developed a bioprinter that is able to print cells onto surfaces such as petri dishes. This printer can be easily created using parts from an HP 5150 Inkjet printer.⁶⁹ The availability of such manuals from DIYbio laboratories is becoming greater since their creation in 2009. More individuals can learn techniques in a variety of biology fields and all from the comfort of a non-school setting.

⁶⁸ Ibid.

⁶⁹ Joseph Flaherty, "DIY Bioprinter Lets Wannabe Scientists Build Structures From Living Cells" Wired. <http://www.wired.com/design/2013/01/diy-bio-printer/> (accessed January 25, 2013).

3. RESEARCH DESIGN

This thesis will utilize the Structured Analytic Technique, What If? Analysis.⁷⁰

Recognizing early signs/indicators of a significant event, such as a terrorist attack, leads to policies that can be implemented to reduce or prevent the event from occurring. If the event is not prevented the What If? Analysis allows for a better understanding of how to respond to a significant event such as a terrorist organization attacking the U.S. with a biological weapon. Key assumptions will be addressed in the discussion section of this thesis in order to allow the reader to define and create their own key assumptions and indicators that can be compared with the authors in the discussion section.

The location of the scenario will take place in Houston, Texas and target locations are modeled after real locations within the city. The names of the locations chosen will remain anonymous to protect the integrity of those locations; however the capacity and structural models will be used in the scenario.

The aim of the scenario is to utilize the internet, social media sites, and scientific literature to demonstrate that technology for scientific experiment has advanced greatly since the 2001 Amerithrax attacks. This scenario will also demonstrate that the level of education that one needs is high school level or a basic college education.

A domestic terrorist group will be defined and given a purpose for initiating the attacks. The ideology of the terrorist group will be defined in the methodology section of this thesis to better understand how the What If? Analysis was designed. It is at the authors discretion to rationalize the actions of the domestic terrorist group with evidence in the literature i.e.

⁷⁰ Richards J Heurer Jr., and Randolph H Pherson. *Structured Analytic Techniques For Intelligence Analysis*. (Washington, DC: CQ Press , 2011), 231-234

newspaper articles, academic journals etc. After the ideology of the terrorist group has been defined the location of the laboratory and all necessary preparation will be broken down into constituent parts in order to analyze how a group could possibly weaponize anthrax. The parts include location, facility setup, laboratory equipment, acquisition of biological agent, and weaponization of biological agent.

4. METHEDODOLOGY

4.1 Domestic Terrorist Group

The domestic terrorist group for this scenario can be described using three characteristics from Sánchez-Cuenca and de la Calle.⁷¹

1. Seeking a territorial change
2. Achieves this through armed pressure
3. Using violence to compensate for a loss in social movement

As described in the literature review each domestic terrorist group has their own ideology that they follow. For this group they are seeking immigration reform for the city of Houston, Texas. Census data show that in certain super neighborhoods in Houston the population of ethnic minorities is increasing greatly.⁷² The Hispanic population in Houston has risen more than any other ethnicity and the white population is decreasing each year. Immigration reform appears to be leaning in the direction of amnesty for those who have entered into the U.S. illegally. Although far from being an easy process it is becoming a hot topic that could lead to millions of undocumented immigrants gaining citizenship.⁷³

This domestic terrorist group is against having millions of undocumented immigrants enter into the U.S. Individuals in this group feel strongly that adding millions of immigrants to the U.S. will affect their ability to obtain health care, the city's budget, and taxpayer funded benefits.⁷⁴ This domestic terrorist group has been a staunch supporter to the *Support Our Law*

⁷¹ Sánchez-Cuenca, *Domestic Terrorism* 38-39, 44.

⁷² U.S. Census Bureau, *Race/Ethnicity:1980-2010 City of Houston* accessed March 14, 2013, http://www.houstontx.gov/planning/Demographics/docs_pdfs/Cy/coh_race_ethn_1980-2010.pdf

⁷³ Chris Farrel, "Obama's Next Act: Immigration Reform" *Bloomberg Businessweek*, December 13, 2012, <http://www.businessweek.com/articles/2012-12-13/obamas-next-act-immigration-reform> (accessed January 14, 2013)

⁷⁴ See Governors Brewers comment in regards to the impact immigrants will have on Arizona's economy CNN, "Undocumented Immigrants Line up For Relief From Deportation" August 17, 2012, <http://www.cnn.com/2012/08/15/us/immigration-deferred-deportation> (accessed January 20, 2013).

Enforcement and Safe Neighborhoods Act, more commonly known as SB 1070, which was passed in Arizona in April 2010. Since then this group has been preparing for “ethnic cleansing” of their own.⁷⁵

For these reasons this group has decided that it would be best to act to remove the immigrants themselves. Following the characteristics listed above this terrorist group seeks a territorial change in the sense of reducing the amount of ethnic diversity especially among the Hispanics within the city of Houston. They will achieve this through the method of copycat phenomenon discussed in the literature review to amplify fear to seek a policy change regarding immigration reform. The method they will copy is the letters that were sent during the 2001 Amerithrax attacks. However this method will only be used to incite fear. An actual attack will be conducted at a location that is to be decided. This group has now moved to violence to compensate for the loss of a social movement, removing undocumented immigrants from the city of Houston.

This group contains 17 members all from different backgrounds. There are individuals that are licensed nurses, teachers, unemployed, and ranchers. The variability of the groups work experience is necessary for the targets that are selected in the attack and for the location of the laboratory setup. None of the individuals in the group have a criminal background and they are of varying ages comprising both men and women. The youngest in the group is 22 years old and the oldest in the group is 46 years old. Planning the attack starts in 2010 and will be carried out in 2014 after all preparations have been thoroughly made.

⁷⁵ Raymond Michalowski, “Ethnic Cleansing American Style: SB 1070, Nativism and the Contradiction of Neo-Liberal Globalization,” *Journal of Crime and Justice* (2012): 2. (accessed March 29, 2013).

4.2 Laboratory Setup

Setting up a laboratory that will go unnoticed by the FBI field office in Houston and local law enforcement is a top priority. Location of the laboratory plays a critical role in being able to manufacture enough anthrax to conduct an effect attack for the purposes of this domestic terrorist group. Not only is the location of the laboratory important it is the ability to setup the facility to be able to manufacture the anthrax. The laboratory equipment that will be used to weaponize anthrax is also an important consideration. Once the facility has been setup with the laboratory equipment it is possible to start testing areas for anthrax spores that can be cultured and manufactured into spore form for effective dissemination.

4.2.1 Location

In Texas there are several counties where *B. anthracis* is naturally occurring in the soil, Crockett, Edwards, Kinney, Maverick and a few other counties.⁷⁶ Given that Texas is the second largest state in the U.S. there are many locations that are isolated from urban areas. Areas that are isolated tend to be for ranchers in the counties listed previously. Edwards's country where *B. anthracis* is naturally occurring constantly has land for sale by the acres for ranching and hunting purposes. These areas range from 0.55 acres to 2,000 acres. These areas provide sufficient acreage to construct a laboratory for the purpose of manufacturing anthrax. Economic feasibility is a factor that is considered in choosing the location. In Rocksprings, Texas, there is a location for the purposes of hunting that can easily fit a trailer or house turned laboratory. It is 36 acres for the price of \$49, 500.⁷⁷ This location is ideal for concealment and privacy in manufacturing

⁷⁶ Texas Department of State Health Services *FAQS: Anthrax*, accessed February 26, 2013, <http://www.dshs.state.tx.us/idcu/disease/anthrax/information/faqs/>

⁷⁷ Land of Texas.com *Land for Sale near Rocksprings, Texas – Edwards County*, accessed February 26, 2013, <http://www.landsoftexas.com/texas/land-for-sale/36-acres-in-Edwards-County-Texas/id/931420>

anthrax. On the premises there is already a small hunting cabin that can be used for residential purposes so as not to contaminate the spores. It is accessible by all-weather country road and 15 miles outside of the city of Rocksprings, Texas. The size and isolation that this location offers makes it an ideal area to sample soil for *B. anthracis* and cultivate anthrax spores.

Rocksprings, Texas is a total of 332 miles from Houston if driving I-10 W and 351 miles if driving TX-71 W and I-10 W. Laboratory equipment that is purchased by group members in Houston can easily be concealed in the bed of a truck or in the trunk of a car and driven to the location. This location also allows for easy access into Uvalde County, approximately a 1 hour and 10 minute drive, where a rare strain of *B. anthracis*, Ames strain, had been discovered.⁷⁸ Although it is highly unlikely to gather this strain while soil sampling there is still the possibility of obtaining this rare and fatal strain.

4.2.2 Facility Setup

The seclusion of the location chosen allows for the group to place a trailer within the 36 acres. This trailer would function as a laboratory for the purpose of manufacturing anthrax. Electricity is present in this location however the trailer will run off of generators that can be purchased online or at any home improvement store. Generators can cost anywhere from \$199.99 to \$4,497.00 depending on the model and the location in which it is purchased. Using a generator will insure that any samples that are frozen or inside the incubator will not be destroyed in the case of a power outage.

The ideal location for the laboratory would be in the kitchen portion of the trailer. The stove can be used in place of a Bunsen burner and the refrigerator can be used to store samples of

⁷⁸ National Review Council, *Scientific Approaches*, 43-44.

spores and bacteria not being used. The open area allows for movement and placement of laboratory equipment where needed. Air filtration is not a necessity since *B. anthracis* is not a communicable disease. However, to prevent infecting the laboratory worker sporicides can be purchased and used to sterilize the working area. To prevent inhalation once spore production has begun, the laboratory worker can easily purchase a gas mask or a simple dust mask and avoid touching mucosal surfaces with hands.⁷⁹ If, however, the need arises to put in a filtration system the most commonly used is the high – efficiency particulate air (HEPA) filter which can cost anywhere from \$48.55 to \$499.00 depending on the size and model.

4.2.3 Laboratory Equipment

Common laboratory equipment for any type of microbiology laboratory can be purchased online from retailers such as Amazon, eBay, and craigslist. This makes purchasing and setting up a laboratory relatively easy and at minimal cost. The total cost of equipment can have a wide range depending on the make, model and size of equipment purchased as well as the manufacturer it is purchased from (see Table 4.1).

⁷⁹ Occupational Safety & Health Administration, *Occupational Exposure to Anthrax: OSHA Frequently Asked Questions*, accessed March 17, 2013, <http://www.osha.gov/SLTC/bioterrorism/anthrax/>

Table 4.1: Laboratory Equipment and Prices

Equipment	Cost Range (lowest-highest)*
Autoclave	\$279.95 – \$1,479.95
Centrifuge	\$180.91 - \$813.45
Centrifuge Tubes	\$7.26 - \$186.62
Drying Oven	\$494.95 - \$1,828.35
Erlenmeyer Flask	\$3.00 - \$28.50
Gram Stain Kit	\$22.50 – \$61.45
Incubator	\$357.89 – 2,779.14
Inoculating Loop/ Needle	\$2.50 – \$44.00
Lyophilizer (dry freezer)**	\$675.00 - \$9,000.00
Micropipette	\$77.90 - \$149.99
Micropipette Tips	\$11.00 – \$13.79
Microscope	\$74.98 - \$194.99
Mortar and Pestle	\$3.56 - \$55.70
Motility Test Kit	\$22.90 – \$130.95
Petri Dish	\$7.50 - \$15.00
Sheep Blood Agar Petri Dishes (10/pk)	\$24.95 – \$28.94
Slides and Cover Slips	\$4.99 - \$13.70
Trypticase Soy Broth	\$9.00 - \$156.14
Total	\$2,260.74 – \$16,980.66

*Prices vary depending on company used and model purchased

**A Lyophilizer can be used in place of the drying oven or to store frozen samples of spores.

Another factor that affects the type of equipment and the cost is the method chosen for manufacturing anthrax. There are many different ways in which one can culture a *B. anthracis* strain into spore form. Methods can differ in use of agar or broth mediums – agars are solid forms of broth mixtures – and the type of agar/broth used. Turning *B. anthracis* into a powder form has just as many different methods as well. Common methods used are lyophilizers, spray dryers, sieves and mortar and pestle.⁸⁰ Each method chosen can lead to different equipment purchased and overall cost.

B. anthracis is a facultative anaerobic bacterium which means that it can be grown in the presence of oxygen or without oxygen. This allows for either the use of incubating in flasks that contain liquid media or the use of a fermenter respectively.

4.3 Acquisition of Biological Agent

B. anthracis can be harvested from the soil in areas where it naturally occurs. Other opportune areas to gather a sample are from dead livestock and animals in the area. The bacteria can be found on hides of animals, horns, hoofs, or other tissues from the carcasses of dead animals. Multiple samples will need to be gathered. For soil samples all that is needed is to gather soil from an area and place it in a container that can be taken back to the laboratory for testing. Steps for testing soil samples are common and regular in the laboratory and can be demonstrated with a simple flow diagram (see Figure 4.1).

⁸⁰ The FBI requested that the National Research Council (NRC) of the National Academy of Sciences (NAS) conduct a review of the scientific approaches used by the FBI in their investigation of the 2001 anthrax letters. The committee came up with 36 ways for preparation of anthrax spores that could have been used in the letters, National Research Council, *Review of the Scientific Approaches Used During the FBI's Investigation of the 2001 Anthrax Letters*. (Washington, D.C.: The National Academies Press, 2011): 78-79.

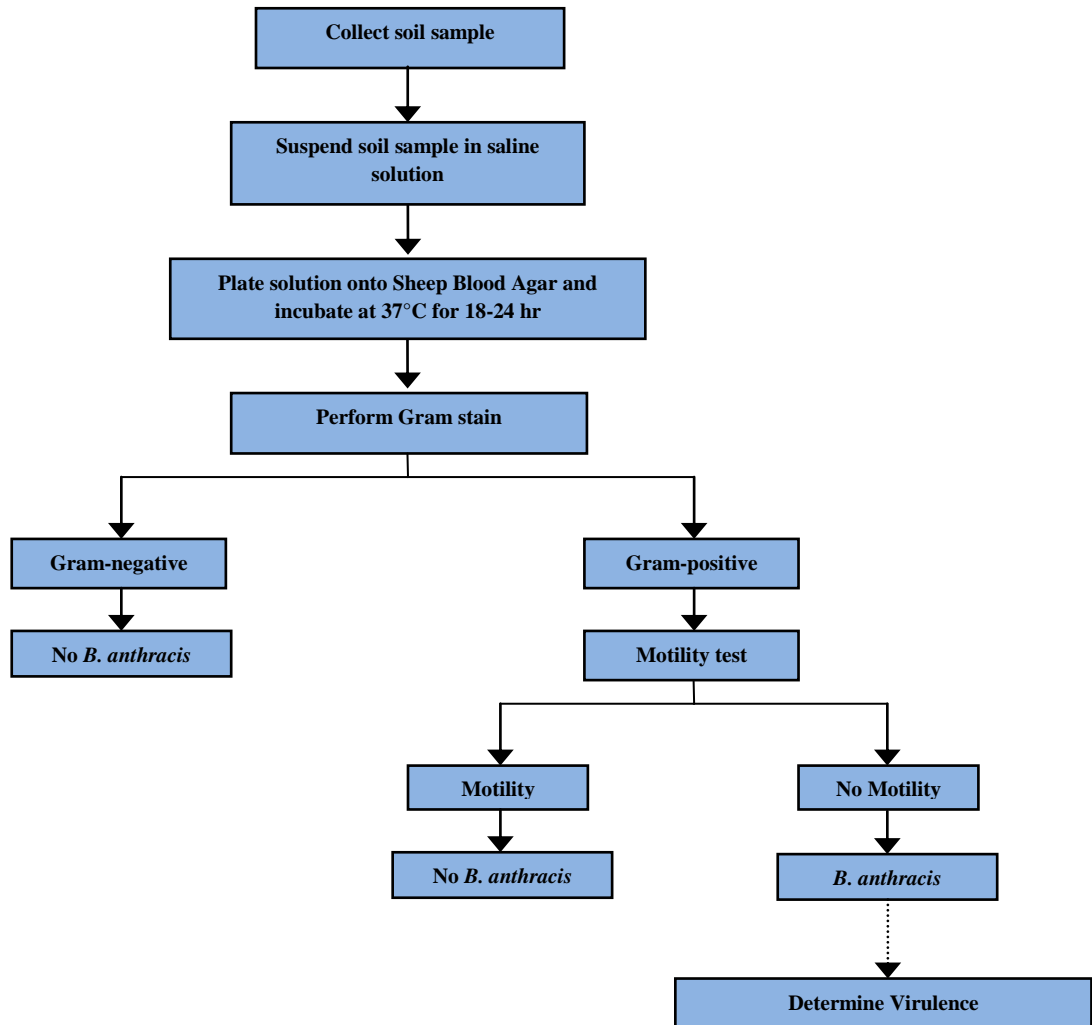


Figure 4.1: Flow Diagram for the Process of Isolating *B. anthracis* from Soil Samples

B. anthracis grows ideally on Sheep Blood Agar (SBA) that can be purchased commercially. When plated, bacteria will form colonies that are comma – shaped projections that produce the “Medusa head”, have a ground glass appearance, and tenacious consistency.⁸¹ To

⁸¹ Centers for Disease Control and Prevention, *Basic Laboratory Protocols for the Presumptive Identification of Bacillus anthracis*, 2001: 9 -10.

ensure the organism on the plate is *B. anthracis* a Gram stain is needed. *B. anthracis* is a gram positive rod shaped bacteria and will appear purple under a microscope.⁸²

Once the motility test has been administered and the organism is presumed to be *B. anthracis* it is possible to inoculate mice to determine if the strain is virulent (optional). The mice that die from inoculation carry the virulent strain and a blood smear can be conducted to obtain the strain. Once this strain has been obtained a culture of the strain can begin and be prepared for spore production.

4.4 Weaponizing *B. anthracis*

Weaponizing *B. anthracis* is not all together that hard to do. The issue becomes how to disseminate it correctly to have the greatest effect. This group plans to use anthrax in relatively small amounts and in an enclosed area. How to get started on weaponizing *B. anthracis* starts with a simple internet search (see appendix) most of the information to weaponize anthrax is just a click away. Sometimes the information is outdated but a little research can lead to the correct methods and answers.

Once *B. anthracis* has been isolated it can be inoculated into a Erlenmeyer flask with trypticase soy broth, shaken for 6hr at 37°C and then plated on nutrient media to form spores or it can be plated on SBA plates and wait until spore formation has occurred.⁸³ Continuous culture

⁸² A video of how to conduct a gram stain can be viewed on Youtube “Gram Stain Procedure,” Youtube video, 2:11, posted by “cegodsey,” January 6, 2007 http://www.youtube.com/watch?v=OQ6C-gj_UHM (accessed March 15, 2013). the procedure is outlined in Joanne M. Willey, Linda M. Sherwood, and Christopher J. Woolverton, “The Study of Microbial Structure: Microscopy and Specimen Preparation” In *Microbiology* 7th edition (New York: McGraw-Hill, 2008), 26-28.

⁸³ M. Carrera and Others, “Difference Between the Spore Sizes of *Bacillus anthracis* and other *Bacillus* Species” *Journal of Applied Microbiology* 102 (2007): 304-305; if left on SBA plates spore formation may or may not occur. It is best to use a nutrient broth or agar that facilitates spore formation, see Niall A. Logan and Peter C. B. Turnbull “*Bacillus* and Recently Derived Genera” In *Manual of Clinical Microbiology*, 7th edition, edited by Murray and

in a chemostat, Erlenmeyer flask while shaken, or fermenter can also be used to produce and maintain spores.⁸⁴ The method chosen by the author requires plating on SBA or on a nutrient rich agar to allow sporulation (growth of spores). This method is one of the cheapest and requires very little knowledge in chemical compounds if using SBA; however, the author suggests nutrient media for highest yield of spores and is depicted in the flow diagram (see Figure 4.2).

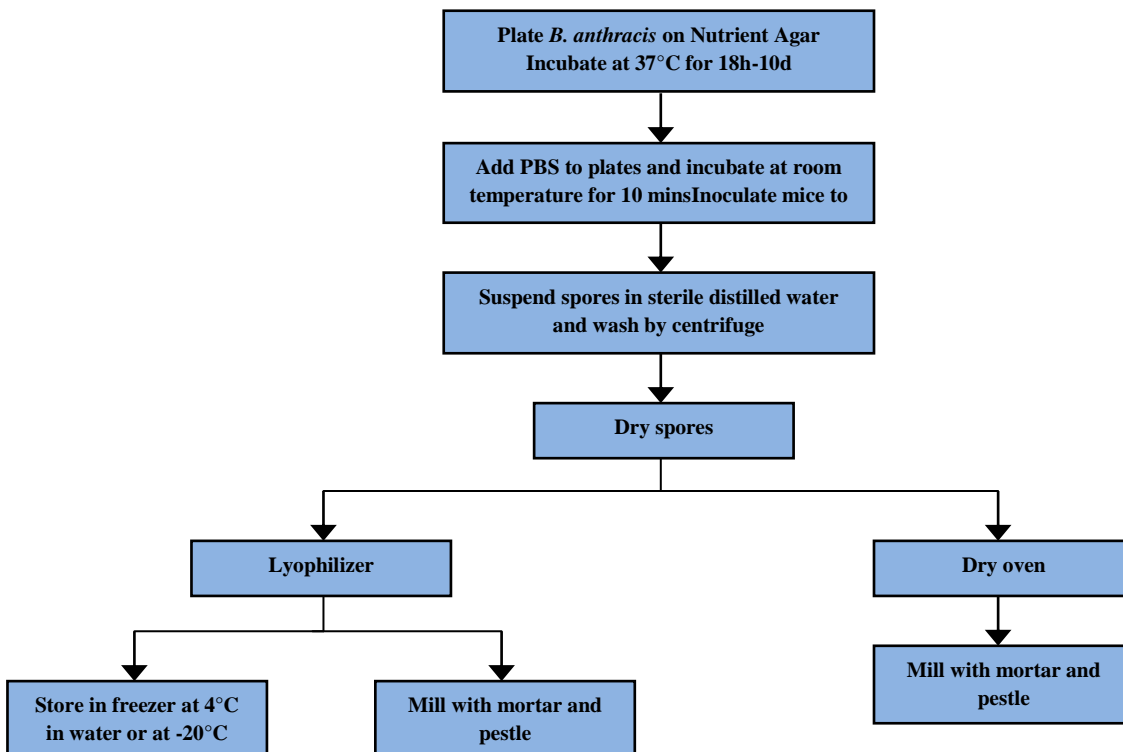


Figure 4.2: Flow Diagram for the Production of Anthrax Spores

Others (Washington D.C.: ASM Press, 1999), 357-360. Chemicals for nutrient broth can be obtained from any online store.

⁸⁴ A complete comprehensive manual to creating a chemostat can be used since purchasing one is very difficult, Maitreya Dunham, *Dunham Lab Chemostat Manual*, <http://dunham.gs.washington.edu/chemostat.html> (accessed March 29, 2013); this method can be used in conjunction with a paper written in 1970 that demonstrates continuous culture of *Bacillus subtilis* spores, I.W. Dawes and J. Mandelstam, "Sporulation of *Bacillus subtilis* in Continuous Culture" *Journal of Bacteriology* 103, no. 3 (1970): 530-531; Nutrient broth for *B. anthracis* spores can be prepared using the methods described in M. Carrera "Difference Between the Spore Sizes" 304-305.

To harvest spores add phosphate buffered saline (you can also use over the counter saline solution from a local drug store) and incubate for 10 min to allow easy removal of spores. Once spores have been washed in a centrifuge (at least three times) there are two methods to drying the spores. Using a lyophilizer is more complicated than a drying oven but it allows for freezing of the spores to be store for later use.⁸⁵ Once dried, spores can be turned to powder using a simple mortar and pestle. It is possible to add nanoparticle silica or bentonite to keep the spores suspended in air for longer durations however, this is not necessary to form the powder of spores.

4.5 Target Selection and Dissemination

Target selection was determined by the amount of damage that could be achieved in a given location. This was determined by the author to be in the categories of economic impact, panic, political statement, population at the location at any given time, security surrounding the area, and ease of access to the area (see Table 4.2). Each location that is chosen is given a number to the corresponding category to determine the best possible target. The target with the highest number is the one chosen for the attack.

⁸⁵ The complete process for freeze drying can be obtained at OPS Diagnostics “Bacteria Freeze Drying Protocol” <http://www.opsdiagnostics.com/notes/ranpri/rpbacteriafdprotocol.htm> (accessed March 15, 2013)

Table 4.2: Target selection matrix

	Economic Impact	Panic	Political Statement	Population	Security	Ease of Access	Total
Park	2	3	2	3	5	5	20
School	2	4	3	3	3	2	17
Hospital	5	5	5	4	4	4	27
Church	2	3	4	3	5	5	22
Super Market	4	3	3	3	5	5	23
Restaurant	2	3	2	3	3	5	18
Clinics	3	4	4	3	4	4	22
Entertainment Venue	5	5	5	5	4	4	28
Childrens Museum	2	4	3	3	4	5	21
Space Museum	2	3	3	3	3	4	18

In this case the entertainment venue and the hospital are the two targets that scored the highest with 28 and 27 respectively. In order to create the most effective attack that will generate the most fear it is decided by the author to use a cascade attack. The attacks will be times so that individuals are not infected at the same time.

Given that members of the group are from varying backgrounds and planning is for 3 years the hospital will be the first to be targeted to initiate fear. Antibiotics that are administered to patients will hamper the effects of the agent so it is decided that the new born nursery and the Neonatal Intensive Care Unit (NICU) will be the best targets. Infants that are not breast feeding or that are left in hospital care overnight receive a premeasured amount of formula in 59 ml

bottles that have to be discarded one hour after opening.⁸⁶ An aerosolized attack of anthrax is what is feared the most and sensors are being used to test the air to detect biological contaminants, however an attack using the ingested form of anthrax has not been prepared for in the literature.⁸⁷ Little is known about the effects of gastrointestinal anthrax (GI) due to the limited amount of cases that have been presented.⁸⁸

Hospitals that are contaminated with anthrax spores will have to be shut down and hospital business will be slowed while other hospitals will be overcrowded with patients from the contaminated hospitals. Fear will be instilled in the public about attending hospitals and possibly getting infected with anthrax.

While the hospitals are being shut down, a second attack will occur that will cause individuals to seek medical attention after a number of hospitals have been shut down. If the timing is correct than the hospitals and clinics that remain open will be overwhelmed with the amount of individuals that are seeking medical attention. A target that will be filled with enough people to infect to cause crowding in hospitals will be the entertainment venue. This venue will have a capacity of 18, 043. Having individuals on the security team for a specific event will allow access to the building and the opportunity to setup a system that can distribute the anthrax spores effectively. This will be done using a timed detonator attached to a small firework such as

⁸⁶ This information was confirmed by email correspondence with a lactation specialist at a Houston hospital that has a newborn nursery and NICU.

⁸⁷ Guidelines for inhalation anthrax and cutaneous anthrax are given by the CDC, Eric Jacob Stern and Others, "Conference Report on Public Health and Clinical Guideline for Anthrax," *Emerging Infectious Diseases* 14, no. 4 (2008) <http://wwwnc.cdc.gov/eid/article/14/4/07-0969.htm> (accessed March 16, 2013).

⁸⁸ Jeannette Guarner and Carlos del Rio, "Pathology, Diagnosis, and Treatment of Anthrax in Humans" In *Bacillus anthracis and Anthrax* Edited by Nicholas H. Bergman (Hoboken, NJ: John Wiley & Sons, Inc, 2011), 255-256, 263.

a pack of Black Cats.⁸⁹ Once the firework ignites if attached to a bag containing anthrax spores this will cause the spores to be released into the air during the event and will go unnoticed.

⁸⁹ Videos on the internet demonstrate how to create timed detonators to ignite different materials. This video clip explains how to create an electric timed detonator using household products, Phil Lonsdale, "How to How to Make a Timed Detonator for Lighting Fireworks Safely," Wonder How To. <http://explosives.wonderhowto.com/how-to/to-make-timed-detonator-for-lighting-fireworks-safely-425938/> (accessed March 18, 2013).

5. WHAT IF...

The Houston Chronicle on March 26, 2014 reported 23 “mysterious” infant deaths from three separate hospitals. Hospital officials when contacted stated that mother and infant had no adverse symptoms prior to release from the hospital. Hospital officials stated that in more than half the cases the mother and infant had been previously released shortly after giving birth. Mothers returned to the hospital with the infants within two to three days after release reporting symptoms of fever reaching 101°F, vomiting, and diarrhea. Infants were admitted into the Neonatal Intensive Care Unit (NICU) where shortly after, death resulted in all cases. Others cases showed that infants were just released from NICU, having been admitted for premature birth, and returned to their mothers for release from the hospital. These cases resulted in return to the hospital with in one to three days later. The same response was initiated with infants being admitted to NICU and death followed shortly. The mothers in all cases were unaffected. Hospital staffs at each facility have not yet determined the cause of the deaths but have stated they are investigating.

On March 27 the same hospitals where increases in infant deaths were reported released a statement to the Houston Chronicle and local news stations. Hospital officials reported an increase in deaths in patients receiving post-operation care and patients receiving care for terminal illnesses. In each of these cases a report was given of high fever around 102°F, nausea, bloody diarrhea, and vomiting. Patients were already receiving antibiotics for each of their respective conditions. Hospital officials stated they are looking into the cause of the deaths but no conclusions could be given at this time.

Later that day on a local new station the lead anchor made a comment of a possible new type of hospital acquired infection. The news anchor used the words “new superbug” that was

able to resist the antibiotics patients were already receiving in the hospital. This sparked wide spread speculation on the internet on social media forums. Comments were being left on social media sites scrutinizing the three hospitals where the infant deaths were first reported and criticism of hospital leaders to correctly identify the cause of death.

At this time hospital representatives from each hospital where the deaths are occurring have agreed to meet to discuss the possible causes of death. Acting board members from each hospital in the areas of malpractice, public relations, and epidemiology discuss the possible causes of deaths in each patient. The representatives from the hospitals realize that most patients from the post-operations (post – op) had been released one to two days prior to the infants and returned with similar symptoms. In each case when the patient returned death resulted in 24 – 48 hours. Persons that were in contact with the deceased did not show the same symptoms and a communicable disease is ruled out as a possible cause of death. Each individual verified that samples of blood had been sent for testing and agree to contact other hospitals to investigate similar cases. In total for all three hospitals a report of 26 infant deaths, 12 post-op patient deaths, and 16 terminally ill patient deaths is recorded. This brought the total of deaths to 54 persons by unknown causes. An attempt to contact patients who were released from the hospital following post-op care was agreed to take place the following day for all three hospitals.

The decision to contact the Health Authority (HA) and the Houston Department of Health and Human Services (HDHHS) to coordinate contacting patients was made during this meeting. Results from the laboratory reports and autopsies would be given to the HDHHS to determine the correct response and provide health risk communication services if needed. Investigation of patient history and contacts would be conducted by the HDHHS in an attempt to determine the

source of the infections that led to deaths of 54 patients. The mayor was contacted to inform him of the situation so there would be no surprises if he was watching the news.

On March 28 members of the HDHHS attempt to contact previous patients who were released after post – op care from the three hospitals and other hospitals in the region. From those who were able to be contacted there were a total of eight patients who experienced similar symptoms to those described, however symptoms were mild and seemed to subside after two to three days. Three other patients reported no symptoms and two patients were reported dead who did experience the same symptoms; however they did not seek medical attention. No patients from other hospitals are experiencing the same symptoms and causes of death. Results from the laboratory were inconclusive and further testing was being conducted. Autopsy results were not yet received from infant or post – op patients.

At 9:08 A.M. on March 28 two local news stations receive letters addressed from local schools in the area. Upon opening the letters addressed to the stations a white powdery substance is released from the envelopes. The FBI is immediately contacted following the incident. The contents of the first letter state:

I HAVE THE ANTHRAX
YOU NEED TO TAKE PENICILLIN
BE PREPARED TO DIE
DEATH TO IMMIGRANTS
DEATH TO THE INFERIOR RACE

The contents of the second letter state:

YOU WILL DIE
TAKE YOUR MEDICATION

THOSE WHO DON'T DESERVE WILL DIE

DEATH TO IMMIGRANTS

DEATH TO THE INFERIOR RACE

While the FBI is being contacted by the local news stations regarding the suspicious envelopes, personnel from the hospital who had previously called in sick have shown up to the hospital with symptoms of fever above 101°F, muscle aches, sore throat, and breathing problems. They are prescribed broad spectrum antibiotics and sent home. The symptoms staffs are reporting do not match symptoms in the cases that resulted in death from unknown causes and only the FBI at the moment are aware of the anthrax letters sent to the news stations.

Laboratory results from post – op patients and infants show an organism that is non – motile, a gram – positive rod, and when grown on sheep blood agar present as flat ground glass non hemolytic colonies. Samples of the blood from patients are then sent to the local Laboratory Response Network (LRN) for further testing to determine the organism. Suspicions begin to form of a possible anthrax attack on the hospitals however; this is not reported to any media outlets for fear of creating panic in the city of Houston.

Autopsy reports of infants and the post – op patients show hemorrhagic ulcers in the ileum and cecum of the gastrointestinal tract (GI) and are determined to be the site of entry for the organism. Lesions along the GI tract in the jejunum, duodenum and esophagus are reported in infants and post – op patients. Upon further examination under the microscope, ulcers show extensive acute hemorrhage, edema, and necrosis. Samples from lymphatic vessels were sent to the local LRN for further testing following the previous findings in the local laboratories of the hospitals. In some of the infants and post – op patients there was pleural effusions and edema and hemorrhage of mediastinal lymph nodes. Samples were taken from the lymph nodes and sent to

the LRN for further testing. Autopsy results from the terminally ill patients were given further investigation to eliminate their illness as a possible cause of death. However, results from these patients show similar findings to those obtained in infants and post – op patients.

The FBI and local law enforcement are contacted about the incident at the hospitals and given the details of the laboratory findings and the patient information. The investigation conducted by the HDHHS has determined that the only hospitals that are affected by this incident are the three hospitals where the “mysterious” deaths were first reported. This together with the letters sent to the local news stations leads to the possibility of a bioterrorist attack. Knowing the possible agent in the letters the FBI conducts a field anthrax test on the letters and it appears negative. Samples are being tested at the LRN. One lab worker comments that the white powdery substance has the consistency of baby powder and smells like it too. Upon further testing his statements are true. However, testing continues to determine if there is any trace of residue mixed in with the baby powder.

FBI begins to investigate the connection between the letters and the hospital incidents. The letters seem to be referring to an attack against different ethnicities notably “immigrants” and the “inferior race”. The FBI investigates the deaths that occurred at the hospital and find a link to the letters. In all of the deaths the individuals are of a minority ethnicity. Not one case is anything but an ethnicity that is a minority. However, with this new information the FBI requests that hospitals be tested with a field kit to determine if the anthrax was released in the hospitals or outside of the hospital.

At this time a leak from the media about the letters is sent to the local news stations. The incident is not being reported on national new stations and informs the public that there was “anthrax sent to local news stations in Houston, Texas that appear to have the same style of

writing as the letters that were first mailed 2001” the news anchor then gives a synopsis of the 2001 anthrax letters case that occurred over 10 years previous. As a response to this statement social media forums are flooding news station sites with comments about a possibility of the FBI not having solved the case and the perpetrator is still at large and now attacking Houston.

Local news stations in Houston comment on the letters and report that field tests provided a negative for anthrax. News anchors attempt to dispel the false information about the comments surrounding the FBI not having “caught” the right individual that mailed the letters in 2001. A special report is given on the hospitals status of the causes of death that were first reported on March 26. Information about anthrax being the cause is not yet released so as not to fear the public of the situation if it is not anthrax. Local news anchors state that until further information is given to them regarding the situation individuals should not be afraid to attend hospitals. Those affected were infants and individuals who were immuno – compromised who could have suffered some type of complication.

During this statement FBI personnel are conducting anthrax field tests at each of the hospitals reported. The field tests are showing positive for traces of anthrax in newborn nurseries, NICU, patients’ rooms from the post – op patients and terminally ill patients. Other areas of the hospital are being tested for traces of anthrax to determine the scope of contamination. The FBI requests a team enter each hospital to gather evidence in the rooms with anthrax testing positive and send any samples to the CDC.

The HA is contacted by the FBI to determine the situation. HA officials determine that since anthrax is not communicable patients from the hospital can be sent to other hospitals to continue their treatment. The order to evacuate hospitals is given immediately and patients are being sent to facilities that can care for each patients need. Hospitals in the surrounding area that

have not been contaminated are preparing to receive patients that are coming in. HA officials order that individuals in the hospitals that were contaminated need to receive antibiotics, specifically ciproflaxin for those that were in the areas that tested positive for anthrax.

Family members of those who are being treated in the hospitals with anthrax contamination are being notified by hospital staff and HDHHS personnel. Family members are notified of the hospitals that the patients will be taken to and to remain calm; patients will be receiving antibiotics and will be monitored for symptoms similar to those in previous patients.

The Mayor is contacted at this time and made aware of the situation and has appointed a Public Information Officer (PIO). Officials from HA and HDHHS believe there is enough antibiotics to give to all those in the affected area and determine there is no need to reach out for sources from surrounding areas. The Catastrophic Medical Operations Center (CMOC) is contacted by the HA to assist with medical resources if need be. For the time being the HA determines that the National Incident Management System (NIMS) needs to be used to coordinate the situation effectively and keep communications open between the agencies involved. The PIO is contacted by the Incident Commander (IC) to provide a message to the public to make them aware of the situation and the Office of Emergency Management (OEM) begins oversight of the situation for public information. FBI has informed all agencies involved that they will be treating this situation as an act of terrorism and will act accordingly.

At this time the PIO has readied a statement to provide to the public. The broadcast is given locally and information about the broadcast is given to national news media outlets. The PIO states:

“Please pay close attention. This is an urgent health message from the Houston Department of Health and Human Services. Spores that cause anthrax disease have been verified in the deaths of 56 persons from three separate hospitals. At this time we do not

know the extent or the source site for the release of anthrax. We are investigating currently to determine where the deceased individuals came into contact with the spores. Currently local law enforcement, the FBI and HDHHS are working together to determine the cause. Updated announcements will be made as soon as these officials know more. Anthrax disease is not communicable so it cannot be transferred from person to person. There is no need to worry about contracting anthrax if you have not been in any of the three hospitals where the incidents occurred. Based on what we know if you were in any of the three hospitals from March 19 until recently specifically in the newborn nursery, post – op wing, or wound care and are experiencing symptoms of abdominal pain, nausea, diarrhea, vomiting please seek medical attention. Anthrax is treatable with antibiotics. It is important that you follow instructions of health officials so you can protect yourself, your family and your community and stay informed.”

Laboratory results coupled with the autopsies indicate that the deaths were due to *Bacillus anthracis* bacteria infection of the gastrointestinal tract. This indicates that at some point in time the deceased consumed a substance that was contaminated with anthrax spores.

On March 29 a letter is sent to the local FBI office. The letter is addressed to the FBI spokesperson that recently appeared in a news cast and the return address is from a local school in the area. The letter is sent to the LRN and preliminary tests show there are no anthrax spores on the letter or in the white powder that is released when opened. The white powder is thought to be baby powder like the previous letters. The contents of the letter state:

YOU ARE WRONG
TAKE YOUR PENICILLIN
MORE WILL COME
DEATH TO IMMIGRANTS
DEATH TO THE INFERIOR RACE

FBI personnel believe that the two incidents are now related. The FBI is asking news anchors in the local area to broadcast if anyone has seen any suspicious activity at the hospitals or if they notice any other suspicious behavior.

Staff personnel from the hospital that had previously called in sick are now showing up at the available hospitals with symptoms that are similar to the flu. Hospital nurses fear the symptoms are a result of anthrax due to inhalation. The staff personnel are asked to remain in the hospital to receive treatment and allow the FBI to take their statements. Staff personnel are from the floors that contain the newborn nursery, NICU, and post – op patients. Each staff member recalls a nurse always attending the infants and believes it was the infants that had died. Some staff members stated this particular nurse would converse with a Certified Nurse Aid (CNA) that was seen cleaning the rooms of some of the patients that had died. She was also seen standing on a chair and messing with the vents in areas of the hospital with a can of compressed air.

While the FBI attempt to locate the nurse and CNA they notice the amount of persons in the emergency room coughing and complaining of chest pains. A nurse is stopped to ask if the increase of patients is due to individuals who believe they are infected with anthrax or if these individuals are actually sick. The nurse is unsure since she just started her shift and attempts to find a nurse or staff personnel who have been working. One of the persons who appear to be ill is approached by the FBI and asked where they have been the past two weeks. The individual states that they have only been to school and to a concert event that just played at one of the venues in Houston. When questioned further the FBI agent finds out the concert took place on March 24th and 25th. The FBI agent takes note that the performer at the venue was of an ethnic minority.

Clinics and pharmacies start to notice an increase in the amount of persons entering that show symptoms similar to a cold or the flu. Pharmacy/drug stores are selling an increased

amount of over the counter medication for cold symptoms. In one clinic two patients passed out from fever in the waiting room and died within a matter of hours afterwards. Blood samples from these two individuals are sent to the LRN to determine if anthrax was the cause of death.

FBI personnel notify the HDHHS and OEM of a possible aerosol attack of anthrax on a specific entertainment venue. One of the staff persons from HDHHS ask the question that is on everyone's mind; why wasn't it picked up by the BioWatch sensors? There is no answer to this question but the FBI feel the only thing they can do now is to work on getting as many people as they can to a hospital for treatment. HDHHS has contacted the Department of State Health Services (DSHS) to coordinate with the Governor's Division of Emergency Management (GDEM) of a possible request for Strategic National Stockpile (SNS) materials if there was indeed a release of anthrax at the entertainment venue.

FBI personnel conduct a search of the entertainment venue and determine with preliminary field test kits that there are anthrax spores in the area. The Mayor is notified of the situation and asked to approve a media message that the POI can release to the public with an update of events. The entertainment venue is then evacuated of the staff currently working, there is no event taking place this day.

Hospitals that have not been shut down are now becoming overcrowded in the emergency room (ER) with patients complaining of chest pains and difficulty breathing along with fatigue and headaches. It is becoming chaos in the ER and some of the patients are becoming violent in fear of being infected with anthrax. Patients are starting to shows signs of anxiety, and anger. Patients are requesting that they receive the anthrax vaccine and medication immediately without being seen by a doctor.

At this time in Austin and San Antonio patients are showing up in ER waiting rooms with symptoms similar to the flu. One patient has already died while waiting to be seen by a doctor in San Antonio and three more have died in Austin hospitals. For fear that their hospital has also been attacked with anthrax the lab immediately tests for anthrax. Causes for the four deaths are unknown but staffs at the hospital believe it to be anthrax.

The PIO in Houston is giving a statement that is being broadcast over national news channels regarding the incident that is taking place in Houston and to give an update regarding information of the entertainment venue:

“So far we have discovered that there may have been another release of anthrax at an entertainment venue in downtown Houston. This was an event that took place on March 24th and 25th this past week. We ask all who have attended this event to please seek medical attention if you are experiencing any of the following symptoms: fever above 100°F, coughing, shortness of breath, headache, muscle ache, fatigue, and chest pain. We ask that everybody remain calm and remember that anthrax is not a communicable disease if you did not attend the concert that took place on March 24th and 25th at this specific entertainment venue in downtown Houston then there is no need to worry. Please follow the instruction of your local health departments and we will get assistance to you as soon as we can. When we learn more information we will let you know.”

The FBI is investigating the entertainment venue and locates what appear to be crudely crafted bombs attached to the rafters of the entertainment venue roof. The bombs seem to be attached to cloth bags that have been torn apart likely due to the explosion. There appear to be six bags in total three on each side of the roof. Preliminary field test show it to be contaminated with anthrax. The cloth bags and bomb devices are sent to LRN to positively identify that anthrax spores were in the cloth bags.

Social media sites are flooded with comments from all over the U.S. criticizing the FBI for leaving out information regarding the letters that were sent to the media stations and that the FBI are trying to cover up that they did not actually “catch” the correct perpetrator during the 2001 anthrax letters. A great distrust is spreading across the internet in regards to the FBI. The protocol that was originally called into question during the investigation is being brought forth once again. Comments are being left stating that it took the FBI seven years to finally accuse and attempt to bring to trial the suspect but he was never actually convicted due to his untimely death.

Another press conference is held to refute the claims that the letters are mailed by the same individual as in 2001. FBI experts explain that the letters have a similar style to the original anthrax letters mailed out, however, there are no anthrax spores inside the letters and the letters contents differ from those originally mailed in 2001. The level of sophistication in regards to the code that was believed to be in the letters from 2001 are lacking in the letters that have been sent to the news stations. FBI experts believe the letters to be a hoax but are investigating the matter and believe the two incidents are somehow connected. The goals of the attacks differ from those in 2001.

DSHS contacts the CDC to request SNS assistance with antibiotics and anthrax vaccines for those infected in the cities of Austin, Houston, and San Antonio. The majority of individuals infected appear to be in the Houston area and deaths have increased in the hospitals treating the patients. Personnel from the hospitals that were originally the site of anthrax release have started to die. Two doctors who worked in pediatrics and one doctor who was a surgeon have died. Nurses from the hospitals have become ill and appear to be close to death, but the hospital is limited on space and is running out of antibiotics to distribute fast enough.

On March 30 push packs arrive from CDC undisclosed locations to Austin, Houston, and San Antonio. Texas Inventory Management System (TIMS) has setup points of distribution (POD) in each city. Death counts are 102 in Austin, 5,652 in Houston, and 72 in San Antonio. FBI and hospitals are expecting more deaths in Houston due to the capacity of the entertainment venue which is 18, 043. The event was held for two days with both days being sold out which leads to a potential of 36, 086 deaths.

FBI officials are notified that another letter has been sent to a local new station. This letter was dropped off at the reception desk and not sent through the mail system. The letter is sent to LRN for testing. Preliminary test identify anthrax spores outside the envelope. The contents of the letter state:

YOU LOSE YOUR TOO LATE

YOU THOUGHT YOU HAD ME

TAKE MORE MEDICATION

THIS IS THE END

IMMIGRATION REFORM SHOULD NOT HAPPEN

DEATH TO IMMIGRANTS

DEATH TO THE INFERIOR RACE

Results from LRN show that the anthrax spores from the hospitals and entertainment venue are from the *B. anthracis* Ames strain. There appear to be no nanoparticle silica or bentonite around the capsule. There are contaminants mixed in with the spores and may be the reason the death count is not as high as expected for the amount of persons who were potentially exposed during the concert.

Another press conference is setup by the POI to notify the public of the string of letters that have been sent to local media and the one sent to the FBI local field office. This conference is also used to direct individuals to the locations of distribution to receive a 10 day pill pack and be informed of the need to take antibiotics for up 60 days.

Social media networks are being populated with comments on individuals not wanting to take the antibiotics that are being distributed. Distrust has run wild from comments posted on the social media sites. The rumors of the attack being conducted by the same individual as the 2001 attacks are still being discussed. A fear of hospitals has also started and there are comments being posted that the antibiotics are contaminated with anthrax spores. Rumors are being spread on the internet that hospitals initially attacked started with contamination of antibiotics. Public distrust of the government has grown out of control. There is also criticism of why the BioWatch sensors did not pick up on the biological agent when it had been activated for tularemia in previous years.

A special news report is given by the POI to address the rumors that have started over the internet that are keeping individuals from receiving antibiotics from the designated areas:

“Please pay close attention. The FBI has concluded that the hospitals attacks were conducted by two staff members at each hospital. It is believed that nurses who has access to the newborn nursery and the NICU were contaminating infants’ formula with spores of anthrax that resulted in death by gastrointestinal anthrax. One staff member used a can of compressed air to disperse anthrax spores from a container into ventilation shafts and in rooms of post-op and terminally ill patients. This terrorist group is more than 10 members large and used jobs in the locations affected to disperse the anthrax. We ask that anyone who notices suspicious activity from employees please report them to the FBI. We believe these individuals worked through a temporary employment agency to enter the hospitals and on a local security crew for the event at the entertainment venue.

This group is ethnically motivated so please report any suspicious behavior in regards to ethnic discrimination that seems out of the ordinary.

We ask that all individuals understand that dispersal of antibiotics is to assist in limiting the amount of deaths of persons potentially infected with anthrax. If you were at the entertainment venue on March 24th and 25th please report to the nearest distribution center to receive antibiotics. Once we have more information we will give another update.”

In the aftermath of the event the FBI continues to investigate to determine the individuals responsible for the attacks. So far they have identified two of the nurses who were implicated in the attacks. These two nurses have died from inhalation anthrax. The CNAs who were reported to have been the individuals to release anthrax in an aerosol form in the hospital have yet to be identified. The FBI have determined that the entertainment venue security was infiltrated by a member of the domestic terrorist group and that is how they were able to move freely inside the building and setup the timed bombs (Black Cats) that released anthrax from their containers.

Public distrust for government agencies has increased due to the nature of the letters and fear perpetrated through social media. The reported deaths in each city after four days are 123 in Austin, 11,786 in Houston, and 89 in San Antonio, a total of 11, 998. This amount does not reflect surrounding areas such as College Station, Huntsville, and Corpus Christi where individuals might have traveled to see the two day event at the entertainment venue. Distribution of antibiotics continues and persons in the area of Houston have now become fearful of hospitals. The incident is now over no other letters are received and no other releases of anthrax are reported.

A public survey is given some months after the incident in Houston. Public distrust of government agencies have increased. More than half of those surveyed have no faith in the BioWatch sensor system and believe governments spending in those programs are useless. The

survey also uncovers that at least 2,000 persons who died due to anthrax did not seek medical attention for fear of hospitals and interacting with government agencies.

6. DISCUSSION

The above scenario is one of many possible outcomes using biological agents as weapons. This scenario focused on the copycat phenomenon that was explained in the literature review and the fear it can perpetuate through the media. Not only does this scenario challenge the assumption that terrorists do not have the capability to disseminate a biological weapon it challenges the assumption that an aerosol attack will be used. Not all terrorist attacks will utilize the most popular method of dissemination that is expected. Inhalation of any biological agent is the ideal way to cause the most casualties however, utilizing a less “popular” form of dissemination led to less chances of being detected as seen in the scenario. Furthermore, the cascade effect of attacking targets in a coordinated timed manner led to health officials being overwhelmed and to a potential loss of over 36, 000 lives.

Indicators for this specific case are many, some are obvious and some are not so obvious (see table 8.1). Because this event occurred in more than one location with time between each attack, there are indicators for before the initial hospital attack and for the duration of the attack. This means that from the time of the first deaths of infants being reported this is around the time that the concert event would have taken place.

Table 8.1: What If? Analysis Indicators

Before
<ul style="list-style-type: none"> • Frequency of meetings increase with known ethnically discriminative individuals • Number of individuals attending meetings has increased • Known members of ethnically discriminative groups purchasing houses/land outside of actual living area • Known members taking medical related jobs with temporary agencies (traveling nurse) • Known member of group leaving permanent residence not business related for long periods of time before returning • Two or more group members applying to the same job when they both don't work in the same field. • Attendance at DIYbio laboratories • Purchase of laboratory equipment by more than one member • Communication between members becomes erratic or ceases • Group members apply to jobs in local security fields for the first time • Purchase of fireworks out of season • Internet searches for remote activated/timed bombs • Internet search for <i>Bacillus anthracis</i> information • Library records of books containing information on culturing <i>Bacillus</i> species • Access to social media forums containing information about bomb making or bacteria growth • Internet searches for concert events targeted towards a specific ethnicity • Strong public opposition to a certain policy
During
<ul style="list-style-type: none"> • Anthrax identified but not inhalation type of symptoms • Victims of first attack are infants • Appearance of persons of a specific ethnicity seeking emergency care more often than usual • Increased number of deaths due to unknown causes • Initial wave of victims is small, large group of victims may follow • Receiving packages that resemble past terrorist attacks • Large event is happening concurrently or within a week of first reported incidents • Social media sites that have conspiracy language appear more often • First attack was in an area where antibiotics could be easily administered to infected individuals • Suspected person visiting social media sites for the purpose of perpetuating fear • Attack of first responders

Indicators for before the incident are what would be expected, increased searches into biological weapons specifically *B. anthracis*, increased meetings of known extremist groups, and increased searches for purchasing laboratory equipment. This last one is now becoming an issue as can be seen with the literature review on biohackers. If someone is purchasing laboratory equipment for their own pursuit of knowledge how do you determine they are not creating a biological weapon. Most important is to look at the indicators together as a whole rather than separate. If an extremist group such as the one described in the scenario have increased meetings and each member is buying laboratory equipment separately, this might be an indication that a laboratory is being setup for the purposes of weaponizing a biological agent.

The “during” indicators have two that are particularly important. The first is one that challenges the key assumption that terrorist groups generally do not attack children, especially infants, directly.⁹⁰ They can be part of a group that is targeted and subsequently get killed however it is more likely in the U.S that children are killed through criminal acts not terrorist acts.⁹¹ In this scenario the first victims to fall to this terrorist attack are infants in the newborn nursery and NICU. From the perspective of the terrorist group this is logical.

According to the Amendment XIV Section 1:

“All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside...nor shall any State deprive any person of life, liberty, or property, without due process of law...”⁹²

⁹⁰ A compiled list of attacks from all over the world against children has been compiled by Robert Johnston. *Terrorist and Criminal Attacks Targeting Children*. <http://www.johnstonsarchive.net/terrorism/wrjp39ch.html>

⁹¹ There is no definitive information on this topic. Looking at the database of attacks on children provided by Robert Johnson and the websites from the Israel Ministry of Foreign Affairs, U.S. Department of Veteran Affairs, and the American Academy of Pediatrics children are either used by foreign terrorist groups for suicide bombing, or in regards to the U.S. are victims of mass group targeting and not the specific target. Most literature is aimed at treating children with PTSD after a terrorist attack.

⁹² U.S. Const. Amendment XIV Sec 1. <http://memory.loc.gov/cgi-bin/ampage?collId=llsl&fileName=014/llsl014.db&recNum=389> (accessed February 08, 2013).

In the section defining the terrorist ideology they are initiating an ethnic cleansing. In their eyes children of specific ethnicities born on U.S. soil to immigrant parents do not deserve to live in the U.S. This is an extremist view that is present in domestic terrorist groups. This group is conducting ethnic cleansing in hopes of changing immigration reform to the removal of undocumented immigrants.

The second “during” indicator is in regards to first responders. The first responders on the scene for this attack were the doctors that were treating the patients, mainly infants that were infected with anthrax. Although the attack was not initially against the doctors and staff, the attempt to aerosolize the spores by the CNA subsequently led to hospital staff becoming ill. As a result in the scenario two pediatricians were killed along with several nurses. This affects the hospital's ability to have enough staff to treat individuals that would be coming in as a result of the second attack.

With all of these indicators together there are some recommendations that can be made to assist in mitigating such an attack, or simply responding more efficiently if it occurs. There is no way to limit access to literature that can be used to weaponize anthrax. As was demonstrated by the author you can find just about anything on the internet and you can validate it once you know what to look for. Instructions to weaponize anthrax given by eHow (see appendix) are incorrect in some areas. It states that some chemicals are kept secret for a reason; however the chemicals that are used to make anthrax spores stay suspended in air longer are in scientific papers if you know what to look for.

One recommendation that can be made was first presented by the Committee on Prepositioned Medical Countermeasures and that is to integrate ethical principles and public

engagement into the development of prepositioning strategies.⁹³ The way the author interprets this in regards to this scenario is that the more the public knows about the availability of antibiotics during a bioterrorism event the more likely they will understand and not be fearful to receive antibiotics. In the case of this scenario individuals were afraid to get the antibiotics because the only news they heard was that three hospitals had been shut down due to anthrax contamination. There may have been some confusion about the entire event and persons may have thought that antibiotics were not working. Educating people in the areas of antibiotics and biological agents and actions that can be taken for a biological agent would assist in alleviating some of the fear brought on in an attack.

Another program that has already been advocated for and needs to be further strengthened is the Hospital Preparedness Program (HPP) which deals with enhancing medical surge capacity.⁹⁴ In this scenario three hospitals were shut down due to contamination of anthrax at an unknown source. Even though anthrax is not communicable if the source is unknown the hospital had to be shut down. With an increase in medical surge capacity the surrounding hospitals would be able to handle the influx of patients and better handle the second wave of patients from the second attack. Another point that is brought forth in this same committee hearing is the fact that even if you have enough space there are not enough personnel to respond.

⁹³ Institute of Medicine, *Prepositioning Antibiotics*, 18

⁹⁴ Gregg A. Pane, *Is the Medical Community Ready if Disaster or Terrorism Strikes: Closing the Gap in Medical Surge Capacity*, Statement before the Subcommittee on Management Investigations and Oversight, House of Representatives, January 25, 2010

7. Conclusion

The aim of this thesis was to design a scenario of a domestic bioterrorist attack using only knowledge from internet sites, scientific journals, and academic journals. The level of knowledge that one needs to conduct the experiments is at best high school level and intent. The processes for each step in manufacturing anthrax are outlined in the literature available to the public. The flow diagrams presented in this thesis are common ones that are used in microbiology laboratories to conduct experiments. This does not mean that these experiments can be achieved the first time. It may take multiple attempts to obtain a virulent strain of *B. anthracis*; however a terrorist group only needs to get it right once.

7.1 Implications

This thesis focused specifically on the production of anthrax spores and the process to weaponize them. This process can be extended to many other biological agents. If an individual is able to obtain a strain from any bacteria that is classified as a Category A agent all they have to do is look into the scientific literature to determine how to weaponize it. The process may be different in regards to methods of culturing (anaerobic or aerobic bacteria) and media preparation but the principle is the same in regards to looking in the literature to find what is needed.

With the advance of technology the price for constructing a laboratory is becoming cheaper and if the individual possess an inclination for scientific processes they may be able to substitute certain chemicals and equipment for less high profile items. With the availability of DIYbio groups this gap is closing even more. Science is becoming easier to replicate and this includes weaponizing biological agents.

7.2 Limitations

One of the limitations of this study was the inability to be as detailed as the author wanted in the design of the scenario. Due to much of the processes of response to bioterrorist attacks being classified the response in the scenario may not be as close to how responders would act in real-life situations. The literature surrounding terrorist attacks is aimed at responding to a mass casualty attack and not to a cascade type of attack.

Another limitation is the inability to test the scenario in regards to the science behind it. The author understands that the scientific process are in the literature but the number of trials it takes to effectively carry out these methods may be hindrance to terrorist groups. As was the case with Aum Shinrikyo who could not effectively disseminate anthrax and botulinum toxin a domestic terrorist group may move on to a different method to achieve political influence.

REFERENCES

- 107th US Congress Public Health Security and Bioterrorism Preparedness and Response Act of 2002, PL 107-188, June 12, 2002
- 107th US Congress Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA PATRIOT) Act of 2001, PL 107-56. October 26, 2001
- Alper, Joe, "Biotech in the Basement" *Nature Biotechnology* 27, no. 12 (2009): 1077. doi:10.1038/nbt1209-1077 (accessed January 16, 2013).
- Anti-Defamation League . "Anthrax Hoaxes: 1998-1999"
<http://archive.adl.org/learn/anthrax/Hoaxes2.asp?xpicked=3&item=6> (accessed February 03, 2013).
- Bansak, Kirk. "Biodefense and Transparency." *The Nonproliferation Review* 18, no. 2 (2011): 349-368.
- Carrera, M. and Others, "Difference Between the Spore Sizes of *Bacillus anthracis* and other *Bacillus* Species" *Journal of Applied Microbiology* 102 (2007) doi: 10.1111/j.1365-2672.2006.03111.x (accesses April 04, 2013).
- Centers for Disease Control and Prevention, "The Laboratory Response Network Partners in Preparedness." 2005, <http://emergency.cdc.gov/lrn/> (accessed February 19, 2013).
- Centers for Disease Control and Prevention, *Basic Laboratory Protocols for the Presumptive Identification of Bacillus anthracis*, 2001: 9 -10.
- Cirincione, Joseph, Jon B Wolfsthal, and Miriam Rajkumar. *Deadly Aresenals: Nuclear , Biological, and Chemical Threats*. 2nd. Washington , D.C.: Carnegie Endowment for International Peace , 2005.
- CNN, "Undocumented Immigrants Line up for Relief from Deportation" August 17, 2012, <http://www.cnn.com/2012/08/15/us/immigration-deferred-deportation> (accessed January 20, 2013).
- Coleman, Loren "The Copycat Effect" adapted from *The Copycat Effect How the Media and Popular Culture Trigger Mayhem in Tomorrow's Headlines* (New York: Simon & Schuster, Inc, 2004): 1-12

- http://www.riskinstitute.org/peri/images/file/Coleman_Copycateffect.pdf (accessed February 19, 2013)
- Croddy, Eric, Clarisa Perez-Armendariz, and John Hart. *Chemical and Biological Warfare: A Comprehensive Survey for the Concerned Citizen*. New York, NY: Copernicus Books, 2002.
- Danzig, Richard, et al. *Aum Shinrikyo: Insights Into How Terrorists Develop Biological and Chemical Weapons*. Washington, DC: Center for a New American Security, 2011.
- Dawes, I.W. and J. Mandelstam, "Sporulation of *Bacillus subtilis* in Continuous Culture" *Journal of Bacteriology* 103, no. 3 (1970): 529-535
<http://jb.asm.org/content/103/3/529.full.pdf+html> (accessed March 16, 2013)
- Duncan, Annabelle, and Kenneth G Johnson. "Viewpoint: Strengthening the BWC: Lessons from the UNSCOM experience." *The Nonproliferation Review* 4, no. 2 (1997)
- Dunham, Maitreya, *Dunham Lab Chemostat Manual*,
<http://dunham.gs.washington.edu/chemostat.html> (accessed March 29, 2013)
- Farrel, Chris, "Obama's Next Act: Immigration Reform" *Bloomberg Businessweek*, December 13, 2012, <http://www.businessweek.com/articles/2012-12-13/obamas-next-act-immigration-reform> (accessed January 14, 2013)
- Flaherty, Joseph. "DIY Bioprinter Lets Wannabe Scientists Build Structures From Living Cells" *Wired*. <http://www.wired.com/design/2013/01/diy-bio-printer/> (accessed January 25, 2013).
- Government Accountability Office, "Biosurveillance: Observations on BioWatch Generation-3 and Other Federal Efforts." GAO-12-810. Washington, D.C., 2012.
- Grossman, Lawrence K. "The Story of a Truly Contaminated Election," *Columbia Journalism Review* (2001): 65 <http://encore.utep.edu:50080/ebsco-web/ehost/detail?sid=5517c92d-421c-40ed-9eee-66646e8bc833%40sessionmgr111&vid=1&hid=120&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=ufh&AN=3970003> (accessed February 24, 2013).
- Guarner, Jeannette and Carlos del Rio, "Pathology, Diagnosis, and Treatment of Anthrax in Humans" In *Bacillus anthracis and Anthrax* Edited by Nicholas H. Bergman, Hoboken, NJ: John Wiley & Sons, Inc, 2011

- Heurer Jr., Richards J, and Randolph H Pherson. *Structured Analytic Techniques For Intelligence Analysis* . Washington, DC: CQ Press , 2011.
- Inglesby, Thomas V. “Anthrax: A Possible Case History,” *Emerging and Infectious Diseases* 5, no.4 (1999): 556 – 560, http://wwwnc.cdc.gov/eid/article/5/4/99-0419_article.htm#suggestedcitation
- Institute of Medicine. *Prepositioning Antibiotics for Anthrax*. Washington, DC: The National Academic Press, 2012
- Johnston, Robert. *Terrorist and Criminal Attacks Targeting Children*.
<http://www.johnstonsarchive.net/terrorism/wrjp39ch.html> (accessed March 25, 2013)
- Kouzminov, Alexander. *Biological Espionage: Special Operations of the Soviet and Russian Foreign Intelligence*. Mechanicsburg, PA: Grennhill Books, 2005.
- Land of Texas.com *Land for Sale near Rocksprings, Texas – Edwards County*, accessed February 26, 2013, <http://www.landsoftexas.com/texas/land-for-sale/36-acres-in-Edwards-County-Texas/id/931420>
- Logan Niall A. and Peter C. B. Turnbull “*Bacillus* and Recently Derived Genera” In *Manual of Clinical Microbiology*, 7th edition, edited by Murray and Others (Washington D.C.: ASM Press, 1999), 357-360
- Lonsdale, Phil, “How to How to Make a Timed Detonator for Lighting Fireworks Safely, ”Wonder How To. <http://explosives.wonderhowto.com/how-to/to-make-timed-detonator-for-lighting-fireworks-safely-425938/> (accessed March 18, 2013).
- Mangold, Tom, and Jeff Goldberg. *Plague Wars: The Terrifying Reality of Biological Warfare*. New York, NY: St. Martin's Press, 1999.
- Meier, Oliver. "Verification of the Biological Weapons Convention: What is Needed." *Medicine, Conflict and Survival* 18, no. 2 (2002)
- Michalowski, Raymond “Ethnic Cleansing American Style: SB 1070, Nativism and the Contradiction of Neo-Liberal Globalization,” *Journal of Crime and Justice* (2012):1-23, doi:10.1080/0735648X.2012.752253 (accessed March 29, 2013).
- Miller, Judith, Stephen Engelberg and William J. Broad. "US Germ Warfare Research Pushes Treaty Limits." *The New York Times*. September 4, 2001.

www.nytimes.com/2001/09/04/world/us-germ-warfare-research-pushes-treaty-limits.html?

National Research Council, *Review of the Scientific Approaches Used During the FBI's Investigation of the 2001 Anthrax Letters*. Washington, D.C.: The National Academies Press, 2011

Northwest Public Health "An Act of Bioterrorism: Oregon, 1984" Spring/Summer 2010
<http://www.nwpublichealth.org/archives/s2010/an-act-of-bioterrorism-oregon-1984>
(accessed February 24, 2013)

Occupational Safety & Health Administration, *Occupational Exposure to Anthrax: OSHA Frequently Asked Questions*, accessed March 17, 2013,
<http://www.osha.gov/SLTC/bioterrorism/anthrax/>

OPS Diagnostics "Bacteria Freeze Drying Protocol"
<http://www.opsdiagnostics.com/notes/ranpri/rpbacteriafdprotocol.htm> (accessed March 15, 2013)

Pane Gregg A., *Is the Medical Community Ready if Disaster or Terrorism Strikes: Closing the Gap in Medical Surge Capacity*, Statement before the Subcommittee on Management Investigations and Oversight, House of Representatives, January 25, 2010

RAND Corporaton, "Domestic Terrorism" <http://www.rand.org/topics/domestic-terrorism.html>
(accessed February 12, 2013).

Rosenau, William. "Aum Shinrikyo's Biological Weapons Program: Why Did it Fail?" *Studies in Conflict & Terrorism* 24 (2001)

Salerno, Reynolds M, Jennifer Gaudio, Rebecca L Frerichs, and Daniel Estes. "A BW Risk Assessment: Historical and Technical Perspectives." *The Nonproliferation Review* 11, no. 3 (2004)

Sánchez-Cuenca, Ignacio and de la Calle, Luis. "Domestic Terrorism: The Hidden Side of Political Violence," *Annual Review of Political Science* 12 (2009): 31-49.

Special Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction," Final Report (Geneva, 19-30 September 1994), Document No. BWC/SPCONF/1, Part II, p.10.

- Stern, Eric J. and Others, "Conference Report on Public Health and Clinical Guideline for Anthrax," *Emerging Infectious Diseases* 14, no. 4 (2008)
<http://wwwnc.cdc.gov/eid/article/14/4/07-0969.htm> (accessed March 16, 2013).
- Stern, Jessica "The Prospect of Domestic Bioterrorism," *Emerging Infectious Diseases* 5, no. 4 (1999): 517-522 <http://ftp.cdc.gov/pub/EID/vol5no4/ascii/stern.txt> (accessed December 09, 2012).
- Stern, Jessica, "Larry Wayne Harris the Talkative Terrorist" In *Toxic Terror* Jonathan Tucker ed (Cambridge: MIT Press, 2000), 228
- Sutton, Victoria, *Law and Bioterrorism*. Durham, NC: Carolina Academic Press, 2003.
- Texas Department of State Health Services *FAQS: Anthrax*, accessed February 26, 2013,
<http://www.dshs.state.tx.us/idcu/disease/anthrax/information/faqs/>
- Tucker, Jonathan B, and Kathleen M Vogel. "Preventing the Proliferation of Chemical and Biological Weapon Materials and Know-How." *The Nonproliferation Review* 7, no. 1 (2000)
- Tucker, Jonathan B. "Biological Threat Assessment: Is the Cure Worse Than the Disease." Arms Control Association. October 2004. www.armscontrol.org, (accessed October 18, 2012)
- Tucker, Jonathan B., "Historical Trend Related to Bioterrorism: An Empirical Analysis" *Emerging and Infectious Diseases* 5, no. 4 (1999): 498-504 (accessed March 03, 2013).
- U.S. Census Bureau, *Race/Ethnicity: 1980-2010 City of Houston*, accessed March 14, 2013,
http://www.houstontx.gov/planning/Demographics/docs_pdfs/Cy/coh_race_ethn_1980-2010.pdf
- U.S. Const. Amendment XIV Sec 1. <http://memory.loc.gov/cgi-bin/ampage?collId=llsl&fileName=014/llsl014.db&recNum=389> (accessed February 08, 2013).
- U.S. Library of Congress, Congressional Research Service, *The BioWatch Program: Detection of Bioterrorism*, by Dana A Shea and Sarah A. Lister. CRS Report RL32152.
<http://www.fas.org/sgp/crs/terror/RL32152.html> (accessed February 12, 2013).

- United States Department of Justice, *Amerithrax Investigation Summary*, 2010
<http://www.justice.gov/amerithrax/docs/amx-investigative-summary.pdf> (accessed October 14, 2012)
- United States Department of Justice, *Justice Department and FBI Announce Formal Conclusion of Investigation into 2001 Anthrax Attacks*,
<http://www.justice.gov/opa/pr/2010/February/10-nsd-166.html> (accessed February 08, 2013)
- Willey, Joanne M., Sherwood, Linda M. and Christopher J. Woolverton, "The Study of Microbial Structure: Microscopy and Specimen Preparation" In *Microbiology* 7th edition, 17 – 38. New York: McGraw-Hill, 2008.
- William, David. "Early Warning on BioWatch." *Los Angeles Times*. September 23, 2012.
<http://articles.latimes.com/2012/sep/23/news/sc-dc-adv-biowatch-patents-20120823>
 (accessed September 29, 2012)
- William, David "The Biodefender That Cries Wolf" *Los Angeles Times*, July 08, 2012,
<http://articles.latimes.com/2012/jul/08/nation/la-na-biowatch-20120708/4> (accessed November 16, 2012)
- "BioWatch Contributors Pointed to Inaccurate Readings: Documents," NIT: Global Security Newswire. August 23, 2012. <http://www.nti.org/gsn/article/biowatch-designers-alerted-us-inaccurate-readings/>.
- "Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction" Final Declaration (Geneva, 3-21 March 1980), Document No. BWC/CONF.I/10
- "Research Information ." Boston University Medical Campus National Emerging Infectious Diseases Laboratories . October 2012. <http://www.bu.edu/neidl/research/> (accessed October 2012).
- "Crimes and Criminal Procedures" Title 18 *U.S. Code*, Sec. 2331. definitions. 2012. Available <http://uscode.house.gov/download/pls/18C113B.txt> (accessed February 18, 2013).
- "Gram Stain Procedure," Youtube video, 2:11, posted by "cegodsey," January 6, 2007 http://www.youtube.com/watch?v=OQ6C-gj_UHM, accessed March 15, 2013.

APPENDIX

How Is Anthrax Made? | eHow.com

How Is Anthrax Made?

By Andy Pasquesi, eHow Contributor

0

Other People Are Reading



[Why Do Hands Go Numb While Sleeping?](#)



[How to Prevent Anthrax Poisoning](#)

What Is Anthrax?

An ancient disease, anthrax is an umbrella term for the dozens of strains of the bacterium *Bacillus anthracis*. Devastating to livestock, anthrax cells kill host organisms by releasing two kinds of toxins. As the cells multiply in the system, the concentration of toxins increase to lethal levels.

The danger of anthrax (and the reason why the military and terrorists seek it as a biological weapon) is that it forms endospores - a tough structure that protects the cell while it enters a dormant, hibernation state. Endospores allow anthrax to survive in soil, fur, clothing or other inhospitable environments for several years. When the endospore enters a host, it "reactivates" and starts reproducing rapidly.

Anthrax can infect hosts by landing on the skin or ingestion. However, the deadliest form of infection occurs when the spores are inhaled.

Weaponizing Anthrax

The actual process for fabricating weapon-grade anthrax is classified (and for good reason). That said, the military scientists who create this biological weapon of mass destruction most likely use the same protocol medical scientists use to cultivate virulent anthrax spores for the purpose of testing the efficacy of anthrax vaccines. The difference, however, is that the military scientists induce endospore formation, dry the spores and combine them with chemical "stabilizers" that help the spores remain airborne longer.

Sponsored Links

[Online Gantt Chart](#)

Smartsheet® Makes it Easy. Nothing to Install. Try it Free!

www.smartsheet.com

Mass-Producing the Bacteria

Certain military biodefense laboratories (Fort Detrick, for example) store freeze-dried spores

of especially virulent anthrax strains, such as Ames and Vollum. To mass produce these spores, the freeze-dried spores are activated and cultured.

First, the freeze-dried spores are dissolved into 1 ml of saline solution, spread onto a nutrient agar petri dish and allowed to incubate at 37 [degrees](#) Celsius for 24 hours. The colonies that form are then transferred to their own nutrient agar petri dishes and allowed to incubate further.

Spore Formation

Once enough colonies have formed, the scientists must recreate the "environmental stresses" that cause the anthrax cells to grow the protective endospores. Because anthrax is an aerobic organism, the spore process begins by reducing the amount of oxygen in [the environment](#). The petri dishes are placed in a sealed chamber and carbon dioxide is pumped in until the gas constitutes 50 percent of the total air pressure. Meanwhile, the temperature inside the chamber is lowered to 20 degrees Celsius.

Purification

After between 24 and 48 hours, the colonies from the petri dishes are transferred to [saline solutions](#) with pH levels balanced to mimic that of a mammalian host. These solutions are loaded into a centrifuge, which helps separate the spores from less-dense contaminants. As each layer of contaminants is removed, more deionized water is added to the spores for subsequent rounds of centrifugal separation.

Drying

Once purified, special chemicals (largely classified) are added to the spore-water mixture. From what can be pieced together from news reports, silica seems to be one such chemical, although there might be others. This enriched mixture is turned into powder using a machine known as a spray dryer. In spray drying, a liquid is separated into thousands of microscopic droplets by passing through a high-precision atomizer. These droplets are sprayed directly into a heated chamber; the combination of heat, low humidity and large surface-area-to-volume ratio of the droplets causes the water to evaporate instantly. As a result, the silica and other special chemicals form a partial shell around the individual spores.

This shell helps prevent the spores from clumping together due to humidity. Less clumping means smaller particle sizes, which means that the weaponized spores will remain in the air longer and even bypass certain filter grades.

CURRICULUM VITA

Stacy M. Langston enrolled at Texas State University – San Marcos in January 2007.

Stacy graduated from Texas State University – San Marcos with a Bachelor of Science degree in Microbiology and a double minor in Chemistry and Psychology. In August 2011 she enrolled in the Intelligence and National Security Studies master's program at the University of Texas at El Paso. She was a selected participant in the National Security Analysis and Intelligence Summer Seminar in July 2012.

Permanent Address:

1716 Paul Moran Pl.
El Paso, TX 79936

This thesis was typed by Stacy M. Langston