

U.S. Bioterrorism Preparedness:
A Case Study of Minnesota, New York, and Texas

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Abstract

Much of the focus surrounding bioterrorism preparedness since 9/11 has been on federal response plans. This focus has resulted in a lack of studies in the literature which address the quality of individual state response plans. This paper is a first step in addressing that deficiency. Three states have been selected for case study analysis: Minnesota, Texas, and New York. Each state's response plans have been analyzed using a combination of qualitative criteria, adherence to a six-step continuum for establishing bioterrorism preparedness, and per-capita public health spending. Using these criteria for analysis, a few lessons have been learned. First, there is an issue of conflation between public health and bioterrorism preparedness. This overlap makes it difficult to identify the strengths and weaknesses of a state's bioterrorism response plan. Second, Minnesota's public health response plan, which contains as subset bioterrorism-specific incidents, has been found not to be as successful in meeting the analysis criteria as the response plans of New York and Texas. One suggestion for how Minnesota can improve its response plan for a bioterrorism event is to separate more clearly bioterrorism response aspects from the current public health framework.

Introduction and motivation

This paper examines current U.S. bioterrorism preparedness at the state level. Since the terrorist attacks of 9/11 and the following anthrax mailings, U.S. national security has been crystalized around the issue of biosecurity. Billions of dollars have been spent on bioterrorism research and preparedness since 2001. What has been accomplished in that time? More importantly, what strengths and deficiencies currently exist in U.S. biosecurity and preparedness plans? This paper addresses some of those questions by conducting a qualitative comparison of preparedness plans among three states: Minnesota, Texas, and New York. Research and funding at the national level has been analyzed and dissected, but there is a need to understand how different states are planning for an act of bioterrorism.

This is especially true given the significant role states play in responding to a disaster or health emergency.

In the event of a bioterrorism attack, the state's level of preparedness plays a significant role in how well the crisis is handled. After the initial local response, state agencies play key roles in responding to the crisis based on the state's documented crisis response plans. Federal agencies often act in support of state response plans, but only after states initiate their own responses; a public health crisis, which can be difficult to differentiate from a bioterrorism event, does not necessarily warrant federal response at all. Previous analysis of U.S. bioterrorism preparedness as a whole has tended to focus on the national level, but that focus has left a gap in the literature about state preparedness and response planning. If a state's response plan is found to be underdeveloped, the potential implications of an attack in that state could be significant regardless of the strengths of the federal plan.

Since the terrorist attacks on 9/11, there has been an increase in focus on U.S. bioterrorism preparedness. This focus, exacerbated by the anthrax mailings following 9/11, stems from concern that the United States as a whole has deficiencies in its bioterrorism preparedness plans. Immediately after 9/11, research into the state of bioterrorism response found "response efforts did not have the integrated communications and unified command needed for a large-scale response, and information crucial for decision making was not shared among agencies."¹ Subsequent federal, state, local, and nongovernmental response has been to bolster weaknesses in bioterrorism response identified subsequent to the autumn of 2001.

To understand preparedness for such an attack, this analysis is split into two parts. First, an overview of how federal agencies respond in the event of an act of bioterrorism is presented, so that interactions between state and federal responses can be assessed. Following that, a comprehensive examination is performed on the response plans of three states: Minnesota, Texas, and New York. These

¹ Khan, Ali (2011). *Public health preparedness and response in the USA since 9/11: a national health security imperative*. CDC report available online at http://www.cdc.gov/phpr/documents/Lancet_Article_Sept2011.pdf

three states were chosen because they provide geographic and political diversity which allow for an interesting comparison. The focus of this state-level examination is to identify key strengths and deficiencies of each state's preparedness planning using a combination of qualitative evaluation rubrics. How preparedness plans interact with local and nongovernmental networks such as hospital treatment emergency planning is discussed, but those aspects of state preparedness are not the focus of this analysis.

Prior to conducting the analysis, a brief history and overview of bioterrorism events in the United States is given as motivation for why this is an important topic to study. Included in this overview of bioterrorism attacks is a list of the most virulent and likely used agents in a bioterrorism event. Following the background and motivation section, an overview of the responsibilities of key federal agencies is provided. After that, the methodology and rationale for selecting the states as case studies in this analysis is provided, followed by the analysis of each state's preparedness plans. Finally, conclusions drawn from this analysis are presented at the end of the paper.

Background and motivation

There are two well-documented examples of bioterrorism acts in recent U.S. history which underscore the importance of analyzing bioterrorism preparedness in the United States: the first occurred prior to 9/11, and the second shortly thereafter. In 1984, cult followers of Baghwan Shree Rajneesh placed *Salmonella* bacteria in salad bars in 10 Oregon restaurants. The attacks caused 751 people to become ill and 45 hospitalizations, but there were no fatalities.² Cult members were able to purchase a culture of *Salmonella typhimurium*, the germ used in the attack, from a medical supply store. Using the expertise and training of members of the community, the Rajneeshee community was able to develop the strain, test out deployment methods prior to the actual attack, and make refinements as necessary. Finally, in September of 1984, they launched the attack. The number of actual victims might

² Department of Homeland Security Danger of Biological Attack briefing, July 15, 2011. Available online at http://www.dhs.gov/files/publications/gc_1245183510280.shtm

be higher than the estimated 751; the afflicted community lies on an interstate, and passing travelers who might have been afflicted might not have reported their symptoms.³

More recently, and perhaps more well-known, are the 2001 anthrax attacks. In this case, the perpetrator sent anthrax spores through the U.S. Postal Service. In total, 22 people were infected and five died from their exposure. Compounded by the fear of the recent 9/11 attacks, the anthrax attacks placed a heavy burden on American society. Extensive testing and cleanup of affected areas were conducted after the attacks, including the postal offices the letters traveled through and federal buildings where the letters were delivered. To further compound the cost of the attacks, more than 10,000 individuals received drugs and other medical treatments as a preventative measure. In total, these responses cost billions of dollars.⁴

Subsequent to 9/11 and the anthrax attacks of 2001, the United States government enacted legislation to bolster a bioterrorism response system which was known to be deficient. For the purpose of this analysis, the term deficient means that preparedness plans in place prior to 9/11 were found in future reviews to be insufficient in responding to a bioterrorism event in at least one significant way. To strengthen national preparedness and ameliorate some of these deficiencies, the U.S. Congress passed a few primary pieces of legislation. One example, Project BioShield⁵ was an act passed in 2004 whose primary goal was to fund research, development, and deployment of vaccines to the most frequently used biological agents.⁶ Another piece of bioterrorism legislation passed was the Bioterrorism Preparedness Act of 2002. This legislation created the Select Agent Program, which is a list of federally mandated agents which limits access, possession, and transportation of select agents to key personnel

³ Carus, W. Seth. *The Threat of Bioterrorism*. National Defense University Strategic Forum Institute for National Strategic Studies. Number 127, September, 1997.

⁴ Bush, Larry M., and Perez, Maria T. *The Anthrax Attacks 10 Years Later*. *Annals of Internal Medicine*, October 2011 p. 41-42

⁵ Project BioShield II Act of 2005, full text available online at <http://www.govtrack.us/congress/bills/109/s975/text>

⁶ Gottron, Frank. *Project BioShield: Purposes and Authorities*. Congressional Research Services report, July 6, 2009.

who are approved to perform these tasks.⁷ A final piece of key legislation which affected U.S. bioterrorism preparedness was the Patriot Act. Language within the Patriot Act addressed the need for the United States to bolster its bioterrorism preparedness capabilities in light of vulnerabilities identified after 9/11 and the anthrax mailings.⁸

In 2002, the Department of Health and Human Services performed a preliminary analysis of the preparedness levels of 12 states for a bioterrorism event. The study found that “public health infrastructure left [the United States] underprepared to detect and respond to bioterrorism”.⁹ In light of the then-recent anthrax attacks of 2001, interest in U.S. susceptibility to bioterrorism was high. The report found there were deficiencies in multiple aspects of bioterrorism preparedness, including underfunding prevention and vaccination regimens, a shortage of surveillance and prevention, and even an absence of statewide response plans. In states which did have response plans, the study team was able to identify gaps and oversights regarding key preparedness factors, such as which state, local, and federal agencies had authority to respond and in what manner.¹⁰ More work, it was decided, needed to take place at all three levels (local, state, and federal) to shore up these deficiencies and increase preparedness in case of another attack.

Part of the attempt to bolster American preparedness overall was to increase funding on key biological agents and change which scientific communities had access to previously classified materials through the 2002 Bioterrorism Preparedness Act. This bill made agents used in bioterrorism research and preparedness planning more difficult to access. Additionally, some ties were severed with foreign research institutions which had previously been collaborated with, and U.S. researchers and scientists working with these agents were forced to go through more comprehensive and strict registration and

⁷ H.R. 3448: Public Health Security and Bioterrorism Preparedness and Response Act of 2002. Full text available online at the Library of Congress website: <http://thomas.loc.gov/cgi-bin/query/z?c107:H.R.3448.ENR>:

⁸ H.R. 3162, U.S.A. Patriot Act, Section 1013, 2001

⁹ Rehnquist, Janet. *State and Local Bioterrorism Preparedness*. Office of the Inspector General of the Department of Health and Human Services, 2002, p.17

¹⁰ Ibid.

application processes to access agents. More stringent rules governing inventory and safekeeping of weaponized Ebola and anthrax agents were also put into place. The intent of this policy was twofold: first, to increase safety by reducing access to potentially unsuitable research candidates; second, to create gatekeeper institutions through which research on these agents would pass through. Post-hoc analysis of the impact of this legislation on research indicates that the policies had some detrimental effects. There were two primary ways in which the policy failed. First, “there was an increased turnover rate of authors in the select agent community that was not observed in the control organism”.¹¹ Second, there was a “loss of efficiency, with an approximate 2-to-5-fold increase in the cost of doing select agent research as measured by the number of research papers per millions of US research dollars awarded”.¹²

It is important to note that these findings are based both on objective data (i.e. the number of papers published using the agents in question) and the recollections of the scientists who were conducting the research at the time. Attempts to increase preparedness for a bioterrorism attack may have counterintuitively decreased preparedness. Scientists whose feedback was used as the basis for this analysis indicated that research took longer, there was more turnover among elite scientists working at the increasingly limited number of institutions allowed to conduct such research, and fewer results came out per dollar spent.

The purpose of highlighting these two events is to underscore the realities of assessing the risk of a bioterrorism attack. First, the probability of an attack occurring is very low. On a practical level, this makes sense because of the technical skills required to conduct an attack. In the case of both the anthrax and *Salmonella* attacks, the perpetrators had to have advanced technical knowledge, access to advanced equipment, and access to agents to carry out their attacks. Having all three of these elements is difficult to do without raising suspicion from authorities. The second important lesson from these

¹¹ *Effects of the USA PATRIOT Act and the 2002 Bioterrorism Preparedness Act on Select Agent Research in the United States*. Casman, Elizabeth A., Dias, M. Beatrice, Reyes-Gonzalez, Leonardo, and Veloso, Francisco M. Proceedings of the National Academy of Sciences of the United States of America, May 2010

¹² Ibid.

attacks is that the effects can be devastating. This is especially true of the anthrax attacks. Five people died and seventeen others were hospitalized due to exposure to anthrax resulting from the 2001 attacks. As noted previously, the financial cost to clean up and respond to the attacks was in the billions of dollars. Finally, there are unquantifiable costs associated with bioterrorism which are intrinsic to the acts: the terror of the public who worried that unrecognized envelopes in their mailboxes might be contaminated or contain anthrax.

These two incidents are only two examples; other bioterrorism scenarios exist, and the consequences of those scenarios could be far more deadly and costly than these two successful attacks. One of the fundamental issues which makes preparing for a bioterrorism attack difficult is the number of disbursement methods and biological agents available for use in an attack. The following table taken from the CDC lists the most virulent and easily accessible biological agents which could be used in an attack, known as the Category A agents. Classification of a biological agent as Category A means that the agent is more heavily restricted in terms of availability for research, possession, and transportation. Researchers must provide reasonable justification for the type and quantity of biological agents, toxins, or delivery systems they possess, and extensive security measures insure against unauthorized access to laboratories that possess these agents. Finally, the Patriot Act creates a class of “restricted persons” who may not possess, transport, or receive a biological agent listed as “select”.¹³

Table 1. Symptoms and Treatment for Category A Diseases.¹⁴

Category A diseases	Common Symptoms	Treatment/Prevention
Anthrax	Initially resembles common cold; progresses to severe breathing problems and shock.	Treatable if antibiotics taken very soon after exposure; limited supply of investigational vaccine exists.
Botulism	Blurred vision, difficulty swallowing, and muscle paralysis.	Treatable if assistance with breathing is provided; antitoxin is effective if administered early

¹³ H.R. 3162, U.S.A. Patriot Act, 2001

¹⁴ Critical Biological Agents: Disease Reporting as a Tool for Determining Bioterrorism Preparedness. Horton et al, 2002, p. 263

		in course of disease.
Plague (pneumonic)	Fever, headache, weakness, and cough; may cause shock.	Early treatment with antibiotics can be effective; there is no vaccine available for use within the United States.
Smallpox	Fever, headache, nausea, and rash leading to hard blisters.	Routine vaccinations ended in the United States by 1972; no proven treatment.
Tularemia	Fever, chills, body aches, and weakness; inflammation and hemorrhaging of airways.	Vaccine is under review by the Food and Drug Administration (FDA); early treatment with antibiotics can be effective.
Viral Hemorrhagic Fevers <ul style="list-style-type: none"> • Ebola • Marburg • lassa • junin 	Fever, fatigue, muscle aches, exhaustion, and diarrhea; severe cases include bleeding under the skin, in external organs, or from body orifices.	With few exceptions, there is no cure or established drug treatment; care is supportive (palliative) in nature.

Note from this table how many of the diseases have little or no treatment if the disease is not caught early in its progression. These Category A diseases are selected because “they are most likely to cause mass casualties, create panic, and require a specific public safety response.”¹⁵ While there is a shortage of documented successful attacks in United States history, the anthrax letters of 2001 prove that the entire nation can be captivated and held in fear by the threat, and execution, of a biological attack. Disbursement methods and other environmental factors greatly affect the potential lethality of an attack, but this table provides a good overview of the sheer number of biological agents and the difficulty in preparing for all of them.

Preparing for a bioterrorist attack is an inherently difficult and complex matter. Various federal, state, and local authorities have responsibilities in responding to an event. These responsibilities oftentimes overlap, resulting in a system where authority is vague or gaps could exist. Response times can suffer, and those most desperately in need of assistance can be forced to wait while bureaucratic

¹⁵ Katz, Rebecca. Biological Weapons: A National Security Problem that Requires a Public Health Response (working paper).2001-2004

systems clash. An unfortunate example of such bureaucratic inefficiency in responding to a public health crisis is governmental response, both state and federal, to Hurricane Katrina in 2005. According to the Inspector General of DHS, “many of the criticisms [of FEMA’s response to Katrina] were warranted”.¹⁶ One of these failures was a delayed response by FEMA officials to grasp the magnitude of the disaster, thus delaying aid and crucial support for victims. The report also concludes that FEMA was “ill-equipped to conduct the massive search-and-rescue function” for survivors. In short, federal response to Katrina fell to FEMA; that response was found severely lacking when tested by a significant disaster.¹⁷ The intergovernmental response initiated by DHS was supposed to mitigate disasters. Some research on DHS and disaster relief following the department’s inception suggests that crisis response planning was too focused on acts of terrorism and not focused strongly enough on natural disasters.¹⁸

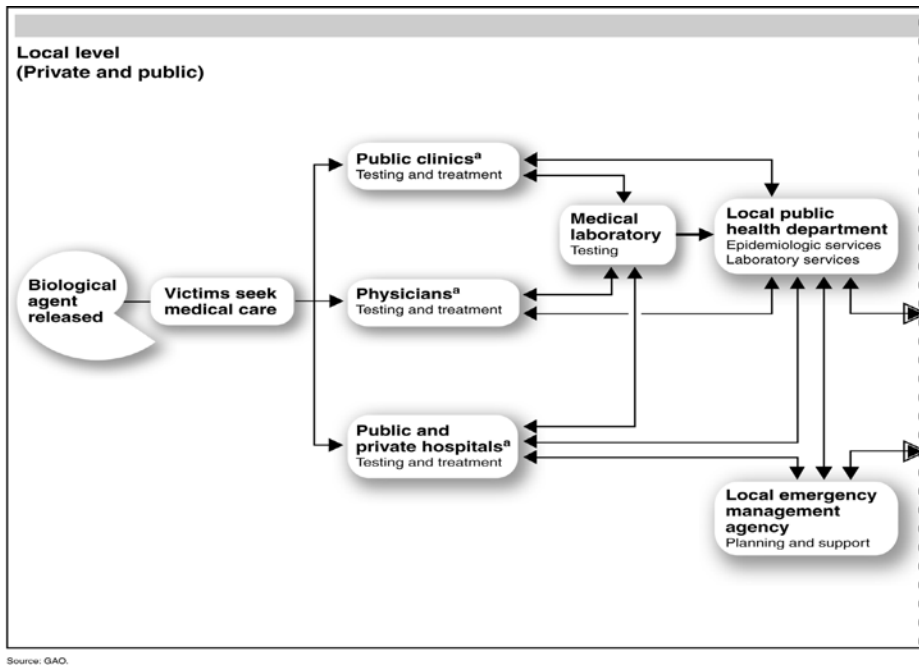
A report by Birkland and Waterman in 2008 also suggests a more comprehensive rationale for shortcomings in public health planning and response at all levels of government: federalism. Planning a response for bioterrorism, as noted previously in this paper, is a task which requires intergovernmental cooperation between agencies at all three levels of government. The interconnected web of response following the release of a biological agent is presented in the following diagram. It shows the complex overlapping responsibilities of local, state, and government agencies as they all respond to a biological crisis.

¹⁶ DHS Inspector General report, 2002

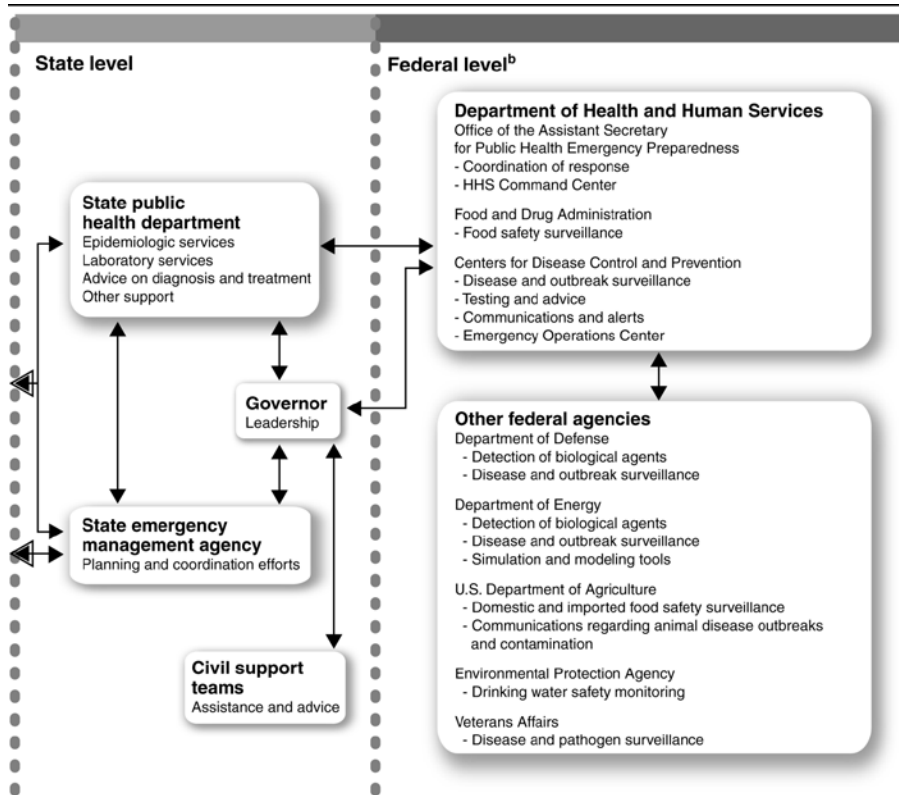
¹⁷ Ibid.

¹⁸ Birkland, Thomas and Waterman, Sarah (2008). *Is Federalism the Reason for Policy Failure in Hurricane Katrina?* The Journal of Federalism, Volume 38, Number 4, p.700

Figure 1: Local, State, and Federal Agencies Involved in Response to the Release of a Biological Agent



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¹⁹ *Bioterrorism: Information Technology Strategy Could Strengthen Federal Agencies' Abilities to Respond to Public Health Emergencies.* GAO, May 2003.

As this flow chart indicates, the first response to an act of bioterrorism is at the local level. Individuals who are exposed to the agent seek treatment from medical professionals. Individual hospitals and care systems have their own emergency response protocols which affect how patients are cared for. State health agencies then provide laboratory services to determine which biological agents have been used in the attack and epidemiological assistance in tracking the illness through the population. Finally, federal agencies respond after local and state agencies have initiated their response plans. Various federal agencies have a number of responsibilities in responding to a public health crisis which work in conjunction with local and state agencies. The interconnected nature of all these different response plans emphasizes the complexity and scope of attempting to analyze U.S. bioterrorism preparedness as a whole. State plans are viewed as the bridge between local and federal response.

Overview of federal agencies

Before analyzing individual state response plans, it is helpful to have a basic understanding of federal response plans to examine how they intersect with states. Presented below are the basic responsibilities and roles taken in preparing for, and responding to, a bioterrorism act for a few of the primary federal departments and agencies. This is an important factor to consider when evaluating preparedness. It is important to understand the role some of the major federal agencies play in bioterrorism preparedness and response plans. The following section identifies some of the key agencies at the federal level. They have been roughly grouped together into operational capacity, e.g. law enforcement and detection agencies are grouped together.

Multidisciplinary

Department of Homeland Security (DHS)

The Department of Homeland was formed in 2002 to unify efforts to prevent and react to disasters – specifically terrorism. This agency is the primary federal body responsible for a wide variety

of functions related to bioterrorism, including response (FEMA), deploying medical countermeasures (MCMs), detection of biological threats, and coordination with state and local governments.²⁰

FEMA

The Federal Emergency Management Agency (FEMA) is the primary federal agency responsible for responding to disasters, either natural or manmade. FEMA's mission is to "reduce the loss of life and property and protect communities nationwide from all hazards, including natural disasters, acts of terrorism, and other man-made disasters".²¹ The Department of Homeland Security took over administration of FEMA in March of 2003.²² The responsibilities of FEMA are widespread and essential to national preparedness for a disaster. Through a network of ten regional offices throughout the country, FEMA officials partner with local and state governments, nongovernmental organizations such as healthcare networks, and other strategic partners to support the agency's mission and core competencies.²³

One of the most important tools for national preparedness created by FEMA is the National Response Framework (NRF). The NRF is a document which "presents the guiding principles that enable all response partners to prepare for and provide a unified national response to disasters and emergencies".²⁴ The NRF evolved over time as a result of disasters and emergencies FEMA to which FEMA was forced to respond. The Framework unifies the efforts of responders across governmental and private-sector structures to provide a coordinated, effective response to a crisis.²⁵ Built from the lessons

²⁰ Garza, Alexander. *Taking Measure of Countermeasures: A Review of Efforts to Protect the Homeland Through Distribution and Dispensing of CBRN Medical Countermeasures*. DHS comments before Congress, May 5, 2012. Accessed on DHS website at http://www.dhs.gov/ynews/testimony/testimony_1305125288085.shtm on 3/20/2012

²¹ *Prepared. Responsive. Committed*. FEMA brochure July 2008

²² Federal Emergency Management Agency mission statement. Available online at <http://www.fema.gov/about/index.shtm>

²³ *ibid.*

²⁴ DHS NRF brochure, January 2008

²⁵ *ibid.*

learned from prior disasters and health crises, the Framework is an evolving tool whose purpose it is to provide the most efficient and effective response to a national health crisis.

FEMA interacts with the states by providing both personnel and financial assistance to states in times of emergency. When an emergency is declared, FEMA funds are made available to state governments to supplement state and local recovery efforts. FEMA is then authorized to coordinate disaster relief efforts using its authority to supplement state and local authorities. At its discretion, FEMA is authorized to identify equipment and resources necessary to ameliorate the effects of a disaster, bolster public health, save lives, and offer assistance to state and local recovery projects.

Law Enforcement: Detection and Thwarting

Federal Bureau of Investigation (FBI)

The FBI is “the lead law enforcement agency responsible for investigation of WMD threats”.²⁶ In this role, the FBI acts to detect threats and prevent them from occurring. In particular, the Weapons of Mass Destruction Directorate (WMDD) is the “operational element” whose primary focus is on preventing the use of Weapons of Mass Destruction (WMD).²⁷ The FBI also plays an integral role in training local law enforcement agencies. Agents in one of the 56 field offices partner with local stakeholders such as law enforcement and first responders to improve response plans in the case of emergency. The goal of these training exercises and simulations are to improve response time and smooth collaboration between local, state, federal, and nongovernmental parties.²⁸ Note that the FBI’s involvement in the preparedness and response portion of a bioterrorism event is in preventing an attack from even occurring. Other agencies or governmental bodies, such as FEMA, would respond with disaster relief and cleanup should an attack take place. In that scenario, the FBI would also conduct operations to determine and apprehend the culprit of the attack.

²⁶ Majidi, Vahid. Statement Before the Senate Committee on Homeland Security and Governmental Affairs. October 18, 2011

²⁷ FBI WMDD mission statement. Accessed online at <http://www.fbi.gov/about-us/investigate/terrorism/wmd>

²⁸ Majidi remarks to Congress

Medical research: Prevention, Detection, and Recovery

National Biodefense Analysis and Countermeasures Center / Biological Threat

Characterization Center

The primary role of the NBACC is to “develop the science critical to defend the nation against bioterrorism”.²⁹ Part of this development process is conducting research on biological agents which could be used in an attack. This includes researching new vaccines and therapies to counter biological threats. Additionally, NBACC uses its scientific procedures to detect planned or actual bioterrorism events and assists in identifying perpetrators.

Centers for Disease Control and Prevention (CDC)

The CDC is one of the primary federal agencies responsible for bolstering public health preparedness. Research done at the CDC supports the preparation and response work performed at DHS. In particular, the CDC is the central hub for providing public health assistance. Preparedness activities of the CDC which bolster public health include providing resources to help strengthen local, state, and territorial response plans and monitoring real or potential public health emergencies.³⁰

Other agencies of interest

Other federal agencies are integral to the nation’s bioterrorism preparedness and response capabilities. The Department of Agriculture focuses on agricultural bioterrorism, but analysis of that type of bioterrorism is not the focus of this paper. The Department of Defense, Department of Energy, Environmental Protection Agency, and other federal agencies all have their parts to play in national preparedness for a bioterrorism attack.

Non-federal response

In addition to the preparedness plans for federal agencies, individual states, local governments, and even nongovernmental organizations such as hospital networks have their own preparedness plans.

²⁹ NBACC mission statement available online at <http://www.bnbi.org/>. Accessed 3/20/2012

³⁰ CDC website <http://www.bt.cdc.gov/cdc/> accessed 3/17/2012

All of these plans come together to form a patchwork quilt of preparedness. Delineating the duties and responsibilities of the key players in preparing and responding to a bioterrorism crisis is a key first step in understanding and evaluating preparedness overall.

State bioterrorism preparedness plans contain public health elements. As shown in Table 1, there are numerous viable strains of germs, bacteria, and viruses which could be used in an act of terrorism. The ways in which these infecting agents spread through the population can mimic naturally occurring outbreaks of diseases, making it difficult for scientists and researchers to identify an act of terrorism. These public health elements help in non-disaster scenarios such as the H1N1 swine flu epidemic in 2009. States were able to utilize their improved capacity for communication and coordinated agency response to respond to a naturally occurring influenza outbreak.

Paper Purpose

This paper is an analysis of current U.S. bioterrorism preparedness at the state level. Three states were chosen as case studies based on a few criteria. First, case study analyses with three cases allows for sufficient depth of analysis without being overwhelming in detail while also providing an opportunity for breadth as well. To maximize the breadth of analysis offered in this paper, the states chosen represent a geographically diverse sample of states: Minnesota representing the Midwest, New York the east coast, and Texas the South. In choosing these states for analysis, it was important to choose geographically diverse states to minimize the possibility of overlapping or similar response plans in adjacent states. New York, with its history of being the target of terrorist attacks in the past, is an excellent candidate for selection in this analysis. Texas has a history of being heavily focused on border security, so another reason it was selected for this paper was to see if any connection between border security concerns and bioterrorism preparedness exists. Additionally, Texas is politically unique from the other states selected in the study. It is important that the states selected for this study have these unique aspects to provide a comprehensive and thorough analysis. Finally, the reason for centering the

analysis on state-level preparedness instead of at the federal level is that a biological attack takes place within a state. Literature on response to bioterrorism has not been a focus in the literature, so this paper will be a step towards filling that gap.

Rationale for choosing the states

The rationale for choosing the three states for analysis in this paper is based on a few characteristics. Given the relatively short time period for research and analysis in this project, only a few selected states could be analyzed. Choosing a sample of states representative of the entire union was not a feasible option. Therefore, other considerations had to be made. Minnesota was the first state chosen, and for good reasons other than its locality and sentimental reasons. Minnesota has a strong reputation for health research and care. Minnesota is home to world-class health care and research at the Mayo Clinic, not to mention the manufacturing and medical supplies engineered at 3M. Minnesota also has a nice mixture of urban and rural populations, is good-sized, and is economically diverse.

The challenge was to find a state both similar and dissimilar from Minnesota. It was important that the state chosen to contrast with Minnesota not be in the same geographic area to prevent regional attitudes and cultural norms to influence the results of the comparison. Geographic and cultural similarities between Minnesota and Wisconsin, for example, might misrepresent the comparative strengths and weaknesses of each state's preparedness plans. Due to the similarities, comparative strengths might be muddled and weaknesses exaggerated to differentiate between the states. Moreover, the purpose of the selected states is to make a passable attempt at representing the entire country. This is most feasibly done by selecting states from different geographic parts of the country.

The choice of New York as a state for analysis stems from its experience as the site of previous terrorist and bioterrorist attacks. This paper specifically addresses changes in national biosecurity and preparedness post 9/11 and subsequent anthrax mailings; as the site of the events on 9/11 and some of the sites affected by the anthrax mailings, New York has a demonstrated history dealing with crises. The

a priori assumption going into researching each state's plans was that New York would have a much more comprehensive and more detailed outline for how to respond to an act of bioterrorism. Given the size of the population of residents in New York City and the historical threats and acts of terrorism which have targeted New York City, it makes sense to use New York as a comparison to Minnesota.

The final state selected for analysis is Texas. The criteria for geographic and cultural dissimilarity are met with this selection, so it seems a good fit based solely on those merits. In addition, Texas has a rural and urban divide which echoes that of Minnesota. Granted, the size of the state and the population in Texas are much larger than Minnesota, but those were not determining factors in choosing comparison states. Finally, one of the key aspects of the culture of Texas made it an interesting choice for analysis. Texans are well-known for being independent and distrustful of government involvement in their daily lives. By choosing Texas for a comparison to Minnesota and New York, it might be possible to tap into that independent culture and isolate the effects it has on the state's public health preparedness and planning.

Previous State Analyses

A nonprofit group, Trust for America's Health (TFAH), publishes reports on the state of preparedness and response plans at the state level for a variety of health topics. TFAH is, according to their website, a "non-partisan, nonprofit organization dedicated to saving lives by protecting the health of every community and working to make disease prevention a national priority".³¹ The mission of the organization spans from conducting independent, science-based research to advocacy and lobbying on public health related issues. In particular, two reports published by TFAH in 2008 and 2010 titled *Ready or Not?* evaluated state level bioterrorism preparedness using a ten category checklist. Each indicator in the checklist was identified by the staff at TFAH as being critical components to a state's ability to

³¹ TFAH website – www.tfah.org/about accessed 4/1/2012

respond adequately in the event of a bioterrorist attack. These criteria evaluate key aspects of a state’s response plan, but they do not represent a comprehensive or exhaustive assessment.

As noted previously, the response to an act of bioterrorism occurs at national, state, and local levels of government. None of the criteria in the *Ready or Not* assessment evaluate how state plans sync with other levels of government. Additionally, the indicators in the 2010 report center on key aspects of funding, response practice, and communication. These are vital capabilities for a state to have in responding to an incident, but there are no indicators evaluating what states are doing to bolster detection and preventative measures prior to an event. Tables below present the results found in the 2010 edition of *Ready or Not* at the national level and how each state of interest performed.

Table 2: Ready or Not? 2010 Key Findings³²

Indicator	Finding	Description of indicator/why is it important
1. State increased or maintained level of funding for public health services from FY 2008-9 to FY 2009-10.	17 states met the requirements for this indicator.	Funding of public health infrastructure underscores a state’s commitment to maintaining public health.
2. State can currently send and receive electronic health information with health care providers.	43 states met the requirements for this indicator including all three states in this analysis.	Electronic communication of health information is crucial in times of a public health emergency.
3. State health department has an electronic syndromic surveillance system that can report and exchange information.	40 states have such a system.	Delivery of public health services depends on timely and reliable information. ³³
4. State health department has the ability to convene an emergency response team within 60 minutes at least twice during 2007-2008.	44 states were able to identify staff who met the criteria for this indicator.	Identification of emergency response staff is essential for states to conduct preparedness and response drills.
5. State public health department activated its Emergency Operations Center (EOC) as part of a drill, exercise, or real incident a minimum of two times in 2007-2008.	44 states activated their EOC a minimum of two times during 2007-8.	Activation of the EOC, while not necessary for all public health crises, is critical in practicing for full-blown emergencies.

³² *Ready or Not? Protecting The Public’s Health From Diseases, Disasters, and Bioterrorism*. Levi, Jeffrey et al. Trust for America’s Health 2010. p.13

³³ *Ready or Not?* 2010 p.18

6. State developed at least two After-Action Report/Improvement Plans (AAR/IPs) after an exercise or real incident during 2007-2008.	48 states developed at least two AAR/IPs after an exercise or real incident in 2007-8.	This indicator measures a state's capacity to analyze response actions, identify weaknesses, and implement improvements.
7. State requires all licensed childcare facilities to have a multi-hazard written evacuation and relocation plan.	25 states mandate all licensed childcare facilities have multi-hazard written evacuation and relocation plans.	Children are an often overlooked group to plan for in the event of a public health crisis; additionally, children present complex and unique challenges.
8. State is able to rapidly identify disease-causing E.coli 0157:H7 and submit results by PulseNet within four working days 90% of the time during 2007-08.	29 states were able to rapidly identify the disease-causing strain of E.coli.	States must be able to receive, test, and report disease-causing bacteria within a specified timeframe.
9. State has the necessary lab workforce staffing to work five, 12-hour days for six to eight weeks in response to an infectious disease outbreak, such as novel influenza A H1N1.	Only 3 states do not have enough staffing capacity to meet increased demands during a public health crisis.	Public health labs are essential in conducting diagnostic and surveillance testing during an outbreak.
10. State increase Laboratory Response Network for Chemical Treat (LRN-C) capacity.	49 states maintained or increased LRN-C capacity.	The LRN is an integral component in U.S. bioterrorism preparedness. States must continue to maintain or improve their contributions to the network.

Each state analyzed for this paper, Minnesota, New York, and Texas, is given a dichotomous indicator if they met the standard listed in each category. The range of scores for all states was as low as 5 to as high as 10; the median score for all states is 8. Each state's results are presented in Table 3, and a score out of ten is calculated for each state.

Table 3: Scores for States of Interest³⁴

Category	Minnesota	New York	Texas
1. State increased or maintained level of funding for public health services from FY	0	0	1

³⁴ Ready or Not 2008, pp.11-141

2008-9 to FY 2009-10.			
2. State can currently send and receive electronic health information with health care providers.	1	1	1
3. State health department has an electronic syndromic surveillance system that can report and exchange information.	1	1	1
4. State health department has the ability to convene an emergency response team within 60 minutes at least twice during 2007-2008.	1	1	0
5. State public health department activated its EOC as part of a drill, exercise, or real incident a minimum of two times in 2007-2008.	1	1	0
6. State developed at least two After-Action Report/Improvement Plans (AAR/IPs) after an exercise or real incident during 2007-2008.	1	1	1
7. State requires all licensed childcare facilities to have a multi-hazard written evacuation and relocation plan.	0	1	1
8. State is able to rapidly identify disease-causing E.coli 0157:H7 and submit results by PulseNet within four working days 90% of the time during 2007-08.	1	0	0
9. State has the necessary lab workforce	1	1	1

staffing to work five, 12-hour days for six to eight weeks in response to an infectious disease outbreak, such as novel influenza A H1N1.			
10. State increase Laboratory Response Network for Chemical Treat (LRN-C) capacity.	1	1	1
Total	8	8	7

Comparing state results: *Ready or Not*

The 2010 publication of *Ready or Not* contained a set of ten indicators of bioterrorism preparedness used to evaluate each of the fifty United States. Table 2 summarized the results for each of the states of interest in this paper: Minnesota and New York both scored an 8/10, and Texas scored a 7/10. It is important to note which indicators each state failed to meet the criteria for meeting and how meeting those criteria would improve the state’s overall bioterrorism preparedness within the six-step framework. Minnesota and New York both missed in the category of maintaining or increasing funding for public health services over a two-year time period whereas Texas did not. The question of funding public health programs is addressed in the next analysis section, but it is important to note funding of public health services is a key component to all six steps of preparing for a bioterrorism event.

Another interesting overlap is that both New York and Texas failed to meet the criteria for rapidly identifying infectious agents and submitting the results of their tests. This is a potential major shortcoming in both states’ preparedness plans; rapid identification of the biological agent causing illness and transmission of those results to necessary agencies and decision makers is an integral component to responding to a bioterrorism event. Only 29 states were able to meet the criteria for this indicator. Minnesota did meet the criteria for this indicator, however, so it must be noted that one of the three states in this analysis does not suffer from a potentially critical shortcoming in bioterrorism preparedness.

Another potentially significant finding from the *Ready or Not* report is that pre-identified emergency staff in Texas failed to acknowledge notification of drills and exercises within 60 minutes of the drill or real event taking place. Again, this is a potentially significant finding: responding to a crisis with the appropriate personnel and within a timely fashion is a critical element in preparing for and responding to a biological event. The implication of these results is that emergency response staff in New York and Minnesota are more responsive to events and exercises than those in Texas. This is a potentially significant shortcoming should Texas have to respond to an actual biological crisis.

The three states chosen as case studies for analysis in this paper all achieved high scores: two states, Minnesota and New York, scored an 8 while Texas scored a 7 out of a maximum 10. These scores are all at or close to the median score for all states of 7. The analysis presented in the *Ready or Not* reports is a good overview, but these quantitative indicators fail to capture more nuanced interpretations of bioterrorism preparedness necessary to make more incisive judgments. As such, these measures are presented as background information, not as a piece of the analysis used in this paper. To analyze the quality of a state's bioterrorism preparedness plan, different criteria are developed and utilized.

Methodology

The analysis used in this paper follows three steps. First, the TFAH scores in the *Ready or Not* publications have already been presented. These scores are used to set the stage for further analysis, but are not meant to be the primary basis of analysis. The preparedness and response plans for a bioterrorism incident for each of the three states are evaluated in three additional ways to supplement the TFAH *Ready or Not* scores. First, they are evaluated subjectively to determine how well each plan meets predetermined criteria. The qualitative criteria used in this analysis are:

- Integration – how well the state integrates local, state, and federal agencies and responders within the response planning documents.

- Transparency – how clearly the preparedness documents define the scope of the response by making the responsibility and organizational hierarchy of responding agencies clear..
- Thoroughness – how well documented each state’s preparedness and response plans are, including specific response plans for bioterrorism events.
- Clarity – how intelligible the documentation is for laypeople to read and understand, especially concerning separation of the plan into multiple documents.

Second, each state’s preparedness and response plans are assessed to see how well they align with multiple types of preparedness activities along a time continuum. Six steps are described in a National Academy of Sciences framework for response to agricultural bioterrorism.³⁵ These six steps can be extrapolated for use in general bioterrorism planning as well. They are:

1. Deterrence: preclude terrorists from planning or carrying out an attack.
2. Prevention: reduce vulnerabilities which can be exploited in an attack.
3. Thwart: the ability of law enforcement to respond to information, intercede, and stop an attack before it is carried out.
4. Detection: differentiating between naturally occurring outbreaks of disease and a malicious attack.
5. Response: mobilizing appropriate agencies to respond immediately to the crisis.
6. Recovery: ongoing support and disaster mitigation after the immediate effects of the attack are over.

In particular, each state’s plan will be evaluated with these six steps in mind. Of critical importance is the ability of the state plan to address these key issues through explicit action steps or explicitly stated goals within preparedness or planning documentation. A response plan which focuses in great detail exclusively on response and recovery, for example, will not be considered as successful as a plan which focuses on a wider range of these six steps in.

As a final method to examine biosecurity and preparedness, the amount of spending each state has made on preparedness planning is evaluated on a per capita basis. This is supported by research presented in *Ready or Not 2010*. Dollars per capita of bioterrorism preparedness spending is a viable

³⁵ Moon, Harley W. et al (2003). *US Agriculture is Vulnerable to Bioterrorism*.

measure to evaluate how committed each state is to respond to acts of bioterrorism. This measure, however, indicates only the per capita spending; it does not indicate whether that amount is well spent in preparation for an actual event.³⁶

As a final note on methodology, it should be noted that the criteria selected as the basis of analysis have some drawbacks which need to be mentioned. Transparency as a metric for analyzing state preparedness plans is useful for citizens who wish to understand their state's preparedness plans, but having totally transparent preparedness documentation available for anyone to download online might open a state to the potential threat of having its defense systems exploited in an attack. The tradeoff between security and transparency is one that states make when publishing their response and preparedness documentation, and it is important to note in this analysis. When considering criteria for analysis, the focus was on creating standards which walked the fine line between being relevant and exposing a state to increased risk of attack. In particular, the transparency criterion evaluates how clearly the state's response plan presents a comprehensive response plan; there is no need, nor any requirement, that the response plan provide specific details on how a bioterrorism crisis will be responded to.

Overlap of bioterrorism preparedness and public health

One criticism among scholars who have studied this topic is that bioterrorism planning seems expensive and inefficient.³⁷ There are questions about how much the public benefits from research done on an event which is so unlikely to occur. In the wake of the 9/11 and anthrax attacks of 2001, national recognition of lacking bioterrorism response plans fit acutely into the fear-based paradigm of vulnerability which gripped the nation. It made sense at the time given recent events that the country would be fearful of any possible vulnerability, real or imagined. One way to allay the criticisms that

³⁶ *Ready or Not?* 2010.

³⁷ Based on virtually all the research I've done, this is the general theme. Evaluations of both state and federal programs indicate that research and prevention dollars are being thrown away without producing much benefit.

bioterrorism research and preparedness is too expensive to merit continued funding is to conduct such research under the wider umbrella of public health.

One of the most important aspects of defining a bioterrorism preparedness and response plan is differentiating between naturally occurring outbreaks and intentional disasters. The overlap between these two types of outbreaks has resulted in many states combining the public health and bioterrorism aspects of their preparedness plans into one system. One of the most important tools within this overlapping system is the CDC's Early Aberration Reporting System (EARS). This system is designed to give CDC epidemiologists the ability to rapidly and accurately determine if a disease outbreak is natural (i.e. not the result of a bioterrorism event) or a more malicious event.³⁸ The response patterns for both scenarios differ greatly. In response to a natural pandemic such as the seasonal flu, state and local hospital and health systems provide flu clinics where citizens can receive flu vaccines. Some clinics also provide participants with other amenities, such as hand sanitizer, to give the public as many opportunities to fight the outbreak as possible.³⁹

Federal preparedness plans are much more robust, but generally fall under the category of researching disease patterns and providing vaccines in the case of an outbreak. For example, federal scientists at the CDC knew the Swine Flu pandemic was likely and were able to develop and disburse vaccines to key staff members before the virus became too widespread. The distinctions between a natural outbreak and bioterrorism are important. Public health and bioterrorism response plans differ in their inherent scope, intent, and metrics of efficacy. Funding comes from different sources as well: research and development of vaccines might come from the CDC or National Institutes of Health while response plans and procedures for putting "boots on the ground" (i.e. first responders and other emergency response plans) come from FEMA or law enforcement agencies like the FBI who are trained

³⁸ *The Bioterrorism Preparedness and Response Early Aberration Reporting System (EARS)*. Seeman, G. Matthew, Treadwell, Tracee, and Hutwagner, Lori. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* vol. 80, No. 2, 2003, pp. i94-i95

³⁹ *ibid.*

in emergency response. The overlap between public health and bioterrorism, combined with the inextricably linked nature of the two, means that an evaluation of U.S. bioterrorism response cannot completely ignore or parse out the effects of the public health aspects of response plans. Rather, this analysis looks for the synergies between those two goals and evaluates plans on the aggregate level.

Analysis: Overview and assessment of state plans

Minnesota

The responsibility for drafting Minnesota's bioterrorism preparedness and response plan rests on the division of Homeland Security and Emergency Management, which is in the Minnesota Department of Public Safety. HSEM "helps Minnesotans prevent, prepare for, respond to and recover from disasters and works to keep Minnesota secure from acts of terrorism".⁴⁰ Part of the statutory responsibility of HSEM is to draft and update state preparedness plans for dealing with crisis situations can be found in the Minnesota Emergency Management Act of 1996. Section 12 in particular outlines the responsibility of HSEM as "[HSEM] shall develop and maintain a comprehensive emergency operations plan and emergency management program".⁴¹

The bulk of Minnesota's public health crisis response plan is found in the Minnesota Disaster Recovery Assistance Framework (MDRF)⁴². The MDRF outlines the responsibilities and leadership roles of state agencies in the event of an act of bioterrorism or other disaster. There are eighteen recovery frameworks (RFs) outlined in the document. The RFs break down a public health event into components with detail what needs must be addressed in response to the crisis. Each RF outlines the responsibilities for state agencies to mitigate the effects of an event. Within each RF, state agencies are assigned a

⁴⁰ HSEM mission statement. Available on HSEM website <https://dps.mn.gov/divisions/hsem/about/Pages/default.aspx>, accessed 4/30/2012

⁴¹ Minnesota Emergency Management Act of 1996, subsection 12. Accessed online at <https://www.revisor.mn.gov/statutes/?id=12&view=chapter#stat.12.09> on May 1, 2012

⁴² Minnesota Disaster Recovery Assistance Framework 2010

Primary (P), Secondary (S), or Coordination (C) role depending on how relevant the agency's mission and work is to fulfilling the needs of the RF. The eighteen recovery functions are:

1. Hazard Mitigation
2. Floodplain Management
3. Insurance Assistance
4. Damage Assessments
5. Debris Management
6. Health Protection
7. Mass Care and Human Services
8. Housing Assistance
9. Minnesota Disaster Housing Task Force
10. Economic and Business Recovery
11. Public Infrastructure Recovery
12. Donations and Volunteer Management
13. Agricultural Assistance
14. Long-Term Community Recovery
15. Legal Assistance
16. Disaster Recovery Centers
17. Minnesota Recovers Task Force
18. Tribal Disaster Recovery Assistance

Of the eighteen recovery functions, five include specific provisions for biological crises: Damage Assessments (4), Debris Management (5), Health Protection (6), Mass Care and Human Services (7), and Public Infrastructure Recovery (11). In the event of a bioterrorist attack or public health crisis, the other recovery functions would likely be utilized. These five, however, were the only ones to specifically mention biological events or agents. There are a few particulars to note about the MDRF. The first is that certain agencies within the state government are the linchpins of the state's ability to prepare and respond to a crisis. In particular, the Department of Health (MDH) has a leadership role in each of the five recovery functions which cover biological catastrophes. For example, MDH is tasked with identifying which biological agent has been used in an attack, establishing protocol for responders and managing consequences into the future, ensure the purity and safety of food and water supplies, and providing

technical assistance for testing and health policy as needed. The responsibilities of MDH in the event of a bioterrorism or public health crisis are widespread and essential to the state's ability to react.

One of the critical components to any state's preparedness documentation is how well integrated federal agencies and programs are with state and local efforts. In each recovery framework, a section detailing how federal programs such as FEMA are to be accessed by state agencies that need federal assistance. Additionally, there are references in the response frameworks listed above for how state agencies can coordinate with federal agencies where applicable. As an example, in RF 7, Mass Care and Human Services, there is a section describing in loose detail how FEMA and Red Cross shelter information can be accessed by health care professionals.

Unlike in preparedness documents for Texas and New York, however, the Minnesota documentation connects state, local, and federal integration somewhat obliquely rather than directly. Some of the language describing the partnership between Minnesota state agencies and federal efforts relies on vague terminology like "assist on federal projects" or "federal mitigation efforts", but specific funds, projects, and federal agencies are specifically named.

Analyzing Minnesota's preparedness as a state is interesting compared to the other case studies in this analysis because of the interrelationship between public health and bioterrorism preparedness procedures. This issue of conflation between public health spending and bioterrorism preparedness is one of the major takeaways from this analysis. The MDRF identifies only four of eighteen recovery frameworks which include language pertinent to a biological or bioterrorism event. Because the entire response plan is encapsulated within a public health mitigation framework, the bioterrorist aspects of the plan are not as clearly identified in Minnesota's response plan as in the other states assessed in this analysis.

The MDRF offers a thorough breakdown of the roles and responsibilities of state agencies in the event of a biological crisis, but that thoroughness somewhat obfuscates the goals of preparing for a

bioterrorism disaster. Choosing to balance between solely preparing for an unlikely scenario (a bioterrorism event) versus incorporating plans for such an event into broader public health planning complicates response plans. The response procedures in the Texas and New York plans are clearer and presented more concisely. The information necessary for local, state, and federal agencies, namely which agency has jurisdiction over another, is buried in detail. Moreover, the interrelationship between local, state, federal, and nongovernmental networks is not as clearly established in the MDRF as in other state response plans. Some aspects, such as how local governments can apply for aid from FEMA, are specifically outlined. In other sections of the document, the wording is much more vague and unspecific.

Another deficiency found in assessing Minnesota's bioterrorism preparedness plan is that the document is not as transparent or clear as the plans of the other states evaluated in this analysis. The lack of clarity stems from two key problems in the document. First, the arrangement of the document by recovery framework makes it difficult to understand an agency's role in the case of a bioterrorism event. Agencies can be assigned leadership roles for multiple recovery frameworks which could conceivably be activated by one crisis; in such a scenario, which framework should the agency focus on? The answer is not clearly defined in the MDRF. Second, while the responsibilities of each agency are thoroughly defined for each RF, it can be difficult to keep track of those responsibilities across frameworks.

When evaluating the Minnesota response plan according to the six-step model, one of the primary criticisms to be made about the MDRF is that its primary purpose is focused on damage mitigation subsequent to an attack. On the timeline of the six steps, response to an attack comes after nearly all the other steps. There is little overlap between the MDRF as a whole and the preventative measures taken prior to an attack occurring. Other phases in the six-step prevention methodology are either hinted at or not mentioned at all. The primary focus of the MDRF is on the recovery and response aspects of the plan. Part of this lack of cohesion might be attributable to the broad scope of the plan, in particular how the plan is focused on public health in general and not a bioterrorism attack.

To summarize, Minnesota's response to a bioterrorist attack does not meet the criteria of integration, transparency, or clarity. One of the primary reasons for this is the conflation between public health and bioterrorism found in the response plan. These deficiencies are especially prominent when comparing Minnesota's disaster recovery frameworks to the recovery plans of New York and Texas, both of which have bioterrorism-specific response plans. The response plan in Minnesota is certainly thorough, but that thoroughness is not necessarily a positive attribute; the majority of the MDRF language outlines a response to a more general public health crisis with only a small percentage of the language referring to a bioterrorism event in particular. Finally, the MDRF focuses primarily on the tail end of the six-step continuum, recovery, which ignores most of the other six steps in preparing for an act of bioterrorism.

New York

One of the assumptions behind selecting New York was that, due to its history of experiencing terrorist attacks, the state would have a more comprehensive preparedness and response plan in place. When researching New York's bioterrorism preparedness, this assumption turned out to be true: New York is, according to the state's Homeland Security Strategy, "the number one terrorist target in the [United States]".⁴³ The Office of Homeland Security in New York has been coordinating the state's preparedness plans for the past 50 years⁴⁴, during which the office has overseen numerous terrorist attacks.

New York's Division of Homeland Security and Emergency Services (DHSES) maintains an extremely comprehensive preparedness and response documentation system. There are two primary documents which contain most of the pertinent information on the preparation and response plans in New York: the Homeland Security Strategy and the Mass Fatality Annex. The Homeland Security Strategy

⁴³ New York State Homeland Security Strategy, 2009, foreword

⁴⁴ New York Office of Homeland Security website: <http://www.dhSES.ny.gov/oem/>, accessed 4/3/2012

outlines the big picture strategies and theoretical aspects of preparing for an attack while the Mass Fatality Annex is a more in-depth and technical description of how to respond to disaster scenarios.

In the event of a bioterrorist attack in New York, the Office of Homeland Security is responsible for coordinating how the state will respond. This coordination includes bringing together local, state, and federal organizations and determining leadership roles among these organizations. There are ten strategic goals in the New York State Homeland Security Strategy⁴⁵. These priorities mostly align with Department of Homeland Security National Priorities, but have been tailored to meet the specific needs of New York State. The strategic goals are listed below.

1. Strengthen CBRNE⁴⁶ detection, response, and decontamination abilities
2. Protect critical infrastructure and key resources
3. Strengthen information sharing, collaboration, and intelligence analysis capabilities
4. Strengthen counterterrorism and law enforcement capabilities
5. Enhance incident management and response capabilities
6. Strengthen communications and emergency alerting capabilities
7. Strengthen emergency planning, citizen and community preparedness
8. Enhance regional capabilities, coordination, and mutual aid
9. Support health emergency preparedness
10. Enhance cyber preparedness capabilities

Each of these strategic goals also has a number of sub-objectives, ranging from 6 to 21, which provide a detailed description of the specific outcomes for each goal. As an example, a few of the specific objectives within the first strategic goal, to strengthen CBRNE detection, include:

- 1.5 – identify CBRNE training shortfalls and conduct training to close identified gaps
- 1.9 – enhance capacity for decontamination both on-scene and at secondary levels, such as hospitals
- 1.16 – develop a statewide capacity to monitor and assess environmental health impacts of a CBRNE event
- 1.17 – enhance laboratory capability and capacity for the detection of chemical, biological, radiological, and nuclear threat agents

⁴⁵ New York State Homeland Security Strategy, 2009, p.3

⁴⁶ Chemical, Biological, Radiological, Nuclear, or Explosive materials

In the event of a bioterrorist attack, the guidelines described in the Mass Fatality Annex take effect. In response to a crisis, the state categorizes the seriousness of the incident on a five-point scale. A Level 5 incident requires continuous monitoring, readying of response teams, and monitoring for developing emergencies. A Level 5 event, on the other hand, is a full-blown catastrophe warranting state agencies and assistance from the federal government.⁴⁷ State agencies are grouped together into seven functional groupings which streamline and coordinates activities among member agencies under the direction of Functional Branch Supervisors. Finally, the annex makes special note to incorporate local agencies and resources wherever possible.

The amount of information provided by New York State agencies on how they plan to deal with an act of bioterrorism is extensive; it is by far the most thorough of the three states evaluated in this paper. The documentation available for download from the state straddles the borderline between being sufficient and overwhelming. One criticism of the state's preparedness plans is that it is divided into separate documents which must be synthesized in order to fully understand the entirety of the plan. New York's plan is transparent enough, but it does not meet the benchmark of transparency set by Texas.

The preparedness plan for New York also has mixed results in terms of clarity. On one hand, the specific sub-objectives of the state's Security Strategy goals provide a clear set of objectives the state is striving to accomplish. On the other hand, the Mass Fatality Annex which describes the responsibilities of state agencies in a mass casualty situation, such as that of a bioterrorism attack, is not tremendously clear. The annex falls victim to some of the same clarity problems present in Minnesota's response plan. Agencies are organized into operational groups, but the hierarchy of how those groups are structured is missing from the documentation.

⁴⁷ New York State Mass Fatality Annex, 2011. p. 22-23

Finally, New York's preparedness and response plans were assessed using the temporal six-step evaluation process the other state plans were evaluated against. In this case, the state plan of New York contains explicit steps which address all six of the steps in this analysis. Unique to New York's plan is its prevention and deterrence aspects. Not only does the New York plan contain steps for state, local, and even federal authorities to detect and prevent attacks from occurring, the state preparedness plan contains a risk analysis of possible threats. This risk analysis is presented to underscore the relative risks of various disaster scenarios and how the preparedness document addressed them. Vulnerabilities and consequences of an attack are also laid out, thus fleshing out the consequences of an attack in more detail than the preparedness plans of Minnesota or Texas.⁴⁸

In total, New York's history with terrorist attacks means that its preparedness documentation fully meets most of the criteria used in this analysis. The only criteria which New York's plan did not fully meet is clarity: the response plan, split between big-picture goals and incident-specific response, does not provide as clear of a response plan as possible. To compensate, the response and preparedness documentation provided by New York's Office of Homeland Security clearly integrates various government agencies, is thorough in its explanation, and is transparent in describing how state agencies are to organize and respond to a crisis. Additionally, the specific objectives described in the Homeland Security Strategy documents extensively cover the six steps of the preparedness paradigm.

Texas

The Texas state preparedness and response documents are available for free download on the state's Department of State Health Services website.⁴⁹ These documents, referred to as appendices, by the government, "provide guidance to local jurisdictions and coordinate securing and deploying federal and other resources if state and local assets are insufficient" to meet the needs resulting from a

⁴⁸ New York State Homeland Security Strategy 2011, p.13

⁴⁹ Texas DSHS website <http://www.dshs.state.tx.us/commprep/planning/documents.aspx> accessed 4/10/2012

catastrophe.⁵⁰ The documents available to the public detail how state and local officials are to respond and coordinate in the event of various types of scenarios, including a mass fatality incident, how to provide post-catastrophe support for victims and responders, and various public health crises such as a pandemic flu outbreak. Most interestingly, the state of Texas has identified a response plan specific to bioterrorism; unlike Minnesota, where bioterrorism preparedness is linked with public health planning, Texas has a preparedness and response plan unique to bioterrorism.

The current version of the bioterrorism preparedness appendix, updated in 2011, covers in detail the state's plans for handling a bioterrorist attack through a multifaceted response plan. Unlike the response plan for Minnesota, the Texas plan incorporates how state agencies within Texas are to coordinate with other states and federal government in the event of a bioterrorist attack.⁵¹ The contrast to Minnesota in this regard is clear: Minnesota's response plan itemizes how Minnesota state agencies respond to a public health crisis; Texas' response plan includes interstate and federal coordination to compensate the responsibilities of Texas state agencies.

The bioterrorism-specific response plan identifies four key phases to responding to a biological crisis: detection, notification, incident response, and recovery and remediation.⁵² Within each of these four phases, the plan outlines how local and state authorities are to coordinate with national policies and governmental agencies to implement the appropriate response protocol. Critically, Appendix H identifies a clear delineation of what action steps are necessary to respond to the crisis, which agency or organization is responsible for performing the task, and the proper sequence with which those tasks are to be performed. For example, lab testing, performed by the Department of State Health Services (DSHS) is one of the first steps taken if a local jurisdiction even suspects a bioterrorism incident has taken place. If the labs conducting the tests identify potential biological terrorism agents, appropriate

⁵⁰ *ibid.*

⁵¹ Texas Appendix H 2011 p.32-35

⁵² Texas Appendix H 2011 p.13

law enforcement, monitoring, and public health officials and agencies are notified; each of these agencies and officials has a protocol for how to respond to an act of bioterrorism which are initiated upon receiving this notification.

A qualitative assessment of the preparedness and response plans for Texas shows that the state is well-prepared for an attack. One unique aspect to the Texas response plan is that the responsibilities of key agencies are laid out in a much clearer and more concise way than Minnesota has for its agencies. In Minnesota's response plan, the duties and responsibilities for each agency are laid out by response framework (i.e. health protection). Agencies within the government whose role or mission operates within that framework have their duties outlined to meet the needs of that specific framework. Since there are eighteen frameworks covered in the plan, keeping track of the responsibilities of each agency can be difficult to do. The plan laid out in Appendix H is more transparent than Minnesota's plan simply because Minnesota's is intertwined with a broader public health perspective. The clearly defined responsibilities of agencies within Texas' plan make it a transparent, thorough, and clear preparedness plan.

Next, the state of Texas plan was examined to see how it meets the six-step model of preparing for a bioterrorism attack: deter, prevent, detect, thwart, respond, and recover. One crucial observation to be made is that within Appendix 6, the Biological Terrorism Response Plan, four key foci are identified within the response plan: detection, notification, incident response, and recovery and remediation. There is a significant amount of overlap between the six –step process of preparing and responding to a bioterrorism event and Texas' four phases. Specifically, the detection and recovery elements of both models overlap. For some of the other four components of the six-step plan, individual steps within the bioterrorism response appendix satisfy the criteria despite not matching one-to-one between the two plans. One possible area of weakness, or an opportunity for growth and clarification, is for Texas to

make clear its deterrence methods. While deterrence is usually handled at the federal level, local authorities have a valuable role to play in deterring attacks as well.

Public health spending dollars per capita

The final aspect of analysis in this paper is to look at how much the state is spending per capita public health spending. . One shortcoming in using per capita spending as a metric to gauge preparedness is that the raw figure does not speak to the sufficiency of the funds. As noted in the state case studies, the conflation between public health spending and bioterrorism preparedness makes differentiating between public health spending and bioterrorism preparedness difficult. Additionally, the raw figure of dollars per capita does not indicate whether those dollars are being spent efficiently or if they are sufficient to prepare state for a bioterrorism event.

It is useful to understand federal bioterrorism funding and how it relates to that of individual states. Federal funding for biodefense for fiscal year 2010-2011 totals \$6.48 billion for civil biodefense projects. About 66% of that is going to the Department of Health and Human Services, followed by the Department of Human Services (16%) and the Department of Defense (10%).⁵³ These figures do not include Project BioShield funds which were allocated in 2004. Since 2001, civilian biodefense funding at the federal level has gone through periodic ups and downs, peaking in 2010 at \$8.148 billion. Funding at the federal level is trending upwards slightly in FY2011 from FY2010, increasing from \$6.205 billion to \$6.476 billion.⁵⁴ Based on the numbers in this report, the average per capita spending using unadjusted dollars and current U.S. population estimates is \$17.94.⁵⁵

In 2010, the Trust for America's Health, which is the same organization which produces the *Ready or Not* reports, released an analysis of state-level public health spending. This analysis contained

⁵³ Franco, Crystal and Sell, Tara Kirk. *Federal Agency Biodefense Spending, FY2010-2011*. Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science. Vol. 8, Number 2, 2010 p.129-131

⁵⁴ Ibid.

⁵⁵ Population estimate of 313,418,687 taken from <http://www.census.gov/population/www/popclockus.html> and average biodefense spending of \$5.623 billion calculated from Franco and Sell p.130

two components. First, TFAH compared how much funding states received from the CDC for public health projects. The report also analyzed how much state legislatures allocated for the state's public health budget. Because of this, comparing states to one another is not quite a straightforward affair; state and local governments apply for and receive funding for programs from the CDC. In fact, approximately 75% of the funding the CDC receives for bioterrorism projects is allocated to state and local governments.⁵⁶ Of the three states of interest in this paper, New York receives the highest number of per capita CDC dollars (\$22.21), followed by Texas (\$21.28), and then Minnesota (\$16.50).⁵⁷ Of these, Minnesota falls below the national average of \$19.23 per capita dollars received by states from the CDC.

Comparing those figures with the per capita amounts being spent by states using all funding sources, New York has the highest per capita spending (\$68.83). Interestingly, Texas (\$15.83) and Minnesota (\$14.66) have relatively similar per capita spending on bioterrorism projects. Both figures are below the national median of \$28.92. It also bears pointing out that New York and Texas are experiencing a positive growth in their funding (10.1% for New York and 3.1% for Texas) while Minnesota experienced a decrease in funding of 7.8% between 2008 and 2009. This analysis does not quite mesh with the 2010 *Ready or Not* indicator of public health spending, but the difference is explicable. The *Ready or Not* figures assess public health spending between 2009 and 2010 whereas the *Shortchanging America's Health* article looks specifically at public health budgets between 2008 and 2009.

Analyzing per capita spending on public health and CDC-funded biopreparedness programs is a way to analyze the issue of biopreparedness from a different perspective. It is not a perfect measurement or a flawless corollary because efficiency is not easily measured by dollars spent per capita. Allocating nearly \$70 per person to prepare for a public health incident in New York might have demonstrably different outcomes than spending only \$14.66 per capita in Minnesota. Additionally, the

⁵⁶ TFH *Shortchanging America's Health* 2010, p.3

⁵⁷ *Ibid.* p.5

analysis presented here is intended to shed light but not be taken without criticism. The dollar values here represent funding levels, but it is not clear from the reports supporting this paper if those funding levels are sufficient to prepare the country or individual states from a bioterrorist attack. Even more importantly, these dollar values do not indicate that the money being spent is being spent wisely. Since the per capita spending on bioterrorism preparedness is a piece of a larger analysis, it is not the intention of this paper to explore in greater depth measures of efficacy regarding federal and state spending. Based on the numbers found in these reports, however, it would appear that both Minnesota and Texas have room for improvement to pull themselves closer to the national median.

Limitations of analysis

Since this paper covers a broad topic, there are certain tradeoffs which have been made. First and foremost, the states selected for this analysis were not intended to be a nationally representative sample. Choosing three states allowed for some flexibility in covering diverse geographic areas and variations in the size of the states. The rationale for choosing each state provided earlier in the paper outlines these criteria in some detail. Still, these case studies should not be construed as an attempt to extrapolate patterns found in individual states to the nation as a whole.

A second limitation of this paper is that the scope precluded it from exploring in great depths the specific programs, response frameworks, and preparedness plans found at all levels of government. This paper is based on exploring the relationship between agencies and actors at all levels of government, but the possible scope of information on this subject is extremely large. The information presented here is intended to be a broad enough overview to give the reader a sense of the national picture without getting bogged down in too many details while retaining enough depth of information on salient points. Omissions or curtailed explorations of various programs, agencies, or responsibilities were not intentional, but should be noted as a potential limitation.

A final limitation of this analysis is that the analysis is based on the concept that preparedness and response documentation are solely indicative of a state’s ability to respond to an act of bioterrorism. This assumption might not be accurate. A more in-depth analysis of a state’s infrastructure would offer valuable insight on a state’s ability to prepare for and respond to an act of bioterrorism. In fact, there might be some symbiosis in a state possessing a better infrastructure and its ability to respond to a crisis. Minnesota was chosen as a case study for this analysis in part because of its reputation for having a strong medical infrastructure, but little analysis to that effect has been performed. Another study which linked a state’s medical and public health (i.e. its nongovernmental response) infrastructure to its preparedness documentation would be insightful and add tremendously to the analysis presented here.

Conclusions/implications

Studying bioterrorism preparedness is an important, albeit complex, pursuit. The analysis used in this paper is comprised of a combination of qualitative and quantitative components meant to offer a comprehensive comparison without delving into too much depth. First, the following table summarizes the findings of the analysis.

Table 4: Summary of Qualitative Findings

	Six steps of bioterrorism preparedness ⁵⁸	Integration ⁵⁹	Transparency	Thoroughness	Clarity	Per capita dollars	<i>Ready or Not</i> 2010 scores
MN	Re, Rc	X		X		14.66	8/10
NY	Dr, P, T, De, Rs, Rc	X	X	X	X	68.83	8/10
TX	Pr, De, Rs, Rc	X		X	X	15.83	7/10

There are several important conclusions to be drawn from this analysis. First and foremost, the issue of conflation between public health and bioterrorism preparedness is one which must be

⁵⁸ Six steps are abbreviated as: Dr-deterrence, P-prevention, T-thwarting, De-detection, Rs-response, Rc-recovery

⁵⁹ Qualitative assessment synthesized from the analysis section of the paper.

addressed in future analysis. Analyzing state preparedness and response plans like that of Minnesota is made more difficult because of the overlap between public health and bioterrorism. As noted in the Minnesota overview and analysis section, portions of Minnesota's disaster response framework contain bioterrorism or biological event response plans, but those portions are only a small subset of the entire plan. Due in large part to this overlap, Minnesota's response framework was found in this analysis to be less successful in planning and preparing for an act of bioterrorism. This is especially clear when looking at Table 4. Of particular note is the deficiency of Minnesota's response plan in meeting the six steps of bioterrorism preparedness. In part because Minnesota's bioterrorism response plan is encompassed within a broader public health disaster response framework, only two of the six preparedness steps in the continuum are met: recovery and response.

One key finding of this analysis, therefore, is the importance of a response plan incorporating more of those six steps. Minnesota's response plan is entirely focused on the mitigation and recovery steps. If a clearer distinction was made between public health crisis response and bioterrorism preparedness, the clarified bioterrorism aspects could be written to meet more of the six steps of bioterrorism preparedness. In particular, the authors of the MDRF could write or clarify steps taken by key Minnesota state agencies like the Department of Health or law enforcement agencies which target prevention, detection, or thwarting activities.

The other states, New York and Texas, who were more successful in delineating the two concepts of bioterrorism and public health preparedness, were found to be much more successful in drafting response plans which met these analysis criteria. Texas in particular stood out as having a very successful response and recovery plan in place which needs little or no clarification or addition based on the criteria used for this particular analysis. Other analysts using different criteria might have different conclusions. The primary strength of the Texas bioterrorism response plan is that it exists as a unique document separate from other public health scenarios. The inherent strength of this approach is that

the criteria of clarity, thoroughness, integration, and most of all transparency, are all met with a bioterrorism-specific document. The cornerstones of Appendix H mesh well with six steps of bioterrorism preparedness, but not all six criteria are met. A suggestion to the authors of Appendix H might be to make more clear how efforts by Texas state agencies can incorporate or focus on thwarting and deterrence activities. Otherwise, this analysis finds no significant suggestions for improvement to the Texas bioterrorism preparedness and response plan.

Similarly, there is little room for suggestion to New York's state response and preparedness plan. By its nature, New York had by far the most complex and thorough documentation; as shown in Table 4, New York met the most criteria out of any of the states in this case study, missing only the criteria of the documentation being as clear as what can be found in other states. In the unique case of New York, however, there is no obvious method to clarify the response plan documentation. As noted in the analysis, New York has been the target of more terrorist attacks than any other state in the country. As such, officials in New York need to prepare and plan for a wide variety of attacks and scenarios, including bioterrorist attacks, more than any other state. The risk of attack is higher, and, correspondingly, the planning must be more complete and explicit. The clarity criterion in this analysis focuses on how intelligible the documentation is for non-experts to read and understand how the state plans to respond in the event of an attack. New York, because of its history, needs to have an inherently less clear response and preparedness plan than other states.

This conflation of bioterrorism and public health issues makes it difficult for a state to clearly and concisely provide documentation on how it will respond specifically to an act of bioterrorism. One of the lessons learned through this analysis is that states who group together the two concepts have very different applicability and usefulness to the public in a bioterrorism catastrophe than those with bioterrorism-specific response plans. The bioterrorism specific response plans offer a much more direct and low-level approach than the more general public health response plan. In the event of a bioterrorist

attack, it seems likely that states with more specific response plans would better equip its citizens than the more general public health response plans.

Combining these two concepts, bioterrorism and public health, makes sense. Developments of bioterrorism defense and preparedness help states bolster their public health infrastructure; conversely, advancements in public health systems ostensibly make responding to an act of bioterrorism more manageable. The risk of a bioterrorism attack is small, so developing a public health infrastructure which contains as a subsection a response plan for how to deal with a bioterrorist attack makes sense. The criteria for this analysis, namely that the response plans be transparent and clear, do not preclude that public health plans and bioterrorism response plans need to be mutually exclusive.

In the case of Minnesota, there is an opportunity for the state to evaluate and assess its disaster response framework to make it more suited to responding to an act of bioterrorism. This could be done in a few ways. First, the MDRF could have additional details added to it which are more specific to an act of bioterrorism. The document could have subdivisions within each recovery framework expanded to include bioterrorism-specific responses for state agencies. Another suggestion would be to increase the clarity in the document for how state, local, and federal agencies can work together to respond to a crisis. This was another aspect of the Minnesota response plan which was not as well developed as that of other states.

A final conclusion and suggestion to Minnesota drawn from this analysis is that it increase its pursuit of CDC public health dollars while finding in its state budget increased funding for public health. Minnesota, as noted previously, is reputed to have a strong public health infrastructure. That reputation is not supported when looking at the information found in this analysis. Minnesota failed to maintain public health spending as indicated in the *Ready or Not* report, and it has the lowest state per capita spending on public health of the three states selected for analysis. Part of the assumption of this analysis is that the strong public health infrastructure of Minnesota gives it an advantage in preparing

and responding to a bioterrorism event, but the results found in this analysis indicates that Minnesota's public health spending might be declining unless state legislators provide additional funding for public health in the future.

Public health infrastructure is not a variable measured accurately by this analysis. There is a great opportunity here for further research. The connection between the explicitness of state response plans and preparedness is the focus of this analysis, but other key factors in preparedness were not included in this paper. Nongovernmental agencies, such as hospital networks or care centers, have their own response plans which are much more immediate to a crisis. Evaluating those and extending that analysis to a wider analysis of a state's public health system and connecting those findings with bioterrorism preparedness would be an interesting next step to take from this paper.

Given all of this analysis, what is the future of bioterrorism preparedness for the states analyzed in this paper? For two of the three states, New York and Texas, their preparedness plans offer little room for constructive insight. Minnesota's plan, on the other hand, does have room for improvement. This improvement likely will come in the development of more bioterrorism-specific language within the public health framework it currently resides within. Despite these shortcomings, there are reasons to be tentatively optimistic about the state of bioterrorism preparedness within the United States. Analysis of state response and preparedness plans turned up significant amounts of documentation; states have given the issue of bioterrorism preparedness thought and planning as merited by the possibly serious ramifications if an event occurs.

The issue of bioterrorism is critical to study, and based on this research states have been working to create comprehensive response plans. States have varying levels of thoroughness and complexity in their response plans, and those differences cause state plans to have varying levels of effectiveness. Deficiencies identified in the response plan of Minnesota have shed light on the conflation of bioterrorism and public health; this is an incredibly important issue which deserves further study. If

the current trend of increased focus on bioterrorism continues into the future, it will remain important for future studies to evaluate state-level preparedness instead of focusing on the federal level. Analyzing the issue of bioterrorism preparedness at the state level is, and will continue to be, a rich and under analyzed field despite its significance to national security.