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BIOTHREAT RESPONSE: LOCAL EMERGENCY RESPONSE EFFORTS FOR SUSPICIOUS AND UNKNOWN SUBSTANCES

by

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December 2019

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In 2001, the United States faced two attacks that ultimately changed how emergency responders mitigate and recover from terrorism events: the devastating attacks of 9/11 and a case known as Amerithrax, in which letters tainted with anthrax were mailed to media outlets and politicians.

While the nation was initially unprepared to take on a biological weapon of mass destruction such as anthrax, government agencies and first responders collaborated to overcome this silent adversary, and the FBI closed its Amerithrax investigation in 2010. This thesis presents a historical analysis of Amerithrax to assess how the federal and state resources that were developed with this case have affected the nation's preparedness for future weapons-of-mass-destruction attacks with a biological nexus. The analysis shows that, as a result of Amerithrax, response agencies adopted laws and procedures to standardize equipment, training, investigative methods, and emergency preparedness and response efforts. Furthermore, the thesis analyzes policies of local law enforcement, fire, and emergency medical response teams, showing that local decision-makers have failed to take the same posture as their state and federal partners, which weakens their response capabilities. Finally, the thesis compares efforts in the United States to efforts of foreign governments and provides recommendations to help local agencies respond more successfully to cases involving suspicious and unknown substances.

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BIOTHREAT RESPONSE: LOCAL EMERGENCY RESPONSE EFFORTS FOR SUSPICIOUS AND UNKNOWN SUBSTANCES

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ABSTRACT

In 2001, the United States faced two attacks that ultimately changed how emergency responders mitigate and recover from terrorism events: the devastating attacks of 9/11 and a case known as Amerithrax, in which letters tainted with anthrax were mailed to media outlets and politicians. While the nation was initially unprepared to take on a biological weapon of mass destruction such as anthrax, government agencies and first responders collaborated to overcome this silent adversary, and the FBI closed its Amerithrax investigation in 2010. This thesis presents a historical analysis of Amerithrax to assess how the federal and state resources that were developed with this case have affected the nation's preparedness for future weapons-of-mass-destruction attacks with a biological nexus. The analysis shows that, as a result of Amerithrax, response agencies adopted laws and procedures to standardize equipment, training, investigative methods, and emergency preparedness and response efforts. Furthermore, the thesis analyzes policies of local law enforcement, fire, and emergency medical response teams, showing that local decision-makers have failed to take the same posture as their state and federal partners, which weakens their response capabilities. Finally, the thesis compares efforts in the United States to efforts of foreign governments and provides recommendations to help local agencies respond more successfully to cases involving suspicious and unknown substances.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFRD	Atlanta Fire Rescue Department
ASTM	American Society for Testing and Materials
CDC	Centers for Disease Control and Prevention
crim-epi	criminal-epidemiological
DHS	Department of Homeland Security
EMS	emergency medical services
FBI	Federal Bureau of Investigation
FIT	Field Investigation Team (European Union)
GAO	Government Accountability Office
GDPH	Georgia Department of Public Health
hazmat	hazardous materials
HMRT	hazardous materials response team
IAFC	International Association of Fire Chiefs
LRN	Laboratory Response Network
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
SPADA	Stakeholder Panel on Agent Detection Assays
TCE	threat credibility evaluation
USPIS	United States Postal Inspection Service
USPS	United States Postal Service
WMD	weapon of mass destruction
WMDD	Weapons of Mass Destruction Directorate

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EXECUTIVE SUMMARY

> Beyond those day-to-day tasks of bridging the foreign-domestic divide and matching intelligence with plans … challenges include broader management issues pertaining to how the top leaders of government set priorities and allocate resources.
>
> —*The 9/11 Commission Report*[1]

Although the United States, both in the public and private sectors, has strengthened its emergency response system to improve its ability to respond to, mitigate, and recover from attacks, there are gaps that must be addressed if the nation is to be truly prepared. Each time the nation has been tested by its adversaries, whether foreign or domestic, response and recovery efforts have improved. For example, responders pooled resources to respond to the World Trade Center bombings in 1993; the Oklahoma City bombing in 1995; the 1996 Centennial Olympic Park bombing in Atlanta; the 1997 Family Planning Clinic bombings in Atlanta and Birmingham, Alabama; and on the fateful day of September 11, 2001. Following each response effort, leaders at all levels of government analyze their shortcomings and address the gaps by implementing standards and protocols to become better prepared. The country faced a tough test, however, only a week after September 11th, when a weaponized biological agent known as *Bacillus anthracis*, or anthrax, was released into the environment, resulting in multiple casualties. At the time, the Federal Bureau of Investigation (FBI) and its partners were investigating the September 11th attacks; simultaneously, they were tasked with the anthrax investigation, a bioterrorism case that became known as Amerithrax. This thesis explores the threat of suspicious and unknown substances with a biothreat hazard, the historical narrative of Amerithrax, the strengths and weaknesses of the response, and the evolution of preparedness at the various levels of government.

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[1] National Commission on Terrorist Attacks upon the United States, *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks upon the United States*, 1st ed. (New York: Norton, 2004), 374.

During the Amerithrax attacks in 2001, local, state, and federal resources were deployed to investigate numerous incidents nationwide involving suspicious and unknown substances. Resources were stretched thin as agencies attempted to address the calls for service; because technology was not advanced enough, investigators could not figure out the unknown agent that was causing the damage, and field samples had to be taken to the few certified laboratories for testing. The process was slow and not cost-effective.

In 2006, the FBI partnered with the Centers for Disease Control and Prevention (CDC) to address the shortcomings of the Amerithrax response. They determined that they needed to standardize a process for sample collection and field screening for rapid preliminary determination of suspicious and unknown substances. They recognized, too, that laboratories needed to be certified and specialized to rapidly process samples taken from the field. Today, as a result of these findings, a definitive assessment of a substance can be distributed to stakeholders within twelve to seventy-two hours. Also as a result of this effort, the FBI formed the Weapons of Mass Destruction Directorate (WMDD) in 2006. This directorate was tasked with taking the lead on all bioterrorism threats within the continental United States and U.S. territories abroad; eventually, the directorate would include fifty-six field offices, each staffed with a liaison between the FBI and all response stakeholders. The CDC also worked with the FBI to increase the number of laboratories available to conduct definitive testing, creating the Laboratory Response Network, or LRN. Most LRN facilities are state-level health laboratories tasked with testing possible biothreat agents. All LRN and WMDD personnel operate under mandated laws, policies, and procedures to ensure consistency in equipment, as well as in mitigation, response, and recovery efforts.

The Amerithrax case was unique because the biological substance used was delivered via the United States Postal Service (USPS); as a result of the decade-long investigation that followed, the USPS now trains its postal inspectors to respond to and investigate suspicious substances that have traveled through the mail system. The technology they use to conduct sampling and field screening is approved by legal standards, and the inspectors work closely with the FBI to ensure that their response capability is consistent with the LRNs and CDC.

Another lesson learned from Amerithrax is that the response capabilities of state and federal partners can be dependent on local responders. Suspicious and unknown substances are not always delivered through the mail or discovered at the federal level; it is therefore imperative that local law enforcement, fire, and hazardous materials (hazmat) personnel can begin an initial investigation. Amerithrax proved that a biological agent can cause mass casualties and costly environmental damage if the process of detecting that agent—or determining what it is—is slowed or halted. If local first responders can begin field sampling and screening in such cases, they can expedite determination and response efforts. It is during this crisis response phase at the local level that research has shown a transition to long-term investigation and health management of a biological release can be hindered if the local responders are not consistent in mitigation, response, and recovery efforts. State and federal partners cannot start a threat credibility evaluation without initial results from local resources. This means that, if a threat is valid and local responders do not have the ability to respond in a consistent, coordinated manner, the state and federal investigations are stalled, which may result in increased casualties.

As a result of Amerithrax, state and federal partners recognized their challenges and adjusted for future response measures; however, local government agencies do not always understand the importance of strong countermeasures when faced with a biological threat. Consistency at the local level is imperative for a coordinated and effective response to suspicious and unknown substances. Although there are policies, procedures, and guidelines written for local first responders that allow these agencies to govern themselves, the guidelines and polices are not enforceable like they are at the state and federal level. As result, there is no consistency among local jurisdictions nationwide. Training, equipment, and operational procedures on the ground have not improved, even after lessons learned from Amerithrax. It is imperative that decision-makers at the local level begin to look at how they improve their response capability to enhance biothreat preparedness to prevent another Amerithrax. This thesis recommend training initiatives, as well as the formation of a new working group to address shortcomings at the local level.

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I would like to thank Fire Chief Joel G. Baker (ret.) and his command staff at the Atlanta Fire Rescue Department for granting me the opportunity to serve as the department's homeland security officer. They trusted me to lead the department in countering terrorism at the local, state, and federal levels to protect our city. A special thank-you to the members of the International Association of Fire Chiefs (IAFC) Terrorism and Homeland Security Committee, where I continue to serve with leaders such as Kevin McGee, Ken LaSala, Jim Schwartz, Michael Little, Matthew Rush, Salvatore Cassano, and Joe Pfeifer to address terrorism threats as they relate to the U.S. fire service. I would like to thank George Glenn, training manager of IM programs for Texas A&M Engineering Extension Service (TEEX), for granting me the time off that I needed to complete this program.

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I. INTRODUCTION

On September 11, 2001, the United States experienced coordinated attacks by adversaries that changed how responders at all levels of government would forever look at public safety. Due to the nation's swift launch of a global war on terror, experts agree that terrorists will never again have the capabilities to launch detailed, planned attacks such as those seen on 9/11; the horrific events that day served as a foundation for lessons learned that have reshaped and redefined response efforts.[1] Responders have changed their capabilities to mitigate acts of terror by posturing themselves around policies that support emergency preparedness, detection, and disruption. The same can be said for response efforts to acts of biological terrorism, which were improved following an event known as Amerithrax, which began only a week after the September 11th attacks, when letters tainted with anthrax were sent through the U.S. mail system.

Although state and federal agencies have enforceable, standardized policies and procedures for handling emergency response related to suspicious and unknown substances, the response structure at the local level throughout the United States is inconsistent. The gaps in local operational response are a result of policies and procedures that are only recommendations; for local responders, there are no standards enforced by executive decision-makers. Both the public health community and first responders tasked with response to biological threats have a desire to establish standards for responding to biological terrorism.[2] Such standards, associated requirements, and test protocols are a necessity to guide—among others—manufacturers, equipment developers, and public health and safety agencies responsible for making procurement and response decisions.[3]

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[1] Vincent E. Henry and Douglas H. King, "Improving Emergency Preparedness and Public-Safety Responses to Terrorism and Weapons of Mass Destruction," *Brief Treatment and Crisis Intervention*, 4, no. 1 (2004): 11–35.

[2] Matt Davenport, "After Amerithrax: Biodefense in a Post-9/11 America," *Chemical and Engineering News Magazine* 94, no. 38 (September 26, 2016): 36–40, cen.acs.org/articles/94/i38/Amerithrax-Biodefense-post-911-America.html.

[3] Stephen Foley, "Strategic Plan for CBRN Equipment Standards" (paper presented at the Weapons of Mass Destruction (WMD) Terrorism Preparedness & Response Conference & Exhibition, Arlington, VA, 2001), 17.

A. PROBLEM STATEMENT

The anthrax attacks that occurred between September and November 2001 (coined as *Amerithrax* by the FBI) resulted in the deaths of five Americans and the serious illness of seventeen others. Within a short time, the fire service became responsible for local emergency response to biothreats, including field sampling.[4] As a result of Amerithrax, in July 2006 the Federal Bureau of Investigation (FBI) established the Weapons of Mass Destruction Directorate (WMDD), whose mission is to ensure that the FBI and its partners can anticipate, mitigate, disrupt, and respond to threats from weapons of mass destruction (WMDs).[5] In the WMDD framework, operational guidance calls for coordination among partners from emergency response teams, local and state public health agencies, and federal law enforcement.[6] However, because local first response agencies fail to follow the framework established by the WMDD, local procedures tend to be inconsistent and underdeveloped. Leaders such as David Ladd, director of hazardous materials response for the Massachusetts Department of Fire Services, are concerned that flexibility in the response framework can be detrimental, especially when it comes to how agencies train, conduct exercises, select detection technology, and approach interoperability.[7] In a criminal-epidemiological (crim-epi) scenario, local first responders are the first to arrive on the scene; if local response is delayed, or if local responders fail to screen an unknown substance accurately, the result could be disastrous.

Crim-epi operations deal with cases of malicious intent to introduce disease to harm the public and the environment.[8] When a suspicious, unknown substance is introduced into

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[4] Rick Emery, "Field Biological Detection Capabilities," *Fire Engineering*, 164, no. 9 (September 1, 2011): 1, https://www.fireengineering.com/articles/print/volume-164/issue-9/terrorism-and-the-fire-service/field-biological-detection-capabilities.html.

[5] "Weapons of Mass Destruction," Federal Bureau of Investigation (FBI), accessed September 8, 2019, https://www.fbi.gov/investigate/wmd.

[6] Bert Coursey et al., "Framework for a Biothreat Field Response Mission Capability" (report, Department of Homeland, April 5, 2011), https://www.hsdl.org/?view&did=767721.

[7] Davenport, "After Amerithrax."

[8] Mark M. Lanier, "Epidemiological Criminology (EpiCrim): Definition and Application," *Journal of Theoretical and Philosophical Criminology* 2, no. 1 (2010): 72–73, https://core.ac.uk/download/pdf/10688594.pdf.

society, public health operations must join the law enforcement actions of a criminal investigation. This thesis argues that if local first responders are equipped with a standardized and operational capability for the field screening of unknown substances, they will be able to protect the health and safety of the public and responders alike, and could contribute to faster and better crim-epi investigations for all stakeholders. In this vein, the thesis seeks to answer the following questions:

- Is it possible to standardize local response to suspicious and unknown substances within the WMD response delivery system? Would such a standard improve and sustain the response process as it pertains to crim-epi investigations and incident response operations?
- Is it possible for local responders to improve their crisis response to support consequence management or crim-epi events?
- Would the development and use of a standardized process achieve the desired ends?

This research is of interest to federal, state, and local emergency response stakeholders because it may be used to change or establish response protocols and training. A standardized WMD response to suspicious and unknown substances at the local level may expedite decision-making for criminal investigations and prosecutions, as well as epidemiological operations, if public health stakeholders need to surge resources for the mass care of the public.

B. GOALS AND OBJECTIVES

The goal of this research is to examine the deficiencies in local response to a suspicious and unknown substance involving a biological agent; specifically, the thesis addresses deficiencies caused by a lack of inclusive or comprehensive mandates, policies, and procedures. To do so, the research examines the response protocols and procedures established by state and federal agencies after the Amerithrax attacks in 2001. These policies and procedures guided now-established strategies for criminal investigations and epidemiological operations. The objective of this research is to identify local response

issues and determine if a similarly standardized framework is—or can be—implemented and enforced at the local level.

C. LITERATURE REVIEW

The sources discussed in this section establish the need for a standardized response to suspicious and unknown substances that may be biological. The literature explores lessons learned that demonstrate the inconsistent responses to suspicious and unknown substances at the local level.

1. Local Biothreat Response

According to Dr. Vahid Majidi, former assistant director of the FBI's WMDD, biological threats—including hoaxes—are ever-increasing.[9] Because local public safety agencies (primarily fire and law enforcement agencies) have dealt with such threats in an improvised manner, they have created a culture that is hampering mitigation of, response to, and investigation of WMD biothreat operations. In a RAND publication titled *Protecting Emergency Responders: Lessons Learned from Terrorist Attacks*, Brian Jackson et al. point out that the way biological agents are handled is critical; when first responders are insufficiently prepared, informed, or trained, they end up developing policies and procedures in real-time during the response.[10] Jackson et al. provide a credible analysis and offer best practices by looking in-depth at domestic incidents such as the 1993 attack on the World Trade Center in New York, the September 11th attacks, the Oklahoma City bombing, Amerithrax, and several other terrorism events that required local response. In "After Amerithrax," Matthew Davenport discusses why public safety responders lack consistency in biothreat response. Davenport argues that first responders must take every incident seriously by executing protocols with a general response baseline, but that baseline

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[9] Ten Years after 9/11 and the Anthrax Attacks: Protecting against Biological Threats: Hearing before the Committee on Homeland Security and Governmental Affairs, Senate, 112th Cong., 1st sess. (October 18, 2011), https://archives.fbi.gov/archives/news/testimony/ten-years-after-9-11-and-the-anthrax-attacks-protecting-against-biological-threats.

[10] Brian A. Jackson et al. *Protecting Emergency Responders: Lessons Learned from Terrorist Attacks* (Santa Monica, CA: RAND, 2002), 63, www.rand.org/pubs/conf_proceedings/CF176.html.

varies from city to city and state to state.[11] Relying on evidence from the Government Accountability Office (GAO), BioWatch, and the FBI, Davenport demonstrates that local responders have failed to consistently adhere to a response framework. Davenport's findings support the need for a deeper dive into policy at the state and local level to foster consistency in response operations. He argues that there are standards in place for use by first responders that can ensure the nation has countermeasures for bioterrorism and that can facilitate response efforts.[12]

Vincent Henry and Douglas King agree that there is a need for a detailed, specialized strategy that outlines resources from all response stakeholders and that provides a framework for response to suspicious and unknown substances.[13] Their writing also explains why first responders must approach bioterrorism methodically: a slow and deliberate approach allows law enforcement to investigate the potential criminal aspect of an event to prove malice or safely identify a hoax.

2. The Framework for Bioterrorism Response

In a report titled *Anthrax Detection*, the GAO assesses how federal agencies detect anthrax in postal facilities and their capabilities to test biological agents.[14] The report thoroughly explores the biological response capabilities of federal agencies—including the United States Postal Service (USPS), Department of Homeland Security (DHS), Department of Health and Human Services, and Environmental Protection Agency—and highlights the framework for probability sampling, which helps the agencies determine when results are negative versus when there is contamination.[15] The framework has five phases: strategy development, sample collection, sample transportation, sample extraction, and sample analysis. The GAO believes that the response at the federal level should include

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[11] Davenport, "After Amerithrax."

[12] Davenport.

[13] Henry and King, "Improving Emergency Preparedness."

[14] Government Accountability Office, *Anthrax Detection: Agencies Need to Validate Sampling Activities in Order to Increase Confidence in Negative Results*, GAO-05-251 (Washington, DC: Government Accountability Office, March 2005), www.gao.gov/new.items/d052151.pdf.

[15] Henry and King, "Improving Emergency Preparedness."

DHS investing in sampling strategies and developing agency policies, procedures, and guidelines.[16] The report provides standardized and mandated guidelines for federal agencies to follow, but it does not give directives or recommendations for local public safety agencies.

In 2004, the International Association of Fire Chiefs (IAFC) collaborated with the FBI's Technical Hazards Response Unit, the FBI Laboratory division, and the Centers for Disease Control and Prevention (CDC) to develop a framework for local responders. Although this document is only a reference for local response to potential biological threats, it provides guidance and a foundation for policy. It states that first response agencies of all sizes throughout the nation have taken independent actions to address biological threats.[17] According to the document, titled "Model Procedures for Responding to a Package with Suspicion of a Biological Threat," the framework for local responders is "based on sound principles, complements the concepts of unified command, promotes interoperability and generates standard operating guidelines that all departments will recognize."[18] This document provides a flowchart that outlines the necessary steps for meeting specific benchmarks, such as notifying the FBI WMD coordinator and coordinating the transport of field-screened samples to the local laboratory. The document also provides recommendations for protecting response operators, mitigating potential exposures to patients, and identifying the equipment necessary to conduct proper field screening to facilitate crim-epi operations. Although this document does not mandate or enforce response at the local level, it is an excellent resource for the development of operating procedures. The IAFC is a credible organization with the capability to reach out to organizations and political partners at a high level.

In 2008, Congress asked the GAO to assess local response to chemical, biological, radiological, and nuclear releases in urban areas. Although the FBI is the agency responsible for investigating terrorism—to include bioterrorism—Health and Human

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[16] Henry and King.

[17] International Association of Fire Chiefs, "Model Procedures for Responding to a Package with Suspicion of a Biological Threat" (guidelines, International Association of Fire Chiefs, January 2004), 3.

[18] International Association of Fire Chiefs, 3.

Services is responsible for conducting epidemiological operations, and first responders are responsible for response to malicious and accidental releases of WMDs in in their area of responsibility.[19] The GAO's report cites that detection devices for bioagents tend to be ineffective and unreliable, and that local responders do not have standards in place to procure and deploy the equipment necessary to detect such agents.[20] The report goes on to argue that uniform standards for equipment can help local responders purchase the right equipment and employ that equipment during response and training efforts.[21]

Best Practices for Sample Collection and Transport during an Initial Response to Potential Bio-threat Materials is a federal document written for responders at all levels and published by the National Institute of Standards and Technology (NIST).[22] The document provides a framework for coordinating response and communication to suspicious and unknown substances with a potential biological threat nexus. There are several scenarios presented for local responders to implement field-screening processes that validate response to visible powders, liquid contaminants, and unknown, nonvisible contaminants.[23] This resource contains documentation for existing standards, regulations, and guidance from organizations such as the National Fire Protection Association (NFPA) and the American Society for Testing and Materials (ASTM). The guidance in this document is a necessary reference for local responders looking to develop policies and procedures that align with state and federal response guidelines.[24] The twenty-page document provides a flowchart/decision tool framework for responders to decide how to

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[19] Government Accountability Office, *Homeland Security: First Responders Ability to Detect and Model Hazardous Releases in Urban Areas Is Significantly Limited*, GAO-08-180 (Washington, DC: Government Accountability Office, June 27, 2008), www.gao.gov/assets/280/277637.pdf.

[20] Government Accountability Office.

[21] Government Accountability Office.

[22] Jayne B. Morrow, Autumn S. Downey, and Lisa J. Delaney, *Best Practices for Sample Collection and Transport during an Initial Response to Potential Biothreat Materials*, NIST Technical Note 1776 (Washington, DC: National Institute of Standards and Technology, November 2012), https://ws680.nist.gov/publication/get_pdf.cfm?pub_id=909556.

[23] Morrow, Downey, and Delaney.

[24] Morrow, Downey, and Delaney.

approach a given scenario when they arrive on the scene. It delves into risk assessment for transportation to an LRN facility and provides a matrix of standards for various scenarios.

While the NIST document provides specifics for responders to follow at the tactical and task levels, ASTM E2770-17, *Standard Guide for Operational Guidelines for Initial Response to a Suspected Biothreat Agent*, addresses strategic-level response measures. The goal of this eighteen-page document is to support best practices for operational response to potential biothreat agents utilizing coordinated tactics, as articulated in the DHS National Response Framework. The guide is targeted toward emergency response agencies responsible for fire rescue and hazardous materials, public health, law enforcement, and emergency management with a direct role in the initial response.[25] This guide is compliant with the National Incident Management System (NIMS), provides a risk-based response architecture, and assumes the implementation of crisis response before the recognition of a suspected biothreat event. The document also explains how to cease activity if responders determine there is no threat, or when federal resources assume the consequence management investigation and operations.

Figure 1 shows a standard emergency response to a suspicious and unknown substance. The framework shown here is for a simple response; responses can become very involved and may require additional resources and subject matter expertise.

[25] American Society for Testing and Materials, *Standard Guide for Operational Guidelines for Initial Response to a Suspected Bio-threat Agent*, E2770-10 (West Conshohocken, PA: ASTM International, November 2010), https://www.ok.gov/health2/documents/ E2770_Standard%20Operational%20Guidelines%202-15-13.pdf.

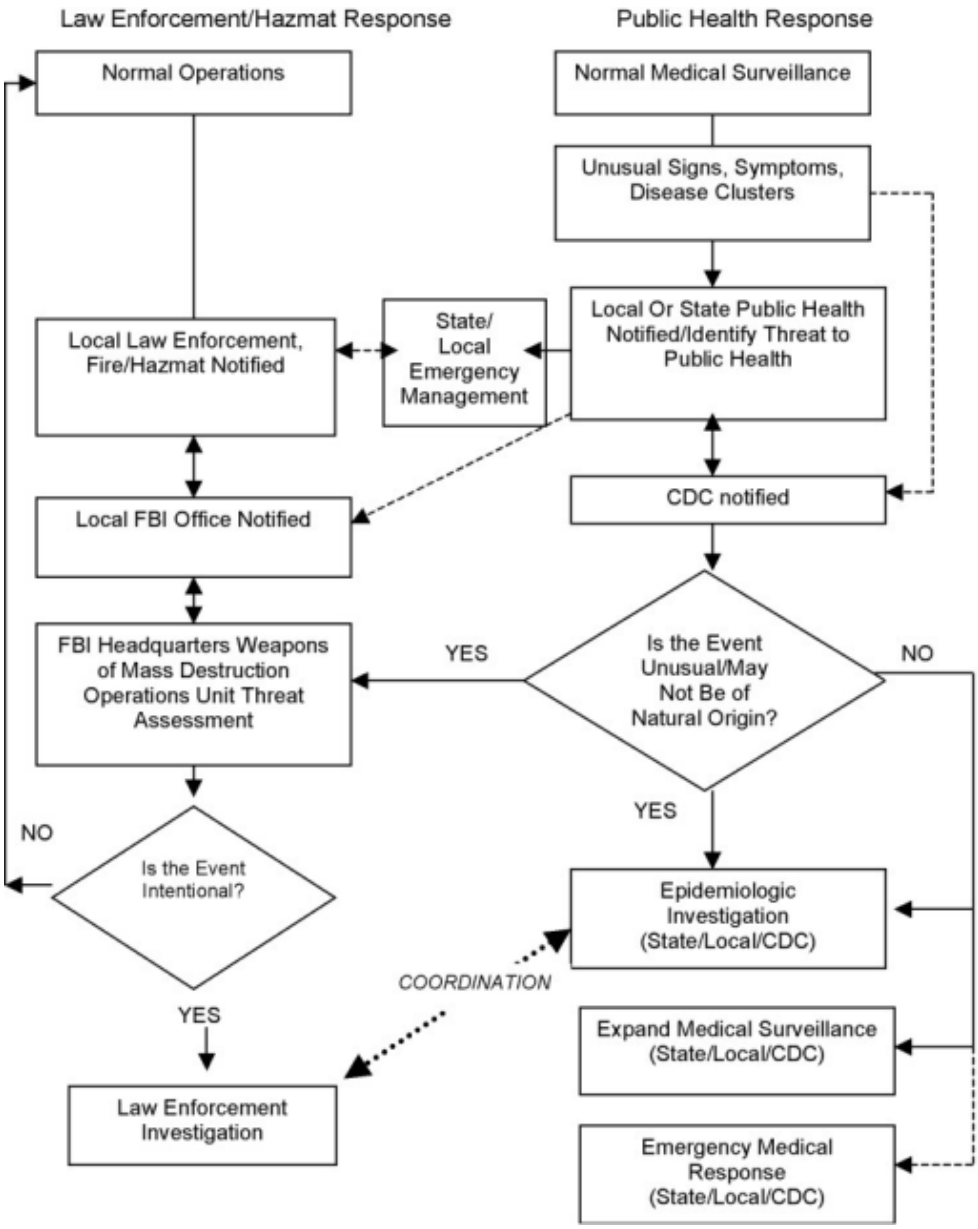

Figure 1. Standard Emergency Response to a Biological Threat[26]

[26] Source: "Outbreak Response and Bioterrorism Investigation," Mandegar.info, accessed November 17, 2018, http://mandegar.info/?l=Outbreak+Response+and+Bioterrorism+Investigation.

3. Local Response: Coordination and Preparedness

The WMD response framework is similar to a framework developed for chemical spills and hazardous materials responses; however, Dr. Joseph F. Waeckerle, writing for the American Medical Association, argues that local responders should modify such concepts of operations for mitigation purposes. He states that protocols for a chemical spill are generally inapplicable for a local response to biological terrorism.[27] His argument is supported by Thomas Creamer, who states that training for hazardous material events provides responders with core principles for operating in austere atmospheres, but responders fail to hone their skills for WMD events at the highest level.[28] Creamer, who served as a consultant to the Department of Defense, Department of Justice, and the FBI, was the preparedness training director for the New York State Division of Homeland Security and Emergency Services. His article focuses on WMD response, including collaboration among fire, emergency medical services (EMS), and law enforcement personnel.

Since Amerithrax, emergency responders have had to adjust their capabilities to respond to the threat of terrorists using WMDs, which has significantly changed the local mission of emergency response and public safety.[29] An article in *Fire Engineering* by Tony Mussorfiti and John Seley titled "A Risk-Based Approach to Hazmat/WMD Emergency Response" supports the notion that fire, law enforcement, and public health personnel must collaborate in order to be effective. The authors discuss the merits of a decision-based approach over traditional tactics used by responders as an incident develops.[30] This methodology creates "decision points" for responders on the ground to take the necessary

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[27] Joseph F. Waeckerle, "Domestic Preparedness for Events Involving Weapons of Mass Destruction," *JAMA* 283, no. 2 (January 12, 2000): 252–54.

[28] Thomas Creamer, "Multi-agency Response to WMD," *Fire Engineering* 158, no. 11 (November 1, 2005), www.fireengineering.com/articles/print/volume-158/issue-11/wmd-supplement/multiagency-response-to-wmd.html.

[29] Tony Mussorfiti and John E. Seley, "A Risk-Based Approach to Hazmat/WMD Emergency Response," *Fire Engineering* 164, no. 9 (September 1, 2011), www.fireengineering.com/articles/print/volume-164/issue-9/terrorism-and-the-fire-service/a-risk-based-approach-to-hazmat-WMD-emergency-response.html.

[30] Mussorfiti and Seley.

precautions when dealing with WMDs. The FBI's threat credibility evaluation (TCE) process supports this response capability. Mussorfiti and Seley's article provides detailed steps for this approach to WMD mitigation, to include flowcharts and competency standards from the NFPA. The NFPA is not a regulatory agency but rather a consortium of individuals from local, state, and federal agencies as well as the private sector who provide recommendations to response organizations. Response protocols governing the handling of hazardous materials are formally provided by the Occupational Safety and Health Administration (OSHA) in the Code of Federal Regulations (29 C.F.R. § 1910.120). The OSHA protocols are regulatory.[31]

The Biological Incident Annex (BIA), although written for federal agencies, is scalable to support a biological incident response of any size and to provide flexibility without negating established laws and policies; local, state, tribal, territorial, and nongovernment agencies, along with volunteer organizations and private industry, can use this document for preparedness and response planning.[32] Although the BIA focuses on response capabilities at the federal level, a biological response begins at the local level; a standardized and systematic response locally will support the federal response. Epidemiological operations at the federal level, led by Health and Human Services, are dependent, for instance, on the initial screening/ of the substance at the local level.[33]

Recognizing the gaps in biothreat response at the local level, the DHS Science and Technology Directorate authored a document titled "S&T Standards Protecting the Nation against White Powder Attacks" in August 2014. The document recognizes critical elements in coordinating response activities among local fire rescue/hazmat personnel, law

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[31] OSHA Code of Federal Regulations, Pub. L. No. 1910, § 120(a), 29, https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9765#1910.120(c).

[32] Federal Emergency Management Agency, *Biological Incident Annex to the Response and Recovery Federal Interagency Operational Plans-Final January 2017* (Washington, DC: Department of Homeland Security, January 23, 2017), https://www.fema.gov/media-library-data/1511178017324-92a7a7f808b3f03e5fa2f8495bdfe335/BIA_Annex_Final_1-23-17_(508_Compliant_6-28-17).pdf.

[33] Federal Emergency Management Agency, *Biological Incident Annex*.

enforcement, environmental responders, laboratories, and public officials.[34] The document provides national operational guidance and sample collection protocols for mitigation efforts, and highlights national biothreat response capabilities such as a concept of operations. The concept of operations supports the use of field technology and coordination among the responding agencies, stressing the importance of field screening in cooperation with the Laboratory Response Network (LRN).[35] The LRN was established in 1999 by the FBI, CDC, and the Association of Public Health Laboratories as the nation's laboratory response system for WMD threats and natural disasters that cause public health emergencies.[36] LRN labs are a force multiplier in response to bioterrorism events. The standards document also defines minimum performance requirements and cites the standard practices for measuring and characterizing suspicious powders.[37] The document provides an overall support mechanism for local responders and their partners. It is a national consensus-establishing standard for all stakeholders for command, coordination, communication, and control, which ensures the safety of the public and maintains a seamless and secure chain of custody for possible prosecution of perpetrators.[38] Nonetheless, these standards are not enforced or mandated at the local level.

The documents discussed in this literature review outline a need for local responders to standardize response protocols. While this review covers only the need for standards at the local level, the remainder of the thesis will explore specific actions at all stakeholder levels, but will continue to highlight core capabilities, interagency coordination, and overall preparedness at the local level.

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[34] DHS Science and Technology Directorate, "Science and Technology Standards Protecting the Nation against White Powder Attacks," Department of Homeland Security, August 11, 2014, https://www.dhs.gov/sites/default/files/publications/S%26T%20Standards%20Protecting%20the%20Nation%20Against%20White%20Powder%20Attacks-508_2.pdf.

[35] DHS Science and Technology Directorate.

[36] Tyler Wolford, "Laboratory Response Network," Association of Public Health Laboratories, accessed November 17, 2018, https://www.aphl.org/programs/prepardenss/Pages/LRN.aspx.

[37] DHS Science and Technology Directorate, "Science and Technology Standards."

[38] DHS Science and Technology Directorate.

D. RESEARCH SCOPE AND THESIS ORGANIZATION

The primary focus of this thesis is the local response to suspicious and unknown substances with a potential biological threat nexus. As mentioned, local response efforts do not mirror federal and state standards. Local executives, in conjunction with their field commanders, must understand that their response is critical to the management of criminal investigations and epidemiological operations. The analysis herein focuses on successful policies, procedures, and mandates that guide state and federal response, which will help to fill the gaps in local response efforts.

Following this introduction, the thesis begins with a historical narrative of the anthrax letter attacks of September through November 2001, known as Amerithrax. The narrative outlines the response at the local, state, and federal levels and provides a timeline of events that highlights the gaps at each level of response during the attacks. This is done by looking at each level separately through crisis response (local, state, and federal) and consequence management (state and federal). The next chapters analyze gaps in the capability of a biothreat response at the local level post-Amerithrax, to include analyzing the capabilities in training, policy, procedure, and technology. The final chapter provides smart practices, observations, and recommendations for policy, procedure development, and refinement of long-term strategical response.

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II. ANATOMY OF A RESPONSE

As stated in the *Criminal and Epidemiological Investigation Handbook*, written by the FBI and CDC,

> The weapons of mass destruction (WMD) statute, 18 U.S.C. § 2332a defines bioterrorism as the threat (or conspiracy) to use a WMD, including any biological agent, toxin, or vector … against a national of the United States or within the United States. The term WMD includes any weapons involving a disease organism. However, it does not require the actual use of a biological agent. Neither does it require that the biological agent be a select agent, only that the agent be capable of causing biological malfunction, disease, or death in a living organism (Title 18 U.S.C. Section 178).[39]

A. HISTORICAL SUMMARY OF AMERITHRAX

As the United States was struggling to recover from the attacks of September 11, 2001, a separate attack involving the use of a biological agent was unfolding, with deadly consequences. Five letters containing anthrax (*Bacillus anthracis*) mailed through the United States Postal Service (USPS) to Senator Tom Daschle, Senator Patrick Leahy, and the mainstream media caused fear and panic across the country. This was the first act of bioterrorism in the country perpetrated through the USPS.[40] It was eventually concluded that five deaths and twenty-two other cases of harm were the result of the intentional, malicious release of anthrax through these letters.[41] The FBI gave this unprecedented attack of bioterrorism the case name Amerithrax.

During Amerithrax, the FBI and collaborating partners responded to 257 potential cases of suspicious letters, 200 of which were anthrax threats; however, they were all

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[39] FBI and Centers for Disease Control and Prevention (CDC), *Criminal and Epidemiological Investigation Handbook* (Washington, DC: Department of Justice, 2011), https://www.cdc.gov/phlp/docs/CrimEpiHandbook2011.pdf.

[40] David Heyman, "Lessons from the Anthrax Attacks: Implications for U.S. Bioterrorism Preparedness: A Report on a National Forum on Biodefense" (report, Center for Strategic and International Studies, April 2002), https://biotech.law.lsu.edu/blaw/anthrax/dtra02.pdf.

[41] James M. Hughes and Julie L. Gerberding, "Anthrax Bioterrorism: Lessons Learned and Future Directions," *Emerging Infectious Diseases* 8, no. 10 (October 2002): 1013–14, https://doi.org/10.3201/eid0810.020466.

determined to be hoax incidents.[42] There were over 30,000 responses to suspicious and unknown substances throughout the United States, and an Amerithrax Task Force was established as the case expanded, led by the FBI, USPS and United States Postal Inspection service (USPIS), local and state law enforcement agencies, federal prosecutors, and state and federal scientists.[43] The attacks resulted in numerous 911 calls involving suspicious and unknown substances; citizens and places of business would call 911 to report any powdery substance that looked out of place. Between October and November 2001, the New Jersey Department of Health and Senior Services received over 6,000 calls and the CDC received 8,860 calls related to bioterrorism.[44] The surge in biothreat emergencies created an inconsistent culture of responsibility among first responders and hindered active investigations and mitigation efforts. The local responders could not operate offensively for detection and decontamination operations. Compounding these issues were a lack of emergency preparedness, poor information sharing, and inadequate training among responders, resulting in strategies and tactics that were developed on the scene.[45]

Although the attacks initiated a public health investigation, the case quickly fell to the FBI.[46] Bioterrorism was new to public safety partners, however, and many investigative techniques were not conducive to responding to, investigating, or controlling the incident. Initially the FBI opened a criminal investigation of the Amerithrax-related incidents while examining potential links to terrorism—specifically, the September 11th attacks. The investigation had a two-pronged approach: agents and law enforcement investigators tracked leads and interviewed witnesses while scientists from the FBI and

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[42] Heyman, "Lessons from the Anthrax Attacks."

[43] "Amerithrax or Anthrax Investigation: Famous Cases and Criminals," FBI, accessed September 15, 2018, https://www.fbi.gov/history/famous-cases/amerithrax-or-anthrax-investigation.

[44] Caron Chess and Lee Clarke, "Facilitation of Risk Communication during the Anthrax Attacks of 2001: The Organizational Backstory," *American Journal of Public Health* 97, no. 9 (September 2007): 1578, https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2006.099267.

[45] Jackson et al., *Protecting Emergency Responders*.

[46] National Research Council, *Review of the Scientific Approaches Used during the FBI's Investigation of the 2001 Anthrax Letters* (Washington, DC: National Academies Press, 2011), 24.

outside laboratories analyzed evidence.[47] During the Amerithrax investigation, the FBI collaborated with other stakeholders to establish procedures for scientific analysis of the letters and samples of spore powders collected from the environment and clinical laboratories.[48] Initially, standardized protocols were not in place, making organized response and organization difficult. The attacks revealed weaknesses in the U.S. bio-preparedness response, exposing deficiencies in public health infrastructure, forensic science, and diagnostic capabilities.[49]Although the FBI partnership included highly qualified experts, a clear investigative management structure and process were not present to oversee the scientific criminal investigation, and an epidemiological operation was not available in 2001.[50]

Amerithrax was a resource-intensive operation and the case expanded over six years. During that time, seventeen FBI special agents and ten USPIS postal inspectors put in 600,000 investigative hours—which spanned over six continents—interviewed 10,000 witnesses, issued 80 search warrants, reviewed 26,000 emails, and analyzed of over 4 million megabytes of computer memory, resulting in 5,750 grand jury subpoenas.[51]

Since the Amerithrax attacks, response stakeholders have changed how the country prepares for bioterrorism events, and have established processes for analyzing biological threats. Table 1 illustrates the current roles and responsibilities of stakeholders involved in response to a biological threat that is suspicious and unknown.

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[47] "FBI and Justice Department Response to NAS Review of Scientific Approaches Used during the Investigation of the 2001 Anthrax Letters," FBI, February 15, 2011, https://archives.fbi.gov/archives/news/pressrel/ress-releases/fbi-and-justice-department-response-to-nas-review-of scientific-approaches-used-during-the-investigation-of-the-2001-anthrax-letters.

[48] National Research Council, *Review of Scientific Approaches*, 24.

[49] Heyman, "Lessons from the Anthrax Attacks," VIII.

[50] National Research Council, *Review of Scientific Approaches*, 54.

[51] FBI, "FBI and Justice Department Response to NAS Review."

Table 1. Standard Response to Suspicious and Unknown Substances

	FBI	USPIS	LRN	Local LE	Fire/hazmat
Notify response partners	R	I	I	A	A
Clear for explosive hazard in field *open/unopened package*	RAC	I	I	RAC	I
Field screen *for flammability and hazards*	RAC	RAC	I	I	RA
Conduct threat credibility evaluation	RA	C	C	C	CI
Package the substance *for transport to lab or for evidence*	RA	RA	I	C	ACI
Conduct lab testing *for definitive biothreat identification*	RA	I	RA	I	I
Conduct criminal investigation *federal*	RA	RA	I	CI	_
Conduct riminal investigation *local*	I	I	I	RA	_
Conduct epidemiological operation	RA	I	RA	I	CI
	R = Responsible A = Accountable C = Consulted I = Informed				
	LRN=Laboratory Response Network LE=Law Enforcement				

The basic roles and responsibilities in this matrix are based on a scenario in which a biothreat is delivered through the U.S. mail system. Because scenarios vary, there is some room for flexibility in incident management and recovery.

B. CRISIS RESPONSE: FEDERAL

There was little concern for bioterrorism preparedness and response prior to Amerithrax; the United States had minimal congressional legislation and few presidential directives addressing the matter, and the CDC and its partners lacked contingency plans.[52] Amerithrax changed this, and it also changed the postal service's concept of operations for

[52] David W. Craft, Philip A. Lee, and Marie-Claire Rowlinson, "Bioterrorism: A Laboratory Who Does It?" *American Journal of Clinical Microbiology* 52, no. 7 (July 2014): 2293.

processing mail. For an article in *CBRNe World*, Postal Inspection Program Manager Tripp Brinkley expressed that, according to officials, the mail system was never considered an effective distribution network for biological terrorism.[53] While experts believe that the USPS was not an intended target of the attacks, the anthrax letters proved that the USPS is a potential transportation system for WMD biological threat agents, and it was the first time that the U.S. mail system successfully facilitated the delivery of a weapon of terror.[54] Upon learning which anthrax strain was sent through the mail, the FBI and the USPIS opened their joint investigation; within twenty-four hours, scientists confirmed the presence of anthrax powder in the letters sent to the U.S. senators and news media.[55] During the forensic investigation, the USPIS examined the envelopes by looking at the manufacturer, size of containers, materials used to make the pockets, barcodes, and stamps. Based on an extensive microscopic comparison of defects to the envelopes, including the shipping and receiving records from the USPS, investigators concluded that the containers used in the anthrax attacks were banded and secured in the Northern Virginia region.[56]

A terrorist's ultimate goal is to create fear and pandemonium; in the case of Amerithrax, the result was also frustration, confusion, uneasiness, and uncertainty among the public and the response system.[57] In Florida and New York, the public's desire for antibiotics increased; as described by one pharmacy in Florida, this "semi-educated panic" was brought about by the public's poor understanding of the facts.[58] Scientists, the FBI, USPIS, and local law enforcement did not know much about anthrax and its deadly potential if weaponized. Before the anthrax letters, CDC scientists and experts in biological

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[53] Tripp Brinkley, "A First-Class Delivery System," *CBRNe World* (Spring 2008): 70.

[54] U.S. Postal Service, "Lessons in Crisis Communications" (report, USPS, October 12, 2001), https://page.org/attachments/5df31b9a04832e70a9d5629a7f10a8e8543282c4/store/83859fab3e5fd48400f43864da6bba288b3c6ccfa999bb3b8e225e54abc0/USPS_Case.pdf; Brinkley, "A First-Class Delivery System."

[55] Department of Justice, "Amerithrax Investigative Summary" (report, Department of Justice, February 19, 2010), 11, https://www.justice.gov/archive/amerithrax.

[56] Department of Justice.

[57] Center for Counterproliferation Research, "Anthrax in America: A Chronology and Analysis of the Fall 2001 Attacks" (working paper, National Defense University, November 2002), 12, https://fas.org/irp/threat/cbw/anthrax.pdf.

[58] Center for Counterproliferation Research, 12.

warfare believed that biological exposure was nominal because the number of biological spores mailed could not be great enough to cause disease.[59] After citizens learned about the anthrax letters, however, there was fear, irrational thinking, a great deal of frustration, and delay and inconvenience with mail delivery, which compromised operations of major federal agencies in Washington, DC.

C. CRISIS RESPONSE: STATE

Before Amerithrax, national security concerns limited the number of laboratories that were capable of conducting microbiology tests on acutely ill patients.[60] With over 30,000 samples to analyze during the attack, the lack of certified laboratories became a problem. Anthrax was unknown in the clinical field of practice, and many clinicians lacked the knowledge to recognize, diagnose, and treat its signs and symptoms.[61] As a result, emergency responders—who were also overwhelmed by the surge of anthrax scares—mishandled the samples as they turned them over to law enforcement for transport to the state crime lab or a local health lab. The CDC faced challenges during the investigation, too, from the logistically intensive demands from stakeholders at the local and state levels, which the agency had to manage while trying to coordinate a public health response as the incident expanded.[62] Without sufficient certified facilities, other laboratories in the National Capital Region were permitted to support the clinical response and criminal investigation; however, these laboratories did not have the capabilities or expertise to support criminal investigations and public health efforts.[63]

After fifteen years of investigation and data analysis—and billions of dollars—stakeholders involved in the response at the federal and state levels have improved response

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[59] Frank Gottron, *The U.S. Postal Service Response to the Threat of Bioterrorism through the Mail*, CRS Report No. RL31280 (Washington, DC: Congressional Research Service, 2002), 6, www.au.af.mil/au/awc/awcgate/crs/rl31280.pdf.

[60] Craft, Lee, and Rowlinson, "Bioterrorism," 2290.

[61] General Accounting Office, *Bioterrorism: Public Health Response to Anthrax Incidents of 2001*, GAO-04-152 (Washington, DC: GAO, October 2003), 6, www.gao.gov/new.items/d04152.pdf.

[62] General Accounting Office.

[63] Craft, Lee, and Rowlinson, "Bioterrorism," 2292.

capabilities for biological threat agents; importantly, the FBI, CDC, and Association of Public Health Laboratories established the Local Laboratory Response Network (LRN).[64] According to the FBI and CDC,

> biological events can occur anywhere; therefore, the mission of the LRN is to develop, maintain, and strengthen integrated national and international networks of laboratories that can respond to the needs for rapid testing, timely notification and secure reporting results that are associated with acts of biological terrorism or other high-consequence public health emergencies.[65]

LRN facilities take custody of the biological samples retrieved from an incident, grow cultures, and assist in the investigation of the presence of a potential health threat. Currently, within twelve hours, a local LRN laboratory can notify responders (via its WMD coordinator) if there is a potential threat. Within seventy-two hours, the cultures should give a definitive result confirming the presence of a biological threat. The LRN facility provides a preliminary analysis and assessment of the samples collected from the field before determining if the evidence needs to be tested further by the FBI laboratory.[66]

The LRN is a force multiplier for public safety. Upon receipt of a sample, scientists grow the cultures by extracting DNA on the scene, and then transport the sample to the laboratory. LRN facilities are the only laboratories with the proper scientific tools to process biological agents. State crime laboratories cannot make determinations about unknown substances. All LRN facilities are bio-life safety laboratories (BSL) rated for research in the counter-proliferation of biological agents and are operated at the state and federal level. Labs are rated on a scale of one through four; BSL-4 laboratories are the most capable of handling extreme threat agents, such as anthrax, botulism, plague, smallpox, and hemorrhagic fever. The labs all have an identical concept of operations and are responsible for adhering to the same policies and procedures, regardless of their

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[64] Davenport, "After Amerithrax"; Vahid Majidi, "Ten Years after 9/11 and the Anthrax Attacks: Protecting against Biological Threats," FBI, October 18, 2011, https://archives.fbi.gov/archives/news/testimony/ten-years-after-9-11-and-the-anthrax-attacks-protecting-against-biological-threats.

[65] FBI and Center for Disease Control, *Criminal and Epidemiological Investigation Handbook*, 91.

[66] Majidi, "Ten Years after 9/11."

jurisdiction, set forth by the Department of Health and Human Services and Department of Justice. As a result of after-action meetings, the LRN improved by centralizing communications, standardizing equipment, rewriting protocols, and mandating reporting policies for transportation.[67] Standardizing scientific analysis techniques for final bioagent assessment has given credibility to LRN facilities at all levels of the paradigm (shown in Figure 2). With the increased number of labs available for transportation, testing, and diagnosis, responders are able to get information more quickly.

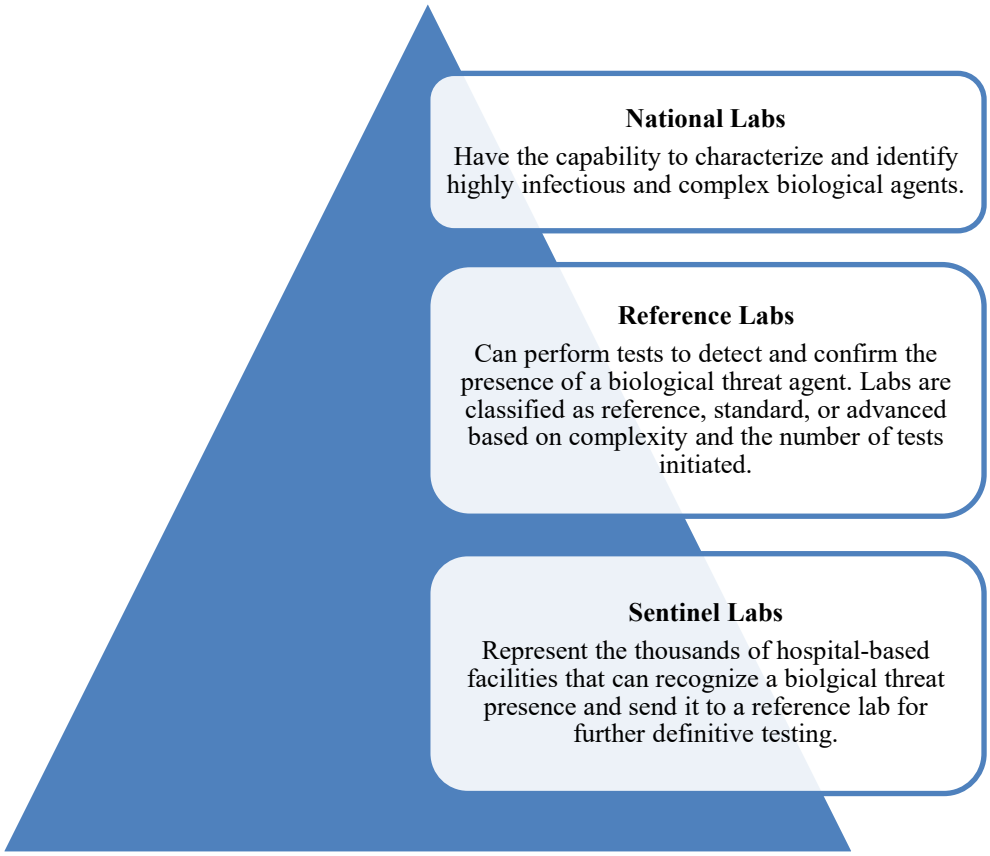

Figure 2. Laboratory Response Network Facilities[68]

[67] Craft, Lee, and Rowlinson, "Bioterrorism," 2294.

[68] Adapted from Association of Public Health Laboratories and CDC, "Laboratory Response Network: Prepare, Detect, Respond" (brochure, Association of Public Health Laboratories, 2015), 3, www.aphl.org/aboutAPHL/publications/Documents/PHPR_LRNBrochure_52015.pdf.

D. CRISIS RESPONSE: LOCAL (LAW ENFORCEMENT AND FIRE/HAZMAT)

Response to a WMD biological agent typically originates at the local level, with federal resources immediately available as needed. As illustrated in the roles and responsibilities matrix (see Table 1 in Section A), local responders are accountable; however, the WMD coordinator can assist in a request for federal response, which minimizes the incident—and its costs—at the local level.[69] Nevertheless, it is advantageous if local teams can control the onset of an incident without the use of federal resources. In the event of a suspected or confirmed biothreat, local responders from fire/ hazmat and law enforcement teams may investigate the scene, determine the nature of the threat, and collect samples.[70] As the incident expands, local responders may request additional resources from federal or state agencies: this a systematic approach to command, control, and coordination to meet overall incident objectives.

The local-level response was challenging during Amerithrax because responders were unprepared for such an event. Most public health response plans for biological incidents called for officials to heed federal procedures and collaborate with public safety responders (law enforcement and fire/EMS) within their communities and across jurisdictions.[71] Response partners across the nation at all levels of government, however, lacked the knowledge to control such events rapidly, and they were not familiar with one another's response capabilities. As the responses were unfolding, stakeholders were meeting with one another for the first time on the scene.[72] Without national strategy or tactical guidance, the learning curve was steep and hazmat teams treated the suspicious substance/white powder calls with extreme caution.[73] The post-Amerithrax response environment saw the fire service surge to procure equipment to deal with the new trending

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[69] General Accounting Office, *Bioterrorism: Preparedness Varied across State and Local Jurisdictions*, GAO-03-373 (Washington, DC: GAO, April 2003), 6, https://www.gao.gov/products/GAO-03-373.

[70] Morrow, Downey, and Delaney, *Best Practices for Sample Collection*, 2.

[71] General Accounting Office, *Bioterrorism: Public Health Response*, 15.

[72] General Accounting Office, 16.

[73] Emery, "Field Biological Detection Capabilities," 21.

threat of WMDs. Unfortunately, as field-testing and response processes evolved, the products on the market lacked scientific testing.[74] The USPIS recognized that local hazmat teams were using inconsistent strategies and tactics in conjunction with various commercial technology and equipment in the field that was not credible for capturing analytical data, which resulted in false-positive assessments and conclusions.[75] Past and present gaps indicate a lack of performance standards and third-party testing for field-deployable biological testing equipment.[76] In terms of personal protective equipment, hazmat teams train to wear fully encapsulated suits when they are confronting an unknown chemical. Fire and hazmat team members initially chose to don this gear during the Amerithrax incidents, but commanders realized this procedure was not practical: it was neither cost-effective nor necessary for this type of response, as the product was a solid substance. In present-day response, hazmat responders in local jurisdictions who are well-trained for biothreats involving suspicious and unknown powders will choose Level B or Level C protection prior to sampling product sources.

Public safety priorities are identical to those of the Office of Domestic Preparedness as far as scope, recognition, detection, self-protection, crime scene preservation, scene security, and proper notification processes.[77] The priorities are very similar in a hazardous materials response; however, the scope and objectives slightly differ because a biological threat response may become a criminal investigation. The response to terrorism-related incidents requires the essential elements of the National Incident Management System (NIMS): there must be a multiagency response that is focused, mission-specific, tactically coordinated, and strategically sound.[78] Public safety officials will rely on past response experiences when they respond to suspicious and unknown substances. The GAO observed that, in 2001, jurisdictions that were most prepared for or experienced with bioterrorism

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[74] Emery, "Field Biological Detection Capabilities", 21.

[75] Brinkley, "A First-Class Delivery System."

[76] Emery, "Field Biological Detection Capabilities," 22.

[77] Creamer, "Multi-agency Response to WMD," 2.

[78] Creamer, "Multi-agency Response to WMD," 2,

were those that had experienced public health emergencies or that had prepared for a National Security Special Event (such as a political convention or major sporting event).[79]

During Amerithrax, when parts of a plan did not exist or had not been tested by experience, coordination of the local response was often tricky and relied on techniques that did not facilitate the appropriate response.[80] Local responders often rely on their fire hazmat teams to investigate suspicious and unknown substances because the response is similar to that of a chemical release. But during a discussion on lessons learned from a previous terrorist attack, one panelist stated, "The essential paradigm for anthrax nationally is that if you know hazmat, you know biological and that is simply not true."[81] During a hazmat response involving toxic industrial chemicals, if the product is secure, responders are trained not to make direct contact with the substance. During a biothreat response, however, one cannot conclude that the substance is not a threat because it is in a sealed container; unlike an industrial chemical release, a suspicious and unknown substance must be field tested to determine its molecular makeup. Failing to field screen a substance with a biological threat nexus does not end the response, but, at the very least, it slows a criminal investigation. Many law enforcement personnel do not have the training to deal with unknown substances. Moreover, their departmental standard operating procedures may prohibit them from taking an unknown substance into custody until the material is ruled safe. However, Homeland Security Presidential Directive 5 ("Management of Domestic Incidents") and Homeland Security Presidential 8 (National Preparedness Goal) provides stakeholders with the ability to approach WMD events methodically if local response to biothreats becomes standardized.[82]

Responders feel pressure to act a certain way based on their culture, training, and experience, but responding to an unknown, such as a WMD biothreat, requires a plan of action that differs from the traditional response used for hazardous materials cases.

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[79] General Accounting Office, *Bioterrorism: Preparedness Varied*, 22–23.

[80] General Accounting Office, *Bioterrorism: Public Health Response*, 15.

[81] Jackson et al., *Protecting Emergency Responders*, 43.

[82] Creamer, "Multi-agency Response to WMD."

Moreover, when incident commanders lead biothreat events based on their experience with chemical releases, they may face unforeseen consequences.[83] For an efficient, effective response, there must be an approach that outlines clear decision points and related circumstances but that is not based on incident-specific scenarios; the approach should give responders and commanders flexibility in their decision-making.[84] A successful response to a WMD incident involving suspicious and unknown substances also requires a tiered partnership between fire/EMS and law enforcement personnel, whose decision-making at the local level is needed to guide the state and federal response. The WMD emergency response plan developed by Mussorfiti and Seley, for instance, promotes a coordinated and collaborated response for rapid mitigation and recovery.[85] Decision-based approaches such as this one are like an ongoing threat assessment: they provide systematic steps for mitigating the effects of an unknown. A decision-based approach will allow operators to make judgments about the situation in front of them, in real time. An incident-specific approach, on the other hand, overwhelms emergency responders with information and procedures for specific types of events. Though there may be similarities, no two incidents are the same. By associating different but related categories, the responder is subject to confusion and possibly conflicting information. While the response for a chemical spill and a suspicious, unknown substance may have a similar framework, the steps for handling the products are incredibly different; there is no cookie-cutter approach, and treating these events the same way can cause a delay in the steps necessary for other stakeholders to complete their mission. The goal, instead, should be an easy-to-understand emergency response plan that allows for the greatest flexibility.[86]

As a result of Amerithrax, the International Association of Fire Chiefs (IAFC) recognized an issue in the U.S. fire and emergency services industry with emergency responses to suspicious and unknown substances. In collaboration with local responders, FBI WMD coordinators, and scientists, the IAFC published a procedure manual in 2008

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[83] Mussorfiti and Seley, "A Risk-Based Approach to Hazmat/WMD."

[84] Mussorfiti and Seley.

[85] Mussorfiti and Seley.

[86] Mussorfiti and Seley.

designed to help local fire and EMS hazmat teams create a response plan. The IAFC has stated that "no community is immune from the threat. To protect the health and safety of the public, and to help deal with hoaxes and suspicious materials, clear procedures for assessing and managing biological threats are imperative."[87] The IAFC procedure manual addresses all the elements of a response. The manual establishes command, communications interoperability, and life safety for the responders regarding prophylaxis, decontamination procedures for public safety and the public, coordination efforts with the FBI WMD coordinator, field-screening steps to facilitate further testing at an LRN facility, and notification procedures to stakeholders. Vincent Henry argues that "first responders cannot realistically hope to function with full effectiveness at the scene of a disaster, and agencies cannot realistically expect to maximize their effectiveness and the saving of lives, unless all the actors and agencies involved have a coordinated response plan in place."[88] However, the manual is only a recommendation for procedures; it is not enforceable.

Some local agencies have used such precedents as an impetus for reform. The Atlanta Fire Rescue Department (AFRD) modeled its standard operating procedure for WMDs/suspicious and unknown substances after the Georgia Department of Public Health's suspicious substance procedures, along with the IAFC's procedures for responding to suspicious packages. The policy supports law enforcement and provides methods and guidelines for all personnel to facilitate efforts related to mitigation, response, criminal investigation, and recovery.[89] The purpose of the policy is to ensure that all substance response operations are methodical, that they maximize effectiveness and safety, and that they provide a systematic method of investigation to rule out chemical, biological, nuclear, and radiological threats to life and environment. The policy offers a model procedure for AFRD personnel to respond to and investigate potential white powders, to include suspicious and unknown substances in sealed or unsealed letters, packages, or

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[87] International Association of Fire Chiefs, "Model Procedures," 3.

[88] Henry and King, "Improving Emergency Preparedness, 27."

[89] Atlanta Fire Rescue Department, "Atlanta Fire Rescue Department Response to Suspicious Substance(s)," Policy 115.21 (policy document, Atlanta Fire Rescue Department, October 12, 2015), 1.

containers.[90] Although the procedure has facilitated better responses to WMD unknowns, responders still have a tendency to refer back to their hazardous materials response culture. Additionally, many local response agencies fail to consider standardizing a response to biological agents that are suspicious and unknown.[91]

[90] Atlanta Fire Rescue Department.

[91] International Association of Fire Chiefs, "Model Procedures."

III. CONSEQUENCE MANAGEMENT

After Amerithrax, it became clear that the initial crisis response to a suspicious and unknown biothreat is critical. Improper management at the local level can delay or halt an investigation, and state and federal partners rely on local responders to provide a preliminary assessment that will help them determine if the incident should expand—that is, if they should initiate the consequence management phase of an investigation. It is at this level of an investigation (if warranted) that public health and law enforcement officials combine efforts to mitigate the biological threat while simultaneously engaging in a criminal investigation. The various tiers of interagency response needed to combat bioterrorism and prevent a public health crisis support consequence management. After the attacks of 2001, federal, state, and local authorities took a hard look at ways to improve emergency preparedness and response. While the goal is to prevent long-term consequence management, if the decision is to venture down this path, local assets are the key to a smooth transition. Ultimately, state and federal responders—including scientists and investigators—rely on local response efforts as the first line of defense for suspicious and unknown substances.

It is imperative for local responders to understand that the release of a biological WMD can result in mass casualties if the response is not approached methodically.[92] As Dr. Joseph Waeckerle expressed in a 2000 *JAMA* article, "the probability of a WMD incident is greater than ever and threatens the United States and other countries with potentially devastating consequences, including widespread death, disease, and destruction of societal infrastructure and possibly society itself."[93] As discovered after Amerithrax, when decision-makers at the local level have the resources to respond to a potential biological crisis, they add value to the initial investigation as the consequence management phase is launched. While state and federal stakeholders have adjusted their practices when

[92] Henry and King, "Improving Emergency Preparedness."

[93] Waeckerle, "Domestic Preparedness," 252.

responding to these types of incidents, the local response elements have failed to meet the needs of their state and federal partners.

A. LESSONS LEARNED FROM AMERITHRAX

WMD agents, including suspicious and unknown substances with a biological threat, are a significant concern in the intelligence and public health communities. For agents such as anthrax, it can take twenty-four to seventy-two hours before signs of release show up in the environment. Protocols for handling WMDs containing possible biological agents were not in place in 2001, and the United States lacked a procedure to sterilize potential threats of biological agents in the mail.[94] Investigators and responders improvised throughout the process. Many of the early efforts of the Amerithrax criminal investigation and epidemiological operation were scientific attempts to classify spores used in the letters. Mitigation initiatives were time-consuming since generic laboratory tests did not exist and therefore could not substantiate forensic analysis of the letters.[95] Because response stakeholders could not fully understand the dilemma, a public health emergency broke out. Five U.S. citizens lost their lives, eleven contracted anthrax by inhaling the spores, another eleven suffered cutaneous anthrax from skin absorption, thirty-one tested positive for exposure, and 10,000 more were declared at risk for possible exposure and given antibiotic prophylaxis.[96] Today, as a result of lessons learned from Amerithrax, responders can notify the USPIS that they are on the scene of a potential biothreat delivered in the mailing system and state that postal expertise is required. The USPIS can assist in fast detection and mitigation operations at the scene if the product passes through the mail system during the crisis response phase.

The 2001 anthrax attacks also resulted in new consequence management procedures. During the crisis, thirty-five postal facilities and stores were contaminated and seven of the twenty-six buildings on Capitol Hill were exposed to spores of anthrax.[97] The

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[94] Gottron, "Postal Service Response," 7.

[95] Department of Justice, "Amerithrax Investigative Summary," 9.

[96] Department of Justice, 6.

[97] Department of Justice, 3.

Department of Justice reported that LRN facilities tested 120,000 clinical and environmental samples from October to December 2001, and the USPS closed two processing and distribution centers that were heavily contaminated with the biological agent, isolating more than 1.8 million letters, packages, magazines, catalogs, and other mailed items. The Environmental Protection Agency (EPA) paid $27 million to twenty-seven contractors and three federal and state agencies for the cleanup on Capitol Hill.[98]

After the investigation, federal and state executives implemented robust protocols and mandates to provide a framework for mitigating, responding to, and investigating bioterrorism incidents. To implement the consequence management phase—which is necessary to protect public health when responding to and detecting a biothreat—responders on the scene now have the ability to conduct conference calls and briefings, known as threat credibility evaluations, with highly trained scientists to assess the threat. Transitioning to consequence management also allows law enforcement to investigate the crime and identify those responsible while public health officials focus on protecting the public from the disease-causing agent. Executing consequence management strategies is essential upon the conclusion of the crisis response/management phase. The command and coordination of local assets in conjunction with federal and state assets—FBI WMD, USPIS, and public health—if warranted, are the key to successful consequence management implementation.

While the consequence management phase is methodical, it is governed by policies—and smart-practice recommendations—that permit flexibility within the response. Federal and state assets can deploy numerous resources to address the mitigation of biological threats. For the criminal investigation, investigators and intelligence analysts can help local law enforcement solve the terrorist and criminal elements of a crime. This allows laboratory scientists, technicians, and medical personnel to focus on public health issues—e.g., to employ countermeasures such as tracking the medical cases affecting geographical areas, distributing mass medications to the public, and analyzing metadata—which can also help law enforcement with criminal investigation and prosecution.

[98] Department of Justice, 3.

Collaboration between the response stakeholders through command and coordination promotes proper asset deployment and management. Multiagency and multijurisdictional cooperation give responders flexibility. Before 2001, response stakeholders worked in silos. By employing joint investigations and epidemiological operations, the stakeholders can be proactive and collaborative instead of reactive in case management. Table 2, for example, demonstrates how one tool, threat assessment categories, can help response partners decide which actions to take for mitigation and recovery efforts.

Table 2. Threat Assessment Categories for Joint Criminal Investigations and Epidemiological Operations[99]

Threat Classification	Evidence Leading to Classification	Public Health Actions	FBI/Law Enforcement Actions
No Biothreat *Highly likely that source of exposure occurred naturally*	• No evidence to suggest an intentional release	• Continue to manage and monitor incident	• No further action needed
Possible Biothreat *Possibility that exposure was intentional*	• Public health investigation has not revealed a likely exposure • There are unusual or unexplainable events regarding exposure • The event itself appears to be noncredible but may attract media or law enforcement attention, which can imply malicious intent	• Initiate epidemiological operations to determine the origin of the source • When applicable, share public health information with law enforcement partners	• Access intelligence databases for pertinent information • Where appropriate, share information and data with public health partners
Likely Biothreat *Reasonable belief that exposure involved malicious intent*	• Lab results indicate an actionable biological effect • No presence of natural source to support exposure • No known risk factors for disease occurrence • TCE indicates incident is criminal/ intentional	• Initiate joint criminal investigations and epidemiological operations	• Initiate a joint criminal investigation • FBI opens the case to investigate criminal intent and suspicious activity • FBI Joint Operations Center is activated, if required

[99] Adapted from FBI and CDC, *Joint Criminal and Epidemiological Investigations Handbook*, 2016 international edition (Washington, DC: Department of Justice, 2016), 75, https://www.fbi.gov/file-repository/joint-criminal-and-epidemiological-investigations-handbook-2016-international-edition.

B. FEDERAL BUREAU OF INVESTIGATION AND LAW ENFORCEMENT PARTNERS

The FBI's priority is to protect the United States from terrorist attacks, including the threat of WMDs. In 2006, after the bureau identified over a dozen domestic and international terrorists who expressed interest in using WMDs for future acts of terrorism, the FBI established the Weapons of Mass Destruction Directorate (WMDD). The WMDD addresses preparedness and consolidates investigation and prevention efforts through the collaboration of a unique combination of agents, intelligence analysts, and technical experts.[100] The directorate's investigations and operations group addresses threats and actual uses of WMDs, investigating the transfer of materials, knowledge, and technology needed to create a WMD.[101] During testimony before the U.S. Senate, Dr. Vahid Majidi, former assistant director of the WMDD, explained how the 2001 anthrax mailings exposed vulnerabilities to acts of bioterrorism in the nation's response system.[102] Because covert releases can go unrecognized for some time, coordinating an effective response requires cooperation between public health and local law enforcement teams. During the Amerithrax response, these groups lacked mutual awareness and understanding, and had not established communications interoperability and notification procedures, which limited the effectiveness of law enforcement investigations and public health epidemiological operations. A unified response during consequence management is necessary to facilitate product identification, epidemic prevention, information dissemination to the public, and apprehension of those responsible.[103]

The WMDD recognized, therefore, that sound procedures and policies for countering biological attacks require a huge commitment to partnerships between public safety and public health officials.[104] Through interagency teams, the WMDD developed

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[100] Majidi, "Ten Years after 9/11."

[101] "WMD Central: Five Years and Building (Part 1)," FBI, last modified July 26, 2011, https://www.fbi.gov/news/stories/wmd-central/layout_view.

[102] Majidi, "Ten Years after 9/11."

[103] Majidi.

[104] Majidi.

and implemented outreach efforts to facilitate local responders during the initial field investigative response to WMD threats.[105] The FBI also decided to staff each of its fifty-six field offices nationwide with a WMD coordinator. WMD coordinators focus on their states and territories by working with federal, state, and local responders as well as private industry partners involved in WMD preparedness and response. Coordinators plan, train, and conduct outreach for the prevention, response, and investigation of biological threats. Additionally, to meet the goals of WMD consequence management operations, the CDC and FBI took a holistic approach by designing a training program for joint criminal and epidemiological investigations.[106] Majidi points out that a program like this one enhances public health and law enforcement collaboration during a biological incident.[107]

Collaboration is also needed between local and federal response efforts. Agencies that respond to WMD incidents rely on one another for successful incident stabilization: the FBI relies on the local response, and local responders rely on the FBI. It is essential that local responders understand the importance of a systematic response capability—particularly the FBI's procedures—so that there is a smooth transition between the phases of crisis response and consequence management. During a biothreat incident, the local law enforcement agency provides initial investigative expertise as well as explosive ordnance disposal, and the fire hazmat team fields the agent for further scientific analysis at the laboratory. At the federal level, the FBI's WMD coordinator provides a multitude of assets, such as hazardous materials and bomb technicians, evidence collection, intelligence analysts, and scientists. Public health officials at the state and federal level can both provide scientific and medical expertise as it pertains to the disease-causing agent, and local public health officials, such as those from the county, can distribute medicine to the public if needed. The WMD coordinator, along with scientists from the national lab, local response partners, and other stakeholders, work together to determine if the threat is credible.

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[105] Majidi.

[106] Majidi.

[107] Majidi.

With so many stakeholders in an emergent response environment, no single set of guidelines covers every possible variation that responders may encounter. For this reason, the FBI and the Georgia Department of Public Health (GDPH) maintain specialized assets and expertise to help responders during such incidents. The FBI WMD coordinators, for instance, have a phone number for local agencies to call to make proper notifications and request assistance during a response to a WMD incident. The coordinator will prompt agencies that have a hazardous materials response team (HMRT) to field screen the substance for certain characteristics. Additionally, the document "Guidance for First Responders: Dealing with Suspicious Letters, Packages, and Unknown Substances," published by the GDPH, is a reference for local responders that can be used to construct policies and procedures.[108] Because the GDPH process is not standardized or enforceable by the state, however, there is a lack of operational consistency at the local level.

The GDPH and FBI have also tried to make it easier for local response teams to send samples for further testing. They have done this by writing response guides, providing standard forms for documentation of analysis procedures, and providing outreach upon request. State and federal laboratories in the LRN—which are certified by the CDC—require specific steps to be taken before they can take a substance into custody for further testing. To track this process, the GDPH has a specialized submission form that provides the responder team with the list of essential steps they need to execute.[109] The steps include documenting the incident/case number, citing the location of the samples collected, documenting the organization that is collecting the sample, noting the officer/agent transporting the sample to the state laboratory, and documenting the field screening information (radiological, explosive, chemical, and other results).[110]

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[108] Georgia Department of Public Health, "Guidance for First Responders (911, EMS, EMA Personnel, Law Enforcement, Firefighters, Others): Dealing with Suspicious Letters Packages, and Unknown Substances" (memo, Georgia Department of Public Health, May 15, 2012), http://phdistrict2.org/wp-content/uploads/2018/05/SUSPICIOUS-PACKAGES-1.pdf.

[109] Georgia Department of Public Health.

[110] Georgia Department of Public Health.

C. THREAT CREDIBILITY EVALUATION

The FBI's WMDD also developed a threat credibility evaluation (TCE) process to prepare and coordinate a cohesive response to potential threats in the field.[111] Led by the WMD coordinator, this evaluation begins once the interagency response team completes its field screening. As demonstrated by the model in Figure 3, the TCE determines the operational practicality of on-scene responders, identifies subject behavioral resolve, and interprets intelligence and information related to the threat; it is also what facilitates the delivery of a biological agent to the LRN facility.[112] During the initial TCE, the WMD coordinator, the FBI's Counter-terrorism Division, and interagency subject matter experts create specific response strategies tailored to the incident.[113] The responders, through their investigation, determine if there is a credible threat, and if there are implied threats to a high-profile location or person, such as attorneys, dignitaries, businesses, or schools. Among other concerns, the TCE helps responders determine if any persons exposed to the suspicious substance are contaminated and helps stakeholders determine the next steps for incident stabilization and recovery. Criminal investigations also begin with the FBI's TCE; the WMD coordinator, however, uses information from the local law enforcement team's threat assessment—which usually occurs before the coordinator arrives—as the incident expands. If the on-scene responders have determined the substance is not a threat and the evaluation indicates that no further testing is necessary, local law enforcement may take the substance into possession for evidence.

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[111] Majidi, "Ten Years after 9/11."

[112] CDC, FBI, and Department of Homeland Security, "Guidance on Initial Responses to a Suspicious Letter/Container with a Potential Biological Threat" (guidance document, CDC, November 2, 2004), https://emergency.cdc.gov/planning/pdf/suspicious-package-biothreat.pdf.

[113] Center for Disease Control, FBI and DHS, 5.

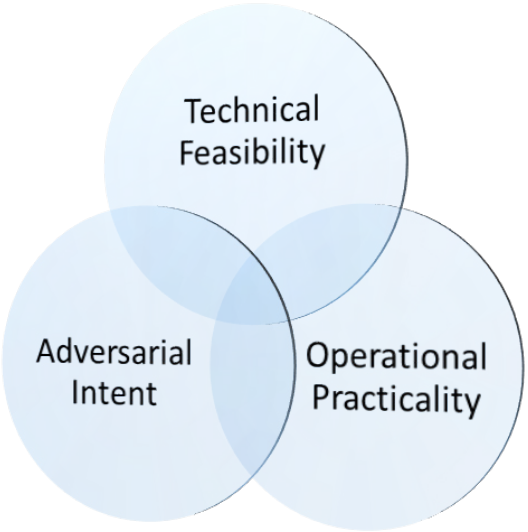

Figure 3. Threat Credibility Evaluation Model[114]

After the threat agent has been sampled and field screened, responders may determine that the incident is a hoax; for example, although the suspect associated with the incident has expressed a threat in writing or has sent a suspicious package to a high-value target, further investigation may reveal that the agent is actually a ground-up soap product or an over-the-counter pharmaceutical—not a biothreat. When this happens, the WMD coordinator has the authorization to pursue federal charges against the suspect for creating a hoax device under 18 U.S.C. § 2332a.[115] Furthermore, according to 18 U.S.C. § 1038 (*False Information and Hoaxes*), "it is a crime to engage in conduct with the intent to convey false or misleading circumstances where such information may reasonably associate with an activity that is a violation of a predicate offense."[116] Hoaxes are a frequent occurrence. Majidi states, "Most (white powder letters) turn out to be hoaxes, and they require a lot of investigative resources; but we have to investigate each and every incident. You never know when one of them will be real."[117]

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[114] Source: FBI and CDC, *Joint Criminal and Epidemiological Investigations Handbook*, 33.

[115] FBI and CDC, *Joint Criminal and Epidemiological Investigations Handbook*, 93.

[116] FBI and CDC, *Joint Criminal and Epidemiological Investigation Handbook*, 93.

[117] Federal Bureau of Investigation, "WMD Central: Five Years and Building (Part 1)."

D. LABORATORY RESPONSE NETWORK (LRN)

Amerithrax proved that LRN facilities are a primary asset in national preparedness. Following the anthrax attacks in 2001, the LRN developed, maintained, and strengthened the domestic and international network of laboratories available to respond to WMD threats and other high-priority public health emergencies by standardizing policies and procedures.[118] As previously disused, only facilities that are certified by the CDC can accurately screen for biological threat agents.[119] Due to the scope of the incident, however, there were not enough CDC-certified facilities to support the Amerithrax response; other laboratories had to be called in. During the incident, responders developed the common practice of triple bagging the substances and turning them over to law enforcement for transport to the state crime lab or local health lab for testing. Today, because LRN facilities only analyze biological agents, it is imperative that responders at the local level field screen and collect samples before a TCE and transport to an LRN facility. Personnel employed by LRN facilities must maintain and collect information for use in law-enforcement-sensitive operations; background checks on employees ensure that only qualified personnel are handling sensitive substances, information, and intelligence.[120]

Consequence management for suspected biological agent releases depends on preparation, early recognition, and a coordinated response.[121] During the Amerithrax incident, the surge of samples was overwhelming for both the responders and the labs; the FBI and CDC recognized that they needed to improve countermeasures to deal with this new threat of terrorism. Standardizing the response at the state and federal level has increased the credibility of the forensic research. Since Amerithrax, recommendations from the American Society of Microbiology have standardized tools, equipment, staff, training, and the controlling and testing of biological and unknown substances, providing credibility to the processing of samples. If an investigation reveals an actual biological threat or a

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[118] Craft, Lee, and Rowlinson, "Bioterrorism."

[119] Georgia Department of Public Health, "Guidance for First Responders."

[120] Craft, Lee, and Rowlinson, "Bioterrorism."

[121] Joseph P. Dudley, *New Challenges for Public Health Care: Biological and Chemical Weapons Awareness, Surveillance, and Response*, vol. 4 (Thousand Oaks, CA: SAGE, 2003).

criminal hoax, local law enforcement, with the assistance of the FBI, can now aggressively pursue charges at a local, state, or federal level.

LRN laboratories also support criminal-epidemiology investigations led by the WMD coordinator. A standardized process is in place to identify which laboratory will receive a potential biological unknown and what must happen before a sample is received at the facility. Under the Public Health Security and Bioterrorism Preparedness and Response Act, "the Select Agent Program provides guidance for the possession, use, and transfer of biological select agents and toxins which have the potential to pose a severe to human, animal, or plant health or to animal or plant products."[122] Once a threat credibility evaluation is completed and it is decided to transport the sample to an LRN facility, the forensics and research are established, standardized, and enforced at the proper state and federal levels. Enforcing policy ensures that personnel are safe and properly trained, and that the testing is consistent and by-the-book in the event of a future prosecution or defensive challenge to the process. Legislation holds laboratories accountable for maintaining proper documentation; providing processes for evidence collection; establishing chains of custody, acquisition, and possession; and implementing checklist items for quality assurance and compliance with legislation.[123] After samples are analyzed in the laboratory, stakeholders are postured to begin the joint criminal investigation and epidemiological operation; the WMD coordinator and public health personnel determine what the investigative team's next steps will be as far as pursuing a case or properly documenting and memorializing the incident in the event of a repeat offense.

The LRN's role is critical to public health and safety. The epidemiological operation begins with the results from the LRN analysis. Until public health officials receive the final assessment from the LRN, the results from the diagnostic tests or field screening are unconfirmed.[124] Epidemiological operations involve managing the response to determine which geographical areas were potentially exposed to or contaminated by the

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[122] Craft, Lee, and Rowlinson, "Bioterrorism," 5.

[123] Craft, Lee, and Rowlinson, 6.

[124] FBI and CDC, *Joint Criminal and Epidemiological Investigation Handbook*, 29.

biological release. Countermeasures may include mass prophylaxis, monitoring of food and agriculture, and prevention of transmission or further contamination. The overall objective of the criminal investigation and epidemiological operation is to identify threat credibility and coordinate a response to protect the public.[125]

E. SUMMARY

Consequence management is critical to the mitigation and recovery process once a biological agent is introduced into the environment, exposing and contaminating humans, animals, and plants. Lessons learned from Amerithrax show that interaction between the FBI, law enforcement, and the LRN are essential.[126] By strengthening these relationships before an emergency, response stakeholders are able to collaborate, communicate, and train for bioterrorism incidents. After-action reports also show that combining the entities involved for joint operations in criminal investigations and epidemiological operations is a best practice for biothreat emergency preparedness and response. The consequence management phase of an incident cannot occur if the partners involved do not understand their missions during the crisis response. Since the 2001 Amerithrax attacks, policies, procedures, and mandates have solidified the response process at the state and federal levels for detection, investigation, and mitigation as law enforcement prepares for the next biological incident.[127]

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[125] FBI and CDC, 33.

[126] Craft, Lee, and Rowlinson, "Bioterrorism."

[127] Craft, Lee, and Rowlinson.

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IV. POLICY AND GUIDELINE ANALYSIS: LOCAL EMERGENCY RESPONSE TO WMDs

In the United States, local fire, EMS, and hazmat responders remain unprepared to respond to bioterrorism due to poor training, lack of consistency in equipment, poor planning, and a failure to collaborate with partners at the various levels of response.[128] While addressing weaknesses in the response efforts and consequence management phases after Amerithrax, state and federal partners drafted policies and procedures to improve their capabilities. They also developed guidelines that local responders can use to improve their response capabilities. Although policies and procedures in this area are enforceable at the federal and state levels, they are not enforceable at the local level; this has contributed to the continued deficiencies in training, guidance, and response among local agencies.

While a biothreat response may seem similar to the response for a chemical spill or release, the agents are different—one chemical, the other biological—and so the responses must be different. Though the hazmat foundation is the framework for a biological response, this type of response cannot effectively control an incident involving a suspicious and unknown substance. Local responders have an opportunity to improve their response efforts by analyzing the actions taken by state and federal partners after Amerithrax.

A. TRAINING

Local emergency responders rarely experience high-impact, low-probability incidents that may have a terrorism nexus; therefore, training is imperative.[129] According to the RAND Corporation, most local responders lack the preparedness and capabilities—particularly when it comes to information-sharing, training, and equipment—to respond to and recover from major incidents.[130] Local first responders will always be the first line of defense should terrorism occur, and so they need the correct resources to confront complex

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[128] Interagency Board, "Bioterrorism Preparedness & Response: A Proposed Model for Bioterrorism Response: Initial Operations and Characterization" (position paper, Interagency Board, January 2017), 2.

[129] Mussorfiti and Seley, "A Risk-Based Approach to Hazmat/WMD."

[130] Jackson et al., Protecting Emergency Responders.

emergencies.[131] And when all stakeholders are trained properly for bioterrorism events, they understand that every item within the event area might be secured and processed as potential evidence.[132]

Response to suspicious unknowns requires more than just a hazmat team that can precisely identify and detect a substance. Law enforcement must also investigate the likely implications of the incident, including potential criminal intent. Most law enforcement personnel, however, cannot conduct an investigation until the hazmat team has conducted the proper field screening to eliminate the threat of flammability, radioactivity, volatile organic compounds, toxicity, and explosives. Responders must understand that LRNs are health laboratories and cannot screen substances for chemicals, explosives, radiological material, or flammability hazards. However, because most hazmat teams also cannot detect the presence of explosives, the response further requires explosive ordinance disposal or bomb technicians to clear a path for the hazmat team to perform its tasks. This requires interagency coordination. Moreover, it is difficult to determine how many resources will converge on a biothreat incident or which local agencies might be needed; all agencies should therefore be prepared to respond and to coordinate with one another.[133]

It bears repeating that joint criminal investigators and epidemiological operations cannot proceed unless the agent is properly handled and screened, which is the role of the local hazardous materials response team (HMRT). The HMRT's ability to analyze and identify the unknown and suspicious substance is critical to the overall success of a potential biothreat response. Moreover, investigators and laboratory personnel cannot achieve their mission during the response until other organizations have taken necessary steps. Observing WMD response from a global perspective, law enforcement partners argue that fire/hazmat personnel do not train to operate on the scene of a biothreat event because they lack the skills needed for this type of crime scene.[134] Because the suspected

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[131] Henry and King, "Improving Emergency Preparedness."

[132] Creamer, "Multi-agency Response to WMD."

[133] Interagency Board, "Bioterrorism Preparedness and Response," 2.

[134] Creamer, "Multiagency Response to WMD."

substance must be processed at multiple levels—including locally—to rule out a biological threat, local responders and HMRT members need standardized biothreat awareness training. WMD training helps stakeholders understand the investigative importance of field screening at the local level to the crim-epi procedures at the state and federal level.

Leadership at the local level will argue that the safety of their responders prevents them from committing to biothreat preparedness. However, as Thomas Creamer argues, "No crime scene manager would ever suggest sacrificing human life for the collection of evidence, but good crime scene management training will provide responders with the tools that enable them to safely and effectively conduct rescue operations while minimizing damage to the crime scene."[135] Proper training is needed to address gaps in HMRT roles and responsibilities during biothreat response; incident commanders and team leaders, as well as their counterparts on the scene, can make the right decisions if they train properly.

Since the attacks of September 11, 2001, and the anthrax letter attacks shortly thereafter, the Department of Homeland Security has established strategic training sites nationwide to facilitate proper training for counter-terrorism and disaster response. WMD training is held at the Center for Domestic Preparedness in Anniston, Alabama. The center provides training to local first responders to prepare them to respond to chemical and biological attacks. The National Center for Biological and Radiological Training at Louisiana State University also provides biological response training, and the Counterterrorism Operations Support Center for Radiological/Nuclear Training at the Nevada National Security Site provides specialized training as well. These training centers offer services free of charge to all first responders seeking specific training for emergency response and preparedness to WMD events. Although this training is free to responders, leadership at the local level often forgoes such career development opportunities due to low staffing levels.

The U.S. Postal Service, too, has been proactive about protective measures within the mailing system, improving its concept of operations.[136] The USPS adheres to standards

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[135] Creamer.

[136] Brinkley, "A First-Class Delivery System," 70.

and recommendations from experts at the FBI, CDC, the Association Society for Microbiology, National Fire Protection Association, and Occupational Safety and Health Administration (OSHA). However, many other policies give the USPS a foundation for their operational guidelines when it comes to biothreat countermeasures. For instance, the USPS now places hi-tech, self-contained detection equipment in each mail processing facility to give workers an early warning alert of possible anthrax.[137] Postal inspectors are trained to conduct field-screening operations and, if there is a trace detection, to call upon the FBI.[138] Local responders that establish relationships with these agencies and train with them consistently can frame policy and procedures using these best practices.

The police and postal inspector communities are small when compared to the fire/ EMS service; hazmat teams from the fire service carry the burden of the primary response to a biothreat incident. Jurisdictions that are small or do not provide hazmat response capabilities rely on mutual aid. For these agencies, awareness-level training can provide the instrumental ability to recognize a threat, secure the scene, and request the appropriate resources. After September 11th and Amerithrax, state and local response organizations took steps to improve their preparedness, to include updating their mutual-aid agreements for general emergencies and response plans for WMD incidents.[139] Since these threats of bioterrorism remain a concern for the homeland, first responders also need tools, equipment, and technology for safe operations. While there is certified technology on the market that is sold for biothreat responses, the products are deemed credible by independent organizations such as the International Organization for Standardization, and the standards are voluntary.[140]

Training is essential to the overall safety of the personnel and organizations involved in biothreat response efforts. The credible practices followed at the state and federal levels create consistency in training, equipment, and scientific research; this leads

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[137] Brinkley, 70.

[138] Brinkley, 70.

[139] Lois M. Davis et al., *Combatting Terrorism: How Prepared Are State and Local Response Organizations?* (Santa Monica, CA: RAND, 2006).

[140] Davenport, "After Amerithrax."

to safe practices in response, investigations, and public health operations. It is strongly recommended, through ASTM E 2770-17, that local responders collaborate with the LRN, FBI, and other responding stakeholders to develop biothreat response training programs.[141] Regardless of the training regimen implemented, it is imperative that organizations follow standards and guidelines with the intention to improve response planning, mitigation, safety, security, command, control, and communications. The FBI WMDD provides public outreach for domestic partners for formulating sound policies and helping retailers spot indicators of WMD activity.[142] Although federal programs recommend various core competencies for local jurisdictions when it comes to joint training for WMD responses, they cannot mandate or enforce the training.[143]

B. GUIDANCE

As established in Chapter II, the response tactics used at a chemical spill or release have served as the foundation for establishing tactical response protocols to suspicious or unknown biothreats; however, these tactics are not necessarily applicable for community defense against biological terrorism.[144] The Interagency Board position statement notes that "hazmat teams are a natural fit for validated biothreat response teams; however, they are designed to respond to industrial and transportation chemical accidents subject to federal regulations."[145] While hazmat teams have the personnel, equipment, training, and skillset to mitigate the effects of a potential biological and unknown substance, they must adjust their tactics to match the problem. Training for hazardous materials events provides responders with helpful core principles, but local teams have not fully honed these skills for WMD events by factoring in the use of biological agents and suspicious substances.[146]

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[141] American Society for Testing and Materials, *Standard Guide for Operational Guidelines for Initial Response to Suspected Biological Agents and Toxins*, ASTM E2770-17 (West Conshohocken, PA: ASTM International, 2017), 6.

[142] FBI, "WMD Central."

[143] Interagency Board, "Bioterrorism Preparedness and Response," 2.

[144] Waeckerle, "Domestic Preparedness."

[145] Interagency Board, "Bioterrorism Preparedness and Response," 8.

[146] Creamer, "Multi-agency Response to WMD"; Waekerle, "Domestic Preparedness."

When it comes to chemical spills or releases, the response at the local level is consistent nationwide, regardless of jurisdiction; this type of standardization does not exist for response to suspicious and unknown substances. For chemical spills, the U.S. Department of Transportation and OSHA have set the training standards for hazardous materials response teams, as well as the standards for equipment, research, and training that help responders establish procedures and countermeasures. For a chemical spill or release, the response for all personnel, regardless of their tier of awareness, begins with the Department of Transportation's *Emergency Response Guidebook*. The book is updated every four years, with the most recent version published in 2016, and it establishes a systematic approach for dealing with the incident during the initial stages.[147] The Department of Transportation also standardizes industry placards, class materials, and identification numbers throughout the industry. Most hazmat responses are consistent because the responder arrives on the scene with the ability to identify a substance without entering the compromised atmosphere, known as the hot zone. Even the least trained responder can identify a product from a distance and isolate the area until advanced technicians arrive, and begin executing the tactics for response and recovery. While the response to hazardous materials incidents is typically accidental, WMD incidents are intentional and can go undetected for days—such as the case of Amerithrax. If response to a biological agents were as rigid and standardized as response to chemical releases for local responders, the threat of biological WMDs would be significantly lessened.

HMRTs and public safety responders have a plethora of other reference materials and standards, too, to assist in safely mitigating a product release. And federal legislation—such as the Code of Federal Regulations and legislation written and enforced by agencies like OSHA—contains general duty clauses that state all employers must provide a workplace free from hazards.[148] One consortium that assists in setting standards and codes for emergency preparedness and response is the National Fire Protection Agency (NFPA).

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[147] Pipeline and Hazardous Materials Safety Administration, *2016 Emergency Response Guidebook* (Washington, DC: U.S. Department of Transportation, 2016), https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/ERG2016.pdf.

[148] Chris Hawley, *Hazardous Materials Incidents*, 3rd ed. (Boston, MA: Cengage Learning, 2008).

The NFPA is a "global self-funded nonprofit organization, established in 1896, devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards"; it provides responders with "consensus codes, standards, research, training, education, outreach, and advocacy."[149] Response agencies have adopted NFPA 472, "Standard for Competence of Responders to Hazardous Materials," to establish response policy and procedures. Unlike federal standards and recommendations from organizations such as OSHA, the NFPA standards have no authority to mandate or enforce compliance, and NFPA 472 does not specifically list, certify, analyze, or assess products.[150]

Consequently, the level of compliance with standards for bioterrorism varies among hazmat teams.[151] For instance, in the case of suspicious and unknown biological substances, responders may not field screen a substance because the container is sealed or has been resealed after being opened. This decision focuses on protecting the environment from additional harm from toxic industrial chemical exposure, and is based on the aforementioned training for chemical spills and releases. Unlike a chemical product, however, a contained unknown substance must be field-tested so that law enforcement and public health officials can investigate. The CDC, FBI, and DHS's guidance for such incidents states that, if there is an implied threat—even if there are no signs of illness—the WMD coordinator along with "a certified HAZMAT unit, local law enforcement, and the public health department should be notified," at which point they should initiate a threat assessment before field screening the product.[152] This notification can take place in various ways; however, it usually begins with a 911 communications complaint. Coordination of partner response will be facilitated by the WMD coordinator to ensure that all levels of the response are notified of the threat.

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[149] "NFPA Overview," National Fire Protection Association, accessed January 6, 2019, https://www.nfpa.org/About-NFPA/NFPA-overview.

[150] Gregory G. Noll, "NFPA 472: Developing A Competency-Based Hazmat/WMD Emergency Responder Training Program," *Fire Engineering* 161, no. 4 (April 1, 2008), www.fireengineering.com/articles/print/volume-161/issue-4/features/nfpa-472-developing-a-competency-based-hazmat-wmd-emergency-responder-training-program.

[151] Interagency Board, "Bioterrorism Preparedness and Response," 8.

[152] CDC, FBI, and DHS, "Guidance on Initial Responses," 1–2.

It is imperative that the fire/hazmat responders tasked with investigating potential WMD incidents are aware of the procedures written to assist them in biothreat response. This situational awareness will ensure that responders handle suspicious products with care, as a biological outbreak could result in widespread severe illness or death. In the case of a sealed package received through the U.S. mail, local responders, under the direction of the WMD coordinator, should know to consult with the USPIS.[153] If the opportunity presents itself, local responders (police and fire) can assist other incoming stakeholders by obtaining the package's origin and tracking information, which should be documented with photographs of the front and rear of the item.[154] Hazmat commanders must understand that trained USPIS inspectors are available to help with field screening; this resource is a force multiplier for local responders at the crisis-response level. As previously mentioned, rapid notification to the proper resources—such as the FBI and the USPIS—from the hazmat team ensures continuity of response; these agencies follow standards and protocols that ensure an adequate response. Local responders should also adhere to guidelines such as ASTM E2770-17, *Standard Guide for Operational Guidelines for Initial Response to a Suspected Biological Agents and Toxins*, which was written to guide local responders and addresses FBI concerns for credible threat evaluation, for collecting samples, and for facilitating screening capability development for emergency responders.[155] Although the guide supports local response and coordination, it is not enforceable.

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[153] CDC, FBI, and DHS, 4.

[154] CDC, FBI, and DHS.

[155] American Society for Testing and Materials, *Response to Suspected Biological Agents*, 1, 5.

V. RECOMMENDATIONS: POLICY AND STANDARDS

Although most local agencies have written policies referencing response and mitigation procedures for WMDs, there remains a lack of consistency in response to WMD biothreats. It is imperative that adopted standards for WMD incidents govern a response framework for local responders nationwide, regardless of jurisdiction or agency. Amerithrax forced organizations to review their practices and rewrite how to respond to and mitigate bioterrorism incidents; after-action reviews and a published report on Amerithrax strengthened state and federal organizational procedures through signed legislation and standardization, improving the nation's emergency preparedness and response to biothreats. Collaboration between stakeholders at the state and federal levels has shown that consistency in response is a direct result of standardization. Local organizations must consider WMD operations at the state and federal level in the United States—as well as practices from around the world—and work to establish consistent frameworks for response and mitigation to biological events.

A. INTERNATIONAL APPROACHES

In the United States, most hazardous materials response teams (HMRTs)—which include personnel at the technician and specialist levels—can respond to an incident twenty-four hours a day, seven days a week. While these teams are capable of collaborating with the necessary partners, such as the FBI and local law enforcement, efforts to do so are mutually dependent yet typically delayed. If local responders do not swiftly execute a field-screening process, the threat credibility evaluation (TCE) is also delayed. This creates a domino effect for the rest of the response efforts. Local agencies in the United States may look to foreign operations to improve domestic response capabilities; this section reviews three related efforts from the European Union, England, and Italy.

1. European Union Field Investigation Teams

Although they have crisis management and consequence management response capabilities, the European Union's Field Investigation Teams (FITs) were initially created for response to suspicious and unknown substances. The members of these teams can

investigate the source of the threat via field sampling and conduct a threat analysis similar to the FBI WMDD's TCE. The FBI TCE determines escalation or de-escalation tactics based on the threat matrix as the incident progresses during the initial investigation. In EU FIT operations, subject matter experts sample biological agents and assess material and equipment as part of investigative response measures.[156] Each team member is a subject matter expert in a specific discipline, such as medicine, microbiology, explosive ordinance disposal, training, communications, or documentation; together, their various skills—such as knowledge in multiple biological agents, intelligence analysis, epidemiology, laboratory science, or plume modeling—facilitate rapid response, mitigation, and recovery efforts.[157] These teams allow for consistency in criminal investigations and epidemiological operations by balancing the mission sets upon the detection of a biological response. Such a model for local agencies in the United States would support the local response physically, and could provide a channel for proper notification to begin the TCE process.

2. Metropolitan Police Service (London, England)

In England, the Police National CBRN Centre and the Metropolitan Police Service (MPS) collaborated to develop a framework for response to WMD biothreats after multiple incidences in which white, suspicious, and unknown powdery substances were released into the environment. MPS used officers from the Territorial Support group to staff its new Dedicated CBRN Unit, and enhanced its capabilities in June 2004 by collaborating with other agencies to form the Multi-agency Initial Assessment Team (MAIAT).[158] Although the MAIAT disbanded in 2005 due to the decline of suspicious and unknown substance incidents, the officers are still involved in response efforts in conjunction with

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[156] Danish National Centre for Biological Defense, "Biological Incident Response and Environmental Sampling: A European Guideline on Principles of Field Investigation" (guideline document, Danish National Centre for Biological Defense, October 2006), ec.europa.eu/health/ph_threats/com/preparedness/docs/biological.pdf.

[157] Danish National Centre for Biological Defense.

[158] "MPS Response to Chemical Biological Radiological and Nuclear (CBRN) Incidents," Metropolitan Police Authority, February 23, 2006, http://policeauthority.org/metropolitan/committees/mpa/2006/060223/09/index.html.

Anti-terrorist Branch Explosive officers.[159] These teams have a twenty-four-hours-a-day, seven-days-a-week response capability and will deploy to high-profile, preplanned events. Some of their goals include addressing surge capacity, procuring funding for equipment, improving training, and providing fixed monitoring equipment for Waterloo International Station and Heathrow Airport.

Training is consistent because of two officers from the Dedicated CBRN Unit who provide the necessary training to team members. Leadership ensures that members deploy safely by providing a range of personal protective equipment such as chem/bio suits and respiratory protection and detection equipment for powders, liquids, and vapors.[160] Officers are trained to service and update their equipment, which helps reduce costs. MPS has the same issue as local agencies in the United States: funding is severely limited. Nevertheless, MPS provides the best practices in CBRN response capability in Europe, and perhaps the world.[161]

3. CBRN Mobile Laboratories in Italy

After September 11, 2001, Italy provided the Italian Fire Brigade with two free mobile response laboratories, which are powered by electrical sources or generators. The Italian Fire Brigade designed the labs to operate in and around hot zones in the event of an industrial accident or terrorist attack, and they allow responders to conduct scientific analysis in the field for rapid assessments and evidence collection.[162] The most important piece of equipment inside the mobile laboratory—which facilitates safe member ingress/egress and handling of suspicious and unknown substances during field operations—is the isolator, also known as the glove box.[163] The mobile laboratory also provides user-friendly guidance, which promotes rapid analysis and assessment of possible bioagents on the

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[159] Metropolitan Police Authority.

[160] Metropolitan Police Authority.

[161] Metropolitan Police Authority.

[162] Giorgio Mari et al., "CBRN Mobile Laboratories in Italy," *Proceedings of SPIE* 7304 (2009), https://doi.org/10.1117/12.819445.

[163] Mari et al.

scene, especially during high-profile or special preplanned events. The laboratories are employed as a deterrent of terrorist activities and are used for training missions in the country and in a partnership with France. Currently, the Italian Fire Brigade is planning to expand its national coverage upon the delivery of upgraded units.[164]

B. CURRENT STANDARDS AND GUIDELINES FOR WMDs

In the United States, the lessons learned from the biological attacks of 2001 resulted in written legislation at the state and federal level for procedural operations, which facilitated increased technical capacity and improved infrastructure, documentation, bio-surety, biosafety, and biosecurity.[165] Several documents provide frameworks for local emergency responders to design a consistent concept of operations. Unlike partners at the state and federal level, however, local responders are not accountable for following these documents. Biological threats can have severe impacts on quality of life within a community and the country. If local agencies establish standardized procedures, they can ensure that responders will take the steps necessary to facilitate the criminal investigations and epidemiological operations that must follow. The following operational guidelines are examples of those adhered to (and enforced) at the federal and state level; they are not currently policy mandates at the local level. Similar mandates for local response could improve operational consistency, which would support consequence management operations and better protect the public.[166]

1. ASTM E2770

As mentioned previously, ASTM E2770, titled *Operational Guidelines for Initial Response to a Suspected Bio-threat Agent*,

> sets a goal to support national standards for responding to and collecting suspected bio-threat agents with guidance centered on coordination among representatives of emergency response teams to include hazardous materials response teams, law enforcement, public health including the Centers for

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[164] Mari et al.

[165] Craft, Lee, and Rowlinson, "Bioterrorism," 8.

[166] Interagency Board, "Bioterrorism Preparedness and Response," 6.

Disease Control and Prevention (CDC) national Laboratory Response Network (LRN), and the Federal Bureau of Investigation (FBI).[167]

A complete guide provides stakeholders with planning, training, sampling collection, and documentation standards for response to suspicious and unknown substances with a biological threat nexus.

2. ASTM E2458

ASTM E2458—*Standard Practices for Bulk Sample and Collection and Swab Sample Collection of Visible Powders Suspected of Being Biological Agents and Toxins from Nonporous Surfaces*—is a standard guideline for emergency responders who handle visible suspicious and unknown powders.[168] Recognizing that many organizations are involved in biothreat responses, ASTM E2458 guides the stakeholder engagement and procedures to preserve the chain of custody and evidence collection for crim-epi investigations and operations.[169]

3. Stakeholder Panel on Agent Detection Assays (SPADA)

The Stakeholder Panel on Agent Detection Assays (SPADA) is a voluntary consensus consortium established by the DHS Science and Technology Directorate which also includes members from the CDC, Department of Defense, and USPS, in addition to academics and state and local public health and public safety practitioners. Together, these stakeholders establish method performance requirements and reference materials for validation protocols.[170] Currently, these standards apply to first responders for the testing of tools used in the field to screen suspicious powders and substances, such as handheld devices for ricin detection and polymerase chain reaction technology for anthrax.[171] In

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[167] Note: Although this information is from ASTM E2770-10 (published in 2010), the newest version of the document is ASTM E2770-17 (published in 2017). American Society for Testing and Materials, *Initial Response to Suspected Biological Agents*, 1.

[168] Matt Davenport, "Standards for Biothreat Detection," presented at the National Strategy for CBRNE Standards, Washington, DC, November 9, 2010, https://share.ansi.org.

[169] Emery, "Field Biological Detection Capabilities," 6.

[170] Davenport, "Standards for Biothreat Detection."

[171] Emery, "Field Biological Detection Capabilities," 8.

2003, the DHS Science and Technology Directorate collaborated with AOAC International as a third party to test field biological detection equipment for validation and standardized sampling protocol and performance criteria.[172]

4. National Preparedness Goal/National Response Framework

Because many resources are needed to respond to WMD events, the response must be integrated. First responders must familiarize themselves with Homeland Security Presidential Directive-8 (HSPD-8). This directive, and the related National Preparedness Goal, provides federal, state, and local responders with direction for preparing for all-hazards incidents. HSPD-8 facilitated the formation of the Office of Domestic Preparedness "Emergency Responder Guidelines" document, which incorporates a WMD training program designed to provide integrated knowledge, skills, and abilities to first responders.[173]

C. RECOMMENDATIONS

1. A New WMD Working Group

Nationally in the United States, local responders are not comfortable or proficient in sampling or screening substances of suspicious origin.[174] To initiate robust forums and discussions, stakeholders should consider establishing a WMD/CBRNE working group consisting of a multiagency, multijurisdiction membership. The group should focus on assisting local responders by researching standards that work at their operational level and determining timelines for implementing recognized standards. The working group can then present its final recommendations to the U.S. Fire Administrator, International Association of Fire Fighters, International Association of Fire Chiefs, International Emergency Managers Association, and the International Association of Police Chiefs for further actions. The working group could also evaluate policies used at the state and federal level that govern their practices and procedures and can consider modeling the mandated

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[172] Emery, 4.

[173] Creamer, "Multi-agency Response to WMD."

[174] Creamer, "Mult-agency Response to WMD," 4.

procedures used by the FBI, USPIS, and the CDC/LRN. Echoing mandates used at the upper tiers of response ensures continuity in biothreat planning, response, mitigation, and recovery. The working group should also explore foreign operations related to biothreat response, like those discussed in this chapter.

2. Training

Simple policy changes that aim for standardization can enhance the crisis and consequence management system in response to suspicious substances. Such changes could also set standards for other departments and partners within the U.S. fire service and local law enforcement. The primary recommendation is to train current responders for WMD operations and to send qualified team members to become WMD instructors. This training model will help counter the effects of attrition from retirement, promotion, and operational exhaustion (burnout). Training should give responders the qualifications, knowledge, skills, and ability to research, develop, and maintain equipment, handle technology upgrades, and recalibrate systems. It is also imperative to research and examine the future use of field-screening techniques; responders should engage in related training courses to enhance local emergency preparedness and response. Hazmat teams should seek to employ diverse subject matter experts with complementary training—like EU FITs—to facilitate strategic management and decision-making capabilities (including decisions about resource deployment) during the consequence management phase of a WMD incident.

Funding for these initiatives can be justified during future budget cycles; grant managers can apply for Urban Areas Security Initiative funding and homeland security grant opportunities. The grant funding should have measures in place to ensure that responders conduct investment justifications for equipment that passes industry standards. Taxpayers have a right to expect the most value for dollars that are approved for strategic initiatives.[175]

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[175] Emery, "Field Biological Detection Capabilities," 10.

D. SUMMARY AND CONCLUSION

Emergency response to suspicious and unknown substances became a huge concern for public health and safety after the Amerithrax attacks of 2001. As the lead agency responsible for the investigation of bioterrorism and biological crimes, the FBI remains concerned about biological agents available for nefarious use.[176] Since the emergence of bioterrorism in 2001, more challenges have surfaced; hoaxes, for example, divert critical assets from other law enforcement and emergency response needs.[177] To combat challenges related to WMDs with a biological threat nexus, the FBI established the WMD Directorate (WMDD) in 2006 and staffed each of its fifty-six field offices with a WMD coordinator, who acts as a liaison between local responders and public health officials for efficiency in emergency preparedness and response. The FBI and CDC also created the Laboratory Response Network (LRN) to increase the number of laboratories capable of addressing biological threats. Additionally, the FBI and the CDC developed a training program for joint criminal and epidemiological investigations to help first responders more rapidly identify and investigate biological threats.[178] State and federal law enforcement partners, including LRN facilities, operate under strict, standardized guidelines, regardless of their geographical location. Standardization for joint investigations has improved information and intelligence sharing and helps creates strong relationships between mutually dependent teams before and during a crisis. This collaborative model enables an efficient response to biological threats, which can help responders detect an attack or outbreak early, maximize interventions, and minimize delays in the apprehension, prosecution, and conviction of a perpetrator.[179]

Although methodical approaches to biothreat response have improved since 2001—for instance, responders no longer triple-bag a substance until it is field screened in conjunction with a threat assessment—gaps remain in America's biodefense, according to

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[176] Majidi, "Ten Years after 9/11."

[177] Majidi.

[178] Majidi, "Ten Years after 9/11."

[179] FBI and CDC, *Criminal and Epidemiological Investigation Handbook*, 53.

those on the front line.[180] Suspicious and unknown substances might be mishandled if the responders do not understand the nature of the incident; hazmat operators must approach a biological threat much differently than a toxic chemical release. As a RAND report argues, "Well-designed guidelines and protocols could significantly improve real-time on-site hazard assessments. Essential elements include sensing equipment, measurement sites, organizational responsibilities and authorities, and data interpretation consistent with operational requirements."[181] The protocols for local responders written by the WMDD and members of the CDC/LRN are not regulated standards or laws. In 2017, the Interagency Board highlighted a lack of standards, policies, and procedures needed to formulate consistent operations for threat determination, field sampling, and evidence collection with validated and standardized equipment.[182] Standardized technology—and procedures to implement the technology—at the local level would eliminate the inconsistencies in local response across. The GAO's analysis of responses to suspicious and unknown substances, including hoaxes and potential attacks provides, confirms that standardizing operating guidelines and upgrading equipment could enhance response efforts and improve responder safety.[183]

Technological changes will also place more emphasis on training and education for first responders. In some cases, we may need to step back and look closely at the roles we have chosen for our members and organizations. Future technology should enhance the design for organizational and operational needs, as opposed to targeting the laboratories. Although there are significant improvements in technology used in the field, first responders do not have access to handheld devices that screen for instantaneous results of biological threat agents.[184] Currently, there is no technology available for domestic use in the field to confirm biological threats; therefore, standards are written to facilitate the field

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[180] Davenport, "After Amerithrax."

[181] Jackson et al., *Protecting Emergency Responders*.

[182] Interagency Board, "Bioterrorism Preparedness and Response."

[183] General Accounting Office, *Bioterrorism: Public Health Response*.

[184] Chris Hawley, "New Technologies for WMD Detection," *Fire Engineering*, November 1, 2005, www.fireengineering.com/articles/print/volume-158/issue-11/wmd-supplement/new-technologies-for-wmd-detection.html.

screening and collection of samples so that the LRN can confirm the presence of organisms.[185]

There is more to response than technology, however. A rapid threat credibility evaluation is facilitated by swift crisis response at the local level, particularly when responders promptly notify state and federal assets, and initiate sampling and field screening. These capabilities are not available nor permissible at LRN facilities, which means samples need to be tested before they are delivered to a lab. If a threat (written or implied) is determined to be associated with the agent, law enforcement coordinates transportation to the laboratory for further scientific assessment. If there is not a threat associated with the agent, local law enforcement investigators can take the sample into evidence for further investigation. If these activities are standardized at the local level, it will help ensure that responders do not miss steps or prolong this process.

Local responders and their leadership should recognize that biological threats are a huge national concern; the nation faces devastating and cascading effects if on-scene procedures are not practiced as recommended. Terrorists have demonstrated the willingness to acquire and employ biological agents in the United States, and Amerithrax demonstrated that a slow response or failure to implement a strong incident action plan at the crisis response level could result in an epidemic outbreak or death.[186] As a result, HSPD-8 stresses the importance of local agencies having the proper preparedness procedures for response to biological substances, as local first responders are critical to an effective response.[187] Federal agencies have developed standards and guidance to support best practices at the local level; policies and guidelines such as ASTM E2770-17, ASTM E2458-10, and NFPA 472/473 provide the framework for national standards, but they are not enforceable at the local level. Enforceable standards and procedures—like those at the state and federal level—will ensure that all responders are held accountable for incident management. Communication and command coordination are the key elements for a

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[185] Morrow, Downey, and Delaney, *Best Practices for Sample Collection*, 4.

[186] FBI and CDC, *Criminal and Epidemiological Investigation Handbook*, 71.

[187] Coursey et al., "Framework for a Biothreat Field Response," 12.

successful multiagency, multijurisdictional response to suspicious and unknown substances with a biological threat nexus.[188] These standards eliminate the question of why responders are collecting the samples.

In her 2011 master's thesis, "First Responder Knowledge and Training Needs for Bioterrorism," Heather Corinne Galada, referencing Amerithrax, argues "that the lack of an effective bioterrorism protocol resulted in many civilian illnesses and deaths caused by the anthrax exposure."[189] A protocol is still needed. To that end, this thesis recommends the formation of a WMD working group, which can identify the challenges local organizations experience when responding to suspicious and unknown substances. This group can evaluate existing standards, guidelines, and protocols to determine how local response agencies can improve in command, coordination, detection, communication, mitigation, and recovery operations. The working group can also establish a framework for mandates and procedures that protect both responders and stakeholders during the crisis response phase. In New York State, for example, a steering committee made up of emergency management, fire/EMS, law enforcement, and public health officials met to provide recommendations on the implementation of collaborative training for multi-response resources. The group was a catalyst for getting the concepts mandated through an executive order in 1996 by Governor George Pataki.[190] The mandates and protocols established by the proposed working group should allow for flexibility for local response organizations and jurisdictions to establish standard operating procedures and guidelines suitable for their areas of responsibility.

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[188] Morrow, Downey, and Delaney, *Best Practices for Sample Collection*, 4.

[189] Heather Corinne Galada, "First Responder Knowledge and Training Needs for Bioterrorism" (master's thesis, Drexel University, 2011), 1.

[190] Creamer, "Multi-agency Response to WMD," 5.

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