Biological Terrorism:
Practical Response Strategies

By Dr. Mohamed Athher Mughal

Introduction

In his 6 November 2001 testimony before the Senate Judiciary Subcommittee on Technology, Terrorism, and Government Information, the deputy assistant director of the Federal Bureau of Investigation's (FBI's) Counterterrorism Division, J.T. Caruso, stated, "The bioterrorism threat has risen to a new level."[1] Biological terrorist incidents involving anthrax have resulted in 22 confirmed cases and five deaths since 3 October 2001. Since then, the FBI has responded to more than 8,000 reports of use or threatened use of biological agents. Clearly, biological terrorism is a real and growing threat in the United States.[2]

Response to such incidents is not limited to civilian authorities. Soldiers will be involved through a variety of venues. Physicians and medical experts from the U.S. Army Medical Research Institute for Infectious Diseases will likely be called on to assist. The Soldier and Biological Chemical Command's (SBCCOM's) Chemical/Biological Rapid Response Team (CBRRT) has the mission to coordinate and synchronize the Department of Defense's (DoD's) technical assistance, both medical and nonmedical, to support civilian-lead federal agencies in responding to domestic weapons of mass destruction (WMD) incidents.[3] Defense Planning Guidance published in April 2000 states that the Joint Task Force Civil Support (JTF-CS) will plan and integrate DoD's support to the Federal Emergency Management Agency (FEMA) for WMD events in the continental United States.[4] Finally, the National Guard's 32 regionally deployed civil-support teams (CST) have the mission to assist local first responders in determining the nature of a WMD attack and then provide assistance in identifying and coordinating the arrival of follow-on state and federal military response assets.[5] Clearly, soldiers, and more particularly, the Chemical Corps, will be involved in civilian responses to domestic biological terrorism.

Biological Terrorism: What It Would Look Like

The primary consequence of a large-scale biological terrorist attack will be a catastrophically large number of casualties. Response systems must be capable of providing the appropriate types and amounts of medical treatments and services. However, the full spectrum of potential consequences is much broader than medical casualties.

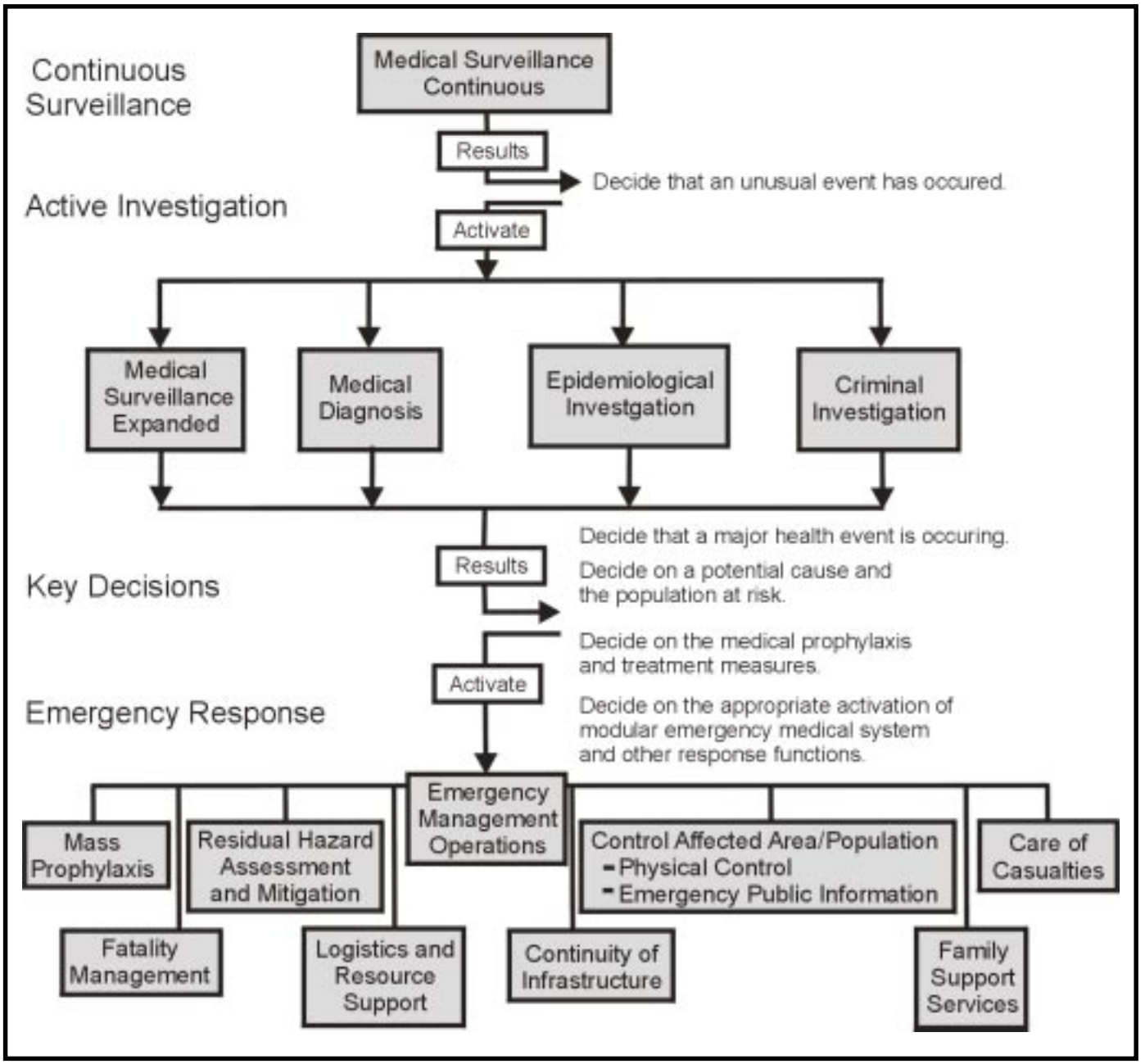
A well-conducted biological terrorist attack will strain our country's public health medical-surveillance systems. It will also require responders to make quick, accurate medical diagnoses and disease identifications. By definition, a bioterrorist event is a criminal act that requires a complex criminal investigation. Depending on the agent used in an attack, such an incident could also result in residual environmental hazards that would require mitigation. Considering the potential magnitude of casualties, a significant portion of a metropolitan area's population may have to be medically managed and physically controlled.

The aforementioned medical treatment, criminal investigation, environmental hazard mitigation, and population control activities will require a coordinated and integrated command and control effort extending across federal, state, and local jurisdictions. In short, the full spectrum of consequences requiring management encompasses multiple professional disciplines and functional areas of responsibility spanning three levels of government.[6]

Response Strategies for Biological Terrorism

Through a series of analytical workshops, SBCCOM's Military Improved Response Program (MIRP) team identified a myriad of emergency functions necessary for bioresponse.[7] To be useful and understandable, these functions needed to be organized into a logical and integrated response system. Thus, the MIRP team formulated a generic biological-response template. The template identifies, organizes, and integrates the essential emergency response functions necessary for a city to respond effectively to biological terrorism. This generic template (see figure, next page) can serve as a useful starting point for cities and states to prepare their own customized local emergency response plans.

Medical surveillance, the first component of the template, should operate continuously to improve the chances of quickly detecting unusual medical events in the local population. Several communities are currently monitoring hospital admissions, 911 calls, and unexplained deaths as part of their medical surveillance systems.



Once an anomaly is detected, medical diagnosis is necessary to identify and confirm its cause. Rapid and accurate disease identification is essential to initiate appropriate and timely medical treatments for many biological-warfare agents. Preliminary medical diagnoses should be sent for verification to preidentified and qualified local, state, federal, or academic laboratories. When a specific disease is confirmed, the public health community will likely begin an epidemiological investigation to determine the distribution of cases and the sources of the disease outbreak. This information is necessary to control disease propagation and identify and treat the population at risk.

Concurrent with these medical investigations, the law enforcement community will begin a criminal investigation to assess the ongoing threat, safeguard evidentiary materials, and identify and apprehend suspects. In the case of biological terrorism, the criminal and the epidemiological investigations could—and likely should—complement one another. For instance, once epidemiologists identify the location of the disease source, criminal investigators could visit the site to collect evidentiary materials and other data pertinent to law enforcement concerns.

Local communities should develop sampling protocols for law enforcement personnel investigating biological terrorist events. These protocols should not only protect personnel and evidentiary materials, but they should also be coordinated with recipient laboratories to ensure appropriate specimen collection and handling. Additional

procedures should be established for baseline and postincident medical screening for all personnel involved.

While the criminal investigation is in process, and pending the specific disease agent, local officials may begin a mass prophylaxis campaign to prevent disease and death in exposed victims. This involves the large-scale distribution and medical application of appropriate antibiotics, vaccines, or other medications. The speed at which medical prophylaxis is implemented effectively is key to the campaign's success. For instance, giving antibiotics to people shortly after exposure to anthrax can significantly reduce the occurrence of disease and death; delayed administration could be ineffective. Further, because the population at risk cannot be verified immediately, medical prophylaxis will likely have to be expanded to include a much larger number of people than those actually exposed.

Transporting contaminated patients

The rapidity and magnitude of medical prophylaxis necessitates a well-functioning and preplanned strategy. Early coordination on decision making regarding prophylactic treatment among all agencies—especially public health, medical and law enforcement, and emergency management—is essential for a successful mass prophylaxis campaign. Federal and state assistance most likely would be needed to support local response planning for mass prophylaxis.

Depending on the attack agent, residual hazard assessment and mitigation may be necessary to assess and protect the population from further exposure to potential environmental hazards. Assessment and mitigation may include environmental sampling of air, water, and soil, as well as swipes and insect and animal screening. Vector control may be used as appropriate.[8]

In the case of a contagious disease, physical control of the affected population may be necessary to control and minimize secondary infections. Strategies could include controlling ingress and egress points, such as bridges and tunnels, and providing security for vital sites such as airports, hospitals, pharmaceutical distribution points, and utility sites. Quick dissemination of accurate, authoritative medical information is essential to maintain control and facilitate an organized emergency response. The local community could look to establish and operate a city hotline, providing information to the media and distributing self-help fact sheets to the affected population.

The local medical infrastructure's patient capacity will have to be rapidly expanded to accommodate the high volume of patients. Alternative health-care centers will have to be established within the affected area. Because of resource constraints, victims will likely have to accept subtraditional levels of care. Appropriate fatality management strategies will have to be put into place to manage the potentially large number of fatalities. The local community will need to stand up family support services to provide information, nonmedical assistance, and crisis counseling to victims and their families.

For an effective response to bioterrorism, the described emergency functions will need to happen at a rapid pace and in high volume, all while ensuring continuous operation of critical infrastructure such as communications, power generation, and water and sanitation services. The local emergency operations center (EOC) and, likely, a joint local, state, and federal EOC will be necessary to lead and manage the multitude of participants and resources involved.[9]

Fine Tuning and Validating the BW Response Template

The original template was derived through intensive analysis of five credible biological threat scenarios. By design, these scenarios were confined to infectious but noncontagious agents. Once a practical, comprehensive strategy for response to a noncontagious agent was developed, this strategy was modified to accommodate the more complex case of a contagious agent. Response to a communicable disease is substantially complicated by the possible diverse sources of infection and reinfection.

To analyze and develop solutions to this problem, the Improved Response Program (IRP) partnered with the Centers for Disease Control and Prevention (CDC) to conduct an analytical workshop in April 2000. The workshop's goal was to refine the CDC's Smallpox Control Plan/Strategy by applying it against a credible contagious bioterrorist attack scenario. Using a panel comprised of biological warfare experts, medical/public health practitioners, law enforcement officials, and emergency responders and managers, the workshop focused on the areas of vaccination, quarantine/isolation, and medical surveillance.

The panel found that the response template, with certain modifications, was a practical strategy for minimizing the consequences of a bioterrorist attack using a contagious agent. Some of these modifications include:

- Adding contact-tracing to the epidemiological investigation.
- Implementing protective measures for criminal investigators.
- Establishing community outreach teams to implement mass immunizations at private homes rather than convene potentially contagious persons at public facilities.
- Limiting public gatherings and mass transportation functions.
- Implementing geographic isolation/quarantining; and establishing more stringent handling, burial, and disposition requirements for fatalities.

Although the response template was derived by a multidisciplinary group of responders from various jurisdictions around the nation, the IRP wanted to validate and demonstrate the template's applicability to different-sized communities in different regions of the country. To do so, the IRP team assembled and conducted investigational workshops with local first responder and emergency management teams in three communities: Wichita, Kansas; Pinellas County, Florida; and Dover, Delaware. In each community, the template proved a valuable and applicable starting point for development of customized emergency response plans.

Bioresponse: Some Practical Insights

A number of salient insights are embedded within the structure of the template. Most notably, a biological event would primarily represent a catastrophic medical emergency. The most critical consequence will be the huge number of medical casualties that, in turn, will require a timely and focused medical response. Health-care management systems, independent hospitals, clinics, and others in the medical community need to be willing to function as a crucial and integrated component within the larger emergency-response system. To this end, the local medical and public health communities need to be intimately involved in the locality's efforts to plan, implement, exercise, and test their bioresponse strategy.

Operating in a "hot zone"

The local community must lead the response to a major biological incident. Local preplanning before the event and rapid implementation of the plan following an incident are required to effectively cope with a major incident.

The emergency-response functions that comprise the response template already exist. The best strategy for preparedness is to effectively manage and realign existing resources to accommodate the complexities of a bioattack. Entirely new systems and bureaucracies are neither necessary nor desirable.

City officials must be prepared and willing to quickly make difficult decisions regarding mass prophylaxis and initiation of emergency-medical operations. These decisions may need to be made on a presumptive basis to reduce fatalities and to keep pace with the onset of casualties. City officials should take the time to understand the issues and options surrounding these decisions before the event to be prepared to make these life-impacting judgments under stress. Control of the affected population under conditions of extreme fear and possible panic is necessary for effective response. Physical control and security at medical facilities and vital installations such as airports, hospitals, and other places need to be considered in advance.

A greater challenge is that public information and rumor control will be needed to keep the public accurately informed and to quell potential panic. Preplanning public announcement approaches could help local officials obtain public cooperation with the response. Speaking with a unified voice through a joint information center will be vital. Co-opting and partnering with the media could be key.

A competently conducted bioattack against a domestic target would constitute a national—and not a local—crisis. The full magnitude and diversity of the required response will necessarily draw from and stress state-, regional-, and national-level assets. Nontraditional response approaches, such as state and national calls for volunteers,

may be needed. The ensuing social, political, economic, and psychological effects will be national in scope.

The template's structured response approach would be substantially strengthened if cities adopted similar configurations and functions for their emergency response plans. Then personnel from state and federal organizations, as well as help from other cities and regions, could be familiar with the overall response strategy. This familiarity would help provide quick, uniform, and effective augmentation of the affected city's assets.

The response template concentrates on response to and mitigation of the immediate consequences of a geographically focused attack spanning the first 3 weeks following the attack. Long-term problems, such as chronic ailments among casualties and economic disruptions in affected areas, were not within the scope of the MIRP's analyses. It may be prudent for another interagency group to analyze and develop strategies to mitigate these long-term effects. Further analyses of response measures for announced attacks and multiple and simultaneous attacks distributed around the country are needed. The military, especially, needs to develop contingency response plans—one for when our nation is actively at war and the other during nonwartime.

Finally, although the MIRP's mission is to develop strategies to mitigate the consequences of an actual biological incident, we believe that the effective prevention of or protection from such events is a vitally important area for our government to concentrate on as well. The costs in terms of suffering, death, and economic loss from a biological attack, even with the best response, would be unacceptable. Efforts to determine ways to protect buildings and other structures from biological attack seem warranted. Immediate detection of an attack would allow for rapid distribution of prophylaxis, which would save many lives in the case of a lethal disease such as anthrax. Efforts by the law enforcement community to prevent such attacks are of inestimable value.

A Final Thought

In 1972, government forces attacked a nearby home on our block in Kampala, Uganda. After a 30-minute firefight, soldiers used tanks and shoulder-fired rockets for their final assault. The earth literally shook. With mounting unrest, large segments of the population were herded to evacuation points and refugee camps. Stripped of everything, my family spent our first 2 weeks in the United States in the attic of a Lutheran church.

Military and paramilitary terrorist acts against civilian targets have been a fact of history for centuries. It is unfortunate that last September, this practice crossed an ocean to become a component of our American experience and psyche. Biological terrorism, particularly, has the potential to test our mettle as a people and as a nation. A well-reasoned, preplanned, coordinated, and teamed response is our only hope to survive and overcome such an attack.

End Notes

[1]Congressional testimony before the Senate Judiciary Subcommittee on Technology, Terrorism and Government Information, J.T. Caruso, November 6, 2001.

[2] Congressional testimony before the Senate Select Committee on Intelligence, Dale L. Watson, February 6, 2002.

[3] See SBCCOM Web site: http://www2.sbccom.army.mil/dbrrt/fs_cbrrt.htm

[4] See Web site: http://www.acom.mil/jtfcs/

[5] Defense Link. "DoD Announces Plans for 17 New WMD Civil Support Teams." January 13, 2000.

[6] Mughal, Mohamed and Paul Fedele, "The Improved Response Program." *Army Chemical Review*, February 2001, pp 12-16.

[7] Mughal, Mohamed, "The Biological Weapons Improved Response Program." *Army Research, Development and Acquisition Magazine*, January/February 2000, pp 44-45.

[8] Vectors are insects that can carry and transmit a disease. For instance, fleas can carry plague, ticks can carry tularemia, and mosquitoes can carry Venezuelan Equine Encephalomyelitis (VEE).

[9] SBCCOM, "Improving Local and State Agency Response to Terrorist Incidents Involving Biological Weapons—Interim Planning Guide," August 1999.
Available: http://www2.sbccom.army.mil/hld/bwirp/index.htm.

Dr. Mohamed Athher Mughal has more than 17 years experience researching and analyzing chemical and biological warfare and terrorism. He has published articles on bioterrorism preparedness in the *Army Research, Development & Acquisition Magazine*, the *Army Chemical Review*, the *Chemical/Biological Quarterly* and *National Defense Magazine*. He has coauthored two DoD technical reports on bioterrorism preparedness and coedited Dartmouth College's Medical Disaster Conference Report with faculty members of the Dartmouth Medical School and the C. Everett Koop Institute. His research papers and findings have been presented at conferences nationwide, at the Centers for Disease Control and Prevention in Atlanta and at the International First World Congress on Chemical and Biological Terrorism, held in Dubrovik, Croatia, in April 2001. Dr. Mughal holds a bachelor's in chemical engineering, a master's in engineering management, and a doctorate in public policy. He is also a branch-qualified Army chemical officer and an honor graduate of the U.S. Army Chemical School.