Lessons Learned: The "Pale Horse" Bioterrorism Response Exercise

Col. David Jarrett, MD, FACEP

The city of San Antonio, Texas, and the Fort Sam Houston Army Post conducted a bioterrorism response exercise to test the command infrastructure in a large tabletop exercise. A number of local, state, and federal agencies participated in the exercise. The scenario, program format, and multiple lessons learned from this experience are described. Needs for additional services, planning, and legal issues are identified. (Disaster Manage Response 2003;1:114-8.)

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And I looked, and behold, a pale horse: and his name that sat on him was Death, and Hell followed with him.
Book of Revelation 6:8

In August 2002, the city of San Antonio, Texas, and the Fort Sam Houston Army Post (located within the city) conducted "Pale Horse," one of the most ambitious, city-based, large-scale, tabletop bioterrorism response exercises to date. The exercise used significant executive-level resources from the Department of Defense (DOD), city, state, and region.

The purpose of the bioterrorism response exercise was to test the command infrastructure in a large tabletop exercise. The exercise included command-level players from military medical (major Army and Air Force medical facilities located in San Antonio), civilian medical, city government, boards of health, state medical, National Guard, regional Federal Emergency Management Agency (FEMA), and Department of Defense (DOD) communities. The initial goals of the exercise were to foster critical thinking, identify roles and responsibilities, and exercise and validate existing plans. The programmed corollary to the exercise was to develop solutions for the inevitable shortfalls and controversial issues that would arise during play. Primary participants of the exercise are listed in Table 1. This article will discuss the experience with attention to the shortfalls and controversial issues identified during the exercise.

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MULTIGROUP TABLETOP EXERCISE

Scenario

To develop realistic play, the city of San Antonio began with its normal level of preparedness. No artificial readiness was contrived to "look better." The primary scenario was an unannounced terrorist attack wherein aerosolized and appropriately stabilized smallpox virus was sprayed over the attendees at the Alamo Dome during a football game. No announcement or threat was relayed (covert attack), and all attendees dispersed to their normal routine. Initial victims of smallpox then began to present to medical providers with the onset of fever in congruence with the normal incubation period. Several assumptions were made on the basis of demographics of the San Antonio population. Because many residents have prior military service, the exercise planners assumed that approximately 20% of the population would have remote vaccination and could be considered relatively herd-immune. (The U.S. military ceased

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14. ABSTRACT

The city of San Antonio, Texas, and the Fort Sam Houston Army Post conducted a bioterrorism response exercise to test the command infrastructure in a large tabletop exercise. A number of local, state, and federal agencies participated in the exercise. The scenario, program format, and multiple lessons learned from this experience are described. Needs for additional services, planning, and legal issues are identified.

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performing routine vaccinations in 1990.[1]) The remainder of the population was assumed to be immunologically naïve. The transmission ratio for smallpox in this scenario was postulated to be 3 to 5 secondary cases per primary case. This transmission rate was considered appropriately conservative; the 1972 Yugoslavia outbreak resulted in 11 to 13 secondary cases per primary case and is consistent with the recent assessment by Gani and Leach.[2]

Program Format

The program prefaced play with a series of plenary session lectures by various subject-matter experts in wargaming; medical capabilities; local first-responder capabilities; and smallpox, bioterrorism, and disaster response agencies. After the lecture series, all participants dispersed to either preassigned or self-assigned groups, referred to as "command cells" specific to their base organizations. Individual hospital organizations, the city government, public health authorities, Fort Sam Houston officials, and others each had their own preplanned emergency operation configuration or operational center serving as their command cells. As play proceeded, individual cells responded to their own internal problems and to both external requests from other cells and to new situational information from the planners (program injects). Overall control was to be maintained by a "White Cell" who simulated requirements from state and federal agencies, and placed new program injects where and when required.

After the game play, each group presented its preliminary "lessons learned" to the plenary session. The following discussion is an overview of the lessons learned from this exercise.

Primary Lessons Learned

Use of investigational new drug vaccines. Use of an investigational new drug (IND) smallpox vaccine protocol will be untenable to control an epidemic resulting from a large bioterrorism attack. Sufficient time and personnel cannot be made available to stem the spread of the communicable disease.

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Ability to provide ring vaccination. "Ring vaccination" cannot be accomplished when contact tracing is untenable, as would be in a situation in which thousands of primary cases are due to exposure to an aerosolized virus. Adequate personnel did not exist to rapidly perform contact tracing due to the mass number of primary infections. In this venue, in which the infected individuals were externally unidentifiable and dispersed widely before the development of symptoms, mass vaccination without regard to exposure probability was the method of resort.

Multidisciplinary communication. Communication among the multiple emergency operations centers, the public, and health care providers was totally inadequate. In an ideal situation, all operations centers would rapidly provide each other pertinent information. Computer networks that have incorporated "instant messaging" have accommodated this function in other operational milieus. Rapid establishment of data collection and analysis points with secure-trunk communication will be necessary. This would be an item of great expense and would require direction from the new Department of Homeland Security.

Rapid Vaccination Secondary Lessons Learned

Knowledge deficit. There is a dearth of knowledge about the disposition of smallpox remains (eg, how long the body is infectious and whether special embalming procedures are indicated). The health care providers' cell (the largest single cell) was concerned about the potential communicability of smallpox in a modern population that includes a substantial number of immunocompromised individuals. Recent chemotherapy, radiotherapy, or corticosteroid therapy treatment and infection with HIV, AIDS, or other immunocompromising conditions substantially alter an individual's susceptibility to infectious disease. This high-risk group was significantly smaller when routine smallpox vaccination was halted in the mid-1970s. The lack of familiarity with normal smallpox vaccine reactions and complications made the decision to use available varicella immune globulin very difficult. Appropriate use would have resulted in consumption of the vaccine before the midpoint of the crisis.

Who has authority? The public health Medical Operations Center which had been designed to coordinate community medical response required a much more rigid charter in order for members to fully discern their mission. The group was unsure of its authority over private and public institutions and its relationship to both. While the initial vaccination program centered on health-care workers in the receiving facilities, no consideration was made for vaccinating the support personnel necessary for continued facilities operation.

Immunization manpower requirements. Operational plans required the use of diluted smallpox vaccine. Under the auspices and resultant informed consent and documentation required of an IND protocol for one to five diluted *vaccinia*, per-patient vaccination time was increased to between 10 and 20 minutes. This 4-per-hour rate is in stark contrast to the 500 vaccinations per day per vaccinator that was routine in the vaccination centers during the smallpox-eradication program.[3]

NEED FOR ADDITIONAL SERVICES AND PLANNING

The city of San Antonio had configured a Medical Operations Center that worked well as a clearance house. However, many of the members had difficulty with scientific questions due to the absence of a public health representative. Information flow was often delayed with other individual agency emergency operations centers until the daily conference calls. More frequent information updates would have been beneficial.

Military medical centers were active in the program and the Brooke Army Medical Center had excellent success with the Hospital Emergency Incident Command System (HEICS). This system was particularly amenable to integrating personnel as they entered game play from outside. For example, a field hospital was deployed into the matrix on its own initiative. The HEICS was able to accommodate this additional resource as a *fait accompli* without external direction. An additional innovation was the deployment of external triage teams that could evaluate patients who remained in both personal and rescue vehicles, and then dispatch them to the appropriate care area via their original transport. This significantly diminished traffic infiltration of the hospital complex proper.

As a counterpoint, the Wilford Hall Air Force Medical Center (AFMC), which is located across town, elected to maintain its status as a Level 1 trauma center to support the Air Force's worldwide mission. The personnel at AFMC assumed that an attack on San Antonio also was an attack on the United States as a whole. Therefore, the medical center was locked down and no nonessential personnel were allowed in or out. All potential smallpox patients were transferred to the Brooke Army Medical Center.

The difficulties that AFMC encountered included a lack of knowledge of local homeland defense plans that incorporated the use of Wilford Hall in the city plan. AFMC had a heavy dependence on civilian contract supplies and equipment that suddenly became unavailable and caused significant disruption in internal plan implementation. Both internal and external communications became difficult because no prior coordination had occurred between the medical operations group at AFMC and key medical personnel (eg, public health, infectious disease, city Medical Operations Center, and Joint Task Force cell representatives).

Fort Sam Houston was represented by an emergency operations center cell. This group was able to determine that sufficient manpower for crisis action team and garrison facilities was available. Crisis communications difficulties hampered interplay and cooperation among military and civilian key emergency medical services. While on-post communication via local-access television was available, post officials could not communicate with off-post workers and family members, who essentially were cut off from information regarding the post. They were thus unable to receive information on where and how to access military facilities.

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The Army's Joint Task Force-Civil Support (JTF-CS) had minimal input into the exercise because it was only programmed for a few hours of the exercise and was not adequately integrated into the response. The JTF-CS was not familiar with available DOD assets, which limited its usefulness, and civilian agencies were essentially unaware of the JTF-CS' presence. The only requests the JTF-CS received came from other military organizations, a total reversal of its intended role as an advocate and liaison from the civil authorities to the military.

Civilian facilities and disaster response groups were organized as subordinate to overall control by the city Medical Operations Center. The largest group was primarily composed of direct patient-care providers. These groups were lacking in the following areas:

1. *Grief counselors and clinic personnel.* The lack of grief-counseling expertise was identified as the mortality figures grew. Grief counselors usually are not considered to be first responders, but because of the magnitude of the crisis, their services were needed very early.
2. *Sufficient manpower.* The manpower for vaccination clinics was markedly insufficient due to the large number of patients and documentation required.
3. *Ability to vaccinate health care workers.* Postexposure prophylaxis of health care workers was rapidly defeated by the epidemic kinetics. Pre-event vaccination of first responders might have obviated this problem.
4. *Proximity of hospitals.* San Antonio's major hospitals are primarily located in a few multihospital areas with nearby contiguous campuses. The University Health Systems utilizing the HEICS was designated the primary smallpox facility. Unfortunately, the university system did not have as part of its plan a sustainment package for this designation. The resultant situation potentially would have resulted in a quarantine of the entire multihospital area. The University Hospital also is a primary Level 1 trauma center. The self-imposed isolation of Wilford Hall AFMC and the designation of the university system as a smallpox center essentially left the city without a primary trauma-receiving point.

5. *Small hospital concerns.* The smaller private system was represented in the program by Nix Hospital. Due to size and staffing constraints, upper middle management personnel were drawn into direct patient management, as no other expansion capability was present. Management employees had very limited hazardous material training.. Medical staff was not available because all physicians had primary responsibilities to other facilities. Since the hospital's supply system was based on demand and limited stocks, all medical material was rapidly consumed and could not be replenished. The basic error in their disaster plan was that it was limited to problems occurring within their hospital only and was not integrated into the plan of the larger community.

LEGAL ISSUES

Legal experts were included as participants in medical and governmental affairs within the game play. This allowed valuable insights into valid technical problems often missed by operational personnel.

Quarantine

Quarantine is a legal rather than medical action, and its implementation appears fraught with difficulties. Even though many quarantine laws still are technically in effect in various jurisdictions, some have lapsed. Even where quarantine technically is still enforceable, the procedures for implementing it have not kept pace with modern civil law.

Planners found there were numerous questions regarding the use of quarantine. For example, what "due process" is appropriate? When quarantine was commonplace, the process was simple and seldom contested. That is unlikely to be the case now. Who will determine ingress and egress procedures into a quarantine area? What will be the enforcement against those persons demanding to leave a quarantine area? What level of force is justifiable? What is the balance between public health and individual family rights? This debate can easily be carried further to include disposition of human remains.

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Liability

No body of law exists to define what the professional and personal liability of private health care providers is for

Table 1. Participants in Pale Horse Tabletop Planning Exercise, San Antonio, Texas

Local Participants
San Antonio City and Bexar County Agencies
Office of the Mayor
Office of Emergency Management
Metropolitan Health District
Medical Examiner's Office
Emergency Operations Center representatives
District Attomey's Office
Information Technology Services Department
Fire/Emergency medical services
Police
San Antonio Water System
Bexar County Medical Society
Greater San Antonio Hospital Council
Local media outlets
Local Red Cross representatives
University Health System/University of Texas Health Science Center
Bexar County Emergency Management Office
State Participants
Texas Department of Emergency Management
Texas Department of Health
Texas National Guard Bureau, 6th Civil Support Team
Federal Participants
Department of Health and Human Services
Centers for Disease Control and Prevention
Office of Emergency Preparedness
National Disaster Medical System
Food and Drug Administration
Federal Emergency Management Agency
Federal Bureau of Investigation
Veteran's Administration
Department of Defense Participants
United States Army Medical Command
Army Medical Department Center and School
United States Army Medical Research & Materiel Command
United States Army Medical Research Institute of Infectious Diseases
United States Army Medical Materiel Agency
United States Army Center for Health Promotion and Preventive Medicine
Great Plains Regional Medical Command
Brooke Army Medical Center
Joint Forces Command, Joint Task Force-Civil Support
United States 5th Army, Joint Task Force-Consequence Management
Joint Medical Planners Office
United States Army Chemical School
TRICARE Regional Office
Brooks Air Force Base
Randolph Air Force Base
Laokland Air Force Base, Wilford Hall Air Force Medical Center
Fort Sam Houston
Navy Bureau of Medicine
United States Air Force Applied Solutions for Operational Medicine

emergency actions when acting on behalf of the government. Does malpractice insurance afford financial protection in this instance?

Many vaccines used against potential bioweapons are technically classified as IND, and as such, their usage requires informed consent. The President of the United States has the authority to remove informed consent requirements for military personnel under exceptional circumstances. No such authority is granted to the president regarding nonmilitary civilians. Food and Drug Administration procedures can be expedited but not circumvented. Currently, the only flexibility allowed the Food and Drug Administration is the decision to eliminate violation penalties under special circumstances.

Social Structure

Planners in this free-play simulation were allowed to consider such decrements in the community services as would result from personnel losses and inability to replenish supplies. They could consider potentially rate-limiting steps such as loss of normal utilities, unavailability of repair personnel, loss of food-service workers. No provision had been made to preferentially vaccinate utility workers in service or retail industries who deal with large numbers of people daily. Would they show up for work? How long can critical industries work on minimal essential staffing? Even fatality management requires protected workers. In this instance, the medical examiner's office lost 50% of its staff before the disease was identified. Human remains disposal became an overwhelming problem, and the power to dispose of remains varied considerably among various jurisdictions.

Control and dissemination of information. Information management, risk communication, and psychological impact are dramatically intertwined. When people are urged to stay in their homes, they are subjected to a continual barrage of news with repetition of the limited data available. Public health officers must be made available on a regular basis to provide accurate new information or to deal with the lack of data. The default of mass media communication is to repetitively report the most dramatic instances when no new announcements are forthcoming—a form of "no news is bad news."

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Accurate news transmission is not solely a function of the mainstream media. Health-care providers also need the ability to locally transmit clinical data. There is a lack of experience in treating acute smallpox or other diseases caused by agents of bioterrorism, and rapid peer-to-peer communication of "what works" and "what doesn't work" must occur. During a time when personal, cellular, and land-line communications become untenable, this may present a formidable challenge. Practitioners frequently found themselves without direct information about vaccination plans, which hospitals had been designated for "dirty" versus "clean" casualty care, and the provision of alternative treatment sites.

CONCLUSION

A terrorist biological attack with a highly infectious agent against a susceptible population would present immense command and control challenges. Contingency preparations must involve not only direct health care organizations but the entire panoply of governmental, legal, communication, and social services. The preconfigured incident command system structure must be rapidly adaptive because it will encounter challenges for which no programmed response is available. Substantive groups will both initiate and deny assistance outside the command and control networks. These circumstances must be rapidly accommodated and incorporated into the command response.

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