



Bioterrorism and Health System Preparedness



Disaster Planning Drills and Readiness Assessment



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U.S. Department of Health
and Human Services
Public Health Service

Introduction

Biological terrorism, or bioterrorism, presents a significant public health threat to the United States. Hospitals across the country are engaged in disaster planning activities to prepare for such a threat. While bioterrorism preparedness is in its infancy, several tools are available and more are being developed to assist hospital disaster planners.

Some of these tools were featured in an April 2003 Web-assisted audioconference sponsored by the Agency for Healthcare Research and Quality (AHRQ) and aimed at hospital and public health officials.

Presentations were made by the following researchers and practitioners:

- s Gary B. Green, M.D., M.P.H., FACEP, The Johns Hopkins University School of Medicine, Baltimore, Maryland;
- s Mary Massey, Anaheim Memorial Medical Center, Anaheim, California; and
- s Howard W. Levitin, M.D., FACEP, Disaster Planning International, Indianapolis, Indiana; and Sue Skidmore, Booz-Allen & Hamilton, McLean, Virginia.

The audioconference also included a question and answer period, during which listeners were invited to submit questions to the panelists.

This issue brief examines resources that can assist hospitals and other health systems in preparing for bioterrorism disasters, and in conducting disaster drills in particular. Disaster drills are an important tool to improve local disaster response. They are exercises designed to test the response of the health care system during mass-casualty emergencies by recreating a disaster situation using mock victims, theoretical scenarios, or computer simulations.

Conventional Disasters versus Bioterrorism

Preparedness for “conventional” disasters—such as earthquakes, floods, major accidents, and fires—is the foundation for bioterrorism readiness. The basic components of an adequate disaster response system have been defined, and the steps necessary to build disaster preparedness capacity have been established. If health care institutions have put all the pieces in place for general disaster preparedness, they will have taken



the first and most important step toward preparedness for responding to a bioterrorist event.

What would distinguish the health system response to a bioterrorist event from the response to a conventional disaster is the additional knowledge, skills, and resources needed in the event of a bioterrorist attack.

Bioterrorism is broadly defined to include terrorist use of biological agents such as anthrax, smallpox, botulism, and plague. In the event of a bioterrorism disaster, additional tasks for hospitals would include:

- § Decontaminating victims;
- § Protecting health care workers from infection;
- § Containing infectious agents; and
- § Using treatments specific to biological agents.

Another distinguishing characteristic to be expected from a bioterrorism event would be its broader impact on the health care system. Dr. Howard Levitin pointed out that, whereas in a natural disaster the vast majority of victims come to the emergency room, are treated, and released, in a bioterrorist event people would become ill and would have to be admitted to the hospital for longer term care. This would affect hospital staffing and inpatient and outpatient capacity. Mary Massey noted another special problem to be prepared for: the fear factor. She added that the most effective way to counter the public's fear is to provide information that is consistent and consistently worded, whether it comes from the local Emergency Medical Service, the public health department, or the

Federal Centers for Disease Control and Prevention.

Disaster Planning: An Ongoing Community Effort

Continuous Effort

Disaster planners should view bioterrorism preparedness efforts as an ongoing quality improvement initiative. "An institution never reaches a total state of preparedness," said Green. He encouraged hospitals to view disaster preparedness efforts as part of a "continuous cycle." Within this ongoing process, hospitals should undertake a number of steps to ensure that they are adequately prepared, as shown below.

The steps in the cycle can be applied at the departmental level, at the institution level, community level, and on up to the regional level.

Key Components

By its very nature, disaster response is complex and confusing. Most planners agree, however, that an adequate disaster response system must include several key components:

- § Incident Command System (ICS)—Also referred to as a "command and control" function, the ICS defines roles and responsibilities of all disaster response participants;
- § System integration—Largely communication capability.

The Continuous Cycle of Disaster Preparedness

- § Assemble an interdisciplinary team of key stakeholders for disaster planning;
- § Review current resources, strengths, and weaknesses;
- § Develop a detailed, written disaster response plan;
- § Disseminate and practice the plan through education and drills;
- § Evaluate the adequacy of knowledge, skills, and resources;
- § Revise the plan based on objective data and lessons learned;
- § Modify education and training as needed to target areas of weakness; and
- § Continuously repeat these steps.



Hospitals must integrate response functions within their facilities and coordinate efforts with outside agencies;

- § Logistics—Includes a supply management system, plan for facilities use, and system for transporting patients, providers, and materials;
- § Security—Critical to enable the other components to operate the way they are intended to;
- § Clinical care;
- § Human resources; and
- § Public relations.

Individual health care institutions may also categorize other components according to their needs.

“There is no cookbook recipe that every institution can follow that can lead to adequate preparedness.”

Gary B. Green, The Johns Hopkins University School of Medicine

Community-Wide Plan

Mary Massey, Disaster Coordinator at Anaheim Memorial Medical Center, stressed the importance of a community-wide plan. “We are all used to emergency preparedness within our own organizations,” she said. “What hospitals need to do is develop an integrated community response.” For example, hospitals

should work with local agencies to define roles and responsibilities in the event of a disaster and to create redundant communication systems. A veteran of many drills, Massey stressed the importance of “bringing all the community players together”: law enforcement, fire departments, emergency medical services, public health officials, community health care providers, and local industries. “This isn’t a battle to see which agency is best; this is a battle to prepare your community.”

Hospital Emergency Incident Command System (HEICS)

One important resource available to disaster planners is the Hospital Emergency Incident Command System (HEICS), an emergency management system developed first by Orange County and later revised by the San Mateo County Health Services Agency of California. Now used by hospitals across the country, HEICS lays out a logical management structure, clear responsibilities and reporting channels, and a common terminology to help hospitals and emergency responders communicate in the event of a disaster. Available free of charge, HEICS may be downloaded from the California Emergency Medical Services Authority Web site (www.emsa.ca.gov/dms2/heics3.htm).

Disaster Training and Evaluation

Training Techniques

Dr. Green and his colleagues at the Johns Hopkins University Evidence-based Practice Center (EPC) have conducted a study, funded by AHRQ,

to identify and review data on the most effective ways to train clinicians to respond to a bioterrorist attack or other public health event that poses similar challenges to the health care system. The study identified several different training techniques:

- § **Traditional educational methods.** These include lectures, discussions, audiovisuals, and written materials.
- § **Teleconferencing.** This approach can reach a larger audience and appears to be as effective as classroom learning.
- § **“Smart” patients or mock victims.** Such individuals are helpful for one-on-one training, but less practical for training large numbers.
- § **“Tabletop” exercises.** Theoretical, “paper” drills do not require physical movement of patients, personnel, or equipment. They usually focus on the ICS and system integration components. Tabletop exercises appear to be useful but might be most effective when combined with other teaching approaches.
- § **Computer simulations.** Simulated drills can potentially replace expensive drills and identify weaknesses in disaster planning.
- § **Disaster drills.** Physical drills improve knowledge of the disaster plan and highlight weaknesses. Little standardization of such drills exists, however.

While little data exist to indicate which training approaches work best or which are most cost effective, most planners agree that their success



depends on practice. “You can have the best plans and policies in the world,” said Massey, “but without communication and training they sit on the shelf and never get used.”

Conducting Drills

Drills are one of the most commonly used disaster training techniques. Experience from the field offers several lessons. First, hospitals should carefully consider the parameters of a drill and make basic decisions about its evaluation, said Green. It is important to have a detailed evaluation plan in place before the drill begins. What are the specific goals for a particular drill? What are the “borders” of the drill—will it encompass the entire hospital or just the emergency department? Will it include supplies? Will it include pharmacy? What about radiology? Which components of the drill will the hospital evaluate? What evaluation tools will the hospital use?

Controlling the end of a disaster drill is difficult from an operational perspective and requires a distinct plan to avoid confusion and loss of data. Hospitals should conduct a debriefing with all players involved immediately following any drill. Such a meeting allows participants to process the drill and offers lessons for future training.

Evaluating Drills

While disaster drills are critical to improving medical response in the event of a disaster, no standard methodology exists to evaluate the effectiveness of a drill. Dr. Green and his colleagues at the Johns Hopkins

EPC are developing a set of data collection instruments for assessment of disaster drills. To maximize flexibility, the instruments are being developed in modules so that users can choose the components they need to evaluate their particular drills. The set includes modules for the incident command system, triage, decontamination, in-hospital treatment centers, and post-drill debriefing. After expert panel review and field testing, they are expected to be available by the end of 2003, and will be posted on the AHRQ Web site (www.ahrq.gov).

Readiness Assessment for Hospitals

One of the original bioterrorism preparedness studies funded by AHRQ in 2000 included the development of the “Bioterrorism Emergency Planning and Preparedness Questionnaire for Healthcare Facilities.” The study is being conducted by Booz Allen Hamilton, working with Dr. Howard Levitin of Disaster Planning International. In the first phase of the study, the Booz-Allen team examined several assessment tools and preparedness questionnaires, most of which emphasized management of specific biological agents rather than broader planning issues. The researchers also found that there were no nationally accepted benchmarks of adequate preparedness, and that there was no mechanism in place to share best practices or useful solutions.

The research team developed a bioterrorism preparedness

questionnaire for health care facilities to help those facilities assess their capacity to respond to and treat the victims of a biological incident. The survey addresses topics such as biological weapons training for hospital personnel, hospital staffing, ability to increase inpatient and outpatient treatment capacity, availability of equipment and supplies, internal and external communications, stockpiling of antibiotics, and laboratory capability. The first-phase questionnaire is available on AHRQ’s Web site.

In the second phase of the study, the Booz-Allen team is developing objective measures to interpret the results of the questionnaire, will develop planning templates, and will identify best practices. The team is also working with a panel of experts and a survey design firm to revise the questionnaire. The revised questionnaire will have 12 categories:

- s Regional linkages;
- s Bioterrorism planning and structure;
- s Training and exercise;
- s Triage, diagnosis, and treatment;
- s Infection control, decontamination, and isolation;
- s Public health surveillance;
- s Surge capacity and space utilization;
- s Laboratories;
- s Pharmacies and mass immunization;
- s Safety and psychiatric support;
- s Information systems; and
- s Public relations.



These categories are consistent with the Health Resources and Services Administration (HRSA) priorities, which will help grantees to benchmark their level of preparedness under the guidelines of the National Hospital Bioterrorism Preparedness Program. The questionnaire is to be field-tested with HRSA grantees.

“Along with the revised questionnaire, we will provide the objective measures that hospitals need to interpret the results of the questionnaire,” said Sue Skidmore of Booz Allen Hamilton, principal investigator for the project. “In other words, we’ll let them know where they fall on a continuum of bioterrorism preparedness.” Ultimately, the agency hopes that these tools will help hospital and health systems planners to communicate better medical resource needs in the event of a bioterrorist attack or other disaster.

For More Information

The complete audioconference on “Disaster Drills and Readiness Assessment” is available as a streaming presentation and as a text transcript on the AHRQ Web site (www.ahrq.gov/bioterbr.htm).

The Johns Hopkins Evidence Report, *Training of Clinicians for Public Health Events Relevant to Bioterrorism Preparedness*, is available on the AHRQ Web site and through the AHRQ Clearinghouse (call 1-800-358-9295 or order electronically at ahrqpubs@ahrq.gov; request AHRQ Publication No. 02-E011).

The tools discussed in this issue brief, and other tools and publications related to health system preparedness for bioterrorism, will be posted on the AHRQ Web site as they become available. Please check the Web site frequently.

This issue brief was prepared for AHRQ by AcademyHealth under contract number 290-98-0003.

Basic Components of Disaster Response System

- s Incident Command System (ICS)
- s System integration
- s Logistics
- s Security
- s Clinical care
- s Human resources
- s Public relations

Anaheim Memorial Medical Center's Mary Massey reflects on her experience in planning and conducting disaster drills.

- s It's O.K. to make mistakes. At first we took it very personally if we made any mistakes. Over time we realized that a perfect drill wasn't possible and that errors presented opportunities to learn.
- s Make it as real as possible. Don't just practice with key players who already know how it should work. Get real people working as victims. Ask the community to get involved as victim volunteers.
- s Make it fun. Take lots of pictures. Laugh at yourselves. Remember, the goal is to find a way of taking care of you and your community, not to make the prettiest, most perfect disaster drill that has ever happened.



AHRQ Pub. No. 04-P007
January 2004