

# The Use of Trained Observers as an Evaluation Tool for a Multi-Hospital Bioterrorism Exercise

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**Keywords:** bioterrorism; emergency medical services (EMS); evaluation; exercise; Hospital Emergency Incident Command System (HEICS); observers

#### Abbreviations:

EMS = emergency medical services  
EOC = Emergency Operations Center  
FEMA = US Federal Emergency Management Agency  
HAN = Health Alert Network  
HEICS = Hospital Emergency Incident Command System  
HRSA = US Health Resource and Service Administration  
ODP = Office of Domestic Preparedness  
US = United States  
WMD = weapons of mass destruction  
WSU = Wayne State University

Received: 02 December 2004

Accepted: 02 February 2005

Revised: 15 March 2005

Web publication: 03 May 2005

#### Abstract

**Introduction:** Evidence suggests that regular disaster exercises have beneficial effects on subsequent mock and actual disaster responses. The purpose of this report is to describe a multiple hospital, bioterrorism exercise, evaluated by independent observers who used an evaluation template.

**Methods:** The overall tabletop exercise design included participation from 23 Joint Commission Accreditation of Healthcare Organizations hospitals, four health departments, and a representative from one federal agency. The exercise was evaluated by trained exercise observers utilizing an independently prepared, evaluation protocol.

**Results:** All exercise sites successfully identified the bio-agent involved and answered after-exercise debriefing questions without much difficulty. Evaluations, in the form of an after-action report by the independent observers, commented upon the many limitations to the construct of the exercise.

**Conclusion:** Having an independent observer group at the exercise appeared to provide a value-added benefit for capturing subjective information and data. However, these data were not in a form conducive to statistical analysis. Further work is needed to create an evaluation tool that would allow for statistical analysis so that exercises can be compared and improvements can be objective.

Klein KR, Brandenburg DC, Atas JG, Maher A: Use of trained observers as an evaluation tool for a multi-hospital bioterrorism exercise. *Prehosp Disast Med* 2005;20(3):159–163.

#### Introduction

Having disaster plans “on the shelf”, gives hospital management and planners a sense of security and reassurance known as the “paper plan syndrome”.<sup>1,2</sup> These plans often are written with good intentions, by planners who are not experienced in disaster management, and never have participated actively in an actual disaster nor major emergency; because of this, disaster/emergency plans often are incongruent with what people who are involved in major emergencies are most likely to do and, often promote disaster myths: i.e., people panic.<sup>3–5</sup> Short of having an actual emergency/disaster to test plans, drills or exercises are the only way to predict if implementation of plans will be efficient in an actual disaster/emergency. It is difficult to quantify the results of disaster exercises, but the usefulness of exercises in improving the responses to subsequent emergencies and disasters has been verified anecdotally by a limited number of published exercise evaluations some of which have had an evaluation tool independent of after-action reports and anecdotal evaluations.<sup>2,5–7</sup>

The realization of the importance of the use of standardized protocols for the evaluators of disaster exercises began in the civilian federal sector of the United States (US) government, when a group consisting mostly of former federal, senior officials, participated in the Dark Winter exercise in June 2001.<sup>8</sup> Organizations such as the US Federal Emergency Management Agency (FEMA) and the Office of Domestic Preparedness (ODP) also have developed exercise evaluation programs. Broadly defined, an exercise is a tool to: (1) test and assess policies, plans, procedures, training, equipment, and

interagency agreements; (2) increase the training of personnel in emergency roles and responsibilities; (3) improve inter-agency coordination and communications; (4) identify gaps in resources; and (5) identify opportunities for organization and regional improvement.<sup>9,10</sup>

The purpose of this report is to describe a multiple hospital, bioterrorism exercise that utilized independent observers to facilitate the evaluation process. Their role was to provide feedback and to utilize an evaluation template, which could be useful in future exercises, to compare the efficacy of subsequent exercises and objectively evaluate post-exercise improvements. The stated purposes of the regional exercise were to: (1) gain experience in managing a bio-terrorist event; (2) develop relationships between the hospital, emergency medical services (EMS), health department, law enforcement, and emergency management communities; and (3) meet the requirements of a US Health Resource and Service Administration (HRSA) grant.

### Methods

In compliance with a HRSA benchmark for continued federal funding, Region 2 South of southeast Michigan, which is a multi-county, HRSA-funded, bio-defense Network, prepared and implemented a multi-hospital, bioterrorism drill. Region 2 South incorporates three counties and consists of multiple cities and rural areas, as well as an international border with Windsor, Canada. The area contains many industries and well-known universities and is home to the corporate offices of the three major US automobile manufacturing corporations. On 01 October 2003, 31 facilities consisting of hospitals, health departments, and medical centers located in Region 2 South, participated in a four-hour exercise developed by the Region's Exercise Subcommittee.

Exercise design involved participation from 23 Joint Commission on Accreditation of Healthcare Organizations-compliant hospitals, four health departments, and a representative from one federal agency, all of whom were self-selected to report at four hospital sites for the exercise. All of the hospital participants were from hospitals that are active in regional and hospital bioterrorism preparedness efforts. Each hospital differed in size, ranging from a level-1 trauma center to a community hospital. They had a combined total annual emergency department volume that averaged 60,000. The volunteer Exercise Design Team was composed of experienced prehospital and hospital healthcare providers led by an emergency department administrator who had participated in multiple, local and regional, pre-hospital and hospital exercises.

The exercise was evaluated using standardized, after-drill questionnaires as well as summaries compiled from an independently prepared evaluation tool. As this Event Report is a summary of after-action reports, it did not warrant approval by the Institutional Review Board (IRB).

#### *Exercise scenario*

The exercise utilized a tabletop format that encouraged the participating hospitals to expand the scope of the exercise

Organizational Context	Brief description of organizational roles and responsibilities noted at the exercise
Participant Description	List number and role/job title of participants; Be aware of changing numbers of participants
Scenario Documentation Capture	Collect documentation provided to participants; Document all other communications (i.e., phone/computer)
Timeline	Keep a time line of the exercise, this will allow for consistency between sites
Key Events List	List the major activities related to the exercise objectives including all conversations between "outside" agencies or departments
Key Concepts/ Terminologies List	Make a list of terms which seemed important to the players
Technology Use	Note what was used for communication and information gathering (i.e., cell phone and landline)
Issues for Post-event Review	Specific objectives, discussion points, recommendations

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**Table 1**—Observation summary protocol: the Wayne State University Disaster Team written commentary guide

at their own facilities. The exercise incorporated a bioterrorism scenario, spanning a series of days compressed into a four-hour period. Its design included multiple, timed interjects with specific discussion questions and a Health Alert Network (HAN) communiqué. One day in advance of the exercise, an information packet was sent to a pre-designated, hospital administrator at each of the hospital sites, so that instructions and related information were present for the simultaneous start of the exercise.

At the appointed time, at a designated "emergency operations center" (EOC), the envelope was opened by the facilitator, who read aloud the initial exercise information to the pre-assembled emergency management group. Each group's composition varied by hospital site and was not predetermined by exercise design; hospital groups could use their own judgment in selecting initial personnel who may or may not have had any emergency management training to staff the EOC. Exercise participants had to identify the bio-agent involved, manage the evolving situation, and respond to pre-planned interjects that provided additional scenario information, as well as relevant questions for discussion. The FEMA emergency roles or exercise definitions were not explained to the emergency management group. As the exercise progressed, the group was allowed to invite other personnel into the EOC to add expert input. Although exercise designers were present in the EOC, they were not active exercise participants. The focus of the exercise was to evaluate the regional response with emphasis on the communication and coordination between the various agencies involved.

#### *Exercise observer protocol*

The observers all were members of a multi-disciplinary,

1	Design the directions for implementation of the drill in order to maximize consistency of potential outcomes across sites
2	Drills should have components specifically designed to simulate inter-organizational interaction
3	Drill design should include some information capture and following through of actionable decisions
4	Drills should include an explicit technological assessment component, particularly in the domain of intra- and inter-organizational communication

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**Table 2**—Overall observations compiled by the observation team

disaster team of researchers and graduate students at Wayne State University in Detroit, Michigan. The team's primary focus is multi-agency coordination in emergency responses. All of the observers had worked together before and were experienced collectors of observational data and trained social scientists, but none were medical experts. They all had received pertinent training either through coursework or through team and mentor experience. On exercise day, observer team members were assigned to one of the four hospitals with which they had no affiliation. At one site, two observers were present, the observer team leader who helped to synthesize the observers' notes in the weeks following, and a regular team member. Prior to the start of the tabletop exercise, the observers were introduced to the EOC emergency management group; however, they were instructed not to interact with the exercise participants while the exercise was in progress. After the exercise concluded, it was the choice of the observer whether or not they interacted with the exercise participants.

Data were recorded by the observers and were collected at each site through direct observation, and then was standardized utilizing a pre-designed data collection form designed by the Wayne State University's disaster team leader (Table 1). Two weeks after the exercise was conducted, the observers presented their independently compiled site summaries during an observer team debriefing. To help facilitate the discussion, a second assessment tool, created by the team leader, was used during the debriefing session (Appendix). From this session, the team leader created a summary that was distributed to the exercise observers for review and comments. A neutral summary was compiled, devoid of any personal or hospital identifiers, and forwarded to the Exercise Committee and the HRSA Medical Bioterrorism Preparedness Leadership Group.

### Results

All of the hospital EOC sites successfully identified and medically managed the bio-agent scenario. In addition, they were able to work through the interjects and answer the after-exercise debriefing questions without much difficulty. The number of participants present at each site varied from 5–30 with a median number of participants at each site of 18. Throughout the exercise, the number of participants changed as each EOC invited more staff to

participate based upon the expertise that they needed, i.e., WMD coordinator, microbiologist. No outside agencies or departments not present at the exercise or from the hospital were contacted as part of the exercise.

The WSU observers were able to use their observation summary protocol to compile a summary of the exercise and make recommendations for the leadership of the Region (Table 2). The summary protocol was comprised of eight categories, which were used as prompts for the observers so that they could collect as much relevant data as possible despite their lack of medical and specific institution knowledge (Table 1). In addition to formal recommendations, the observer team also compiled feedback for the Exercise Planning Committee, which was derived from questions which the WSU team used to guide their written summaries of the independent drill site. This feedback included: (1) most of the exercise sites did not have an independent exercise facilitator to read the scenario and guide questions, which was felt to have made some EOC participants feel awkward and very uncomfortable; (2) a scribe either was not utilized or was an afterthought; (3) there appeared to be a lack of understanding as to tabletop exercise protocol; (4) participants were uncomfortable "stepping-out" of their normal daily roles to perform non-familiar responsibilities; (5) it was unclear if an incident command system was utilized or activated; and (6) the drill evaluation design did not allow for individualized exercise information/feedback for the participating hospitals when requested.

There was only one site where there was more than one designated exercise observer. This lack of extra observers was discussed during the observer debriefing and noted to be a hindrance to exercise observance and recording. In addition, some EOC participants commented that they did not feel comfortable participating in a learning exercise in front of observers who they did not know or were not from their hospital system. In addition, a serious limitation for future exercise evaluation may have been that statistical evaluation of the exercise was not possible, as the exercise observer assessment forms were not created with numerical scaling that would allow for statistical analysis.

### Discussion

Emergency preparedness is a fluid and continuous process of evolving, planning, training, and exercising, with each function's success dependent on another.<sup>13</sup> Unfortunately, this exercise only addressed two of its goals: (1) render experience in managing a bioterrorism event; and (2) satisfy HRSA requirements. Multiple problems arose during this exercise and its evaluation. During the exercise, observers noted that there was confusion with exercise terminology among the exercise participants. By FEMA definition, a tabletop exercise occurs within a room without the involvement of outside parties or agencies. This exercise had many elements of a functional exercise, as communication with outside agencies was a goal. In general, exercises are categorized into three major types: (1) tabletop; (2) functional; and (3) full-scale, and should utilize controllers/facilitators and independent evaluators/observers to

assist with evaluation and exercise momentum.<sup>9</sup> Of the three major types of exercises, the tabletop is the least costly and time consuming. Its use is in preparation for an upcoming full-scale exercise or as a stand-alone exercise. Functional exercises are more extensive than tabletops, may involve multiple sites, and generally are conducted in the EOC or its equivalent. Its purpose is to test the planning and response capabilities of personnel and systems utilizing communication avenues, standard operating procedures, and improvisation. The scope of activity in a functional exercise includes more policies and coordination of personnel than usually are involved in a tabletop exercise. The most complicated and labor-intensive exercise is the full-scale exercise and may be days in length. Its use is to evaluate the responding organizations' operational capabilities in an interactive manner. The purpose is to test a major portion of the functions in an emergency plan by incorporating a high degree of realism, extensive involvement of resources and personnel, and oftentimes, stressful elements are included in the overall process.

The drill instructions did not specify group organization, but all groups attempted to structure themselves into a Hospital Emergency Incident Command System (HEICS). The observers commented that there was confusion regarding the facilitator's role as an active participant in the exercise as the incident commander. Additionally, exercise participants were timid to step out of their normal hospital roles and put on a HEICS "hat" that they were told that they would "wear" if an event actually occurred. This is not a surprising finding as this mimics multiple findings in the disaster research literature that people will not step out of their usual roles during a disaster due to a lack of comfort with fulfilling a new role.<sup>11</sup>

A hindrance to the overall evaluation process was that the number of evaluators present was too few for the size of the event. Evaluator numbers depend on the size and type of the exercise and, based on FEMA suggestions, should be present in the following numbers: tabletop, 1–6, functional, 4–12, and full-scale, 10–50.<sup>9</sup> These numbers are similar to ones suggested by the ODP (Table 3).<sup>12</sup> While the evaluation of the exercise by the independent observers provided an excellent critique, it required expert recoding by the team as it was based upon impressions and verbal descriptions. Although it is full of very useful information and is the accepted standard for drill and event critiques, this method does not allow statistical analysis to be performed due to the lack of quantitative representation of the data collected. This made it very difficult to compare exercises observed by different observers, as it did not yield a straightforward means to gauge improvement from one exercise to the next.

Evaluator Type	Number Needed
<i>Incident Site-Function</i>	
Incident/Unified Command*	2-3
Decontamination*	1
Emergency Medical Services Opportunities*	1
Triage*	1
Treatment*	1
Transport*	1
Communications	1
Public Information/Joint Information Center (JIC)	1-2
Mass care/Evacuee reception center	1
<i>Hospital-Function</i>	
Incident Command/ Emergency Operations Center*	1-3
Triage/treatment*	2-3
Decontamination*	1-2
Security	1
Public information	1
Communications	1
<i>Emergency Operations Center-Function</i>	
Command/policy*	1
Plans/logistics/finance*	1-3
Operations*	1-2
Public information/JIC	1
Communications	1
Volunteer agencies	1
Security	1

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Table 3—Guide for determining the number of evaluators needed (based on ODP Guidelines) (\*indicates a critical function; JIC = Joint Information Center)

## Conclusions

The use of exercises to test and evaluate plans is a very worthwhile endeavor; however, in this exercise, a more complete understanding and definition of exercise guidelines would have provided a framework to allow for a better learning experience. In addition, having an independent observer group was a helpful tool; however, more evaluators could have captured more useful and in-depth information.

Furthermore, if exercises are to continue to be utilized as a measure of compliance, training, and preparation, further work must be done to develop and standardize evaluation tools that can be used to meaningfully assess the achievement of these goals.

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### Appendix—Questions for Wayne State University observers to help guide their site's written summaries

1. Did the scenario trigger actions related to the exercise objectives?
2. Were the objectives of the exercise clear?
3. Did the scenario appear realistic?
4. Was sufficient time devoted during the exercise to resolve issues?
5. Was the full complement of team members / roles present or accessible?
6. How were the actions of the assembled team led or facilitated?
7. How would you characterize the role of the facilitator?
8. How important was the facilitator in achieving the desired outcomes?
9. Did this exercise contribute to the emergency response preparedness of the organization?
10. What was the apparent “lesson learned” for the organization observed?
11. What were the future recommendations?
12. Were they consistent with the exercise objectives?
13. How was the evaluation of the exercise at the site preformed?
14. Was there sufficient input from the exercise team?
15. What are general recommendations we have on this exercise for the regional leadership?
16. How could the exercise been improved?

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