



# Training of Clinicians for Public Health Events Relevant to Bioterrorism Preparedness

## Summary

### Overview

Recent terrorist attacks against the United States have increased awareness of the Nation's vulnerability to terrorism. One particularly serious form of terrorism involves the use of biological weapons that could cause devastating epidemics.

To minimize the risks of bioterrorism, the United States has made bioterrorism preparedness a priority for government and military agencies, public health advocates, law enforcement, first responders, and health care professionals. Based on the recommendation of a working group led by the Centers for Disease Control and Prevention (CDC), preparation efforts are concentrating on smallpox, anthrax, plague, botulism, tularemia, and the viral hemorrhagic fevers. These agents have been chosen as areas of focus due to their ease of dissemination and transmission, high mortality rates, ability to cause public panic, and need for special public health preparedness.

Until recently, the public and private health care sectors had been largely excluded from the Nation's bioterrorism preparatory efforts. The very group that would handle the consequences of an attack has yet to receive widespread education on the topic. Fortunately, the value of bioterrorism education has been recently recognized, leading to a significant question: How does one effectively train clinicians for such an unusual public health crisis? The purpose of this evidence report is to identify and review data on the most effective ways to train clinicians to respond to a bioterrorist attack or other public health event posing similar challenges to the health care system.

### Reporting the Evidence

The target population addressed in the studies reviewed in this evidence report consists of clinicians including physicians, physician assistants, nurses, nurse practitioners, and community health workers. The target audience for the report consists of policymakers and others developing educational strategies for health care professionals that could be involved in the assessment and management of victims of a bioterrorist attack.

To identify the most effective methods to train clinicians to respond to a bioterrorist attack, the Johns Hopkins University Evidence-based Practice Center (EPC) addressed the following key questions:

- Q1a. What are effective methods for the initial training of clinicians for detection and management of a bioterrorist attack or other public health event?*
- Q1b. What are effective methods for updating and reinforcing the training of clinicians for detection and management of a bioterrorist attack or other public health event?*
- Q2. What are effective methods for training clinicians to use Web- or telephone-based central information resources in response to a bioterrorist attack or other public health event?*
- Q3. What are effective methods for training clinicians to report events to a central agency in response to a bioterrorist attack or other public health event?*
- Q4. What are effective methods for training clinicians to communicate with other health care professionals in response to a bioterrorist attack or other public health event?*

Due to the paucity of literature pertaining specifically to the education of health professionals in bioterrorism preparedness, the EPC sought to include evidence on the effectiveness of training clinicians for other types of public health events with similar training requirements. Distinctive requirements include the ability to rapidly identify unusual disease syndromes, to contact public health officials, and to communicate with disease control agencies as well as other health professionals. The relevant public health events considered in this report were infectious disease outbreaks, toxidromes or mass poisonings, catastrophic events that incite public fear, and events that call for use of hospital disaster plans.

## Methodology

To identify all studies potentially relevant to the key questions, the EPC team searched electronic databases and Web sites and conducted hand searching of references. The databases searched were: MEDLINE®; the Educational Research Information Clearinghouse (ERIC®); HealthSTAR®; the Specialized Register of Effective Practice and Organization of Care Cochrane Review Group (EPOC); the Research and Development Resource Base in Continuing Medical Education (RDRB/CME®); the Social, Psychological, Educational and Criminological Trials Register (SPECTR); and PsycInfo (INFO®). The team also searched the database of the National Technical Information Service of the United States Government. Hand searching focused on journals that were most likely to have eligible studies, as well as reference lists in key articles. The Internet was searched using the metasearch engine Copernic 2000®. The search covered articles published through June 2001.

For the first step in the review process, two members of the EPC team independently reviewed the titles identified by the search for relevance to the project. All titles deemed irrelevant by both reviewers were excluded from the abstract review process.

Each potentially relevant abstract was circulated to two members of the study team who independently reviewed the abstract and indicated which, if any, of the key questions the article addressed. For articles found not relevant, the reviewers indicated a reason for exclusion. The exclusion criteria were: not written in English; did not include human data; no original data; meeting abstract only; did not include health care professionals; did not address bioterrorism or a relevant public health model; and did not include training or education.

Each relevant article was read by a pair of reviewers using a form to assess study quality and a form to extract information from the article. At least one reviewer had

advanced training in research methods and at least one had relevant advanced clinical training. The reviewers evaluated study quality in terms of educational methods, reporting of representativeness, bias and confounding, description of outcomes, and statistical quality. Study quality scores were calculated for each of the five categories based on the percentage of study quality items that were adequately addressed. An overall quality score was calculated as an average of the five category scores. On the content form, the reviewers abstracted the following types of information from each eligible study: learning objectives, characteristics of targeted health care professionals, educational methods, results for each type of learning objective, and conclusions. Data from the article review process were entered into a relational database.

## Findings

- Of the 1,942 unique studies identified by the literature search, 60 met eligibility criteria for the final evidence report.
- Web site searching failed to identify any additional reports of training programs that met the eligibility criteria for this evidence report.
- Fifty-three (88 percent) of the 60 eligible studies addressed the training of clinicians in how to detect and manage an infectious disease outbreak.
- For these 53 studies, the scores for the categories of study quality ranged from the minimum possible score of zero percent to the maximum possible score of 100 percent, with a mean representativeness score of 56 percent, mean bias score of 15 percent, mean description of educational methods score of 55 percent, mean outcome reporting score of 72 percent, and mean statistical analysis score of 30 percent.
- Seven of these studies described an educational intervention using standardized patients and indicated that use of standardized patients was an acceptable and effective way to train physicians to detect and manage an infectious disease. Physicians tended to prepare for a standardized patient visit ahead of time through self-study materials. Costs for the standardized patients were not discussed.
- In three articles, the use of satellite broadcasting for training on management of infectious disease outbreaks was an effective way to train large numbers of people and to standardize training across geographically separated groups. Satellite conferences improved knowledge, enhanced print-based materials, and appeared to be as effective as classroom training.

- One study described a tabletop exercise in which a theoretical plague release was used to test the medical and public health infrastructure. This was the only article directly pertaining to bioterrorism. Tabletop exercises may be a useful, albeit expensive, tool for training clinicians for bioterrorism preparedness.
- One study addressed training in how to detect and manage toxidromes or mass poisonings. This study had a weak design with a quality score of 21 percent, and it did not fully support the authors' conclusion that teleconferencing was an efficient method for educating clinicians about toxidromes.
- Five studies addressed training in how to respond to events that call for use of a hospital disaster plan. Four of these studies used disaster drills and had total study quality scores ranging from 18 to 34 percent. These studies suggested that disaster drill training may improve knowledge of the disaster plan and allow for identification of problems that may then be addressed.
- One study described the use of computer simulation to train clinicians on use of hospital disaster plans and had a study quality score of 9 percent. The simulation allowed identification of deficiencies in staffing, equipment, medications, electromechanical systems, crowd control, and security.
- One study evaluated a program designed to train clinicians to report a public health event to a central agency. This study had a quality score of 50 percent and indicated that didactic methods can help train infection control nurses to report infectious disease symptom complexes to a central agency.
- None of the studies specifically addressed how to update and reinforce the training of clinicians in how to respond to a public health event.
- No studies evaluated educational programs designed to train clinicians to use Web- or telephone-based central sources of information in response to a bioterrorist attack or other public health event.
- No studies evaluated educational programs designed to train clinicians to communicate with other health care professionals during a public health event.
- None of the studies addressed training in how to respond to events that incite anxiety, fear, or mass hysteria.
- The most common educational techniques used in the studies were lectures (31 studies), discussion (18 studies), audiovisual aids (18 studies), and written material (14 studies).
- Over half the studies (42) employed more than one educational technique in the intervention.

- The eligible studies were extremely heterogeneous in terms of learning objectives, setting, targeted clinicians, and methods, thereby limiting the ability to synthesize results across studies.

## Future Research

This evidence report highlights the lack of strong published evidence about how to train clinicians for bioterrorism preparedness. Furthermore, there is a paucity of well-designed studies pertaining to the training of clinicians in management of public health events relevant to bioterrorism preparedness. This has significant implications for future research in training health professionals in this area.

To determine the most effective way to train clinicians on how to respond to a bioterrorist attack or other serious public health event, future work will need to give more attention to evaluating the effectiveness of educational programs. Evaluation methods should include pretesting and posttesting, as well as at least one comparison group. The use of measurable outcomes will be critical to ensure unbiased determination of the efficacy of educational strategies. Furthermore, targeted outcomes should be linked to well-defined learning objectives.

The following specific questions are areas for future research. They are vitally important questions to answer and are currently without published evidence.

- What are the most effective and efficient educational methods to impart knowledge and skills to physicians, nurses, and other health care professionals about how to respond to bioterrorism or other public health events?
- How often does clinicians' knowledge about preparedness for bioterrorism or other public health events need to be reinforced?
- What is the most effective technique to train clinicians to use Web- or telephone-based central information resources in response to a public health event?
- What is the most effective approach to training clinicians to report possible public health events to a central agency?
- What is the most effective way to train clinicians to communicate with other health care professionals during a public health event?
- How can information technology (i.e., Web-based educational programs, teleconferencing, and computer simulations) enhance training of clinicians for bioterrorism preparedness and other public health events?
- Are disaster drills and tabletop exercises cost-effective educational methods for training clinicians in how to

respond to a bioterrorist attack or other public health event?

- To what extent will clinicians' preparedness for bioterrorism be strengthened by training in how to manage public health events such as infectious disease outbreaks?

### **Availability of the Full Report**

The full evidence report from which this summary was taken was prepared for the Agency for Healthcare Research and Quality by Johns Hopkins University under Contract No. 290-97-006. It is expected to be available in early 2002. When available, printed copies may be obtained free of charge from the AHRQ Publications Clearinghouse by calling 1-800-358-9295. Requesters should ask for Evidence Report/Technology Assessment No. 51, *Training of Clinicians for Public Health Events Relevant to Bioterrorism Preparedness*. Internet users will be able to access the report online through AHRQ's World Wide Web site ([www.ahrq.gov](http://www.ahrq.gov)).



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