FIRST Things First: A Practice-Academic Collaboration to Develop and Deliver a Competency-Based Series of Applied Epidemiology Trainings

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SYNOPSIS

The Florida Center for Public Health Preparedness in the University of South Florida College of Public Health and the Florida Department of Health (FDOH) collaborated to design, develop, and deliver two competency-based epidemiology training programs aimed at increasing the epidemiologic preparedness and response capability of the FDOH workforce. They were also designed to meet the requirements of the National Incident Management System and recommendations or needs identified in national studies. The basis for the trainings is an epidemiology competency set developed by the Northwest Center for Public Health Practice at the University of Washington School of Public Health and Community Medicine. The target audiences for the two trainings are non-epidemiologists or practicing epidemiologists who have relatively little formal education in epidemiology. Both courses have online as well as onsite modules. Alternate tabletop exercises have been completed and delivered for anthrax and plague. Both trainings require participant demonstration of skills. The trainings have been well received, appear to be effective, and are used to credential members of Florida's epidemiology strike teams.

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The capacity of public health agencies to deploy epidemiologists during community health emergencies is critical for protecting the health of the populations affected or at risk. Terrorism attacks, infectious disease outbreaks, hurricanes, and other such mass-casualty events have brought this need into clear focus. Federal, state, and local governments have devoted significant funds and other efforts to strengthen their preparedness and response capabilities, including epidemiology preparedness and surge capacity. However, recent studies have concluded that the public health system is not adequately prepared for some types of terrorist attacks and that the current epidemiology capacities of many state health departments are far less than desirable.

In 2004, the Council of State and Territorial Epidemiologists (CSTE) published a report of its survey of state, territorial, and some local health departments regarding preparedness for radiological (RT) and chemical (CT) contaminating terrorism. The report concluded that there was "a significant lack of public health planning and preparedness for the majority of functions related to chemical and radiological contaminating terrorism." One of the four recommendations in the report is that a trained workforce be established that is "capable of executing functions related to all phases of CT and RT. This is especially important for pre-event and recovery phases and will require hiring trained personnel or cross-training within health departments."[1]

A 2004 assessment of national epidemiologic capacity documented that there had been a substantial increase in the number of epidemiologists employed in state and territorial health departments. However, the study noted that much of the increase was in bioterrorism preparedness and that almost half of the epidemiologists had not had formal academic training in epidemiology (far less than CSTE recommended). The study concluded that the number of epidemiologists "is far below the perceived 'estimate of need' to provide essential services of public health across epidemiology program areas." Although the primary focus of the report is on academically prepared epidemiologists, several of its recommendations apply to other kinds of training (e.g., the development of certification programs that are tied to epidemiology competencies and a commitment by public health agencies to provide improved training opportunities for practicing epidemiologists).[2]

In addition to the significant federal preparedness and response funding to states, the federal government also provided funds to support academic public health preparedness centers in accredited schools of public health (SPHs). The Florida Center for Public Health Preparedness (FCPHP) in the University of South Florida College of Public Health is one of these centers. It was designated and funded by the Centers for Disease Control and Prevention (CDC) through a cooperative agreement with the Association of Schools of Public Health in April 2001. It was one of the first seven academic public health preparedness centers; there are now 26 other such centers in accredited SPHs in other states.

The mission of the FCPHP is to improve the capacity of public health workers, primarily employees of the Florida Department of Health (FDOH), to respond to public health threats in Florida. The FCPHP accomplishes this mission by providing training and resources that will contribute to public health workforce preparedness in its three national specialty areas: epidemiology, disaster behavioral health, and crisis leadership.

PURPOSE AND BACKGROUND

The purpose of this article is to describe the development and delivery of two competency-based, needs-driven training programs in epidemiology created through an innovative partnership between the FCPHP and FDOH. The two courses described are the basic-level Field Investigator Response Surveillance Training (FIRST) and Intermediate Field Investigator Response Surveillance Training (I-FIRST). The FCPHP and FDOH collaboration addressed some of the workforce development concerns noted by CSTE. In addition, the partnership and courses met a variety of recommendations from state, federal, and academic authorities in public health, including the need for:

- innovative, collaborative partnerships to better utilize academic and practice resources;
- SPHs to recognize the essential role of providing continuing education for the public health workforce;
- continuing education and training to be competency based;
- development of training programs in close collaboration with practice partners to ensure that the training meets the needs of public health practitioners and their agencies; and
- using or adapting existing training resources prior to creating original resources to conserve existing preparedness resources and efforts.[3–5]

The collaboration between the FCPHP and FDOH also contributed to Florida's compliance with the National Incident Management System (NIMS).[6] The

federal government requires that states implement NIMS for their preparedness activities. NIMS incorporates several critical training requirements for the public health workforce to ensure that it can respond effectively to public health threats. One of these is a set of asset typing requirements aimed at specification of what training or other credentials individuals and teams must possess to qualify for deployment in a serious public health event, such as a hurricane. For certification either as an individual or part of a team, the training must be competency based and allow for skills developed from the training to be demonstrated. In Florida, for example, epidemiology strike teams have been defined and protocols established for their mobilization during a significant public health event. Further expectations are that the training will be evaluated and that the trainees will be registered in a database that can be accessed in an emergency.

To ensure that the training developed by the FCPHP met the needs of the public health workforce, the Florida Association of County Health Officers (FACHO) formed an advisory committee for the FCPHP. FACHO is composed of the directors and administrators of Florida's 67 county health departments and representatives of the central office of FDOH. The committee identified training in basic epidemiology as one of the highest priority needs in late 2003, and work began on the courses in early 2004. The purpose of the training was to create surge capacity to support or strengthen FDOH's epidemiology staff during major public health events. FDOH requested two training programs: (*1*) a basic-level training that would provide awareness, knowledge, and skills to non-epidemiologists and (*2*) an intermediate program for epidemiologists and non-epidemiologists that would add more skills and prepare them to respond to specific kinds of events. FDOH also wanted the training to support its NIMS asset typing efforts, to include current local, state, and federal policies and practices, to be applied, and to allow practice and demonstration of skills.

DEVELOPMENT PROCESS

The FACHO advisory committee agreed to identify FDOH employees who would work with the FCPHP staff as subject matter experts, thereby assuring that the training would meet FDOH's needs. One of the first steps in the training development process was determining if there was an existing, accepted epidemiology competency set to serve as the foundation for planning and development of the training. After reviewing several sets, the FCPHP selected the epidemiology competencies developed by the Northwest Center for Public Health Practice (NWCPHP) at the University of Washington School of Public Health and Community Medicine.[7] The NWCPHP is also an academic public health preparedness center with which the FCPHP has a strong working relationship. There are nine competencies and numerous subcompetencies in the NWCPHP set:

- Describe the role of epidemiology in public health.
- Design and conduct an outbreak investigation.
- Define terms and concepts associated with infectious diseases.
- Define, describe, interpret, and install public health surveillance systems.
- Obtain, evaluate, and interpret public health information.
- Collect, organize, prepare, and display epidemiologic data.
- Evaluate the efficacy or effectiveness of a screening program.
- Design and implement surveys and questionnaires.
- Design and conduct program evaluations.

The FCPHP advisory committee identified several epidemiologists from FDOH's central office and county health departments to serve as subject matter experts for the development of the training. The epidemiologists met with FCPHP staff several times to systematically review the NWCPHP competencies. They assessed the comprehensiveness and applicability of the competencies to the epidemiology surge capacity needs of FDOH and to the certification of members of NIMS epidemiology strike teams. They also helped FCPHP staff divide the competencies into three levels: basic, intermediate, and advanced. All experts agreed that the NWCPHP competencies would be appropriate to serve as the foundation for the training programs, and the competencies from the basic and intermediate levels were selected to form the learning objectives for the two trainings, respectively. In addition, leaders of FDOH's epidemiology strike team workgroup reviewed and approved selection of the competencies.

FDOH epidemiologists and FCPHP staff worked closely to develop learning objectives that corresponded to the competencies. Once developed, staff used the learning objectives as a guide to determine if existing training programs were available that would meet the needs. Staff did not locate any programs that corresponded to the learning objectives, but did find useful material in CDC's program, Excellence in Curriculum Integration through Teaching Epidemiology

(EXCITE).[8] The remainder of the content was developed by FDOH experts and FCPHP staff. FCPHP staff developed the training activities, assessment instruments, and evaluation methods. At each step in the process, additional subject matter experts and stakeholders at the local and state level contributed additional content and suggestions, including University of South Florida faculty, the regional cochairs for health from Florida's seven preparedness regions, and the Chief of the Bureau of Epidemiology in FDOH's central office.

Completion of FIRST took approximately nine months. This basic program provides non-epidemiologists with the knowledge, awareness, and skills to assist FDOH epidemiologists when epidemiologic surge capacity is needed. The intermediate program, I-FIRST, was developed using the same subject matter expert approach. The I-FIRST program provides non-epidemiologists and epidemiologists with the knowledge, awareness, and skills to serve as more advanced strike team members in responding to specific pathogen-related events.

A NOTE ON COMPETENCY SETS

During the process of developing the epidemiology trainings, the FCPHP staff learned that CSTE and CDC were leading a national effort to develop an epidemiology competency set. However, the CDC/CSTE process did not begin until October 2004, by which time the FCPHP had already developed its FIRST course; the final CDC/CSTE set was published in 2006.[9]

The NWCPHP competencies are organized around epidemiologic activities; the CDC/CSTE Competencies for Applied Epidemiologists in Governmental Public Health Agencies (AECs) are organized around the eight Core Competencies for Public Health Professionals developed by the Council on Linkages Between Academia and Public Health Practice (COL).[9] As noted later, the FCPHP trainings also incorporate several of the AECs. In addition to the differing organizing principles, the AECs are defined as competencies that professional epidemiologists at several levels of experience, responsibility, and education should have. The training that the FCPHP has developed and delivered is aimed at non-epidemiologists or those practicing epidemiology with relatively limited formal education and training in epidemiology. A careful mapping of the NWCPHP competencies to the AECs found that the NWCPHP competencies used in the FCPHP trainings largely fell in the first of the three skill domains of the AECs (assessment and analysis, basic public health sciences, and communication). A few were found in the other five domains (community dimensions of practice, financial and operational planning and management, policy development, leadership and systems thinking, and cultural competency).

PROGRAM DESCRIPTIONS

In addition to the NWCPHP competencies, FIRST and I-FIRST were designed to address selected Core Competencies for Public Health Professionals as adopted by the COL[10] and the Bioterrorism and Emergency Readiness Competencies for All Public Health Workers prepared by the Columbia University School of Nursing.[11]

Both courses require that Web-based material be studied prior to the onsite trainings. The use of online training places awareness and knowledge components online, thus reducing participants' time away from the office and allowing the onsite training to be used for skills-based learning and practice. Participants in the two programs may also earn continuing education credits.

FIRST has three modules: the online module introduces concepts, definitions, terminology, and the role of epidemiology in public health.[12] The day-long, onsite training begins with a brief review of the online topics and includes a board game that requires participants to demonstrate their knowledge of epidemiology terms and definitions. The remainder of the morning presents interviewing and communication skills; faculty also observe how the participants practice these skills individually. The afternoon covers outbreak investigations and includes an investigation of a food-borne illness from a buffet-style meal, using mock foods, individual directions, and calculation of attack rates and risk ratios to identify the source of the gastrointestinal disturbance.

I-FIRST requires completion of FIRST as a prerequisite.[13] It also has an online set of modules that require approximately four hours to complete. Topics covered include field epidemiology, pandemic influenza, gastrointestinal illness of unknown origin, field questionnaire methodology, surveillance post-event strategies, sampling and packaging, and quarantine and isolation. The first day of the two-day, onsite training includes a tabletop exercise on gastrointestinal illness and advanced interviewing skills. Most of the second day is spent on a pandemic influenza tabletop exercise that incorporates aspects of NIMS. Alternate tabletop exercises have been completed and delivered for anthrax and plague, to be used in the training when requested.

DELIVERY AND EVALUATION

FDOH's central office and the county health departments assisted with marketing the courses to their employees using the state training calendar, and announcements circulated through FDOH's intranet. The FCPHP Learning Management System (LMS) was used to register participants, administer pre- and post-tests, ensure that the online training modules had been completed, and issue the appropriate continuing education credits and certificates of course completion. The LMS has an added feature that allows authorized FDOH staff to have access to and query the online database remotely. They can review the database by training, county, preparedness region, and employee, and can print lists of individuals (and their contact information) who have completed the FCPHP's various trainings. This feature is extremely valuable in emergency events that require immediate strike team member identification.

Another unique feature of the partnership was in the course delivery. Each course was delivered by a team of FCPHP staff and FDOH subject matter experts. FCPHP staff provided support and facilitation of non-epidemiologic sections, such as interviewing skills and tabletop exercises. Volunteer FDOH epidemiologists delivered the technical epidemiology sections, described outbreak and other events from their experiences, and debriefed the exercises and activities.

Both training programs included pre- and post-testing as well as course evaluations. The curriculum was revised after each offering to address evaluation results, FDOH expert feedback, and new information from state and federal governments. Data collected from the pre- and post-tests for both FIRST and I-FIRST show that on average there was a statistically significant improvement in scores. In addition, the course evaluations produced very positive ratings for the course content, course facilitators, and course material. Overall, the participants tended to perceive the course delivery as effective and found that the programs adequately met their professional needs. A follow-up online survey of FIRST participants was conducted about four months after the trainings were completed. One of the findings is that respondents indicated that the training increased their knowledge of epidemiology concepts and practices, on average, between a moderate amount and a great amount.

As of February 2007, a total of 744 public health workers have been trained in FIRST and I-FIRST in Florida's seven preparedness regions. Additional trainings scheduled through May 2007 brought this total to approximately 1,000. In addition to the very positive results of the pre- and post-tests and the follow-up survey, the value of the courses is indicated by high attendance rates, waiting lists, and requests for additional offerings.

DISCUSSION

The process and outcomes described in this article illustrate several exemplary or best practices to meet important public health goals. These include:

- forming an innovative partnership between FDOH and Florida's only accredited SPH and its only CDC-designated and -funded academic public health preparedness center;
- joining the skill, education, and experience of practicing epidemiologists and the curriculum design, development, and training skills of the staff of the FCPHP to produce needed training programs and then delivering the programs jointly;
- adopting and modifying a sound set of competencies for applied epidemiology training of frontline public health workers;
- using the epidemiology competency set systematically to organize planning and development of training; and
- making an important contribution to the state of Florida's implementation of the mandates of the NIMS.

Although it took approximately a year to prepare the two courses, the partner-focused approach resulted in a high-quality set of trainings that directly addressed the needs of the public health workforce in Florida. The success of Florida's NIMS implementation has been recognized by the states and partners (including CDC) that are collaborating on Emergency Support Function #8 (the public health and medical services annex to the federal National Response Plan) in the Federal Emergency Management Agency's Region IV. Many of Florida's policies, protocols, and training requirements have been adopted by that group as part of efforts to coordinate the region's preparedness activities.

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