

SUSPECTED SMALLPOX CASE INVESTIGATION TRAINING

BACKGROUND

Smallpox is a serious, contagious, and often fatal infectious disease that was declared eradicated worldwide in 1980 by the World Health Organization (WHO). However, the events of September 2001 and October 2001 raised concern that the smallpox (variola) virus could be used as an agent of biologic terrorism. Since there has been limited experience among public health personnel in responding to smallpox cases, four smallpox case investigation training sessions were provided to Los Angeles County (LAC) Department of Public Health (DPH) Smallpox Response Team members to increase their knowledge and skills in responding to these situations. These trainings were offered to build Los Angeles County's smallpox preparedness capacity in conducting investigations and outbreak control for suspected smallpox cases.

METHODS

From April 2006 through May 2006, four suspected smallpox case investigation trainings were offered by the LAC DPH Acute Communicable Disease Control (ACDC) Program, Bioterrorism Preparedness and Response Section. The trainings were conducted by two physician specialists, three health educators, a public health nurse, and a Federal Bureau of Investigation (FBI) special agent.

The training was organized into four components that consisted of a comprehensive lecture, a hands-on demonstration of the Smallpox Aid Response Kit (SPARK), which is a "go-bag" that contains supplies including: personal protective equipment (PPE), laboratory specimen collection kit and procedures, case investigation forms, smallpox rash evolution guide, a digital camera, and laptop with wireless connection.

The objectives of the training were as follows:

- List the three major diagnostic criteria for smallpox;
- List three of five minor diagnostic criteria for smallpox;
- State how smallpox is transmitted;
- State the notification process for a suspected smallpox case;
- State the infection control precautions needed for a suspected smallpox case;
- Describe the functional role as a member of a public health smallpox response team in the initial evaluation of a suspected smallpox case;
- Describe two mechanisms by which a terrorist attack could be perpetrated using the smallpox virus and its relevance to the assessment of a smallpox case and;
- Describe the importance of chain of custody in evidence collection and transport.

Training participants received a packet of materials that included the notification and call-down process, risk assessment for smallpox using the Centers for Disease Control and Prevention (CDC) criteria, guides for distinguishing smallpox from chickenpox, standardized procedures for specimen collection, guidelines for evaluating a rash illness suspicious for smallpox, PPE donning and removal procedures, worksheets for evaluating a suspect smallpox case(s), checklists for investigating a suspected smallpox case, clinical and non-clinical resource guides, and a list of the SPARK items. The chain of custody issues for specimen collection and joint investigation with DPH and the FBI were reviewed. A copy of The Joint Bioterrorism Investigation Memorandum of Understanding between DPH, FBI, and LAC Sheriff was then given to the participants.

The target audience for this training was DPH staff physicians, public health investigators, nurses, and other staff who would respond to assess and investigate suspect smallpox case(s) in LAC. Smallpox-vaccinated LAC public health workers were contacted by telephone and e-mail to participate in one of the four training sessions. Participants consisted of clinical (physicians and nurses) smallpox-vaccinated individuals and non-clinical vaccinated individuals.

To evaluate changes in the knowledge and skills of the participants, pre-tests and post-tests were administered at the training. The pre-test and post-test included 10 questions consisting of true/false and multiple choice questions. There was an additional section of three short answer clinical exam questions for clinical staff only. Analysis of the pre-tests and post-tests was conducted with the SAS Software program. In addition, pre-tests and post-tests were grouped by the four different sessions. In an effort to maintain confidentiality of the participants, names and identification numbers were not used.

The planning and evaluation process of the training were based on the Continuing Medical Education (CME) and Continuing Education Unit (CEU) activity guidelines. The California Medical Association approved the activity for 2.0 CME category 1 credits. The California Board of Registered Nursing approved the activity for 2.0 CEU contact hours. The CME Program Evaluation and LAC Public Health Nursing Administration Evaluation were conducted for all four training sessions. The evaluation measured if the training objectives were met and also requested general comments about the training. Participants were asked to submit their views on how the information will be applied to their public health duties to improve effectiveness. Further, participants were asked to list the two most pertinent pieces of information they learned from the training. To assist with future programs, participants were also asked to indicate future needs and topics they would like to have reviewed.

RESULTS

There were 45 clinical and 10 non-clinical staff participants that completed the training. Only pre-test and post-test pairs completed by clinical staff participants were analyzed (n=42). The Paired T-test was calculated for the pre-tests and post-tests utilizing the SAS Software program. Analysis revealed that there is a statistical significance between pre-tests and post-tests ($p < 0.0001$). The mean scores out of 100% of the pre-tests were: Group I = 69.4, Group II = 69.4, Group III = 63.4, and Group IV = 70.4. A majority of participants scored below 70% on the pre-test.

An analysis of the post-test revealed improvement in knowledge with the following scores: Group I = 86.2, Group II = 86.2, Group III = 87.8, and Group IV = 90.2. Overall, post-test mean scores ranged from 86.2 % to 90.2% which increased from the pre-test mean score of 70%. Participants that were non-clinical staff members (n=10) did not participate in the clinical exam questions. Therefore, their results were not calculated in the mean scores of the pre-test and post-test.

| Groups | # of participants (n=42*) | Mean Scores | | | 95% C.I. | | T Value | P Value |
|---------------|----------------------------------|--------------------|------------------|-------------------|-----------------|--------------|----------------|----------------|
| | | Pre-Test | Post-Test | Difference | Lower | Upper | | |
| 1 | 12 | 69.4 | 86.2 | 18.5 | 14.2 | 22.8 | 9.42 | <0.0001 |
| 2 | 12 | 69.4 | 86.2 | 18.5 | 14.2 | 22.8 | 9.42 | <0.0001 |
| 3 | 9 | 63.4 | 87.8 | 24.3 | 19.3 | 29.4 | 11.07 | <0.0001 |
| 4 | 9 | 70.4 | 90.2 | 17.6 | 12.4 | 22.7 | 7.87 | <0.0001 |

* Based on pairs matched for completed tests in order to conduct analysis.

CONCLUSION

Suspected smallpox case investigation trainings were provided to smallpox vaccinated public health workers in LAC to improve knowledge and skills in responding to suspect and initial smallpox case(s). A total of 45 clinical and 10 non-clinical public health staff members completed the training. The Paired T-test was calculated for the pre-tests and post-tests utilizing the SAS Software Program. Analysis revealed that there was a statistical significance between pre-tests and post-tests ($p < 0.0001$). A majority of the

participants scored below 70% on the pre-test. However, post-test scores showed improvement in knowledge with mean scores ranging from 86.2% to 90.2%.

The training included an overview of the notification and call-down process, risk assessment for smallpox using CDC criteria, systematic approach to evaluating a febrile vesicular or pustular rash illness using CDC diagnostic algorithms, and information about isolation and infection control precautions. Participants had the opportunity to become familiar with transmitting digital photos via wireless laptop. A hands-on demonstration of the Smallpox Aid Response Kit (SPARK), laboratory specimen collection procedure, and a discussion about the chain of custody issues for specimen collection were reviewed.

In evaluating the four training sessions, 92% to 100% of participants thought that the course objective to state the notification process for a suspected smallpox case was fully met. In addition, 85% to 100% of the participants thought that the objective to describe the functional role as a member of the public health response team in the initial evaluation of a suspected smallpox case was fully met. Some of the general comments about the training were: very well done, excellent overview, comprehensive, practical, instructive, and straight forward presentation with good information. Overall, a majority of the participants agreed that they would recommend future sessions, such as this, to their colleagues. In the near future, a yearly refresher course will be conducted as a self-study module so Smallpox Response Team members can maintain their skills and knowledge.