



MASS SMALLPOX VACCINATION CENTER EXERCISE

INTRODUCTION

On June 23, 2004 the County of Los Angeles Immunization Program (IP) in collaboration with other public and private organizations held the County's first full-scale bio-terrorism exercise. The exercise simulated a Los Angeles County Public Health response to a confirmed case of smallpox and smallpox release at a major sports arena in the area, by providing fictitious smallpox vaccinations to citizens at a mass smallpox vaccination center. Over 230 trained County employees staffed the exercise and over 1,000 volunteers participated as clients.

BACKGROUND

Los Angeles County's Strategic National Stockpile (SNS) Plan outlines the process of requesting, receiving, storing, staging, distributing, dispensing and recovering SNS materials. Incorporated in the SNS Plan is the Los Angeles County Smallpox Preparedness, Response, and Recovery Plan, which include guidelines for Mass Smallpox Vaccination Clinic Operations.

Beginning in the winter of 2002, IP was given the responsibility of coordinating the County's smallpox vaccination program as well as developing the *Mass Smallpox Vaccination Clinic Operation Guidelines*. These guidelines outline the logistical, administrative and clinical procedures used within a smallpox Dispensing/Vaccination Center¹ (DVC), are for use in either the context of bio-terrorism preparedness or as a response to a probable or confirmed case of smallpox, and outline Los Angeles County's post-event vaccination strategy, which includes:

- Quickly identifying and isolating smallpox cases
- Identifying and vaccinating household and close contacts
- Monitoring the vaccinated contact and instituting isolation if fever develops
- Vaccinating health care and public health workers who will be directly involved in evaluating, treating, transporting, and/or interviewing potential smallpox cases
- Vaccinating other response personnel who have a reasonable probability of contact with smallpox patients or infectious materials (e.g., selected law enforcement, emergency response, or military personnel)
- The possibility of a broader vaccination campaign to increase community immunity to smallpox

In October 2003, IP began planning a full-scale exercise of the smallpox DVC to fulfill the CDC's Cooperative Agreement on Public Health Preparedness and Response for Bioterrorism, fiscal year 03-04, grant requirements.

Goals of the exercise were to:

1. Evaluate the efficiency and effectiveness of the smallpox DVC model.
2. Quantify the logistical resources required to implement the smallpox DVC model.

Utilization of the DVC model focused on resource allocation, logistical planning, staffing patterns, time flows, and client and staff perceptions but also provided Los Angeles County the opportunity to evaluate the collaborative relationships of other County and City departments and local agencies involved in responding to a biological event.

¹ Dispensing/Vaccination Center (DVC) is the name given to the dispensing component that would be used to provide mass prophylaxis/vaccination to the 10 million residents of Los Angeles County in the event of a large scale public health emergency.



The exercise took place on June 23, 2004 at the Carson Community Center in Carson, California, ran for 7 hours, included staff briefings, full-scale DVC procedures, staff debriefings, both a qualitative and quantitative evaluation, utilized over 200 staff, and processed over 900 role-playing clients.

METHODS

Planning: Planning for the exercise began in October 2003, nine months before the actual exercise. During the initial meetings, goals for the exercise were developed and a site was chosen. Subsequent meetings were used to develop task lists, assign sub-groups to various tasks and develop exercise materials.

The planning process included bringing over 30 County, City and community organizations together in an Exercise Workgroup. This workgroup met every two months under the chairmanship of IP.

Exercise Site: Carson Community Center was chosen from over 100 potential DVC sites throughout the county, approved by County Public Health and the Emergency Medical Services (EMS) for use as a DVC. This site was able to accommodate large numbers of individuals, was close to major freeways and had experience in conducting emergency response exercises.

DVC Curriculum and Staff Training: Concurrent with the exercise planning, a DVC staff-training curriculum was developed in collaboration with IP, the Office of Organizational Development and Training (OD&T) and the SNS Coordinator.

Initial planning discussions determined that to be able to institute DVCs in the event of a large-scale emergency, a central core of County DHS personnel should be trained immediately. In response, eight (8) complete teams (117 staff per team) – one team from each of the eight (8) Los Angeles County Service Planning Areas (SPAs) along with teams from Long Beach and Pasadena Health Departments were identified and trained. These trainings occurred on June 8th, 9th and 10th, 2004, and enabled Los Angeles County to train over 1,000 employees on the DVC model, Incident Command Structure (ICS) and specific job functions within a DVC.

From the 1,000+ DHS staff trained in DVC functions, 230 were chosen (some from each of the 8 SPAs and Programs) to participate in the exercise. In addition, 800 local actors and 200+ community volunteers were used as clients.

Exercise Summary: The Mass Smallpox Vaccination Exercise was designed to be a half-day bioterrorism exercise. Exercise play focused on DVC operations including; Triage, Briefing/Orientation, Medical Screening, Vaccination, Contact Evaluation, Clinical Evaluation, Clinical Counseling and Post Counseling.

Participants were advised that the exercise was an “evaluated practice” which allowed both staff and clients to “play” their roles within a learning environment. At the same time, Evaluators and Controllers collected information to assess performance within each of the DVC areas and to assess client and staff perceptions of the exercise.

The scope of the exercise enabled the activation of the Los Angeles County Public Health Emergency Control Center (ECC) and the City of Carson’s Emergency Operations Center (EOC).

The exercise consisted of a half-day full-scale exercise. Time sequences are described below:

- Immunization Program staff reported to the exercise site at 0700 and reviewed the DVC set-up while the first shift staff were arriving and registering. (First shift staff and all volunteers were instructed to park at an off-site location and were bused to the exercise site.)
- At 0800 exercise staff began their briefing and exercise volunteers (clients) began registration. Volunteers then formed a “waiting line” outside the DVC triage area.
- At 0900 the DVC triage area opened and official exercise play commenced, the second shift of DVC staff also began arriving and registering for the exercise.



- The second shift's briefing began at 1000 and the second shift relieved the first shift staff between 1100 and 1130.
- The first shift's debriefing began at 1130. First shift staff was allowed to leave the exercise site following debriefing.
- At 1300 the exercise was stopped and all remaining volunteers (clients) were asked to complete evaluations before leaving the exercise site.
- Buses were available on a continuous basis to shuttle staff and volunteers between the exercise site and the parking area.
- A briefing was held for the second shift from 1330 until 1400.

Exercise Evaluation: An academic evaluation team and a team of experienced EMS personnel evaluated the exercise. Both teams were situated throughout the exercise site to observe and record exercise events. The EMS evaluators concentrated on evaluating the administration of the exercise including, Incident Command Structure (ICS), communication, exercise controller participation and other operational variables. The evaluation of the DVC model was conducted by an outside consultant and concentrated on both qualitative variables such as client and staff perceptions of the exercise and quantitative variables such as time flow throughout the DVC.

Feedback from the two staff debriefing sessions was organized with the EMS evaluation feedback into a "Lessons Learned" document and presented to the exercise workgroup at a follow-up meeting in July 2004.

Recommendations and a full evaluation report of the exercise are being finalized.

RESULTS

Evaluation Summary:

- 1,002 clients attended the exercise, 992 (99%) returned their time flow evaluation cards
- Four hundred thirty-four (434) clients (43%) completed the required DVC stations and were vaccinated
- Two hundred eighty-three (283) clients (28%) went through Clinical Counseling
- Forty-five (45) clients (5%) went through the Clinical Evaluation area
- Fifteen (15) clients (1.5%) went through the Contact Evaluation area
- Eight hundred eighty-one (881) clients (88%) completed a satisfaction survey
- Two hundred thirty-two (232) staff (100%) completed a satisfaction survey

Time Flow Study: Ten (10) DVC stations (Table 1) were evaluated for time flow during the exercise.

Table 1. DVC Stations Descriptions

DVC Station	Description
1. Volunteer Registration – Waiting Line	Volunteers are registered, provided fictitious medical history information, and given time flow evaluation cards. Clients are then directed to a waiting line for entrance to the DVC and are provided education materials on smallpox and the vaccine. The waiting line is the first time flow area to be evaluated.
2. Triage	The official entrance to the DVC, clients are asked a series of screening questions based on the fictitious medical history form and are directed to the next DVC area. Non-symptomatic – Briefing / Orientation Symptomatic – Clinical Evaluation Contact of a case – Contact Evaluation
3. Briefing/Orientation	Clients are given medical screening forms and watch the CDC's smallpox video. Clients then complete their screening forms and proceed to the forms review area.



Table 1. DVC Stations Descriptions

DVC Station	Description
4. Forms Review	DVC staff review the client's medical screening form and direct them to either Vaccination or Clinical Counseling (if contraindications/precautions to vaccination)
5. Vaccination	Clients are given smallpox vaccination
6. Post Counseling	Clients are given instruction on the care of their vaccination site and how to determine if the vaccination is successful or needs medical evaluation.
7. Clinical Counseling	Medical personnel evaluate clients who have contraindications/precautions to vaccination and determine if vaccination is possible.
8. Clinical Evaluation	Clients who present to the DVC with symptoms/signs of smallpox disease are evaluated by medical personnel and either cleared for vaccination or referred for additional evaluation/treatment.
9. Contact Evaluation	Contacts of a confirmed smallpox case who present to the DVC are evaluated, given referral information and provided vaccination.
10. Evaluation	After completing the DVC exercise, clients are asked to complete an evaluation survey.

Volunteer clients were provided with fictitious medical history information to use during the exercise that would reflect health conditions and contact status proportionately consistent with CDC expectations. These conditions/statuses ensured a proportion of clients went to specialty stations such as; Clinical Contact, Clinical Evaluation and Clinical Counseling for evaluation and processing. The observed numbers of clients seen in those stations vs. the number of clients assigned to those stations is described in Table 2.

Table 2. Specialty Client Situations

DVC Area	Expected # of Clients	Observed # of Clients
Contact Evaluation	10	15
Clinical Evaluation	30	45
Clinical Counseling	200	283

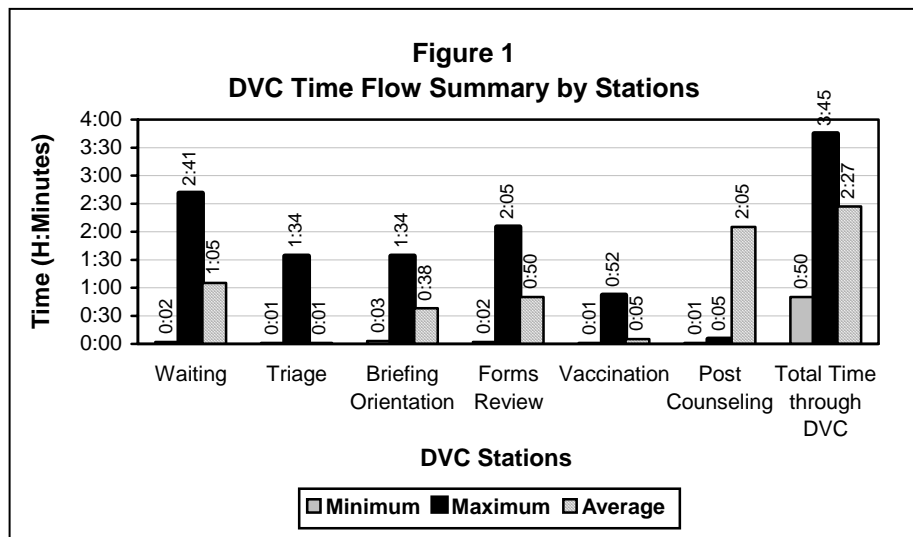
Although, exercise planners took great care in developing medical histories and contact status information for use by volunteer clients, some clients took it upon themselves to make-up illnesses or contraindications to vaccination.

These self-identified conditions/statuses caused some clients to be triaged to areas other than what was expected. DVC

staff also incorrectly identified some clients as having contraindications to vaccination and referred eighty-three (83) additional clients to Clinical Counseling – thus considerably slowing client progress through vaccination.

Minimum, maximum, and average lengths of time clients spent at the main DVC stations during the exercise and total time spent during the exercise are reflected in Figure 1.

Staff Evaluations: Staff was surveyed regarding their perception of their overall experiences, the training they received, and the organization of the exercise. Staff worked in two shifts, approximately





110 staff in each, and represented over 15 different Los Angeles County job classifications. Employees from Pasadena and Long Beach Health Departments also participated as DVC staff. A total of 232 surveys were collected (100%).

Overall experiences

- 65.6% rated their experience as “good” or “excellent”
- 70.2% disagreed that they felt stressed during the exercise
- 76.2% said they would be willing to volunteer in the event of an actual emergency
- 79.3% agreed that the exercise made them feel more prepared for an actual emergency

Training

- 64.0% felt they were well-trained for the exercise
- 70.6% felt the position resource guides developed for the exercise were easy to understand
- 76.8% felt they were able to accurately answer questions from clients
- 89.2% of the staff members felt that all the staff worked well together

Organization of the Exercise

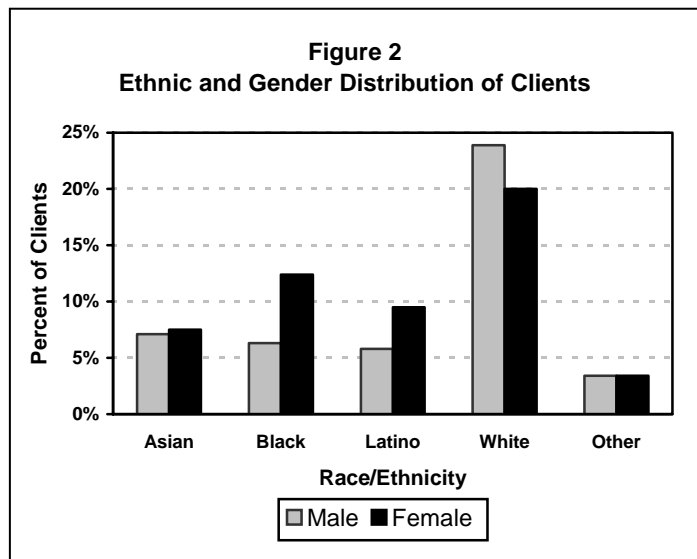
- 55.1% felt the floor plan for the exercise was easy to follow
- 63.8% felt that the stations were well-organized
- 71.5% felt staff was adequate
- 87.5% felt there was adequate space to perform their duties

Recommendations from staff included:

- A need for more ICS training – communication in ICS structure very different from normal communication structure
- More on-site training time

Client Evaluations: Client surveys were designed to determine client demographics, the clients’ overall experience of the exercise, the quality of education and educational materials they received and their perception of the exercise’s organization. Eight hundred eighty-one (881) surveys were collected (88%).

Client Demographics: The breakdown of client demographics, including ethnicity, gender and primary language spoken are shown in Figure 2.



Although English was the primary language of 88% of respondents, 34 other primary languages were reported including: Ethiopian, German, Czech, Hungarian, Fugani, Korean, Navaho, Portuguese, Cambodian, Indian, Greek, Arabic, Sindhi and Russian, in addition to those reported in the table to the right.

The diversity of languages within this client population accurately demonstrates a major factor in developing educational and directional information for an emergency response within Los Angeles County.

The exercise included 4 interpreters, but in no way covered all language needs.



Overall Experiences

- 69.4% of clients rated their experience as “Good” or “Excellent”
- 49.5% felt the exercise was tiring
- 73.3% felt the exercise made them more comfortable in the event there was a real emergency

Education

- 91.7% clients felt the forms provided were clear and understandable
- 88.3% felt the information they received was clear and understandable
- 84.2% reported that staff they encountered was knowledgeable and confident
- 87.9% felt they learned something new about smallpox.

Organization

- 79.4% of clients felt the exercise was well organized and ran smoothly
- 79.6% felt they had clear instructions regarding where to go next in the DVC

DISCUSSION

The accomplishment of the mass smallpox vaccination exercise and the development of the DVC staff-training curriculum was a monumental undertaking. Though faced with many challenges throughout the planning and execution of the exercise, a great many lessons learned were gained from the experience.

Topics that arose from the time flow study as potential reasons for not meeting the goal of 1,000 clients in 4 hours include:

- Two shifts hampered the ability of staff to “get into a groove” and resulted in a large lag time for client processing between shifts
- Briefing/Orientation held clients up because of a mandatory CDC video on smallpox and vaccination. (Average - 38 minutes)
- Forms Review staff were confused and inconsistent on screening requirements and sent twice as many clients to Clinical Counseling (before being able to access vaccination) as planned.
- Vaccination staff were asked questions by clients which should have been answered earlier in the process and re-screened clients before providing vaccination. (Average of 5 minutes/client – expected was 2 minutes/client)

Strengths: Key strengths identified during this exercise included the following:

- Demonstration of excellent teamwork between all of the participating agencies
- Establishment of new cooperative relationships
- Success in the staging and operation of a DVC
- Quick reaction and correction of shortcomings in the DVC plan as they were uncovered
- Increased knowledge in emergency preparedness and smallpox vaccination gained by both staff and volunteers

In addition, several successful outcomes of the exercise not directly related to the model that should also be recognized include:

- This was the first full-scale exercise completed by the County of Los Angeles Department of Health Services (DHS), Public Health
- This was the first test of the County’s DVC model
- This was the first joint County of Los Angeles DHS, Emergency Medical Services (EMS), and Department of Mental Health (DMH) exercise
- The exercise provided “real-life” experience to over 200 trained County Public Health staff

Areas for Improvement: Throughout the planning and during conduction of the exercise, several opportunities for improvement in the DVC model and planning process were identified. Recommendations



for improvement include the following:

- Earlier identification of resources and procurement processes
- Expanded training in Incident Command Structure training for DVC staff
- Revised educational materials for clients
- Less client-generated forms

The planning, execution and evaluation of this exercise provided Los Angeles County with a realistic idea of the mechanisms necessary to coordinate and manage during a public health emergency. It also provided invaluable information on the DVC model and training used to prepare staff to operate a DVC. Over seventy (70) new forms were developed and tested, 1,000+ DHS employees were introduced to the County's Emergency Response Plans and members of health and safety agencies from across the County were able to develop working relationships and collaborations.

In the event of a smallpox outbreak, Los Angeles County will need to institute over 100 DVCs to vaccinate the 10 million county residents that will look to the Public Health Department for guidance and treatment, this exercise provided a solid first step in our ability to protect all Angelinos.

In addendum:

During the nationwide influenza vaccine shortage in the fall of 2004, Los Angeles County used the DVC model and many of the forms developed to provide 40,000 influenza vaccinations during a two-day vaccination campaign across the county. The results derived from using the DVC model proved extremely successful.