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Major article

Infection prevention and mass vaccination training for U.S. point of dispensing staff and volunteers: A national study

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Background: Points of dispensing (PODs) are deployed for medical countermeasure mass dispensing. However, infection prevention and vaccine administration pre-event training offered and just-in-time (JIT) education planned for POD workers have not been assessed.
Methods: Disaster planners were sent an online questionnaire in 2013. McNemar tests compared training offered to staff versus volunteers and pre-event training versus JIT training.
Results: In total, 301 disaster planners participated. The most frequent pre-event training included hand hygiene (59.1% and 28.0%) and personal protective equipment (PPE) selection (52.1% and 24.1%) for staff and volunteers, respectively. Few provided pre-event training on the cold chain technique (14.8% and 5.1%) or smallpox vaccine administration (4.7% and 2.3%) for staff or volunteers. For all topics except smallpox vaccine administration, more staff than volunteers received pre-event training ($P < .01$). The most frequent planned JIT training includes hand hygiene (79.8% and 73.5%) and PPE selection (79.4% and 70.0%) to staff and volunteers. For all topics, more JIT education is planned for staff than volunteers ($P < .001$). More JIT training is planned than has been given pre-event for all topics ($P < .001$).
Conclusion: More pre-event training is needed on infection prevention and vaccine administration to ensure safe and successful POD deployment.
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Pandemics and bioterrorism attacks have the potential to cause enormous morbidity and mortality. A seminal study examining the potential impact of a bioterrorism attack reported that a 30 kg release of anthrax spores over Washington, DC could result in 30,000-100,000 deaths and thousands more ill individuals requiring postexposure prophylaxis and treatment.[1] A future influenza pandemic could result in 20-47 million infected individuals and 89,000-207,000 deaths.[2] Medical countermeasures exist for some potential bioterrorism agents, and a vaccine may be developed for a future influenza strain resulting in a pandemic. The Centers for Disease Control and Prevention's (CDC's) Strategic National Stockpile is a repository for medical countermeasures needed for bioterrorism and other biologic events. However, communities bear the responsibility for dispensing these medical countermeasures rapidly.

The CDC's guidelines specify that public health agencies should have the capability of dispensing medical countermeasures to all citizens within 48 hours.[3] The primary mechanism by which public health agencies plan to accomplish this goal is through deployment of points of dispensing (PODs). POD deployment is complex and requires extensive preplanning to ensure readiness. An essential component of POD preparedness is training and education for individuals who will operate the POD.[4] Researchers have suggested that disaster planners need to incorporate both pre-event and just-in-time (JIT) training into POD preparedness efforts.[4,5] However, only 1 study has assessed the extent to which POD staff or volunteers are being provided training, and many potential education topics were not assessed. In 2006, the Connecticut Department of Public Health assessed both its POD throughput and POD worker-

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specific competence.[5] This study found that a third of the POD workers needed additional training in at least 5 of the 17 identified competency areas. Of the measured POD worker competencies, none related to vaccine administration or infection prevention and control. According to the CDC, PODs need to be prepared for mass dispensing of both oral medical countermeasures and vaccines to address the spectrum of possible biologic events that could occur.[6,7] Furthermore, PODs could contribute to communicable disease spread if infection prevention interventions are not used during a biologic event involving a contagious illness.[4]

Community-based PODs that are open to all citizens (ie, open PODs) are managed by local public health officials, and many public health professionals will assist with POD deployment. However, successful POD deployment is impossible without the use of volunteers to assist with POD operation because of the complex and time-consuming nature of mass medical countermeasure delivery. Public health disaster planners recruit POD volunteers from health care groups and the general public as 1 component of public health preparedness. For the purposes of this study, POD staff will be defined as paid public health department employees assigned to work at the open POD. POD volunteers will be defined as unpaid members of the general public who agree to assist the public health department by working at the open POD. POD staff and volunteers work side-by-side during POD deployment and often share the same job duties. Therefore, it is essential that both POD staff and volunteers receive training on POD operation, including infection prevention and mass vaccination strategies. From a research and preparedness perspective, it is critical that POD staff and volunteer training be assessed to determine gaps in planning. The purpose of this study is to assess the extent to which jurisdictions are providing infection prevention and/or vaccine administration training to POD staff and volunteers, either by having completed pre-event training or by planning JIT training after an event occurs.

METHODS

U.S. public health disaster planners were invited by phone to participate in an online survey in summer and early fall of 2013. All 456 Cities Readiness Initiative (CRI) jurisdictions and a random sample of 500 non-CRI jurisdictions were phoned for potential recruitment; attempts were made to reach the disaster planner responsible for the community POD. If the POD planner was reached by phone, he/she was informed of the study and asked if they were willing to participate. Willing participants were e-mailed a recruitment statement that included a URL to the anonymous online questionnaire, administered through Qualtrics software version 2013 (Qualtrics, Provo, UT). In an effort to maximize response rates, a modified Dillman's Total Design Method[8] was followed, consisting of a 2-week follow-up recruitment e-mail. Each jurisdiction was called 3 times, leaving a voice message when a disaster planner could not be reached in person. The study was approved by the Saint Louis University Institutional Review Board.

Instrument

This study was part of a larger survey that examined the preparedness of U.S. open and closed PODs for mass dispensing of vaccines. No existing research measuring infection prevention or vaccine administration education for POD workers was found in the literature when the instrument was developed; however, articles and reports discussing these topics were identified.[4,9] Questions pertaining to pre-event and JIT training were developed from published recommendations regarding infection prevention recommendations for PODs.[4] The Institute of Medicine mass dispensing workshop report[9] was also used to develop questionnaire items. Pilot testing was conducted with 10 U.S. POD planners to assess content validity, clarity, and ease of use. Pilot testing feedback was used to finalize the instrument. The 32-item instrument measured pre-event and/or JIT training provided or planned for POD staff and POD volunteers on 8 infection prevention and vaccine administration–related topics. In addition, demographic variables were collected.

Table 1
Participant demographics

Characteristics	% (n)*
Individual characteristics	
Sex (female)	65.1 (157)
Employment status (full-time)	90.5 (218)
Age (y)	
≤35	22.0 (53)
36-45	20.3 (49)
46-55	27.0 (65)
≥56	30.7 (74)
Education level	
Associate's degree or less	18.6 (45)
Bachelor's degree	41.5 (100)
Master's degree or higher	39.8 (96)
Formal medical education (yes)	46.0 (118)
Registered nurse	50.8 (60)
Emergency medical technician	29.7 (35)
Physician	1.7 (2)
Other	17.8 (21)
Work experience (y)	
≤1	3.7 (9)
2-5	24.1 (58)
6-10	37.3 (90)
≥11	34.9 (84)
Jurisdiction characteristics	
Cities Readiness Initiative jurisdiction	61.0 (147)
Tribal government	4.6 (11)
Population	
≤100,000	53.5 (129)
100,001-500,000	28.2 (68)
500,001-999,999	11.2 (27)
≥1 million	7.1 (17)

*Denominator varies because of missing or incomplete data.

Data analysis

The R statistical program (R. Core Team, Vienna, Austria) was used for all data analyses. McNemar tests were conducted to compare pre-event training versus JIT training for each education topic and to compare staff training versus volunteer training in the pre-event period and planned JIT. The primary binary outcome of interest assessed was whether the respondents' jurisdictions were currently offering training in smallpox vaccination pre-event or had plans to do so JIT. The outcome was analyzed with respect to jurisdiction and respondent demographic variables using χ^2 tests (univariate analysis) and logistic regression (multivariate analysis). Nonsignificant variables (those with P values $<.05$) were not included in the final model; only the final model is reported. In addition, descriptive statistics were conducted for all variables.

RESULTS

In total, 632 individuals were reached by phone and invited to participate; 20 declined. Those who consented were sent a recruitment e-mail with the survey link; 301 completed the survey. Forty-four surveys were excluded because of excessive missing data, yielding 257 completed questionnaires (257 completed surveys/612 sent a survey link; response rate: 41%). Participant demographics are outlined in Table 1. Most participants (65.1%,

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