Disaster preparedness lessons learned and future directions for education: Results from focus groups conducted at the 2006 APIC Conference

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Background: Infection control professionals (ICP) who have experienced disaster response have not been assessed in terms of the lessons they have learned, gaps they perceive in disaster preparedness, and their perceived priorities for future emergency response training.

Methods: Focus groups were conducted at the APIC 2006 Conference to evaluate ICPs' perceived needs related to disaster planning topics, products they feel are needed for education and reference materials, and lessons learned from past disasters.

Results: ICPs' role in disaster preparedness and response is essential, even in noninfectious disease emergencies. Infection control issues in shelters, such as overcrowding, foodborne illness, lack of restroom facilities, inadequate environmental cleaning procedures and products, difficulty assessing disease outbreaks in shelters, inability to isolate potentially contagious patients, and too few hand hygiene supplies can contribute to secondary disease transmission. Other important topics on which ICPs need to be trained include surge capacity, employee health and safety, incident command system, educating responders and the public on disaster preparedness, addressing changing standards/recommendations, and partnering with public health. ICPs need quick reference materials, such as checklists, templates, tool kits, and algorithms to better equip them for disaster response.

Conclusion: Infection control must continue to partner with public health and other responding agencies to address gaps in disaster planning. (Am J Infect Control 2007;35:374-81.)

In 2005, the United States experienced 5 disasters that cost more than $1 billion each in damages and made it the second highest year in terms of the number of natural disasters occurring in a single year.[1] Similar experiences have occurred around the world in the past few years. Natural environmental disasters, such as Hurricane Katrina in the United States and the tsunami in Asia; infectious disease disasters, such as the

2001 anthrax bioterrorism incident in the United States; plus the outbreak of severe acute respiratory syndrome (SARS) in Canada and other countries have illustrated the tremendous medical, social, and economic impact a disaster can have on any country.

Historically, infection control professionals (ICP) have responded to health care-associated infections and public health infectious disease outbreaks. Beginning in the late 1990s, many ICPs expanded their role to become involved in bioterrorism preparedness planning.[2] Some recent disasters occurring in the early 21st Century, such as SARS and Hurricane Katrina, have illustrated the importance of ICPs becoming involved in planning and response for all types of disasters to decrease secondary morbidity and mortality. ICPs who have experienced disaster response have not been assessed in terms of the lessons they have learned, gaps they perceive in disaster preparedness, and their perceived priorities for future emergency response training. These ICPs' experiences should be assessed, and their lessons learned should be incorporated into development of reference materials and future training for ICPs.

The purpose of this study was to evaluate ICPs' perceived needs related to disaster planning topics and products required for education and reference materials. Specific aims of the needs assessment included

the following: (1) to determine disaster-related education products or reference materials, (2) to prioritize disaster preparedness topics for future ICP training and reference materials, and (3) to determine lessons learned from past disasters.

METHODS

The authors developed the questions for this study. All members of the Association for Professionals in Infection Control and Epidemiology, Inc. (APIC) who were registered for the 2006 National APIC conference were invited to participate in the focus groups, regardless of age, race, gender, or work location (within or outside the United States). The only inclusion criteria were attendance at the 2006 APIC conference and participation in a disaster response in the past.

The authors recruited potential participants via phone calls and e-mail. One focus group met each day in a meeting room located in a hotel near the conference site on June 11, 12, and 13, 2006. A meal was provided to the participants as an incentive for their participation. The Nominal Group Method was used to elicit information on the topics of interest.[3] The focus group method of using opening-ended questions was used to elicit details from participants' experience with disaster response as to why those categories were chosen and lessons learned from past disasters.[4] Participants were informed that information collected would remain anonymous and that all responses were voluntary. Focus group sessions were audiotaped, and the tapes were transcribed verbatim. Content analysis included identifying, coding, and categorizing participants' response to the questions of interest. In addition, major themes that emerged were identified and categorized. Quotations that characterize the major themes are reported. The words enclosed in brackets of the quotations are used to explain the respondents' quotes and are not the participants' words. Subjects' demographic data were obtained for descriptive statistics. The institutional review boards of St. Louis University, National Naval Medical Center, and University of Louisville approved this study. APIC Headquarters funded the costs of the focus groups and audiotape transcription.

RESULTS

All 2035 individuals registered for the APIC 2006 Annual Educational Conference were contacted. Thirty-two participants took part in the 3 focus groups: the first focus group had 15 participants, the second had 6, and the third had 11. A description of the participants' demographic characteristics is reported in Table 1. Focus group participants reported that they resided in

Table 1. Demographic characteristics of focus group participants

	n (%)
Type of disaster to which participant responded*	(N = 32)
Power outage	17 (53.1)
Hurricane	16 (50.0)
Anthrax 2001 bioterrorism incident	10 (31.3)
Flood	10 (31.3)
Emerging infectious disease outbreak	9 (28.1)
Fire	7 (21.9)
Airplane or multicar crash	4 (12.5)
September 11, 2001, terrorist events	3 (9.4)
Bombing	2 (6.3)
Building collapse	2 (6.3)
Earthquake	2 (6.3)
Tsunami	1 (3.1)
Other	3 (9.4)
Work setting	(N = 32)
Hospital	22 (68.8)
Public health	4 (12.5)
Other	6 (18.8)
Hospital bed size	(N = 22)
≤100 beds	1 (4.5)
101−250 beds	4 (18.2)
251−500 beds	12 (54.5)
501−1000 beds	2 (9.1)
≥1001 beds	3 (13.6)
Sex	(N = 32)
Female	29 (90.6)
Male	3 (9.4)
Age, yr	(N = 32)
30–39	2 (6.3)
40–49	6 (18.8)
50–59	14 (43.8)
60–69	10 (31.3)
Highest education level	(N = 32)
Associate's degree	1 (3.1)
Bachelor's degree	14 (43.8)
Master's degree	16 (50)
PhD	1 (3.1)
Employer type*	(N = 32)
Not-for-profit	15 (46.9)
Government	11 (34.4)
For profit (private)	8 (25)
Other	1 (3.1)

*Participants could choose more than one option for this question.

15 states from across the United State; 2 participants were from Canada, and 1 participant has worked in multiple countries. Twenty-five participants (78.1%) are certified in infection control. The participants reported that they had been involved in responding to a variety of types of disasters ranging from power outages and floods to terrorism and infectious disease emergencies; most (75%, n = 24) had been involved in the response to multiple events.

The participants identified many types of education products/reference materials needed for future disaster response and disaster preparedness education topics on which the participants believed that ICPs

Table 2. Education products/reference materials needed for future disaster response

Topics that require development into quick reference materials
Infection control preparedness needs by department
Personal protective equipment requirements for disasters (signage, just-in-time training, fit testing, alternatives)
Supplies needed for disaster response
Immunizations specific to disasters
Infection control needs related to disasters
Infection control for shelters
First aid
Incident Command System (ICS) job action sheets
Infectious disease identification software and paper versions that include treatment and management information
Environmental decontamination
Management of patients and facilities in a bioevent
Types of quick reference tools/materials needed
Planning templates with supply lists
Templates for tiered contact information
Checklists, "cookbook"/tool kit tools
Scenarios with solutions/algorithms
Planning chart
Bullet-style flyers
Pocket-sized references
Drug reference book
Handheld personal digital/data assistants (PDA) that do not require electricity
The Red Book (ie, pediatric infectious disease reference book)
Infectious/communicable disease reference book

Table 3. Disaster preparedness education topics on which ICPs need to be trained

Education topics identified as most important for future ICP training
Mass casualty preparedness issues
Mass casualty response
Surge capacity
Disaster recovery issues
Basic disasters and solutions for response
Protection of clinics/ERs/alternate care sites in "field" conditions (out in open, under tarps, and others)
Communication/reporting structure issues
Responding agencies' roles in disaster response
Incident Command System (ICS)/Hospital Emergency Incident Command System (HEICS)
Working with partners/stakeholders
Infection control concerns
Infection control for alternative care sites
Infection control surge capacity (ie, alternative isolation, cohorting, and others)
Infectious disease issues during natural disasters
Physical plant/utilities/basic needs
Maintaining utilities and basic needs during disaster response
Environmental concerns in the physical plant (ie, mold remediation, sewage, water, and others)
Education
Just-in-time training
Rapid public education on infection control/infectious disease issues
Miscellaneous
Employee health during disasters
Responding with limited resources

need to be trained. The education products that received the most votes during the Nominal Group Method portion of the focus groups are outlined in Table 2. The education topics that received the most votes during the Nominal Group Method portion of the focus groups are outlined in Table 3. In addition, a number of themes emerged from the focus groups related to emergency preparedness issues encountered in previous disasters.

Infection control issues in community-based shelters

One of the most frequently cited topics of importance to disaster planning was the need for better infection control in community-based shelters. Focus group participants from a variety of types of disasters indicated that infection control was lacking in crowded shelters and that this contributed to secondary disease transmission.

"Infection control in shelters is important. We had a child in a shelter in Alabama, not [Hurricane] Katrina, but prior to that, with meningitis, and they'd been there for several hours, and no one realized they had been there. We needed fast treatment [to prevent secondary spread]… and there were outbreaks of diarrhea [in the shelters]."

"When they set up these shelters, they really don't have any idea about what they're going to do for hundreds and hundreds of people [to accommodate] handwashing and [provide] restroom facilities."

Focus group participants listed some specific infection control issues that must be addressed in shelters, such as overcrowding, foodborne illness, lack of restroom facilities, inadequate environmental cleaning procedures and products, difficulty assessing disease outbreaks in shelters, inability to isolate potentially contagious patients, and too few hand hygiene supplies. By far, lack of hand hygiene supplies or the inability to perform hand hygiene was the most frequently cited infection control issue in community-based shelters. ICPs recommended that disaster planners arrange to have a dedicated individual(s) for hand hygiene and infection control in alternate care sites:

"[In disasters] there ought to be people that are just responsible for hand hygiene. I know we talk about it in the hospitals, and we push it, push it, push it, but really in a disaster… hand hygiene is probably the most important thing."

Real-time assessments and surveillance

ICPs stressed the need to perform real-time assessments during disaster response, including general disaster response needs as well as disease surveillance.

"In shelters and out in the community, [you need to] go and see: do they need food, do they need child care, do they need deceased care? You know, what do they need? Do they need an ambulance to get someone to a higher level of care?"
"You have to come up with a list of what everyone needs to run a clinic. How many bottles of disinfectant do we need, how are you going to mix it, where are you going to store it?"

ICPs also discussed the difficulty in assessing disease outbreaks during disaster response, even in noninfectious disease emergencies.

"You know the thing about disasters is that you see a lot of diseases that you don't get normally."
"One of the major problems I had immediately post [Hurricane]-Katrina, was trying to assess exactly what were my problems, because I was trying to [assess] all these ER [emergency room] patients, through the influx."
"Surveillance… has to be on-going. For us, we had 4200 evacuees from New Orleans that came [to our area], and, very shortly after they came, we started experiencing gastroenteritis among them. It spread into the health care workers,… the people who were managing the clinic, the evacuation center. [We needed] to dig out from what the surveillance told us [about what was going on] and try to get everybody back on track."

Surge capacity

Many focus group participants stated that they and their hospital/facility are "extremely concerned about surge capacity."

"Well, for [our area], hospitals are already at capacity. There's not a hospital in my city that has the room to take people into it if there's a disaster."
"We were a small hospital, and we literally had to go into lockdown [after the disaster struck]. We had to be conservative in who we took; otherwise, we would not have been available at all."

Staff surge capacity

One component of surge capacity that was stressed was staff surge capacity or the ability of a facility to have sufficient numbers of staff to handle an influx of patients. Comments such as "staffing is going to be a major issue" illustrated the importance of this issue to participants. The number of available staff was

mentioned as contributing to a facility's ability to stay open and provide patient care or halt routine procedures to accommodate disaster victims.

"The biggest [problem] I've seen [after a disaster hits]—and I've responded to many different kinds [of disasters]—is the staff wanting to leave. So your facility staff has just gone home to do something for their home, or to be with their family, and your nurses are trying to get out the doors, and only a basic crew is remaining… so how do you continue with your current, everyday operations when your staff just left?"
"[Surge capacity is] a big issue because we've got to switch over to responding to the disaster and then which of our routine services can we stop, and when do we need to restart those services?"

The issue of staff surge capacity was most evident in infectious disease disasters, such as the 2003 SARS outbreak.

"Lack of staff [during the SARS outbreak] was a [major issue], because staff didn't want to come in… because nobody knew what [was going on], except we had this unknown bug that was killing people and quite a few actually: 44% of the positive Corona virus [infections] were in health care workers. So we were really having to deal quite a bit one-on-one with the staff [to convince them to stay], and we were there pretty long—24 hours of the day."

However, staffing became an issue anytime a communicable disease outbreak occurred during disaster response. One participant described the difficulty in getting staff to go work at a community-based shelter after an outbreak of gastrointestinal disease had been detected there:

"[We had to make] sure that people were willing to go back to the center after they heard about the problems we were having [with the outbreaks]. [The staff] were thinking, 'You go in there, you're going to get sick.'"

Employee health and safety issues

Focus group participants discussed the importance of monitoring and managing employee health and safety issues during disaster response. Doing so will have the advantage of maximizing staff surge capacity by keeping staff able to continue working without contributing to secondary disease spread. ICPs mentioned a number of employee health issues, such as monitoring staff's mental health, holding daily staff meetings to communicate how they were doing, providing adequate time for rest and sleep, having appropriate

personal protective equipment, and ensuring food safety. One important component of employee health and safety is to teach staff to protect themselves before attempting to rescue disaster victims. As one participant explained, "You have to take care of your staff. [Sometimes] you have to stop what you're doing, which [in our case] was evacuating patients [from flooded areas], because… the staff was getting injured." If health care staff does not protect themselves before entering a potentially dangerous situation, "you've got more casualties than when you started." Another participant described a situation in which a physician could have potentially harmed himself by not following the appropriate procedures during a response to a possible anthrax incident:

> "The doctor had some white powder on himself because he wasn't following the right protocol, and he didn't know what he was supposed to ask or do… so he said [to the patient] 'Let me see,' and then he got [the powder] on himself."

Employee health and safety includes the need to monitor staff for development of infection during an infectious disease emergency. Infected staff can contribute to secondary spread of disease and should be furloughed if they develop signs of infection. One participant described the challenge of monitoring and managing staff for infection, especially during disaster response when staff shortages are common.

> "[For] pandemic flu [planning]… they're talking about how do you evaluate the nurse who arrives for his or her shift febrile…[and even more challenging] is what I'm hearing about influenza… 30% to 50% of people who are contagious are asymptomatic. You're going to be short staffed to start with, and now you've got a febrile nurse. So you call the employee health nurse, and what happens next?"

One ICP described her hospital's procedure for monitoring and managing staff during the 2003 SARS outbreak:

> "We actually had somebody at the door [of the hospital], every single door, or port of entry into our facility… and we have a 1500-bed facility… so at every entrance it was either locked, or there was somebody there monitoring [people]. They took everybody's temperature coming into the facility. If you were febrile, you went home. No ifs, ands, or buts about it. You went home."

Chain of authority/command

Focus group participants discussed many problems and challenges related to the chain of authority in

disaster response and use of the incident command system (ICS). Problems included a general lack of knowledge or experience with ICS, inability of responding agency leaders to function within ICS in noncommander positions, and reluctance on the part of individuals in command positions to make decisions. Comments such as, "I think that incident command is not very well-known or understood in general outside of [first responder groups]" indicated that participants feel that hospital and public health staff needs additional training on ICS. A frequently heard complaint was the difficulty of trying to function within the ICS when responding agency leaders were assigned to noncommander positions. This led to mixed messages being communicated to staff and general confusion because no one knew who was in charge. This problem was mentioned in relation to a variety of disasters.

> "We had the major blackout in New York City, and … nobody knew who to answer to, nobody knew who was responsible, who was in charge."
> "I think it all goes back to … the chain of command, and who really is in charge. If you don't know who's in charge of your facility and 3 people are trying to make a decision and they each have their own little miniagenda [it's confusing]. … D.C. is a phenomenal example of [a jurisdiction with many responding agencies] … there's many, many, many chiefs."
> "[After Hurricane] Katrina … everybody wanted to be in charge, but then when they were in charge, nobody knew what they wanted to do."

Although the ICS is intended to streamline disaster response communication and reporting, focus group participants pointed out that it only works when staff know the system and everyone follows the system appropriately.

Participants also discussed the advantages to the ICS and the importance of being in compliance. They stressed that responding agencies should be educated regarding why they need to follow the ICS. One participant suggested explaining the financial appeal of following ICS to a facility to get everyone on board:

> "If you don't ask for [supplies from] logistics [within the ICS], if you don't go through your local emergency management agency to ask for any resources [you need], then you lose any hope of even applying for federal disaster reimbursement."

Education

Focus group participants discussed many education topics on which ICPs should be trained; these topics are outlined in Table 3. Comments such as "[The training]

is going to depend on the type of disaster it is … one size doesn't fit all," and "biological casualties … [are] very different [from other disasters]. … You have very different issues altogether" indicated that participants believe that there are some topics that are specific to infectious disease emergencies and that ICPs should be trained on these.

Focus group participants frequently mentioned "just-in-time" training as vital to an effective disaster response. Participants indicated that all responding staff will require some level of training during the disaster response, but they also stressed that disaster planners need to "think outside the box" in terms of the groups for which they plan just-in-time training. One participant described it in this way:

> "It's not going to be health care workers that we're going to be 'just-in-time' training with, it's probably going to be college students … so they can train the other volunteers. Or it … may be families teaching families how to care for each other."

Participants indicated that just-in-time training can improve disaster response by decreasing dependency on the health care system, allowing health care to focus on the truly ill victims. They also stressed that it must involve public service announcements and should be coordinated through the ICS' public information officer. These announcements should include information on "what is recommended, [whether people should] shelter in place … whether [people should] go to the ER or not." Participants felt that communicating this information and training to the public will prevent "10,000 people [from] … show[ing] up at your hospital."

Focus group participants stressed that it is important to have education or reference materials that do not rely on electricity because power outages may occur after disasters. They emphasized that disaster responders need education or reference tools that are "rechargeable in some way other than electricity," such as a personal digital assistant (PDA) that uses batteries. Another option suggested by focus group participants was to have paper versions of reference materials and notebooks for recording information. One participant described it this way:

> "When we thought [Hurricane Katrina] was coming, we started bringing a bunch of notebooks, and we walked out the door with those, and then we were out of power for weeks. Those notebooks were the only things we had… ."

Partnering with public health

Focus group participants discussed the importance of ICPs partnering with public health in disaster preparedness because ICPs are often the liaison between public health and hospitals in a community. Participants indicated that establishing a partnership between hospitals and public health enhances the entire community's ability to respond more effectively during a disaster. ICPs who had responded to various types of disasters mentioned this lesson learned.

> "I think we learned from the last hurricane that [infection control's] interface with the county health department is so important. They become your best friend. I think that's a huge lesson, and I think that if we learned nothing else from that hurricane, we learned that."
> "I think it's critical that both [infection control and public health] get together and start way up front, knowing who the people are that are working at the Health Department in the kind of areas that are going to affect you, and we in health departments have to find our partners in the private side, so we get [disaster planning] done up front, and we know each other and we plan together."

ICPs also stated that partnering with public health would bridge gaps in public health's knowledge of infectious disease emergency planning and foster the reciprocal sharing of information. ICPs felt that some public health professionals "are not very well trained" on communicable disease issues "because they're so stretched in everything they have to cover, they don't necessarily have the expertise in infection control and infectious diseases in all of the public health departments across the country." One participant stated that public health frequently calls their hospital during a disaster and asks, "Can you help us out with what we should tell the public about this and this and this?"

ICPs felt that they should share their expertise of infection prevention and control knowledge with public health, which would result in a better prepared community. Shared training and participating together in disaster exercises were mentioned as 2 ways that ICPs could share information and education with public health. Participants indicated that working together through disaster exercises and training programs would strengthen the relationship between public health and ICPs. One participant described it in this way: "[Training and exercising together] made everybody on the same level, and everybody gets along better now after that."

Changing and/or different standards

One challenge participants identified that was unique to infectious disease emergencies was the difficulty in maintaining staff compliance and trust in the

face of changing practice recommendations/standards. This was most evident in infectious disease emergencies involving a new agent (such as SARS) or in a new situation (such as anthrax used in a bioterrorism attack as opposed to naturally occurring disease). ICPs indicated that disasters involving an element of the unknown and frequent changes to practice as likely to create an evolution of fear and mistrust in health care workers and first responders.

> "[My facility] is still trying to get rid of [chemical decontamination] suits. That's what we used [to respond to] SARS, because on Easter Sunday that was the only piece of equipment that we could get a lot of in a very short period of time. So of course [now] we have these [chemical decontamination] suits—which aren't used for infectious diseases—and we're trying to educate [our responders why they aren't necessary] and of course our unions, and everybody [is] saying 'Well, we're not going to be protected because now you're taking this piece of equipment away from us.' Three years later, this is what we're dealing with."
> "It's difficult to change health care workers' way of thinking. [They think], 'Well, we [wore N95 respirators for patients] with SARS'… and now it's very difficult to try and say, 'well, [you don't need to do that anymore]; you are protected with this [surgical] mask.'"

Focus group participants indicated that the fear of a potential avian influenza pandemic is causing many education and planning challenges in their facility and community. One of the biggest challenges is related to the unknown mechanism of transmission for avian influenza, resulting in conflicting guidance that has been released and the recommendation to change isolation precautions midway during the response to an outbreak.

> "The California plan [for responding to avian influenza] actually says, 'While we are not sure we're going to use N95s [early in the outbreak] … once we're sure [how it is transmitted], then we're going to use surgical masks.' I just can't wait to see how our health care workers are going to take [the changing standard]."
> "The first responders are also a concern [in planning for avian influenza] because they want to [wear] the full Hazmat [gear]. They look at [avian influenza] as an unknown. I've been saying to them, 'What do you do during seasonal flu?' And [they respond], 'Nothing!'"

Focus group participants stressed that changing recommendations and standards also have legal and

ethical considerations. The general public does not always understand why medication recommendations (such as postexposure prophylaxis for anthrax) change, and this can be interpreted as discrimination in that it appears that health care and public health are providing a lower standard of care for different victims. One participant described the challenges and potential legal consequences of changing recommendations/standards midway through disaster response this way:

> "It became a real issue after [the 2001 anthrax bioterrorism attack] with the lawsuits that we had. Lawyers said, 'Why did you do this, why did you do that?' It was all very confusing."

Another participant described the difficulty in providing adequate follow-up care for victims when the recommendations change midway through the response:

> "Our physicians got really aggravated with [changing standards] because we had 3000 people [affected], and 100 of them would come to the hospital at a time [for treatment] and then they go back to their facility … and you have a health department come in and they would change the regimen and it was impossible to follow-up on [earlier cases]."

DISCUSSION

The focus group discussions provided several important findings. Information provided by the focus group participants highlights a number of educational/reference materials that are needed for future disasters. Most of these consist of quick reference materials, such as checklists, templates, charts, tool kits, and algorithms. Participants recommend that these materials be available in paper versions or electronically using products such as PDAs that do not require electricity so that they may be accessed during times when electricity is not available. Participants also provided a list of educational topics for ICPs. Mass casualty incidents, infection control during disasters, communication, incident command, physical plant needs, improving health care worker basic knowledge of how infectious organisms are transmitted, and business continuity issues were all identified as being essential training topics.

ICPs' role in disaster preparedness and response is considered to be essential, regardless of whether it is an infectious disease emergency, such as outbreak of an emerging infection or bioterrorism, or a natural disaster such as a hurricane or earthquake. Although ICPs are essential to disaster preparedness and response,

ICPs indicate that participation is not always easy. ICPs' role in disaster response can be complicated by a lack of supplies, inability to conduct real-time surveillance, difficulty in communicating information between facilities, too few staff, need to provide training to non-health care individuals, and challenges in functioning within the ICS. Disasters involving an element of the unknown, such as an outbreak of a new or reemerging pathogen, increase the difficulty in response. Changing standards and recommendations must be communicated carefully to prevent mistrust among the staff and/or the general public. Failure to do so can impinge on a facility or community's ability to mount an effective disaster response.

Another notable finding from this study is that even natural disasters can result in significant public health crises if infection prevention and control strategies are not implemented rapidly and appropriately. Infectious disease outbreaks following disasters can devastate a community, and ICPs' expertise is needed to help prevent secondary spread within alternate care sites as well as their facility. To be most effective, ICPs need to partner with public health professionals in their region before a disaster and establish strong linkages between hospitals and community agencies. These partnerships can strengthen facility preparedness and maximize a community's ability to respond to a disaster. They should also result in stronger health care and public health systems by strengthening surveillance, communication, and basic infection prevention and control needed for day-to-day duties as well as disaster situations.

Overall, the focus group method of inquiry served as a valuable tool in eliciting rich, detailed information about ICPs' opinions of lessons learned from past disasters. Structured surveys with closed-ended responses opposed to the open-ended questions used in this study may have revealed different opinions about references materials needed for future disasters and educational priorities for ICPs. It is not known whether the ICPs who chose to participate differed from those who were eligible but chose not to participate. It is also not known whether ICPs who have no experience with disaster response may have provided different answers compared with experienced ICPs in terms of preferred training topics and reference materials. However, this study was designed to elicit information from those who have responded to an actual disaster to identify gaps in preparedness in real situations rather than simulated events in disaster drills.

CONCLUSION

ICP preparedness for all types of disasters, especially infectious disease emergencies, has become essential. This study identifies lessons learned from past disasters and highlights gaps in disaster preparedness most in need of being addressed: infection control in mass casualty incidents, behavioral health issues, communication, incident command, and maintaining quality of care in suboptimal situations. Disaster planners must continue to address gaps in disaster preparedness. One way to accomplish this is through the creation and distribution of ICP-specific educational tools and reference materials for disaster preparedness and response. The topics identified by experienced ICPs should be used as the basis for these new educational initiatives.

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