**Decontamination with At-Risk Populations: Lessons Learned**

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**Citation**


**Abstract**

“At-risk populations” are often excluded from emergency preparedness plans, despite their increased vulnerability. In August 2007, Sinai Health System (Chicago, IL) conducted a field exercise, a decontamination drill which incorporated people with physical disabilities, who are Deaf, and/or who have limited English proficiency. The planning team included staff from these populations. Three main adaptations were made to the decontamination plan: the use of accessible equipment for non-ambulatory individuals (as appropriate), the inclusion of sign language and Spanish interpreters as decontamination staff, and the addition of physical therapists to the decontamination team. This article details what changes we made to our decontamination plan, how well each change worked, and the additional suggestions provided by participants on how to improve the process in the future. We share our lessons learned and recommendations for future disaster planning.

**INTRODUCTION**

Recent events, both within the United States and internationally, highlight the importance of having procedures in place regarding decontamination of hazardous materials. Yet as these essential plans are being developed, a large percentage of the population is excluded from their benefits. In the United States, the majority of emergency plans are created for individuals who can hear, speak, and understand English and who have the ability to walk, run, or drive as directed. There are, however, large segments of the population who cannot do one or more of these things and are consequently more vulnerable when disasters occur. Emergency preparedness plans must include at-risk populations, and thus account for the full range of individuals who may be part of an actual disaster.

Based on our commitment to provide excellent care, Sinai Health System (2006) in Chicago, Illinois developed a team to review its Hazardous Materials Casualty Response Plan (Haz Mat plan). Our team reviewed each step in the plan and considered its implications for three at-risk populations. The populations chosen were:

- Individuals who are Deaf and whose primary language is American Sign Language (ASL)
- Individuals with a physical disability whose primary language is English
- Individuals (with or without a disability) whose primary language is Spanish and who have limited English proficiency.

We selected these groups because they reflect the at-risk groups mostly likely to arrive at Sinai during an actual emergency; they are a substantial part of our patient population. The revised Haz Mat plan was tested through a field exercise: a decontamination drill was held on August 1, 2007. The scenario in this drill was the release of anthrax within a contained area. Individuals from all three populations listed above, as well as a comparison group of people who do not have a physical disability and are fluent in English, participated in the drill. Following “decontamination,” participants engaged in individual...
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interviews and focus groups. This article details what changes we made to our Haz Mat plan pre-exercise, how well each change worked, and the additional suggestions provided by participants on how to improve the process in the future.

BACKGROUND

Decontamination is a systematic process of removing or neutralizing harmful materials. While the United States has little experience in reacting to mass exposure to chemical terrorism agents, the sarin attack on the Tokyo subway system is just one reminder that such an event can occur.

The needs of people with disabilities and non-English speakers are often not considered in disaster planning. The National Council on Disability cites a “wealth of disaster related anecdotal accounts from the disability community” including:

- Minnesota residents evacuated following 1997’s floods were provided with temporary housing, but stairs to enter and exit the homes made them inaccessible to persons who use wheelchairs.
- A 2002 survey of emergency shelters in Texas showed that while 77% believed they were accessible to people with disabilities, only 47% truly were.
- In 2003, a lack of closed captioning prevented people who are deaf or hard-of-hearing from receiving evacuation notices related to California wildfires, nor could they hear announcements broadcast from police patrol cars.

In 1990, the United States Congress passed legislation known as the Americans with Disabilities Act, or ADA. This law guarantees equal opportunity for individuals with disabilities in government services, public accommodations, employment, transportation, and telecommunications. Executive Order 13347 was signed by President Bush in 2004, calling for “a coordinated effort among Federal departments and agencies to ensure that the Federal Government appropriately supports safety and security for individuals with disabilities in all hazard situations.” The U.S. Congress later passed the Post-Katrina Emergency Management Reform Act of 2006. This legislation calls for disaster procedures for “informing the public evacuation plans before and during an evacuation, including individuals with disabilities or other special needs; with limited English proficiency; or who might otherwise have difficulty in obtaining such information” (p. 1407). Furthermore, it prescribes incorporating the needs of these individuals into all areas of disaster planning. However, while many emergency plans make reference to people with disabilities, “sorely lacking is any consistency of approach, depth of planning, or evidence of safeguards and effective implementation.”

As both a matter of principle and law, people with disabilities deserve these services and should not be left behind during an emergency.

Organizations such as the National Council on Disability and the Research and Training Center on Independent Living offer recommendations for incorporating at-risk populations into emergency preparedness plans. Planners must remember that there are a variety of disabilities and that individuals with disabilities have a wide range of strengths, abilities, and needs. For example, a person with a spinal cord injury will generally be able to follow directions easily, but perhaps cannot stand in the shower. A person who is Deaf probably can stand independently, but may need assistance in understanding what to do. Interestingly, by addressing the needs of people with disabilities, the needs of other individuals are often met, providing a universal benefit. For example, signage in English may be reduced to simple terms in order to better assist people who use ASL as their primary language; English speakers with limited literacy skills also benefit from the less challenging vocabulary.

The inclusion of people with disabilities in both the planning process and drills is essential. One method of achieving this inclusion is the use of “disability specific advisors” in the creation of disaster plans. These advisors are individuals who have disabilities and therefore possess a “user’s
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perspective,” but also are knowledgeable about accessibility issues that encompass a wide range of disabilities. Disability advisors often keep initiatives focused on the strengths and abilities of people with disabilities. Many hospitals and agencies, including Sinai Health System, hire disability resource coordinators who possess a wealth of knowledge regarding community services for people with a range of disabilities. Their inclusion in preparedness planning is highly recommended.

The benefits of including people with disabilities were evident in a terrorism drill conducted in 1997 by the New York City Office of Emergency Management. While previous drills had included actors who held cards saying “blind,” “deaf,” etc., this drill included people with disabilities, revealing several new issues. Issues identified included “wheelchairs, glasses, and canes that were not decontaminated; triage procedures were handled improperly in regard to people with disabilities; no identification mechanism was in place resulting in delayed care; mobility issues with regard to tyvek suits; unclear handling of service animals; and problematic communication as interpreters were delayed…. The most critical finding, however, was the re-contamination of the cold zone (safe area) because of the ineffective response protocol to individual auxiliary aids (i.e., wheelchairs)”.

The inclusion of people with disabilities is vital to the success of a plan. Lastly, it is important to note that disasters happen locally, and there are a variety of factors that have an impact on emergency preparedness plans. As noted by Davis and Mincin, issues of race, economics, and inequity of services can affect how a disaster plan is implemented.

METHODS

The general purpose of this research project was to gather information on how well our health system’s current Haz Mat plan worked for these three at-risk populations and how it could be improved for the future. This data encourages our system to engage in an emerging best practice: “to create an extensive approach to addressing the needs of persons with disabilities” in its emergency plan. We included disability-specific advisors in the planning team: staff who are Deaf, speak Spanish, and/or have a physical disability. Our team implemented three key adaptations to the standard Haz Mat plan:

- The addition of Spanish and ASL interpreters to the decontamination team, in order to increase communication between staff and participants who do not speak English.
- The inclusion of four physical therapists in the decontamination team, in order to help people with physical disabilities move through the decontamination corridor as effectively and efficiently as possible.
- The use of accessible equipment in the decontamination process, including low-wall stalls and shower chairs. Standard equipment in decontamination includes showers with edges of 12 inches or more, which must be stepped over; we chose to purchase a stall with edges of less than 9 inches. Additionally, standard decontamination practice is to place non-ambulatory persons onto backboards and then to place the backboard on sawhorses or to use a roller system platform. Our planning team believed that, as appropriate to the individual, the substitution of shower chairs for backboards would increase the self-efficacy of participants who can ambulate with the assistance of mobility devices. We also had waterproof, nonporous gait belts available for use by the therapists.

We believe that this drill was an ideal test situation for these new methods. (See Figure 1.)
Figure 1

Figure 1: A shower chair. Individuals who are non-ambulatory but are able to sit independently can transfer to a shower chair, rather than lying down on a roller belt. Because the chair has wheels, staff can roll patients in and out of the shower.

By garnering feedback from the participants post-drill, we are following the advice of the Research and Training Center on Independent Living¹, for we are now able to include the suggestions of people with disabilities and non-English speakers in the planning process for future drills or emergency situations.

SETTING

Sinai Health System includes Mount Sinai Hospital and Schwab Rehabilitation Hospital. Mount Sinai Hospital is a Level 1 Trauma Center and teaching hospital. Schwab Rehabilitation Hospital is a physical rehabilitation hospital that serves persons with disabilities. Both are located on the west side of Chicago, in an inner-city community whose residents experience a host of poverty-related problems, including high unemployment, low educational attainment, and substandard housing. Services are provided primarily to patients who are African-American (46.2%) and Hispanic or Latino (47.8%). Spanish interpreters are readily available to assist patients with limited English proficiency.

Sinai Health System’s Deaf Access Program offers a broad range of medical, mental health, and support services to deaf and hard of hearing patients. Three of the primary care physicians and three of the behavioral health clinicians are proficient in American Sign Language (ASL) and are aware of the important aspects of Deaf culture. Sign language interpreters are available on-site to assist with specialty services.

PARTICIPANTS

As stated above, there are many different types of disabilities, and even more types of populations who can be considered “at-risk.” We identified our three target groups by examining Sinai Health System’s patient population and determining which populations were most likely to come to Mount Sinai Hospital in the case of an actual disaster. We identified three groups of individuals:

- Individuals who are Deaf and whose primary language is ASL
- Individuals with physical disabilities
- Individuals who speak Spanish and speak little or no English

Research staff determined that only adults, ages 18 and over, would serve as participants. We chose to include participants who fit multiple requirements for the target groups; for example, a person may have a physical disability and either speak Spanish or be Deaf. These participants were asked to provide input both as individuals with limited English proficiency and who have a disability. Additionally, we included a comparison group of individuals who are fluent in English and do not have a disability. We purposefully focused on these groups of individuals and the issues related to their strengths and needs, yet we acknowledge the many groups of individuals we are not including. For example, we did not include service animals. We concentrated on the three groups of at-risk participants who are most likely to arrive en masse at our hospital in an actual emergency, and call upon other researchers to support our efforts and develop strategies for other populations.

In order to find participants, fliers were posted throughout Sinai Health System and the information was posted electronically on the Deaf Illinois listserv. We distributed
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fliers to individuals who fit the criteria for one of the target populations, which is how the majority of participants were identified. Snowball sampling was also utilized; we encouraged participants to bring family or friends who met the inclusion criteria.

Participants in this study were not current inpatients of Sinai Health System, although many had previously received services. The race and ethnicity of participants generally reflected the hospitals’ patient population, although there was a disproportionate number of people of Hispanic or Latino origin, due to the inclusion of the Spanish-speaking group. Fifty-three percent of the participants identified themselves as “Hispanic or Latino”, 29% percent identified as “African American or Black” and 18% as “White”. Fifty-three percent of the participants were male and 47% were female. In total, 45 individuals participated, including:

- 14 individuals who were Deaf, two of whom were deaf-blind
- 13 individuals with physical disabilities who are fluent in English
- 10 individuals with limited English proficiency (monolingual Spanish speakers), including 5 individuals with physical disabilities
- 8 individuals who did not have a disability and who are fluent in English (i.e., the comparison group)

DATA COLLECTION METHODS AND MEASURES

For this research study, participants were asked to participate in a mock decontamination drill. They then engaged in brief individual interviews, followed by hour-long focus groups. All data was gathered in the participant’s primary language. Four focus groups were held: one in Spanish, one in ASL, one in English for people with disabilities, and one in English for the comparison group (e.g., those without disabilities).

We asked participants to report to Mount Sinai Hospital with their swimsuits under their clothes; swimsuits were available as needed. After all paperwork was completed, we escorted participants to the entrance of the Decontamination Corridor (Decon Corridor). The Decon Corridor consisted of three areas: the Hot Zone (the most contaminated area), Warm Zone (the showers), and Cold Zone (the safe zone, where people went once they were decontaminated). Participants entered through the Hot Zone and were greeted by the Decon Unit Leader, who instructed the participant on decontamination procedures. An interpreter was available as needed. Participants were directed to strip off their “contaminated” clothes (i.e., down to their swimsuits). They put their belongings into a bag which staff simulated placing in biohazard containers. Participants then traveled to the Warm Zone, where they were given dish soap and a brush and directed to shower for approximately five minutes. They were instructed to avoid getting “contaminated” water in their eyes, nose and mouth and to wash head to toe, following OSHA protocol. As needed, participants with disabilities were given assistance with showering and removal of clothing. Physical therapists were supposed to be available to assist with transferring to and from the shower chair. (See Figure 2.)
Figure 2

Figure 2: A participant with quadriplegia is transferred to a rolling shower chair in order to begin decontamination. Decontamination team staff, wearing their PPE, will now push her to the shower.

Auxiliary devices (e.g., glasses, hearing aids) which were made of non-absorbent material were also decontaminated. However, aids with absorbent materials (e.g., canes with soft handles, wheelchair cushions) were set aside. After showering, participants were directed to the Cold Zone, where they received a towel and a Mylar blanket, and out of the Decon Corridor. Those individuals who use a wheelchair were transported using a hospital chair through the Cold Zone and away from the Decon Corridor. Unlike a real emergency, when patients would next be directed to triage, passage out of the Decon Corridor and into the hospital signaled the end of our field exercise.

Following the drill, belongings were returned and participants were given an opportunity to dress. Research staff then conducted a brief individual survey in the participant’s primary language. Demographic details were ascertained, as well as responses to two questions:

- Tell me about your experiences today.
- If you had to rate your experiences today on a scale of 1 to 10, with 1 being “a complete nightmare” and 10 being “very enjoyable,” how would you rate the decontamination process?

For those participants who had a physical disability and spoke English, we knew that we would be able to gather disability-specific information in their focus group, as described below. However, for individuals who spoke Spanish, their focus group would include people with and without disabilities. We therefore added the following two questions to their individual survey:

- What were your experiences regarding the equipment you use for mobility (wheelchairs, canes, etc.)? How did you feel about having to give it up? Please tell me what happened and how that made you feel.
- This question is just for people who use power chairs: In a real-life emergency, if you had to give up your power chair to go through the decontamination area and only manual chairs were available on the other side, would you go through? What factors would make you decide to go through decontamination? What could occur that would make you say, “No, I’m not going through”?
Following the surveys and lunch, we conducted focus groups in the participants’ primary language. (See Figure 3.) All groups were recorded using a cassette tape recorder and research staff took notes to increase accuracy. (Note: ASL interpreters voiced the conversation for the note-takers and recording.) The focus groups were scheduled to last one hour; the Deaf group lasted for 90 minutes. At the end of the session, each participant received $75 for participation in the drill and focus group.

All recordings were transcribed and reviewed by facilitators and note-takers to ensure accuracy. Data from the individual interviews was added to the end of the transcripts and noted as such. We first reviewed each transcript separately, looking for emergent themes. Initial coding focused on repetition; that is, “topics that occur and reoccur,” based on the understanding that “the more the same concept occurs in a text, the more likely it is a theme”25. Metacoding was then utilized to create a matrix, divided by participant groups, of quotes to the a priori themes. We conducted a constant comparative analysis of the matrix, seeking patterns of responses within and between the various groups26. In the spirit of Rooney and White27, we used this approach to compare how participants described an occurrence or a recommendation for future action. Following this quantitative content analysis, we analyzed the data qualitatively, using a symbolic interactionist approach. Based on the work of Blumer28, symbolic interactionism focuses on social interactions among people, action and response based on interpretation (rather than simple reaction), the use of symbols, and the sense of self as it is constructed through communication and interaction. Analysis concentrates on individualistic daily life and experiences, rather than large-scale societal processes29.

Figure 3

Table 1: Themes, Codes, and Definitions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Code Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>( Lack of) Understanding of what to do and where to go while in Decon Center; how staff creates (or does not create) this understanding</td>
</tr>
<tr>
<td>Disability Awareness</td>
<td>Recommendations for how communication can be improved (may be related to language, literacy, or environmental factors)</td>
</tr>
<tr>
<td>Differing Expectations</td>
<td>Explanations of how participants expected the decontamination process to look and feel and/or comparisons to Decon Center</td>
</tr>
</tbody>
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RESULTS

Using content analysis, three main themes emerged from the data: communication, disability awareness, and differing expectations. (See Table 1.) “Communication” included participants’ understanding of what they were supposed to do while being decontaminated, barriers to communication, language issues, and suggestions for improving communication in the future. “Disability awareness” included discussions of what staff did and did not do to properly meet the needs of participants with disabilities and recommendations for future plans. “Differing expectations” included how the actual process of decontamination was different than participants’ previous perceptions, the benefits they received by engaging in this study, and suggestions by participants on how this research data should be used and shared with other decontamination professionals. All three themes were tackled in each focus group, but how they were discussed varied, based on language and disability. Each theme is addressed below.
COMMUNICATION

Deaf: While two participants stated that “everything went smoothly” and “I enjoyed the experience. I was guided well without a problem,” the majority of participants had some difficulty understanding what to do or where to go at some point during the decontamination process. Two women were unclear while undressing: “I wasn’t really sure what was going on. I guess they just really threw me the bag and they didn’t explain what was in the bag and that I was supposed to take those things out and put my clothes in.” Others had difficulty while in the shower: “No one told me that I had to turn around. I actually had to volunteer and do that.” A few people felt more communication was needed to let them know how to move through the Decon Corridor: “I saw what happened with [name] and him being pulled in all directions, to the left and to the right, and kind of ‘maze-ing’ through everything. And, I felt sad for him because he didn’t know where he was going.” One suggestion was to “put us in a line. That would make it more organized and we would know to follow each other, and that would make it more clear for where to go and what to do.” Due to lack of communication, two participants were unsure of the effectiveness of the decontamination process itself, one person fearing that sponges should not be shared and another noting that staff “would probably scrub me harder and more intensely” if this was not a drill.

Participants also had mixed responses regarding one-to-one communication with staff. Two participants talked about the good humor and overall helpfulness of the staff, but two others were upset that they were not given ample warning before being sprayed with the water. (“The interpreter was not available. I didn’t know what to expect. No warning about water hose on my face. I had soap in my eye; it burned and stung.”) There were also mixed reactions to having interpreters available; while some people stated they were “glad the interpreter was there for communication access,” others were concerned that in an actual emergency, the interpreters might not be available, and wanted staff to be able to communicate without them. Four people encouraged the use of body language or gestures by decontamination staff. (“One thing that needs to be improved is that the first responders need to understand body language. Because there are not interpreters always available. And, so, for example, if they need to warn you about something or tell you to scrub your face, they could act that out.”) One person suggested posting signs to tell/show people what to do at various stages of the decontamination process.

Spanish: The majority of participants in the Spanish-speaking group stated they “more or less” knew what to do during decontamination, while one person was quite positive about the experience, stating “I think what they are doing is good...I understood it well.” When asked how sensitive the staff were to their needs as a person with limited English, all of the participants gave the response “more or less.” Some people indicated they would like more bilingual members within the decontamination team. One individual stated that “we need to cope with people that speak English and try to understand English;” yet added “in a real emergency, we hope there would be more people that speak Spanish.” Other suggestions for increasing communication included adding signs (“If this was a real situation, they should use signs in case we don’t understand the language.”) and hand signals (“they try to make us understand with signs, for example, ‘thumbs up’ to show you are ready for the next step.”)

People with disabilities: Eight people with disabilities who spoke English said they knew what to do during the drill, while two people indicated they “more or less” knew what to do, and one person said he had “no idea” what was expected of him. Of note is that of the three people who were unsure, two people had quadriplegia and therefore required more assistance throughout the decontamination process.

Members of this group discussed not only the idea that communication was difficult, but also about why it was so: “They did have difficulty speaking with those masks on. And it was loud!”

Several people commented on the need for communication in regards to disability. One member of the Spanish-speaking group who has paraplegia suggested that staff should “make eye contact with me to make sure I understand” and be “more understanding of people with disabilities.” Similarly, another participant requested that staff offer help as needed: “You’ve got to speak to the person. Communicate what’s going on.” One participant also stressed the need to warn people before spraying them with cold water, particularly in relation to having a spinal cord injury: “They didn’t warn you the water was cold. When you get hit with cold water, you get spasms! Ah!”

One individual who has difficulty breathing commented on the need for staff to remember to ask if a person has a disability, rather than go by visual cues: “Some people it’s obvious they have a disability. Me, it’s not obvious, so they never knew, you know? You might need some attention other than washing this stuff off of you; you might need something else.”
As in the other groups, one person suggested the use of hand signals. Several people were concerned about the decontamination process itself, as shown in these comments:

- "[The water] kind of trickles out. Doesn’t seem like it could really wash off the contaminant, you know?"
- "They had like 3 or 4 different sponges. We all got the same sponge."
- "Go to a store and get some soap. Instead of dishwashing soap. That stuff is for the dishwasher. That’s to clean dishes."

When asked, everyone in this focus group indicated that they would really appreciate having the process explained in more detail, so they knew that they had been fully decontaminated.

Comparison Group: Similar to the other groups, two of the participants in the comparison group were unclear about what to do or where to go while in the Decon Corridor: “I was confused about where to go most of the time. More direction, I think, needs to happen. More clear instructions, like, so you’re not waiting somewhere, wondering if you’re doing something right.” Also, similar to the other groups, one participant suggested the addition of signs: “Instead of them telling us the directions, they should put up signs pointing, telling us how to go about, through the procedure.” Two people mentioned their worry about the lack of water pressure and their fear that it would not take off the contaminant in an actual emergency, and all of the participants admitted to having the same concern. In contrast to the other groups, however, four of the eight comparison group participants praised the staff for their communication efforts, making comments such as: “Everybody was patient; it was fine. Just been smooth, been patient. Treated you with good respect” and “they gave us some love.”

Each of the participants who cannot transfer independently mentioned the need for increased training of the decontamination team staff regarding proper methods of lifting and transferring. Other participants echoed the thoughts of Speaker #3 in the quotes above, agreeing that staff did not understand that they can transfer themselves from chair to chair. One individual wished he had received more assistance with showering: “I had problems with my arm and was given a sponge anyway, to wash myself. If I was contaminated, it would have been bad for me.” While several individuals indicated that they wanted staff to have inquired more about their individual strengths and needs, one person felt that participants should have advocated for themselves: “But it’s also up to us to speak up. You know. ‘I have this,’ or ‘move this,’ or ‘I prefer this,’ you know?”

Another salient issue for people with physical disabilities was equipment. When asked about their feelings regarding the loss of their mobility equipment (i.e., wheelchairs, canes, and walkers) in the Hot Zone, responses ran the gamut from...
“It didn’t matter to me to leave my walking stick behind” to having an interesting experience (“When I went through the water works, that part of it, I saw what was going on with people around me and I thought it was fascinating, and it became a motivating and inspirational experience for me… I liked seeing how other people were reacting.”) and by becoming better prepared for potential future emergencies (“It benefited me in a way; I learned what to do if a real disaster hits.”). Others suggested that they will share this information with other Deaf individuals (“I will tell the people at work about what they should expect, and to expect the unexpected. I will be able to help the community prepare;” “I learned how to decontaminate and will tell my family because I love them so much.”) or encouraged Sinai Health System to do so (“You should have more trainings, for people who are not our friends. Like people who live out of state, strangers.”)

Deaf : Participants did not consider themselves to have a disability (ASLinfo.com n.d.) but rather as having issues regarding communication. These needs, therefore, were addressed in the above “Communication” section. Of the two participants who were Deaf-blind, one person stated that “I think [staff] need more training, more training before that day about what some basic signs are, and about the limited field of vision of Deaf-blind people and things like that.”

DIFFERING EXPECTATIONS ABOUT DECONTAMINATION

Spanish : Participants were unsure what the decontamination process would entail prior to arriving at the hospital. One person imagined a more complex system that involved some type of pool in which he might be dunked: “We thought that they were going to fill [a pool] with another thing to remove them. We thought that there would have been more people to scrub us down. It was simpler.” Another individual imagined the use of a fake chemical and a test to ensure full decontamination: “I thought that there would have been some more drawings, simulated chemicals, and passing a test on how to clean another when they are contaminated.” Participants also expressed their appreciation for the knowledge gained in this process; they feel better prepared in case of an actual emergency: “At least we already have more of an idea. If we didn’t do this we would be with our eyes closed and this is going to help us. I think that we are prepared;” “It was something new for me because it was the first time that I’m doing something like this. I hope that other hospitals do the same in order to be informed and ready.”

Deaf : Participants had arrived that morning with a variety of ideas regarding what the decontamination process would look like. One person anticipated “a pool or something I would be emerged in,” two expected a “more intense shower,” and a third envisioned “a tube, and you get showered in like 180 degrees, or 360 degrees around you.” Other individuals expected decontamination to occur inside the hospital. Several members of the group indicated that they had benefitted from participating in the drill, both by

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recontamination are alleviated.

The Personal Protective Equipment (PPE) worn by decontamination team staff makes communication difficult, whether it is verbal or sign language. The masks muffle voices and the thick gloves are difficult to manipulate into specific ASL signs. Participants were concerned by the difficulty in communicating with staff and with staffs’ communication with one another. They suggested the following strategies, in order to improve communication:

- Have interpreters in each of the zones.
- In addition to using interpreters, staff should use broad gestures to communicate. For example, staff can point to the next place to go, or mimic washing their hair.
- Use bilingual signs and create “lanes” for each shower, to direct traffic without verbal communication. (See Figure 4.)
- Members of both the Deaf and Spanish-speaking groups stated that they would like to follow others who speak their language if possible, in order to figure out what to do. One idea is to allow clusters of individuals who share a language to stick together, so they can mirror each other’s actions. Neither we the researchers nor our participants are suggesting that one shower should be designated the “Spanish shower,” but rather that, just as we keep families together through the process, if a group of people of who speak the same language arrive together, it may be to everyone’s benefit to offer to put them in the same line.

It should be noted that we did have bilingual instructional signs displayed in the Decon Corridor. However, the color (white) and positing of the signs (off to the side) made them difficult to see and, therefore, ineffective. Based on the feedback described above, we have created new, larger, brightly-colored signs which are placed directly in the Hot Zone, so patients can read what to do while they are waiting to be decontaminated. (See Figures 5-6.)

Disability Awareness: Participants felt that staff needed significantly more training regarding working with people with physical disabilities. One participant suggested that staff should receive training on the limited field of vision of Deaf-blind people. For people with disabilities related to mobility, the biggest issue concerned transfers from a personal wheelchair to the shower chair. Those individuals who can transfer on their own were frustrated that staff insisted on assisting; they felt less safe when a staff member touched them as they transferred. Individuals with more severe physical limitations were upset that the staff did not know the proper technique for lifting and transferring, putting both the staff and patient in danger of falling. One participant was also upset about the cold water because it caused his muscles to spasm painfully.
Figure 6
Figures 5-6: Brightly colored, multilingual signs with pictograms are effective communication tools.
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Recommendations include:

- Ask EVERYONE if they have a disability they would like to disclose; not all disabilities are visible. Based on this drill, we have revised our plan to include brightly colored signs asking people to tell us if they have a disability, as well as training for Decon Unit Leaders to ask participants about this issue as they enter the Corridor.

- Ask participants if they want assistance with transferring and showering, as well as the best method for doing so.

- Allow individuals who can transfer themselves to do so in a place that is not covered by a wet tarp, so it is less slippery. If this is not possible, let them wear their shoes to transfer, and then place their shoes in the bag holding their clothes.

- Understand that the loss of mobility equipment (e.g., a wheelchair or cane) can make a person feel unsafe, for s/he has lost the device that provides independence.

- Remember that individuals with disabilities should be treated with respect, and that a physical disability does not imply a cognitive disability.

Differing Expectations: Participants expressed that, prior to arriving at the drill, they were not prepared for how the decontamination process would work. They did not see this as a fault; rather, they had limited experience regarding decontamination and made presumptions based on what they had seen on television or in the movies. The majority of participants were expecting to be dunked into a pool of some sort, and many stated that they thought it would be a multi-step process, going from one cleansing area to another.

Several participants in the non-English groups expressed their appreciation for partaking in this drill, for they now feel more prepared in case of a real emergency. We cannot determine if people who speak English experienced fewer benefits, or if this topic just did not arise during the discussion. Both people with and without disabilities stated that this preparation was especially important for individuals who are Deaf or have a physical disability and encouraged research staff to share this information with others, so more drills can occur.

QUALITATIVE ANALYSIS

We used the symbolic interactionist framework to analyze how participants approached this study and decontamination overall. One of the most interesting findings is that, as a participant of this research study, we asked each person to take on the role of a decontamination “patient” and then to share their experiences in this role. Participants, however, also took on the role of “learner”, to better prepare themselves in case of future emergency. More importantly, they saw their most significant roles as that of “critics” and “advocates” on behalf of their own population(s). They ascribed the meaning of this study as working towards full access of at-risk populations into decontamination, and understood that their feedback was essential to this process. Even those individuals who may not have originally approached the study in this manner took on these roles while interacting with others as part of the focus groups. As a result, participants made excellent, efficient suggestions to improve the decontamination process. As a research team, we were able to not only evaluate how well our adaptations (e.g., the inclusion of physical therapists and interpreters in the decontamination team and the use of accessible equipment) worked, but also learned a variety of other ways to improve the decontamination process for everyone involved.

Another interesting finding from this qualitative analysis stems from the expectations that people brought to the decontamination drill. Participants feel entitled to culturally-competent care, regardless of the degree of urgency of the situation. The exercise became a symbol of healthcare overall, and how it is not always equally accessible to at-risk populations. Some participants were disappointed the decontamination team was not learning quickly enough during this drill (i.e., that the last person did not receive better treatment than the first.) Additionally, the discussion during the focus groups seemed to increase the expectation for fully accessible, culturally-competent decontamination, and thus all other medical care. Participants gained confidence among their peers, and in this way, participation in this study led to individuals feeling more empowered. However, despite these feelings of entitlement to quality care, 100% of participants stated they would go through decontamination even if the process was not adapted to their needs, and this was true even if their lives were not in danger. Everyone feels they deserve the highest quality of care, yet they would be willing to accept whatever was available in an emergency situation.
LIMITATIONS

One limitation of this study is the sample size; less than 20 individuals of each at-risk population participated. Additionally, we are well aware that other populations have needs that differ from our target populations. Further research needs to be conducted in order to develop a plan that meets the needs of everyone. For example, people with developmental or psychological disabilities have very different needs than the participants of this study. Third, this represents a single scenario, and a variety of external conditions can impact the decontamination process. Since it was August, the weather was warm and the process of showering in swimsuits was not overly difficult. It should be noted that although we did not have a specific question regarding how participants would feel about being naked if this was a true emergency, several of the groups discussed the issue. Everyone indicated that they would be fine with it, for their lives were more important. People from other cultures, however, may have issues of dress and social appropriateness that were not discussed within our groups. Fourth, if this had been an actual emergency, the decontamination team would have to manage the general population as well. We treated this as a contained exposure, but a large-scale contamination could occur and it would be more difficult to give members of at-risk populations the extra attention they received during this drill. Lastly, and perhaps most importantly, this was a decontamination drill. There are many other aspects of preparedness planning that have not yet addressed the needs of the full patient population.

CONCLUSIONS

Although much can be learned from the experiences of decontamination drill participants and staff, very little research has been conducted to date. Since nearly one out of five people in the United States has a disability, emergency preparedness planners need to anticipate the needs of people with disabilities in their preparedness planning. Yet this is not enough. Our planning team had made accommodations for our at-risk populations, particularly the inclusion of physical therapists and accessible equipment as part of the decontamination process. However, the best advice came from the participants themselves. Our most significant lesson learned is that decontamination procedures are significantly improved by incorporating patients’ perspectives and using patient-centered care concepts. The information and ideas shared by the participants were creative, practical, and insightful, and have made a dramatic impact on our plans for the future. Based on lessons learned both during our preparedness planning and from the feedback of our participants, we make the following recommendations:

- Develop emergency plans that reflect your patient populations, as these are the people who will arrive on premises during an actual emergency. For example, due to the location and nature of our health system, we have a high percentage of individuals who are Deaf, who have physical disabilities, and/or who speak Spanish and have limited English proficiency.

- Include members of at-risk populations in your planning team and drills and incorporate their suggestions into future preparedness planning. If you do not have staff with disabilities, include volunteers from your patient population or community at large. In our experience, people were motivated to assist in planning efforts. Remember that a diverse planning team will be much more able to meet the diverse cultural, linguistic, and physical needs of participants.

- Be willing to think outside standard protocols; for example, rather than using conveyer belts for all people who were non-ambulatory, we had shower chairs and gait belts available for those who could sit up independently. While standards are essential starting points, they may not be the most effective practices for your patient population.

- Communicate with people as they go through decontamination. Make sure they understand the process, so they know everyone has been fully decontaminated and can feel safe.

- Ask patients if they have any special needs; not all disabilities are visible. Treat each individual as an expert on her/his own strengths and needs, as individuals can tell staff the most effective way to provide assistance. (See Figure 7.)

- Train staff, including emergency preparedness planners, on disability-related issues, including using visual cues with people who are deaf or hard of hearing and transferring skills for people with physical disabilities.
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- If possible, include interpreters of your patient’s most common languages as part of your planning team and in all three of the decontamination zones; they know both the language and the culture. It is particularly important to assign interpreters to the Cold Zone within the Decon Corridor, so they can meet the needs of the patients without the barrier of PPE.

Figure 7
Figure 7: Decontamination staff has a list of questions to ensure they can meet the needs of victims

Regardless of language, staff dressed in PPE should use gross body language to communicate with patients. This form of communication is much easier to understand, given the visual and auditory barriers created by PPE.

- Create large, brightly-colored signs for the Hot Zone, to prepare individuals for decontamination. Include pictograms for individuals with limited literacy. Clearly mark on the ground where patients should line up and move through the Decon Corridor.

The majority of suggestions above are not limited to decontamination. Large, brightly-colored signs with pictograms should be standard protocol for all emergency plans. Treating people as the experts of their own bodies and their own strengths and needs, and clear communication - about what you expect from them and what they can expect from you - strengthens any emergency preparedness plan. Addressing issues of communication, thinking creatively, and focusing on the strengths of participants allows emergency preparedness staff to ensure they have the capacity to meet the needs of all members of their population and creates the highest degree of preparedness.

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References
3. These groups are often referred to as “vulnerable populations” (See, for example, Davis and Mincin 2007) or “special populations” (e.g., Ballen 2009.) In alignment with the United State’s Assistant Secretary of Preparedness and Response (2008), we have chosen to use the term “at-risk populations.” Davis E, Mincin J. Nobody Left Behind: Incorporating Special Needs Populations into Emergency Planning and Exercise [Internet]. Lawrence, KS: University of Kansas; 2005 Jun 26 [cited 2009 Jun 20]. 37 p. Available from: http://www.nobodyleftbehind2.org. Ballen D. Vulnerable Populations [Internet] Tampa, (FL): The Institute for Business & Home Safety; 2009, March [cited 2009 Jul 23]. Available from: http://www.disastersafety.org/resource/resmgr/pdfs/vulnerab
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17. Tyvek is a synthetic, non-porous material. It resembles paper but is actually plastic. It is chemically-resistant and may be used to create garments for decontamination staff. Byrnes M, Davis E. Preparedness for All: Why Including People with Disabilities in Drills is a Learning Tool. Intergancy Chemical Exercise (I.C.E.). Int Assoc of Emerg Managers Bull 2005 Apr;22(4):7-8.


19. Please note that one person chose not to disclose her racial/ethnic background, and one person identified as both Hispanic and African American.

20. In an actual emergency, auxiliary aids with absorbent materials (e.g., canes with soft handles, wheelchair cushions) would need to be discarded as biohazard waste, and people who use these aids would be transported to triage using hospital wheelchairs or gurneys. As this was a drill, we used our wheelchairs to transport participants into the hospital, but then returned auxiliary aids - as well as all other belongings - to participants. We recognize that the long-term loss of mobility equipment could turn an independent person into a dependent individual, as s/he would not be mobile. For more information regarding decontamination of auxiliary aids, please see www.hazmatforhealthcare.org.

21. Mylar is a synthetic material often used for insulation.

22. While we were prepared, no person whose primary language is Spanish used a power chair.


30. Please note that spasticity is a common symptom of spinal cord injury, and that cold water has been shown to increase it. For more information, please see Bromley I. Tetraplegia and Paraplegia: A Guide for Physiotherapists. 6th ed. Philadelphia, PA: Elsevier Health Sciences; 2006. 416 p.

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