

Public experiences of mass casualty decontamination

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PUBLIC EXPERIENCES OF MASS CASUALTY DECONTAMINATION

Holly Carter, John Drury, G. James Rubin, Richard Williams, and Richard Amlôt

In this article, we analyze feedback from simulated casualties who took part in field exercises involving mass decontamination, to gain an understanding of how responder communication can affect people's experiences of and compliance with decontamination. We analyzed questionnaire data gathered from 402 volunteers using the framework approach, to provide an insight into the public's experiences of decontamination and how these experiences are shaped by the actions of emergency responders. Factors that affected casualties' experiences of the decontamination process included the need for greater practical information and better communication from responders, and the need for privacy. Results support previous findings from small-scale incidents that involved decontamination in showing that participants wanted better communication from responders during the process of decontamination, including more practical information, and that the failure of responders to communicate effectively with members of the public led to anxiety about the decontamination process. The similarity between the findings from the exercises described in this article and previous research into real incidents involving decontamination suggests that field exercises provide a useful way to examine the effect of responder communication strategies on the public's experiences of decontamination. Future exercises should examine in more detail the effect of various communication strategies on the public's experiences of decontamination. This will facilitate the development of evidence-based communication strategies intended to reduce anxiety about decontamination and increase compliance among members of the public during real-life incidents that involve mass decontamination.

THE THREAT OF AN INCIDENT INVOLVING chemical, biological, radiological, nuclear, and explosive (CBRNE) agents has increased in recent years because of rapid technological advances and the increasing willingness of terrorists to use nonconventional weapons.¹ These types of agents are recognized as being especially likely to produce high levels of anxiety among members of the public because of their often invisible, undetectable, and ambiguous nature.^{2,3} Public reactions to these types of incidents may

include terror,² public unrest,⁴ and aggression.⁵ In addition to the fear and anxiety caused by CBRNE agents themselves, interventions designed to reduce the impact of CBRNE agents, such as decontamination and quarantine, may cause more anxiety than the agents themselves if they are not managed appropriately.⁶

There is evidence from small-scale incidents involving decontamination that the decontamination process can result in high levels of noncompliance, especially if the

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responders do not communicate adequately with members of the public and if the public's concerns about privacy are not addressed.^{7,8} Members of the public may perceive inattention to their concerns as a lack of respect for their needs by responders.⁹ Failure of responders to communicate effectively with the public during decontamination has also been shown to result in increased public anxiety about the process.¹⁰ A review of small-scale incidents involving decontamination highlighted 2 ways the management of incidents involving decontamination could be improved: first, by improving communication with members of the public during the decontamination process, including offering better explanations about why the process is occurring; and second, by protecting the dignity and modesty of those involved.⁸

Although it has been recognized that successful communication is essential to facilitate the smooth running of the decontamination process, a recent review of decontamination guidance documents from the UK, the US, and Australia shows that most of the current decontamination guidance documents for responders contain little or no mention of communication strategies.¹¹ Instead, several of the guidance documents recommend a "control" management strategy, which suggests that there is a belief that members of the public will need to be strictly controlled. An example of a control method would be using physical barriers to ensure that the public undergo the decontamination process. The control method runs counter to evidence that attempts to force people to undertake recommended emergency measures are likely to result in noncompliance, because they lead people to view actions taken by responders as illegitimate.¹² A focus on "controlling" members of the public during decontamination may also lead responders to actively withhold information from them for fear that they will overreact and behave maladaptively.¹¹ By contrast, research suggests that people are naturally resilient and will try to take appropriate actions to protect themselves and others following a disaster,^{13,14} provided they have sufficient practical information to make sensible decisions about the best course of action to take.¹²

Research on public decontamination from real incidents is limited to small-scale emergencies,⁷⁻⁹ because there have been no large-scale incidents involving decontamination in the UK. This could create a problem if a real incident were to occur, as responders will have only a limited idea of how people are likely to behave. A possible way to address this is to examine the experiences of members of the public during emergency preparedness exercises in which mass decontamination has been conducted. Emergency preparedness field exercises occur regularly throughout the UK, and they often involve large numbers of simulated casualties. They provide a safe learning environment for responders, while aiming to be as realistic as possible, and they are the best available source of insights into how members of the public might experience a real situation that involves mass decontamination. An analysis of such experiences could

therefore form part of the evidence base for the necessary improvements to existing procedures.

This article reports the analysis of feedback data provided by simulated casualties after 5 separate emergency preparedness field exercises. Their feedback was collected using questionnaires that contained both open-ended questions and questions requiring a response on a 5-point Likert scale. This article reports the analysis of the data collected using the open-ended questionnaire items, while the results of the numerical casualty feedback is reported elsewhere.¹⁵ There were 2 aims for this research: first, and broadly, to provide an in-depth understanding of the casualties' experiences of the decontamination process; and second, and more specifically, to examine the effect that certain factors, such as the casualties' perceptions of communication from responders and casualties' opinions about responders' respect for their privacy, can have on the way members of the public experience the decontamination process.

Expectations were as follows. First, because there is little mention of communication strategies in decontamination guidance documents,¹¹ it might be expected that casualties will report that communication was inadequate and could be improved. Second, a lack of communication will play an important role in how members of the public experience the decontamination process, with a lack of practical information and an absence of explanation about why decontamination is necessary, resulting in increased anxiety and confusion about the decontamination process.¹⁰ Third, if members of the public do not believe their needs for privacy have been met, they are more likely to experience stress during the process and indicate a reluctance to comply with instructions.⁷⁻⁹ Fourth, a final expectation is that, to the extent that members of the public define themselves as a psychological group, they are more likely to report giving and receiving help from others to achieve the goal of undergoing decontamination.¹³

METHODS

Participants

Participants were people who took part as simulated casualties in 1 of 5 field exercises that involved decontamination. Participants were recruited by the Health Protection Agency and included members of organizations such as Casualties Union and Amputees in Action, trainee paramedics, medical students, and members of the public. The number of simulated casualties who were decontaminated, and hence from whom feedback was obtained, varied from 28 volunteers (Exercise A) to 131 volunteers (Exercise C). (See Table 1 for full details of each of these exercises, including the numbers of participants and the scenarios.) Across the 5 exercises, 402 simulated casualties completed feedback questionnaires. No specific data about age and gender of participants were collected, but roughly equal

Table 1. Details from Each of the 5 Exercises

<i>Exercise</i>	<i>Number of Casualty Volunteers</i>	<i>Number Decontaminated</i>	<i>Scenario</i>
A	80	28	Casualties trapped in collapsed multistory building, and a Sarin release at motorway service station
B	144	69	Road traffic collision involving a lorry carrying hazardous material
C	200	131	Detonation of a dirty bomb
D	96	40	Accidental contamination of 70 disabled and able-bodied casualties by a chemical following a road traffic collision
E	180	116	Detonation of a dirty bomb at a large sporting venue

numbers of male and female participants took part, with the age of volunteers ranging from 18 to about 85 years. Participants received no payment for taking part in an exercise, although their expenses were reimbursed. Casualties Union and Amputees in Action each received a small donation to their organization.

Measures

Data were collected using feedback questionnaires created by the Health Protection Agency to inform the evaluation of exercise play and identify lessons for future exercises and real incidents. Such questionnaires are used regularly following field exercises to ensure that all participants' views are captured. Feedback questionnaires were completed by simulated casualty volunteers after each exercise and contained questions relating to participants' experiences of the exercise and of the decontamination process specifically. The content of the questionnaire varied slightly among exercises, but the items were broadly similar. (See Table 2 for full details of the open-ended questions used in each exercise.)

Procedure

Volunteers were recruited by the Health Protection Agency Exercises team, and they were provided with briefing information before arriving at the exercise. On arrival, volunteers received a group briefing presentation, which provided them with more information about what would happen during the exercise. This included information on the exercise scenario and how the casualties were expected to behave. Immediately after taking part in an exercise, the volunteers were debriefed, and each volunteer was asked to complete a feedback questionnaire.

Analytic Procedure

Not all volunteers were decontaminated during the exercises, either because of a lack of time or a lack of resources. Only feedback from those who were decontaminated was analyzed. As data were collected using standardized, structured feedback questionnaires, it was decided that the framework approach would be the most appropriate method of analysis.¹⁶ A thematic framework was identified,

based on the relevant issues highlighted in published literature. Each passage in the data was then coded into 1 or more of the relevant themes. This allowed the relevant data to be easily rearranged into chart form, using Microsoft Word, to express the themes more clearly and to establish relationships between them.

Data were categorized into 4 broad themes of interest. The first theme was perceptions about communication from responders during the decontamination process. The second theme focused on casualties' concerns about privacy and how a lack of privacy affected their experience of decontamination. The third theme examined any fear or anxiety that people felt during the exercises. The fourth theme concerned participants' beliefs about how they would behave during a real incident of this type.

Another researcher, who was provided with the coding scheme, coded a subsection of the data. This enabled a check of interrater reliability. There was an agreement rate of 89% between the first and second researchers.

RESULTS

Results are presented under the 4 themes identified and include any subthemes that emerged during data analysis.

Perceptions about Communication

Three subthemes emerged from the data under the broad theme of perceptions about communication from responders during the decontamination process. These were: (1) the need for clearer instructions during the decontamination process; (2) the need for better explanation of why decontamination was necessary; and (3) difficulties in communicating with emergency responders through personal protective equipment (PPE). Each subtheme is described below, including examples of quotes relating to each subtheme.*

*A letter and a number appear in brackets after each quote—for example, (A1). The letter denotes which exercise the participant took part in, and the number denotes the participant number of the person who provided the quote.

The Need for Clearer Instructions

Perceptions about communication from responders were the most widely reported theme, with more than half the participants reporting at least 1 problem with communication during the process. Within the wider communication theme, the subtheme of the casualties' needs for clearer instructions was reported by more than a quarter of all participants. Comments included:

There were no instructions given and services just kept throwing in more suits and telling us to speed up and get out. (C126)

We were sent through the showers with very poor instructions on how to proceed and what to do. (D2)

The information provided by the fire service prior to entering [the decontamination shower] was poor at best. (D17)

I received NO instructions on what/how to wash in the showers!! (E63)

The above quotes illustrate that at least some simulated casualties wanted clearer instructions about how to proceed through the showers and how to wash while they were in there. Simulated casualties highlighted the potential consequences of a lack of clear instructions. One potential result was that casualties didn't know what to do when in the decontamination showers:

I received no instructions about showering, so simply walked through. I don't know if this is correct. (D1)

No one directed us what to do. I was told to walk through, got to the end, no one had a clue and told me to walk back through. (A24)

As there was not much communication when in the tunnel, this led to some people not being able to clean and put on protective outfit in the right manner. (D13)

The above quotes suggest that a lack of clear instructions resulted in confusion among casualties, with several people not knowing what to do when they went through the decontamination showers. There was also a suggestion that providing clearer instructions could help to reduce any stress that casualties might feel:

Perhaps an A board at the gated area with instructions of the derobing would help with stress. (E121)

Importantly, although not all casualties directly expressed a need for clearer instructions, only a few specifically stated that they had received sufficient instructions and that they were confident about what to do during the decontamination process.

The Need for Greater Explanation

Along with a lack of clear instructions, another communication subtheme was that the simulated casualties felt there was a lack of explanation from responders about what

the process of decontamination would involve and why it was necessary. This was the issue most commonly highlighted, reported by more than half the participants. Comments included the following:

I did not feel we knew enough about what was happening and when. (A25)

No attempt to explain why we were pushed through the showers was ever fully made. (B63)

Was not explained, was just told to move forward, felt like I was a sheep being herded! (C89)

No one explained why we had to go through the shower. (D4)

They could have explained what the situation was more so that we understood exactly what was going on. (E64)

Across all the exercises, participants felt that they were not given enough information about the decontamination process or about why decontamination was necessary. The casualties noted specific consequences of the responders not providing sufficient explanation, including that the lack of information caused some people to become agitated, though this was an exercise and not a real incident:

The second group could have told us what was happening because some people were getting a bit agitated. (E102)

Casualties therefore suggested that the stress of the situation, which would be even greater if this had been a real incident, was made worse by the lack of information and explanation they received from the emergency services, leading them to experience increased agitation. In addition, casualties also noted that the lack of information they received would have led to their noncompliance in a real situation, with people leaving the scene before they had been decontaminated:

I would sneak out after waiting around for so long and not being told why. (C109)

[Would go] home, because I was not clearly informed of what was happening. (C116)

[Would leave the scene] because we were not kept up to date with what was going on. (D11)

Because information was not given by the fireman about the need for decontamination before anything else I would probably have wandered off. (D28)

The above quotes make it clear that the lack of information and explanation provided to casualties contributed to their increased stress and the potential for their noncompliance with instructions.

Not all casualties directly expressed a need for improved communication from responders. However, only a minority specifically stated that they felt communication from responders had been adequate.

PUBLIC EXPERIENCES OF DECONTAMINATION

Table 2. Questionnaire Items Used During Each Exercise

<i>Exercise A</i>	<i>Exercise B</i>	<i>Exercise C</i>	<i>Exercise D</i>	<i>Exercise E</i>
1. Please provide a description of your injuries/symptoms and your location before you were attended to and moved by the emergency services.	1. Please provide a short account of what happened to you during the exercise; please include details of how your injuries were treated (if applicable).	1. Please provide a description of your injuries/symptoms/ behaviors before you were attended to by the emergency services or hospital staff.	1. Please provide a description of your injuries/symptoms/ behaviors before you were attended to by the emergency services or hospital staff.	1. Please describe what you felt well during the exercise.
2. Please provide an account of what happened to you when the emergency services arrived at the scene of the incident; please include details of how your injuries were treated.		2. Please provide an account of what happened to you during the exercise; please include details of how your injuries were treated (if applicable).	2. Please provide an account of what happened to you during the exercise; please include details of how your injuries were treated (if applicable).	2. Please describe what you felt could have been improved during the exercise.
3. Please explain if there was anything that the staff attending to you missed, or if you think there was anything more that the ambulance or fire service staff could have done for you during the exercise.	2. Please explain if you think there was anything that your character needed that the staff attending to you missed, or if you felt there was any more that they could have done for you.	3. Please explain if you think there was anything your character needed that the emergency responders or healthcare workers attending to you missed, or if you felt there was any more that they could have done for you.	3. Please explain if you think there was anything that your character needed that the emergency responders or healthcare workers attending to you missed, or if you felt there was any more they could have done for you.	3. Please explain if you felt there was any more that emergency responders could have done for you.
4. If you had any difficulties communicating with the staff attending to you at any point during the exercise, please explain this here.	3. If you had any difficulties communicating with the hospital staff attending to you at any point during the exercise, please explain this here.	4. If you had any difficulties communicating with the emergency responders or hospital staff attending to you at any point during the exercise, please explain this here.	4. If you had any difficulties communicating with the emergency responders or hospital staff attending to you at any point during the exercise, please explain this here.	4. If you had any difficulties communicating with the emergency responders attending to you at any point during the exercise, please explain this here.
5. Please describe any improvements that you think could be made to the undressing stage before you entered the decontamination tents—for example, changes to the instructions on undressing, communication with the staff, or changes to the temporary clothing.	4. Please describe any issues you had at the undressing stage and any improvements you think could be made.	5. Please describe any issues you had at the undressing stage and any improvements you think could be made.	5. Please describe any issues you had at the undressing stage and any improvements you think could be made.	5. Please describe any issues you had at the undressing stage and any improvements you think could be made.

(continued)

Table 2. (Continued)

<i>Exercise A</i>	<i>Exercise B</i>	<i>Exercise C</i>	<i>Exercise D</i>	<i>Exercise E</i>
	5. Please describe any issues you had inside the decontamination showers and any improvements you think could be made.	6. Please describe any issues you had inside the decontamination showers and any improvements you think could be made.	6. Please describe any issues you had inside the decontamination showers and any improvements you think could be made.	6. Please describe any issues you had inside the decontamination showers and any improvements you think could be made.
	6. Please describe any issues you had at the dressing stage and any improvements you think could be made.	7. Please describe any issues you had at the dressing stage and any improvements you think could be made.	7. Please describe any issues you had at the dressing stage and any improvements you think could be made.	7. Please describe any issues you had at the dressing stage and any improvements you think could be made.
6. Please describe any improvements that you think could be made to the decontamination showers that would make you feel more comfortable in a real incident.	7. Please describe any improvements that you think could be made to the decontamination showers that would make you feel more comfortable in a real incident.	8. Please describe any improvements that you think could be made to the decontamination showers that would make you feel more comfortable in a real incident.	8. Please describe any improvements that you think could be made to the decontamination showers that would make you feel more comfortable in a real incident.	8. Please describe any improvements that you think could be made to the decontamination showers that would make you feel more comfortable in a real incident.
7. Please explain how you think Exercise A could have been more like a real incident.		9. Please explain how Exercise C could have been more like a real incident, including what aspects of the exercise were not realistic.	9. Please explain how Exercise D could have been more like a real incident, including what aspects of the exercise were not realistic.	9. Please explain how Exercise E could have been more like a real incident, including what aspects of the exercise were not realistic.
		10. If you thought you would leave the incident site, please explain where you think you would go and what you would do.	10. If you thought you would leave the incident site, please explain where you think you would go and what you would do.	
	8. Please provide any further comments you have on the hospital response.	11. Please provide any further comments you have on the emergency services' response during Exercise C.	11. Please provide any further comments you have on the emergency services' or hospital response during Exercise D.	10. Please provide any further comments you have on the emergency services' response during Exercise E.

Difficulties in Communicating

A practical consideration about responders' communications with casualties was raised: Casualties noted that even when the responders did attempt to communicate with them, this was often hampered by the PPE the responders were wearing:

The suits made it difficult to hear clearly. (A27)

They all had gas masks and couldn't hear them at all, so badly in fact that they had to have "civilians" repeat it louder to the crowd. (C119)

CBRN suits especially made it difficult both to hear responders and for them to hear you. (D14)

They had to shout due to the outfit, so felt slightly disconcerting. (E45)

You couldn't hear their voices due to mask, so you can't hear their instructions. (E96)

Clearly, there is a practical challenge for responders in communicating effectively with casualties, and this should be addressed. The comments above suggest that even when responders did attempt to communicate with casualties, the protective suits made this almost impossible.

When asked about communicating with responders, the majority of casualty volunteers stated that they had found it difficult to communicate with responders through the PPE they are required to wear. Some casualty volunteers did not directly say that they had found it difficult to communicate with responders through the PPE, but no casualties stated that they had not had a problem communicating with responders wearing PPE.

Privacy

A lack of privacy during the decontamination process was a common concern in all the exercises. Comments included the following:

In a real situation to strip off naked would need more privacy. (B24)

There was NO privacy, in or out of the tent. (B33)

BASIC privacy could have been offered in a real situation if the process required complete nudity, in order to preserve dignity where possible. (C128)

[Needed] curtains either end of shower. I was aware there were a lot of people peering in. (D14)

There should be a private place to get changed. (E50)

Participants also highlighted some negative results of a lack of privacy. Several casualties felt embarrassed because of the lack of privacy offered to them:

More privacy as it was quite embarrassing undressing at the front of the hospital. (B17)

I felt quite embarrassed at being half dressed to the public. (B60)

One casualty was so concerned about the lack of privacy available that she refused to go through the showers at all:

I didn't do it. I wouldn't strip in front of everyone. (E98)

Some simulated casualties did not mention concerns about privacy, but none of them specifically stated that they had had sufficient privacy during the decontamination process.

Fear and Anxiety

Although these were only exercises, several casualties described feeling anxious during the decontamination process. Overall feelings during the exercise included: "nervous and a bit scared" (E65), "threatened" (E43), and "afraid" (E59). Other casualties were more specific about their feelings of anxiety during the exercises, which they attributed to aspects of the decontamination process itself, such as the presence of responders in PPE and a lack of information and communication from the emergency services. Results are therefore reported under 2 subthemes: fear and anxiety about the decontamination process, and fear and anxiety because of a lack of communication and information from responders.

The Decontamination Process

Men in masks and suits, quite scary looking and a little aggressive. (A15)

It would have been scary for my character being handled by so many strangers. The suits dehumanise them. (A27)

Would have been a rather frightening experience for real situation. (B14)

Decontamination staff need to introduce themselves more clearly, as [they] look threatening to a confused casualty. (B24)

Several casualties therefore found the decontamination process frightening, even though this was not a real incident. Some casualties suggested that the failure of emergency responders to communicate with them led to their increased fear and anxiety about the decontamination process, which could have been alleviated if more information had been provided. This is described in more detail below.

Responders' Lack of Communication

Comments from casualties about the effect of a lack of communication and information on their levels of fear and anxiety included the following:

I would have been more reassured if I was told what the process involved... I have been through decontamination many times—if it was the first time, I may have been nervous or terrified. (A2)

Members of the team did not let us know what was going on, which would have made people panic because it all seemed a bit strange. (C105)

The emergency services should have been more willing to explain what was going on; in a real situation, people would have been incredibly scared and confused, and a lot of the first hour we were left with no one giving us anything. (C88)

No reassurance given to casualties who would have been frightened and in shock. (D27)

I had no idea what was going to happen, which made me feel nervous and scared. (E65)

The above quotes therefore suggest that fear and anxiety about the decontamination process could be reduced if a satisfactory level of explanation was provided, and that responders' failure to communicate with the casualty volunteers contributed directly to increased levels of anxiety during each exercise.

However, not all casualties said that they felt anxious during the exercise. Several casualties stated that they did not feel anxious, but that they would have if the situation had been real. A few casualties specifically stated that they did not feel anxious and that this was because they had taken part in many of these types of exercises before.

Likely Behavior in a Real Incident

In response to a question asking casualties whether they would have left the incident site if this had been a real incident, and if so, where they would have gone, several participants described how they felt they would behave during a real incident of this kind. Three subthemes emerged under this theme: participants would go home; participants would go to hospital; and participants would, or did, try to help others.

Participants Would Go Home

Several casualties suggested that they would go home during a real incident of this kind, rather than wait for emergency services' assistance:

[I would] try to get home and treat myself. (C28)

[I would] probably go home and call Dr or NHS Direct. (C40)

The reason for this was often stated as being due to a delayed response or lack of communication from the emergency services:

I would leave, head home, shower and see to my own injuries as the services were far from interested. (C89)

If no input [from emergency responders], would not know of dangerous chemicals and would probably shower at home. (D20)

Participants Would Go to Hospital

Several participants also stated that they would go to hospital, rather than wait for assistance from the emergency services:

In a real situation I would probably take myself to hospital if possible. (C32)

I would head to my local hospital; that way I would eventually be seen to. (C44)

If I was able to walk, I would go to the hospital myself. (D14)

Participants Would Help Others

Several casualties expressed a desire to help others and stated that they would have helped others if the incident had been real:

Would have either tried to help worse cases or gone to find help. (C52)

If my injury allowed, I would try to help others and make sure help was on the way. (C79)

If I could help other casualties I would stay, but if not I would go and find help. (C84)

I would try and help who I could and walk away. (D6)

In support of the quotes above about intended helping behavior, some casualties reported that they actually gave help to, or received help from, another casualty during the exercise:

Sat on floor but needed help from another casualty to get up. (A19)

A fellow walking casualty helped me understand. (C110)

I helped a non-sighted person through the shower. (D4)

Little assistance from the teams, and fellow casualties had to help me. (D29)

Although not all casualties said that they would help others in a real incident of this type, no casualties specifically stated that they would not have helped others if the situation had been real.

DISCUSSION

The accounts from volunteers during field exercises provide a valuable insight into the way casualties experience the decontamination process, albeit under exercise rather than real-life conditions. The main finding was that casualties wanted clearer instructions about how to go through the decontamination showers and better explanation about why decontamination was necessary and what would happen to them during the decontamination process. These findings were consistent across all the exercises, with a lack of communication from responders and a lack of practical information being the most commonly reported themes in each of the exercises. Ineffective communication and lack of practical information from responders were reported by several casualties as contributing directly to their anxiety. This is a key finding, as it is likely that if communication from responders and the provision of practical information

are important during the relatively stress-free environment of an exercise, they will be even more important during a real incident.

Lack of communication with casualties is as would be expected, based on the finding that few decontamination guidance documents for responders contain a strategy for communicating with casualties.¹¹ Another interesting finding, which is to be expected based on the recent review of guidance documents for responders, is that responders were perceived as having used a “control” strategy, which resulted in the casualties feeling they were being treated with a lack of respect and in a perception that information was not prioritized. Their perception of the “control” strategy is evident in quotes in which casualties refer to being “treated like animals, no communication”; “like I was a sheep being herded!”; and in quotes that indicate that they perceived the responders as showing a lack of respect for casualties: “services just kept throwing in more suits and telling us to speed up and get out,” and “if we attempted to address emergency staff, we were just turned away.” This perception of a “control” strategy could have serious consequences during real-life incidents involving decontamination, as the perceived lack of respect shown by responders could result in a belief that the actions being taken by responders are illegitimate; this might increase the risk of noncompliance with responder instructions.¹²

Another factor contributing to stress during the exercises was a lack of privacy offered to the casualties. It is likely that concerns about privacy would be even greater during a real incident, as casualties would not be allowed to keep their underwear on. Therefore, many more casualties might refuse to comply with the showering process. This is again as would be expected, based on previous findings that have shown that a lack of privacy contributes to noncompliance during incidents involving decontamination.⁷⁻⁹

Finally, although casualty volunteers were not directly asked whether they would help others during a real incident, several casualty volunteers spontaneously said that they were willing to help each other during the exercises and that they would expect to give help to and receive help from others in a real incident. This would be expected based on findings from research into real-life disasters that indicate that cooperation rather than panic is common.¹⁷ One explanation is that such mutual aid is a function of the extent to which survivors develop a shared identity based on their common fate.¹³

There were several limitations with the current research. First, although exercises attempt to replicate real-life incidents as closely as possible, certain variables (especially anxiety) are likely to be quite different during real-life incidents. Despite this, however, the findings relating to the casualties’ needs for communication and privacy are similar to those reported following real-life decontamination incidents,^{8,9} which suggests that exercises provide a fairly realistic environment in which to examine the public’s reactions to the decontamination process.

A second limitation is that the analysis reported here does not contain any numerical data, and therefore it was not possible to test any hypotheses in this article. However, the feedback collected after these 5 exercises did contain quantitative data, allowing certain hypotheses to be tested, the results of which are reported elsewhere.¹⁵

Finally, an analysis of data gathered purely for the practical purpose of exercise evaluation cannot, by definition, examine possible psychological processes that lie behind the outcomes. Thus, while the finding that the casualties gave aid to each other and expressed dissatisfaction about the emergency services may be consistent with some predictions of the social identity approach, there may be other explanations. Specifically, there was no test included of the role of psychological group membership, which is predicted to play a role in real-life CBRNE incidents involving decontamination.¹² Future exercises that involve mass decontamination might therefore be evaluated using questionnaire methods that are more theoretically driven, since the argument is that by taking into account key social psychological variables, such as group identity, perceived legitimacy, and sense of agency (as well as established measures such as anxiety), better, more socially realistic, and more effective procedures for decontamination can be designed.¹⁸

CONCLUSIONS

The findings presented in this article support the idea that field exercises involving mass decontamination can, in principle, provide valuable insights into the ways members of the public experience the decontamination process. The similarity between the findings presented in this article and findings from real-life incidents involving decontamination suggest that exercises provide a realistic setting within which the experiences of members of the public can be examined.

Future research should strive to examine in more detail the ways members of the public experience the decontamination process and determine which types of communication strategies employed by responders are most effective in decreasing casualties’ levels of anxiety and in increasing their rates of compliance with the procedures that are recommended. This will facilitate the development of evidence-based communication strategies for emergency responders to reduce noncompliance and anxiety among members of the public during real-life incidents involving mass decontamination. Meanwhile, emergency responders should ensure that they provide sufficient explanation about the need for decontamination and clear instructions about what members of the public are expected to do during the process, because these actions are likely to reduce anxiety about decontamination and increase compliance among members of the public during real-life incidents involving mass decontamination.

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REFERENCES

- Alexander DA, Klein S. The challenge of preparation for a chemical, biological, radiological, or nuclear terrorist attack. *J Postgrad Med* 2006;52:126-131.
- Cornish P. *The CBRN System: Assessing the Threat of Terrorist Use of Chemical, Biological, Radiological and Nuclear Weapons in the United Kingdom*. London: Chatham House; 2007.
- Regis E. Evaluating the threat: does mass biopanic portend mass destruction? *Sci Am* 2001;285:21-23.
- Clarke SFJ, Chilcott RP, Wilson JC, Kamanyire R, Baker D, Hallett A. Decontamination of multiple casualties who are chemically contaminated: a challenge for acute hospitals. *Prehospital Disast Med* 2008;23:175-181.
- Koenig KL, Boatright CJ, Hancock JA, et al. Health care facility-based decontamination of victims exposed to chemical, biological, and radiological materials. *Am J Emerg Med* 2008;26:71-80.
- Holloway HC, Norwood AE, Fullerton CS, Engel CC, Ursano RJ. The threat of biological weapons: prophylaxis and mitigation of psychological and social consequences. *JAMA* 1997;278:425-427.
- United States Fire Administration. *Fire Department Response to Biological Threat at B'nai B'rith Headquarters*. Washington, DC: United States Fire Administration; 1997.
- Vogt BM, Sorensen JH. *How Clean Is Safe? Improving the Effectiveness of Decontamination of Structures and People Following Chemical and Biological Incidents*. Oak Ridge, TN: Oak Ridge National Laboratory; 2002.
- Hanley C. Residents sickened by pesticide cloud; ag officials insider changing rules. *Latino News* website. December 7, 1999. http://wearcam.org/decon/decon_like_rape_dec99.html. Accessed October 7, 2010.
- Taylor KM, Balfanz-Vertiz K, Humrickhouse R, Jurik C. Decontamination with at-risk populations: lessons learned. *Internet Journal of Rescue and Disaster Medicine* 2009;9(1).
- Carter H, Drury J, Rubin GJ, Williams RJ, Amlôt R. Communicating with the public during incidents involving mass casualty decontamination: highlighting the gaps in preparedness and response. Submitted.
- Drury J. Crowd dispersal. *CBRNe World* 2009;Spring:40-42.
- Drury J, Cocking C, Reicher S. The nature of collective resilience: survivor reactions to the 2005 London bombings. *International Journal of Mass Emergencies and Disasters* 2009;27:66-95.
- Fritz CE, Williams HB. The human being in disasters: a research perspective. *Ann Am Acad Pol Soc Sci* 1957;309:42-51.
- Carter H, Drury J, Rubin GJ, Williams R, Amlôt R. The effect of communication on anxiety and compliance during mass decontamination. Submitted.
- Pope C, Ziebland S, Mays N. Analysing qualitative data. *BMJ* 2000;320:114-116.
- Clarke L. Panic: myth or reality? *Contexts* 2002;1:21-26.
- Carter H, Drury J, Rubin GJ, Williams R, Amlôt R. Applying theories of crowd behavior to improve the management of mass decontamination. Submitted.

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