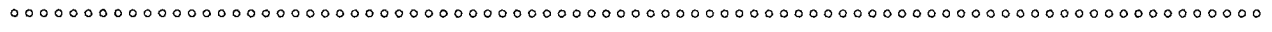# Applying Risk Perception Theory to Public Health Workforce Preparedness Training

Daniel J. Barnett, Ran D. Balicer, David W. Blodgett, George S. Everly, Jr, Saad B. Omer, Cindy L. Parker, and Jonathan M. Links

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Since 9/11, public health has seen a progressive culture change toward a 24/7 emergency response organizational model. This transition entails new expectations for public health workers, including (1) a readiness and willingness to report to duty in emergencies and (2) an ability to effectively communicate risk to an anxious public about terrorism or naturally occurring disasters. To date, however, research on readiness education for health department workers has focused little attention upon the *risk perceptions* that may influence their willingness to report to duty during disasters, as well as their ability to provide effective emergency risk communication to the public. Here, we apply risk perception factors to explore the potential barriers and remedies to effective public health workforce emergency response.

KEY WORDS: all-hazards, health departments, preparedness, risk perception, training

The post-9/11 era has seen an unprecedented expansion of public health emergency response roles, significantly altering the job descriptions of the public health workforce. Public health workers are now considered vital elements of the emergency preparedness and response infrastructure.[1] The Centers for Disease Control and Prevention (CDC) adopted core competencies for public health workers, developed by Columbia University School of Nursing Center for Health Policy.[2] One of the core competencies for all public health workers deals with risk communication in emergency response[2]; these risk communication roles are not necessarily media based, but also may involve any type of interaction with the general public in emergencies. In addition, the CDC-adopted core competencies require all public health workers to describe and demonstrate their in-dividual functional response roles, as well as to apply creative problem-solving and flexible thinking within their functional responsibilities.[2]

⊛ Risk Perception Among Risk Communicators—An Unaddressed Vulnerability

A fundamental tension exists, however, between these crucial roles of public health personnel, and their ability and willingness to assume them. In the face of an escalating public health workforce shortage[3] that

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threatens public health preparedness efforts,[4] the post-9/11 environment has thrust health department employees into new emergency response expectations more traditionally seen in emergency medical services, law enforcement, and fire service contexts.[5] Concepts such as incident command systems (ICS) are not necessarily well understood by public health agencies.[6] Lack of consistent, approved training methodologies[7] and disparities in funding allocation[8] may also serve as barriers, creating varying levels of preparedness in different public health institutions.

In addition to preparedness resource and knowledge barriers, a fundamental disconnect can exist in the way public health workers *perceive* risks. For example, public health professionals in the United States have a tendency to perceive their own local communities to be at low risk for a bioterrorism event, even though a majority of these workers believe that a bioterrorism event is "very likely" or "somewhat likely" to occur somewhere in the United States within the next 5 years.[9]

Such perceptions can have significant implications for public health workers' buy-in and sense of relevance to preparedness education initiatives, as "public health professionals are unlikely to value or seek out preparedness training if they believe an intentional release of a biological weapon is unlikely in their community."[9] Through training needs assessment surveys of public health practice partners in the Mid-Atlantic region, the Johns Hopkins Center for Public Health Preparedness has observed that workers in its public health department training network often view their individual roles as having minor importance in their agency's overall response to a public health emergency (Johns Hopkins Center for Public Health Preparedness, unpublished data, 2005). Public health employees working at extramural sites, such as school-based health nurses, may have an initial tendency to feel isolated from their health department–based counterparts in organizational preparedness efforts.[10]

A disconnect among response expectations and public health employees' perceived roles and abilities to respond may not be manifested in daily noncrisis settings, but will likely surface during public health emergencies. This disconnect may manifest in a crisis as (1) an unwillingness to report to duty if called, (2) an inability to function adequately because of the perceived risk,[10] and/or (3) an insufficient capacity to be effective risk communicators.

To address these potential response deficiencies effectively, we must first understand them from public health workers' perspectives. We suggest that risk perception theories should be applied to understand the factors that impact public health workers' perceptions of public health emergencies. This understanding can shed necessary light on public health workers' ability and willingness to respond to disasters, and their capacity to serve as risk communicators to an anxious public.

● Applying Risk Perception Theories

Several theories of risk perception have been suggested and may be useful in identifying the main barriers to public health personnel adopting an emergency responder role; one prominent model has proposed the labels "hazard" and "outrage" to refer, respectively, to the technical and the nontechnical aspects of risk.[11] In this model's terminology, *hazard* is defined as the product of risk magnitude and probability, while *outrage* is a function of other peripheral influences independent of the actual risk, such as perceived authority, trust, and situational control.[11] The perceived risk, according to this concept, is the summation of actual risk and the "outrage" derived from these peripheral influences.

Other models use different terminology to describe peripheral influences impacting risk perception.[12–14] One such model, for example, describes two main axes that determine risk perception: familiarity with the risk (unknown risk being perceived as higher risk) and level of dread associated with the risk.[15] As the concept of "dread" in this model suggests, risk perception can be viewed as an ongoing interplay between affective (risk as feeling) and analytic (risk as analysis) processes.[16] Recognizing these dual lenses of emotion and logic may help us understand disaster-related risk perceptions; for example, events and consequences linked to powerful feelings can be overwhelming for people, irrespective of low probability of occurrence.[16,17]

We must therefore recognize that public health employees are not just purveyors of risk communication for their communities, but *themselves* represent a community with specific perceptions that must be addressed in the context of emergency readiness training. Based on these risk perception models, a number of contributing peripheral factors may have an important practical influence on how public health employees would respond in a crisis. We will identify some of the factors that may have such an impact on how threats are perceived in the context of public health emergency preparedness efforts.

● Risk Perception Modifiers: Barriers to Effective Public Health Emergency Response

Some potential barriers to effective response are more physical than perceptual: examples of resource-related physical constraints can include inadequate

transportation access to emergency response worksites, or unavailability of backup caregivers for dependents of public health employees.

Certain *risk perception* issues may have a critical impact on the public health workforce's response to a crisis. These factors, or modifiers, stem from a number of features associated with elevated risk perception according to the theoretical models described above. When insufficiently addressed, the following factors could present barriers to effective public health workforce emergency response:

1. *The safety and well-being of their family members is a primary concern to public health workers (as it should be).* Anxiety about the welfare of family members in a crisis can dramatically impact a public health response worker's sense of personal control, and has been shown to have a significant impact on workers' risk perceptions.[18]

2. *Intentional public health threats, such as bioterrorism, may be as frightening to certain public health workers with little understanding of them, as they are to the general public.* An information void during such an emergency may be a potential major determinant of risk perception.

3. *Uncertainty regarding working environment safety may increase an employee's sense of dread;* this could in turn shape the ultimate perception of the risks associated with workers' roles in a given emergency.

4. *Unclear expectations of role-specific emergency response requirements can contribute to a feeling of dread, reducing employees' sense of control and increasing their feeling of vulnerability associated with their response duties.* As a result, some public health workers might hesitate to respond in the face of doubts about their ability to adequately participate.

5. *Inadequate emphasis on the critical value of each employee to a coherent agency response effort can contribute to a sense of irrelevance or detachment with respect to emergency response duties.* It might be easy for an administrative aide in a health department of hundreds to feel like his or her participation in the effort will not be missed.

6. *Insufficient emphasis on stress management techniques can heighten employees' sense of dread.* This dread could result from an employee's sense of lacking personal control.

● Overcoming Risk Perception Barriers: Suggested Remedies

Naturally, practical barriers (eg, transportation and care for dependent family members) must be addressed, for example, by employers' provision of alternate transportation and by employees' preevent designation of alternate caregivers. In addition, in light of the needs listed above, readiness training for public health workers should also address their risk perceptions toward emergencies, not just the factual or procedural elements of their response roles. Furthermore, public health workers need to understand the risk perceptions of a concerned public toward emergencies and recognize the peripheral factors that can modify the public's risk perceptions.

Addressing these modifying influences can augment public health workers' ability to empathize with the risk perceptions of an anxious public, and consequently help to narrow the gap between perceived risk and actual risk: that is, aid in effective risk communication for the community. Below is a list of corresponding potential remedies to the risk perception barriers enumerated above. These barriers and remedies are collectively summarized in Table 1.

1. *Family preparedness* for public health workers may be one of the most critical modifiers of risk perception in this context. Preparing a kit, establishing

TABLE 1 ○ **Perceived barriers to response with possible solutions**

Perceived barriers to response	Possible solutions
Perceived threats to the safety and well-being of family members	Provide family preparedness training, including preparedness kit assembly
Misunderstanding of the risks of intentional public health threats	Teach public health workers where to get additional information and regular status updates
Lack of understanding about the safety of a work environment in an emergency	Provide genuine assurances before a disaster occurs that all necessary personal safety measures will be available, including personal protective equipment, prophylaxis, and treatments
Unclear understanding of the worker's role in emergency response	Create clear expectations about the role the employee will play and what is expected
Inadequate emphasis on the worker's unique contribution to the response	Emphasize the relevance of an individual's response roles
Insufficient emphasis on stress management techniques	Coach employees on stress management techniques, self-care, and resources available to them. Create an atmosphere of acceptance for self-care

a family communication plan, and educating one's family about home response to potential threats (eg, what it means to shelter in place) can provide public health workers with added psychological security to do their assigned duties in an emergency. Knowing that one's family is optimally protected may, according to these models, alter the way that responders view their own risks and their ability to communicate these risks to others. Trainings must address barriers to compliance with guidance on family preparedness activities, such as inability of the worker to recognize the necessity of such measures.

2. *Teaching public health workers where to get additional information and regular status updates* during a crisis may impact their sense of control by potentially clarifying an otherwise cloudy scenario. This, again, may have an independent effect on workers' risk perceptions and should therefore be incorporated into emergency readiness trainings.

3. *Providing genuine assurances that all necessary personal safety measures are available* once an employee reports to duty can potentially decrease the perceived risk, independent of the actual threat. Personal protective equipment, preparedness kits, and rapidly available prophylactic treatment designated for public health responders are among these measures. Public health department leadership must communicate these assurances to all employees *before* a crisis occurs.

4. *Creating clear expectations for employees' response-related needs,* such as predetermined shift lengths; provision of food and shelter for workers on duty; and ensuring transportation access to and from assigned shifts can increase the sense of control and reduce feelings of vulnerability associated with response duties. These expectations must be fully incorporated into employees' job descriptions.

5. *Emphasizing the relevance of an individual's response roles* to successful crisis mitigation and resolution may increase an employee's sense of control. This relevance should be connected to assurances that employees' response duties will be consistent with their accustomed skill sets, a fact that must be emphasized in all preparedness trainings.

6. *Coaching employees on stress management techniques and resources* before, during, and after an event can potentially impact their risk perception by augmenting their sense of control and making a situation feel more manageable. These resources should be used in noncrisis times, not just during emergencies; caring for the caregiver must be a theme stressed in preparedness trainings and communicated regularly by health department leadership.

Meeting Risk Perception Needs of Public Health Responders: Expanding the Evidence Base

The evidence base for public health employees' risk perceptions and risk communications capacities is scant at present, as the majority of the studies addressing willingness and ability to report to duty have focused on clinical healthcare staff.[19-21] To expand the evidence base of factors significantly modifying public health employees' willingness and ability to respond to disasters, we suggest a comprehensive research approach. This involves detailed survey assessments of the public health workforce's risk perceptions and attitudes toward a variety of threats, before and after training interventions specifically directed at the various risk perception modifiers listed above. Impact assessments can also focus on employee response rates in exercises and real-world disasters with respect to these modifiers.

Applying and evaluating risk perception theories in these ways may require a paradigm shift in public health workforce preparedness educational models. Understanding public health professionals' risk perception of encountering a bioterrorism event is important for creating and delivering effective educational programs, since these perceptions may influence the professionals' likelihood of seeking out relevant information and participating in preparedness activities.[22] This could involve a transition from currently used fact-based and role-based readiness training approaches, to training models that more explicitly address health department employees' anxieties and perceived barriers toward emergency response in addition to their informational needs. In this sense, risk perception theory may provide a vital new analytic framework for developing a public health workforce that is more able *and* willing to respond to emergencies.

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