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Disaster Research Center

MISCELLANEOUS REPORT #71

REPORTING FOR DUTY?  
A SYNTHESIS OF RESEARCH ON  
ROLE CONFLICT, STRAIN, AND  
ABANDONMENT AMONG  
EMERGENCY RESPONDERS DURING  
DISASTERS AND CATASTROPHES

Joseph E. Trainor  
Lauren E. Barsky

2011



# Reporting for Duty?

A Synthesis of Research on Role Conflict, Strain, and Abandonment among Emergency Responders during Disasters and Catastrophies

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# Reporting for Duty?

## A Synthesis of Research on Role Conflict, Strain and Abandonment among Emergency Responders during Disasters and Catastrophes

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by

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with

Dr. Lauren E. Barsky, Ph.D.

### Cover Photography:

Top Left: Red Cross Food Distribution during Hurricane Katrina. Disaster Research Center

Top Right: New Orleans LA 2-27-06 Disaster Medical Assistance Team (DMAT) members tend to patients being treated in this acute care tent that is equipped to handle most medical emergencies. This DMAT site on Canal Street is equipped to do Resuscitation, Minor Surgery, Intensive Care, Observation Recovery, Acute Care, and has 2 Pharmacies and is a part of FEMA's assistance to those injured by Hurricane Katrina.. Marvin Nauman/FEMA photo

Bottom Left: Anniston, AL, April 23, 2010 -- Mayor Richard Hildreth (pictured front-left), of Pacific, Wash., assists his team of emergency responders transport a simulated survivor through the initial stage of decontamination during an exercise. Hildreth attended training at the Center for Domestic Preparedness (CDP), in Anniston, Ala., and has completed several CDP courses over the past two years. CDP training instructs responders to determine their response, select required equipment, personal protective levels, and decontamination procedures. Learn more about the CDP at <http://cdp.dhs.gov>.

Bottom Right: Houston, TX, September 24, 2008 -- With electricity outages continuing, Houston increases its police presence by bringing in hundreds of officers from other Texas cities, allowing Houston police a normal schedule since the evacuation of the city. The Federal Emergency Management Agency (FEMA), through its Public Assistance (PA) programs will help local governments during disasters and pay for overtime and other associated costs to keep city services during a disaster. Leif Skoogfors/FEMA

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Despite the support of these individuals and organizations, the contents of this report are the sole responsibility of the authors and do not necessarily reflect their opinions or perspectives.

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## Executive Summary

The aim of the following report is to provide a systematic and scientific analysis of research on whether or not emergency responders will be willing to report for duty in the case of a catastrophic disaster. Through the report we focus on the prevalence of three of the key issues employees might face during a particularly serious event including: role conflict, role strain and role abandonment. In the discussion that follows, we summarize findings and conclusions from over one hundred reports, articles, documents, and analyses related to these issues. The research is not easy to decipher given the variety of different hazards, methodologies, and foci that researchers have. After careful consideration however; it is possible to draw several conclusions on which we provide more detail in the report's body.

In general, studies that ask people how they might react in hypothetical situations, typically called perception studies, tend to conclude that widespread role abandonment will occur in many different types of hazards. On the other hand, research that looks at actual responses to live events, typically called behavioral studies, suggests the problem of role abandonment will be minimal except under very specific conditions, such as those that were present in the case of the New Orleans Police Department during Hurricane Katrina. Both types of studies show that both role conflict and role strain are widespread and could have consequences for overall effectiveness and efficiency.

In attempting to reconcile the differences in the conclusions that perception and behavioral studies draw, it must be noted that both approaches are imperfect in their ability to fully predict the limits of what responders will do during particularly novel and transmissible threats. After careful review and analysis we suggest that in most circumstances role abandonment will be less significant than many perception studies predict. This assertion comes in large part due to difficulties in the overly artificial construction of scenarios. The conclusion is further reinforced by comparing predicted rates of abandonment for events where behavioral data and experiences are available such a natural disasters. In these cases, it is common for perception studies predictions' to far exceed typical behavioral patterns.

More important than the predicted rate of abandonment, we conclude that most agencies' approaches to role abandonment are flawed because they think about this phenomenon as primarily linked to the limits of individuals during different kinds of hazards. The focus on individual

shortcomings underestimates the commitment of the response community and de-emphasizes the importance of organizational design and systems in determining levels of role conflict, strain, and ultimately abandonment. Research often concludes that when proper plans, policies, and systems are in place it can be expected that responders will report for duty.

Based on this assertion, we provide details on four important organizational approaches to facilitating responder support and reducing the residual threat of role abandonment. These include:

- 1) a family safety and support framework,
- 2) increased attention on employee safety,
- 3) increased focus on job expectations and culture of responsibility, and
- 4) the need to effectively channel the potential of volunteers..

## Introduction and Motivation

In the aftermath of disasters, society depends on emergency workers to help communities respond and recover<sup>1</sup>. In our communities' worst moments, these individuals are called on to fully devote themselves to the public good. They are called on to selflessly serve their neighbors. The call to duty is not new as many of these people risk their lives on a regular basis. They run into burning and/or collapsed buildings to save lives. They chase after unknown assailants and face down gunfire to protect the rest of us. Even so, in the wake of Hurricane Katrina questions were raised about the limits of the response community's devotion, as reports emerged that a number of members of the New Orleans, Louisiana Police Department abandoned their posts. Surveys after H1N1 also raised concerns as they concluded that large numbers of emergency responders might not be willing or able to work after a serious pandemic. As a result, planners and managers from the public and private sectors alike have been asking the question, "Will our people show up when we need them most?" The goal of this analysis was to have trained social scientists provide emergency planners with a user friendly and accurate summary of research on whether or not emergency responders will "report for duty" in the event of a major disaster or catastrophic event.

The analysis was conducted by the Disaster Research Center (DRC) at the University of Delaware as part of the National Capital Region and FEMA Region III Regional Catastrophic Preparedness Grant Program (RCPGP) aimed at improving the integration of catastrophic planning efforts among states in and around the National Capital Region (NCR). Specifically, this report is an extension of ongoing work to understand likely human behavioral responses to a catastrophic disaster incident if one should occur in the NCR. Those who are interested in these findings might also want to read the other analyses that have been completed and/or are under way. Most directly, this effort is a spin-off of a parent project called: Population Behaviors in Dirty Bomb Attack Scenarios that was conducted by the Center for Survey Research at the University of Virginia.

The population behavior project was a survey, conducted in the late months of 2009, focused on how households might react in the event of a dirty bomb. The survey results are wonderfully rich and are a great example of how researchers and practitioners can work together to produce results that matter for our nation. The final dataset includes responses from a random sample of 2,657 landline and cell phone numbers from NCR localities in Northern Virginia, Maryland, and the District

of Columbia. The survey asked how people would respond to expertly designed hypothetical scenarios involving 'dirty bombs'. Each respondent was presented with two of three scenarios that ranged from a single 'dirty bomb' released in the NCR area but not nearby to a scenario that included multiple dirty bombs released all over the NCR and exposing everyone in the region to an unspecified level of radiation. These three basic scenarios were also varied on four key factors: the level of hazard, the location of the respondent (at home or at work), whether there was prior notice of the event given by the attackers, and the source of information and instructions about the event. In addition, questions were asked about community attachment, household type, emergency preparedness, expectations for emergency services, catastrophic education efforts, sources and channels of information, confidence in emergency management, prior experience with disasters and a number of social and demographic factors.

The motivation to develop the current report came in 2010 after UVA completed the Population Behaviors in Dirty Bomb Attack Scenarios study. As is often the case, we took the results to professional and academic conferences as well as meetings to show others what we found. Most attendees were very interested and were excited about the potential to use the information for subsequent plans and planning. As is often the case with good research however, the conversations inspired new questions, some of which the initial work was never designed to answer. One of the questions that came up several times was "What about the emergency response community?" The audiences were grateful for the information about how the public might respond, but they wanted to know if their responders would show up in a major catastrophic event.. The initial survey did not target responders and we had not envisioned this type of question. Part of the group was familiar with social science disaster research suggesting that role abandonment was rare, but we were unable to locate an up-to-date comprehensive review of that material. Furthermore, the answer seemed less clear due to emerging research, primarily in the public health community, that suggested that many health care workers would not be willing to work in the event of a pandemic. Some media coverage of these studies was reporting that seventy percent of the healthcare workforce would be either unwilling or unable to provide services in a major public health emergency.<sup>2</sup> If this were true for public health, could the same be true for a terrorist event? Might it be possible that in the face of an attack to the NCR we would not be able to rely on the men and women in emergency services? Had the people in these positions changed over time and become less willing to serve? At the same time,

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what if these numbers were not realistic? What might we be missing? Are there differences between pandemics, terrorist events, and natural disasters? The case of the New Orleans police department further reinforced the need to review these issues. If significant levels of abandonment could happen in New Orleans, could it occur in other places as well?

Given the importance of these matters for those considering catastrophic scenarios, we felt that the issue warranted a full review. In the pages that follow, we present our summary of the research on workforce conflict, strain, and abandonment during disasters. Unlike other studies that report findings from a single survey, set of interviews, or analysis, this report provides a review and interpretation of hundreds of studies that have focused on these issues. The research dates from as far back as 1950 and is as current as 2010. We cover natural hazards, nuclear hazards, terrorist events, and even public health events. We look at studies where people were asked what they might do in hypothetical scenarios as well as studies that asked people what they actually did after real events. Finally, we provide a set of recommendations, drawn from research and practice on how disaster organizations through planning and preparation can combat the potential threats of role conflict, strain, and abandonment.

In [Appendix I](#) we detail exactly how we located the sources that are included in this document. It is important to provide these details, because our only goal in conducting this analysis was to sort through all of the information and provide as succinct and accurate an interpretation as possible. We wanted to provide the best information so that others could use it to make our communities and nation a safer place. We believe that the procedure we used was rigorous and systematic. By describing it in as transparent a way as possible we leave judgment to the reader.

## Part I: Exploring the Phenomena of Role Strain, Role Conflict, and Role Abandonment

Before we begin discussing whether or not emergency responders or public safety workers will be willing to report to work during disasters, we need to quickly define a few terms. Most of this report is about problems emergency personnel might encounter as they fulfill their “roles.” Several terms are used to describe how roles can lead to tension in our lives. It is important to distinguish between these different kinds of tensions so that we can describe how common each is and can talk about potential consequences. Below is a brief explanation of each term. For an extended discussion of these terms see [Appendix II](#).

- **Role** is a term social scientists use to describe all of the expectations placed on a person because of their position in a group or organization. In this report, we are going to talk about three types of problems people may have in meeting these expectations during a catastrophe: strain, conflict, and abandonment.
- **Role Strain** describes a situation when it is difficult to meet the multiple demands of a single role or the more serious expectations of a role.
- **Role Conflict** refers to the times when a person must deal with the difficulties of filling multiple roles.<sup>3</sup> In lay terms, these are the moments when we “wear two hats.”
- **Role Abandonment** is less of a situation than it is a response to the situations we already described. It is a label used to describe when a person dismisses the responsibilities associated with his or her role. In simple terms, a person decides to quit doing the things that are expected of him or her.

*Several terms are used to describe how roles can lead to tension in our lives. It is important to distinguish between these different kinds of tensions so that we can describe how common each is and can talk about potential consequences.*

The research is clear that we need to separate role conflict and role strain as contexts with the potential to motivate role abandonment, which is only one of several possible responses. It is not until the moment that a responder quits his/her job and/or disappears that role abandonment has occurred. Recognizing this distinction is important because there are many possible responses to the

stresses that roles create that are not quite so drastic. A person might compartmentalize, might underperform, might delegate some responsibility, might fail to complete some aspects, might develop a hierarchy of obligations across all roles, or might even turn to others to develop mutual support.<sup>4</sup> Further, it is quite common in disaster for expectations to shift and change and for individuals to make adjustments or adaptations to their roles.<sup>5</sup> As anyone in emergency management knows, not everyone responds the same way to stress and tension.

We should expect that there be some level of variation in responses. Some people will do just fine, some will adapt, and some will not fare as well. In the next section, we discuss how frequently we see role strain, conflict, and abandonment

*As anyone in emergency management knows, everyone does not respond the same way to stress and tension. We should expect that there be some level of variation in responses.*

## Prevalence

The research is clear that role strain and conflict are widespread. A number of studies suggest that these conditions have the potential to seriously and significantly affect the quality of disaster response. Role abandonment literature, on the other hand, is fairly complicated to interpret. In the next section we present conclusions on the prevalence of each type discussed above as well as the major sources of each as reported in the literature.

## Role Strain

When a person has a difficult time negotiating the demands expected of him/her when fulfilling a role we call that tension role strain. Researchers consistently find that significant numbers of emergency managers and emergency responders experience tension when dealing with their work expectations during disaster situations. Key sources of role strain come from: 1) concerns about personal health and safety, 2) concerns about the absence of accurate and timely information, 3) a reduced belief in organizational continuity, and 4) a perception that expectations about what a person can or should accomplish during a disaster were unreasonable or unclear. The presence of role strain to one degree or another has been observed across the full range of natural, technological, and man-made disasters and has been articulated in perception and scenario based studies.

## *Role Conflict: Work-Family*

Role conflict refers to the times when a person must deal with the difficulties of having multiple roles. The literature is equally definitive when it comes to role conflict. People often experience tensions while attempting to negotiate the expectations that different roles place on them, especially when it comes to balancing work and home. Most often the source of role conflict is uncertainty regarding the safety of one's family and friends<sup>6</sup> and a feeling that the responder should be doing something to help them. Similar findings have been replicated during tornadoes<sup>7</sup>; public health emergencies<sup>8</sup>; and earthquakes<sup>9</sup> as well as numerous other natural disasters. Responders have reported concerns that they might contribute to their families' and friends' risk of exposure to contagious or transferable hazards. For example, one study based on the experiences of Canadian nurses during SARS suggested that staff struggled a great deal to cope with the desire to fulfill obligations in the workplace and concerns for family during infectious disease outbreaks. Nurses even went as far as to describe deep-seated doubts over having made a career choice that might increase their families' and friends' risk of infection.<sup>10</sup>

## *Role Conflict: Two Hat Syndrome*

A second type of role conflict that many have not previously considered was identified in the literature. While most studies focus on tensions between family and work, recently a professional only form of role conflict, referred to as "two-hat syndrome," has emerged as an object of study. Two-hat syndrome is related to the trend in public safety for professionals to hold multiple public safety positions. Sometimes these roles cut across fields, such as a police officer that also works part-time as an EMT. Other times an individual may hold positions in multiple departments in a common geographic area. This pattern means that conflicts may arise when career personnel are the core for one organization and also make up a considerable portion of the expected part time or volunteer staff in other agencies or jurisdictions. One study in metropolitan Atlanta indicated that, on average 22.2% of fire and rescue department personnel also work for at least one other public safety

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agency.<sup>11</sup> While the depth of research is not enough to make definitive statements about two-hat syndrome, these observations should be taken seriously and further research and analysis should be done to understand this reality so that emergency organizations can plan accordingly.

## *Role Abandonment*

The results of role abandonment studies are less clear. On one side of the discussion, are those findings that argue role abandonment by public and government officials is little more than a myth; reinforced through popular culture and erroneous reporting by the mass media.<sup>12</sup> On the other side, are those findings from studies that report on the dire consequences of assuming that first responders will be available during major catastrophic events.<sup>13</sup> Some studies from this perspective report that as many as 68 percent of responders will be unwilling to work.<sup>14</sup> Given that different scientists come to drastically different conclusions on this issue, one might question the ability of science to predict patterns of role abandonment during disasters. Most of the confusion can be understood however by separating analyses focused on responders' behaviors and actions after actual events from those that provide scenarios and ask responders to predict how they might act. When we look at these sets of conclusions separately, important patterns and insights emerge. Below we present these patterns and propose a framework for reconciling the differences in perspective.

*Much of the confusion and disagreement between studies on role abandonment can be understood if we examine the methodological differences between studies.*

## *Findings from Behavioral Research*

### Benefits of Behavioral Research

Most behavioral research on role abandonment has been developed from observations made at disaster sites or through interviews with governmental and organizational officials in the aftermath of specific disaster events. The benefit of this design is largely in its simplicity. A disaster has happened and this creates a natural laboratory where researchers can document and analyze what behaviors, thoughts, and actions were actually experienced.

## Limits of Behavioral Research

The difficulty of behavioral research is that findings are limited by the range of events that have occurred and those that have been researched. The ability to cover a sufficient number of events over time determines the degree to which general conclusions can be drawn about behavior. Over the last half century, an impressive number of studies have been conducted on the phenomenon of role abandonments. While traditionally, these studies have focused on natural disasters, such as tornadoes,<sup>15</sup> hurricanes,<sup>16</sup> and earthquakes,<sup>17</sup> more recently public health emergencies and pandemics have also been explored.<sup>18</sup>

## Conclusions from Behavioral Research

Studies that focus on behavioral responses to disaster events typically find that role conflict and role strain **do not** lead to significant numbers of officials who abandon their work responsibilities.<sup>19</sup> These studies often acknowledge that role conflict or strain were present, but go on to find that they rarely lead to abandonment behavior.<sup>20</sup> Those that have identified documented instances of role abandonment typically suggest that the cases represented a very small minority;<sup>21</sup> that consequences for the system were for the most part minimal<sup>22</sup>; and/or abandonment was most often in favor of organizational role.<sup>23</sup> The case of New Orleans Police Department during hurricane Katrina is the only notable exception to this pattern we were able to find in the literature.

In the case of New Orleans, 240 of 1,450 officers on the force reportedly never showed up for work. Of those, 51 officers were fired for “abandoning their posts”.<sup>24</sup> Depending on which number one uses, that means between 3% and 16% actually abandoned their posts. As an “outlier” or a-typical behavioral response, NOLA has great value and can provide us with important insights into the limits of what we typically see in responders. The presence of meaningful abandonment in New Orleans should be examined in detail in order to consider under what conditions the general patterns of human response might turn out differently. More importantly it should be understood so that actions can be taken to avoid similar outcomes in other places.

*Analyses focused on the NOLA police response to Katrina suggest it is more accurate to conclude that this case of role abandonment had much more to do with pre-disaster problems in the organization than problems with individuals.*

While there are no detailed scientific analyses focused on this event to date, many observers have suggested that this case of role abandonment was related to problems in the NOLA police organization.<sup>25</sup> In other words, the disaster did not reveal the weaknesses of individuals' commitment or dedication; it exacerbated existing organizational problems and failures. The event served as a breaking point for an already struggling system. Contributing factors surrounding the outcome that have been mentioned included: no meaningful resource plan, lack of officer experience and training, low morale, and chronic understaffing.

## *Findings from Perception Research*

### Benefits of Perception Research

Perception studies are an alternative method to understand the prevalence of role abandonment. Contrary to behavioral studies, perception studies tend to be more quantitative and to target large numbers of responders. Typically a scenario is provided and respondents are asked to reflect on what they think they would do given that set of conditions. There are several benefits to this type of design. First, large datasets can be constructed and mathematical calculations and analysis produced. The ability to quantify behavior and provide numeric predictions has made them a favored tool for planners. Second, "what-if" scenarios can be explored without an actual event. Given the ability to test "what-if" scenarios, perceptions studies tend to be used more frequently to address hazards that are less common and therefore more uncertain, such as pandemics, public health emergencies, and biological, radiological, or nuclear terrorist attacks. Because perception studies are not tied to a specific set of events, they are also often able to ask questions that force direct comparisons between different hazard types.

### Limits of Perception Research

The difficulty with perception designs is that the scenarios, to a large extent, determine the responses that are produced. Unlike behavioral studies where people are actually experiencing the event, the hypothetical content that is included or excluded from a scenario has a significant effect on the responses. In other words, because respondents are asked to pretend they are in a scenario that the interviewer constructed there is a certain degree of artificiality to the exercise. If done well however, perception studies can be extremely useful.

## Conclusions from Perception Research

Perception studies are more likely to conclude that role abandonment will be a major problem during disasters. We were able to find a range of predictions that suggest between 20%<sup>26</sup> and 68%<sup>27</sup> of responders would be unwilling or unable to work during one type of threat or another. According to these findings, willingness to work appears to decrease during disasters involving chemical, biological, radiological, and nuclear agents. Most often expected abandonment is reported during events that carry a threat of infection and illness, as well as those that are uncertain,<sup>28 29</sup> such as non-conventional,<sup>30</sup> pandemic,<sup>31</sup> and health related disasters.<sup>32</sup>

Another convention in perception studies is to focus on identifying which elements of role strain or conflict are associated with the willingness (or lack of willingness) of emergency responders and managers to work. In terms of role strain, the most common driving factors include those surrounding the personal safety of the responder including: availability of vaccine, availability of personal protective equipment and existing personal health issues. Finally, these studies also suggest that during an event that people who are unsure of their roles and who have insufficient training also tend to draw higher reports of unwillingness to work.<sup>33</sup> In terms of role conflict, it is most commonly reported that abandonment will occur when a responder perceives the hazard as a threat to his or her family's safety. In particular, in the absence of vaccination, or when the responder may act as a carrier of a pathogen, role abandonment is predicted. These studies also highlight the importance of issues more related to care and shelter of responder families.<sup>34</sup> Many suggest that a lack of provisions for the care of children or elderly dependents and gaps in the ability to communicate back-and-forth with family members during an event will contribute to abandonment.<sup>35</sup>

*Perception studies often conclude that role abandonment will be a major problem. . Most often expected abandonment is reported during events that carry a threat of infection and illness, as well as those that are uncertain, such as non-conventional and health related disasters.*

## **Resolving Behavioral and Perception Conclusions**

Given the differences in conclusions, providing a definitive prediction on role abandonment requires considerable thought. This is true because both ways of predicting what will happen in these

events require analysts to make predictions that are based on data with important limitations. If not for a few key insights, it is likely that a scientific conclusions related to role abandonment could not be drawn. Different people would likely defend either the behavioral or perception approaches to prediction based on which one they prefer.

## The Problem with Drawing Conclusions based on Behavioral Studies

Relying on behavioral studies requires an over-extension of finding beyond the original setting where the research was conducted. This decision is likely to introduce some error in predictions. For example, one should use caution in suggesting that findings developed when studying responses to a hurricane can be used to predict response during a bioterror attack when it comes to role abandonment. The truth is that these hazards have important differences in the degree of risk that a responder is exposed to and the threat that one might inflict upon their loved ones. It leaves room to question if people will act the same way during less stable events as they have in natural disasters and smaller scale public health emergencies.

## The Problem with Drawing Conclusions based on Perception Studies

At the same time, perception studies also have problems. Most notably, written reports have not been particularly transparent in presenting the details of the scenarios that serve as a foundation for responses. This oversight makes it very difficult to judge the degree to which the scenario replicates the reality likely to be experienced during real events. This is important because in the instances where scenario data is available, there appear to be important design problems. For example, it is fairly common to ask questions such as “Will you be willing to continue treating patients in the event of an outbreak of an unknown but potentially deadly illness?” This way of putting people into a scenario is quite artificial compared to providing information about a threat in the way it might naturally evolve and allowing them to draw their own conclusions. The first approach forces people into a specific and often more dire interpretation of their situation with very limited information about the actual nature of threat or the protections which are available to them. This convention significantly underestimates how people typically interpret risk information and the very powerful “normalcy bias” that leads people to interpret even strong signals of danger as non-threatening. It is far more likely that in the early phase of a pandemic when information is ambiguous, awareness and personal perceptions of the actual risks will be low and the behavior of professionals will be largely

unaffected. In the later stages of a pandemic, when more reliable data on the risks and consequences of exposure will be available, so too will more information on the plans and systems intended to mitigate those risks. The truth is that by the time it is apparent that such a threat existed, it is likely that a great deal of organizational response momentum, collegiality and sense of collective responsibility are likely to have formed, as is often evident in emergency response organizations. As a result, the decision to continue or cease to provide services requires a context in which much more information and decision-making is considered.

## Conclusions on Abandonment

In attempting to reconcile the two types of research, it is a common convention in the scientific community to give greater weight to behavioral results over perception when direct comparisons are possible.<sup>36</sup> Bearing this in mind, in the case of most natural disasters and a vast majority of other disaster events, role abandonment will be a rare occurrence. In these situations it is highly likely responders who are able to will actually report for duty.

It is more complicated to draw conclusions and make predictions about what will happen in the case of uncertain, highly contagious, and hazardous threats such as biological, nuclear, and naturally occurring public health threats. That being said, there is additional evidence that the predictions of widespread role abandonment from perception studies are to some degree a result of systematic biases. The most important insight comes when one makes comparisons between the predictions of role abandonment for events where prior experiences exist. As an example, one study reported that employees were more willing to report during a snow storm (80.4%), mass casualty incident (MCI) (85.7%), and environmental disaster (84.2%) than a SARS (48.4%), radiation (57.3%), smallpox (61.1%), or chemical (67.7%) event.<sup>37</sup> While the authors' intent was to focus the reader on the relative comparisons between the hazard types, it is important to look at prior responses to these types of events and ask to what degree the predicted rates align with observed behaviors. Making those comparisons reveals that perception study predictions are much higher than what behavioral studies observe. For example, other than the already

*Readers should note that perception research often predicts higher rates of abandonment than we typically see during more routine events such and natural disasters and even snow storms*

discussed case of role abandonment of the police during Katrina, abandonment rates of 15.8% for a natural disaster or 19.6% for a snow storm are not typical. Recent findings on behavioral responses to during transmissible public health threats such as SARS provide increased support for this insight given that the 51.6% prediction does not match up with the behavior on the ground during actual events. While we have highlighted one study here it should be noted that in instances where these comparisons are possible the pattern tends to hold true.

### Making a Case for the Continued Importance of Role Problems

Despite the conclusion that perception studies over estimate abandonment, we feel it is important to recognize the insights and cautions found in perception studies, particularly in the case of pandemic, nuclear, and bio-terror events. There is some reason to doubt that either type of study will perfectly predict behavior in these situations which makes it very difficult to scientifically conclude that abandonment will not ever occur. Particularly in the case of an unprecedented, uncertain, extended, and high mortality event there is room to questions whether “artificial scenarios” from perception based studies or the “over-generalization” of behavioral studies provides the best predictor of behavior. Furthermore, In addition to willingness which is discussed here the issue of ability to report is also of critical importance and highlights the necessity to take measures to protect the remaining workforce.<sup>38</sup> As a result, the lack of a definitive scientific conclusion on abandonment for these most severe situations should not be interpreted as a call to complacency. Both behavioral and perception studies contain extensive evidence that role strain and conflict are very real and quite common in many types of events. Even if they do not lead to abandonment, it is important to recognize that other negative effects are a strong possibility. Even in cases where dire consequences do not evolve, there is evidence that conflict and strain, at a minimum, lead to distraction and may lead to reduced efficiency or effectiveness. This reality should be enough to motivate emergency organizations to strongly consider how they can better facilitate the

*There is some reason to doubt that either type of study will perfectly predict behavior in the case of an unprecedented, uncertain, extended, and high mortality event. there is room to questions whether “artificial scenarios” from perception based studies or the “over-generalization” of behavioral studies provides the best predictor of behavior.*

well-being of their employees not only for their individual gain, but also for the good for the communities they serve.

## Organizations and the Reduction of Role Conflict, Strain, and Abandonment

Conclusions related to this topic are often focused on whether individuals who are able to work will abandon their posts during one type of disaster or another. An underlying assumption of these analyses is that the hazard type is the most important factor in determining how people will respond. It is extremely important to note that most literature suggests that the character, culture, and structure of the organizations within which responders work is equally if not more important. In other words, while it is not likely that any intervention will completely resolve role tensions in every circumstance, plans, policies and support systems can go a long way towards determining if responders will report for duty in circumstances where questions exist. High reliability organizations would do well to take note of the factors that contribute to or reduce role conflict and strain. Taking these seriously is likely to have a number of significant benefits for responders. As an added bonus, given that most role abandonment analyses tie the phenomenon to conflict or strain, addressing these factors is also likely to further buffer the potential for role abandonment as well. It is important to shift how we think about abandonment. We recommend that organizations stop analyzing role tensions as if they were rooted in problems with the individual emergency worker, as it appears many do<sup>39</sup>, and instead consider how organizational designs, plans, policies, and structures increase or decrease these problems.<sup>40, 41</sup> Making this shift helps to empower organizations by suggesting that it is well within their capability to reorient themselves in a way that greatly reduces the residual threat of role abandonment. Literature and practice provide both general and specific insights into things that buffer or protect against role strain and conflict. The most prevalent findings suggest that organizations with the following characteristics are less likely to have issues:

*We recommend that organizations stop analyzing role tensions as if they were rooted in problems with the individual emergency worker, as most commonly do, and instead consider how organizational design and structure increases or decreases the tensions*

- Organizations and professions that instill a clear sense of purpose and value.
- Organizations with a cohesive culture and sense of obligation towards the group.

- Organizations that train and clearly establish employee expectations before and during an event.
- Organizations that honestly communicate with employees to help them understand why they are or are not taking risks.
- Organizations that provide meaningful support and protection for employees and their families.

Part two of this report includes a review of several strategies on how to create an organization that meets these goals.

# Reporting for Duty

## Part II: Recommendations

Numerous studies, including perception studies, show that if better support systems were in place, emergency workers would be more likely to respond to a disaster without concern or worry. We believe that organizations have an important role in buffering their employees from role strain and conflict. In the following we provide a few recommendations on what organizations might consider to address response issues.

### Approach #1- Develop a Family Support and Safety Framework

The most significant source of role conflict for workers was their concern for family members.<sup>42</sup> Given this reality, we recommend the establishment of a robust responder family support framework

*We recommend the establishment of a robust Responder Family Support Framework in order to help alleviate first responder role conflict and help keep emergency workers focused on their professional demands*

in order to help alleviate role conflict and help keep emergency workers focused on their professional demands.<sup>43</sup> At minimum, such a system would 1) facilitate family preparedness for an event, 2) provide effective channels for communication from and to the family, and 3) Help organize and plan for responder families' needs.

An employee preparedness program could be as simple as support resources similar to the "[Family deployment checklist](#)" used by the US Army.<sup>44</sup> Clearly spelling out ways to organize information and tasks that workers should do to safeguard their families in the event of emergency goes a long way.<sup>45</sup> This approach would require

emergency response agencies to develop a campaign targeted on their own employees and focused on how to prepare for activation. Such a campaign could include printed or digital material targeted towards spouses and children to explain what the responder will be doing and why it is important. It could also include lessons learned, or situations that that may have not been considered, that drew from prior event experiences. The campaign might also include family planning checklists and planning tailored specifically to needs of the responder's family such as the [Responder Ready Program](#).<sup>46</sup> This checklist might include broader preparedness reminders, guidance and planning information such as: lists of important contact information, vital personal information, items to have ready or packed for sheltering and evacuation, plans for protective action, etc. The implementation of the campaign could be voluntary or could be more proscriptive and require employees to report back

on their family readiness. A particularly concerned agency might even offer a matched spending program or might negotiate discounted bulk rates to help offset the cost of employee preparedness. Sponsored partnerships with local vendors may also be a good approach to better engage the private sector in these activities.

The second element of a family support framework would include the establishment of a Family Communications Plan. Communication between employees and families need to be facilitated<sup>47</sup> and emergency management agencies should be dedicated to informing family members of the latest developments during an event.<sup>48</sup> Department of Health and Human Services guidelines also stress that communication is believed to keep the emergency worker more calm and stable and better able to focus on his or her job.<sup>49</sup>

Initially, the focus of such a system should be to locate and assess the status of responders' loved ones. In order to facilitate this process, organizations should compile lists of family members, along with their contact information, and typical locations for each of their emergency workers. In the event of a crisis, one person or group of people could be designated to contact these family members. This information would be collected, logged, and relayed immediately to the employees. Providing access to accurate information about

*Modern technologies may facilitate communications, but policy should recognize the need to be in contact with their loved ones.*

workers' family can be expected to help keep them focused on their job during an event<sup>50</sup> As the event further evolved, a voluntary association of spouses could also take over such a task. As each family member is accounted for, organizations should also put in place mechanisms to enable communication between workers and their families across time.<sup>51</sup> It is highly likely that over time employees will want to check in with their families. Modern technologies may facilitate communications, but policy should recognize the need to be in contact. For example, cell phone areas could be designated where employees could go to have personal conversations as needed. Response agencies should consider adopting flexible policies on communication during disasters to allow employees un-structured breaks to communicate with loved ones as needed. Organizations should develop mechanisms to allow family members to contact responders and should facilitate face-to-face meetings. Family members could be pre-registered and given identification or wrist

## Reporting for Duty

bands that give them access to the site.<sup>52</sup> While this may to some seem like a distraction, if properly implemented, it is likely to increase productivity by increasing concentration and decreasing concern.

Emergency workers are less likely to experience role tensions if they know that their families will be cared for in the aftermath of an event. The preparedness campaign discussed above should

*While it is true that emergency response professions all have an element of risk involved, it is the responsibility of organizations to as best possible mitigate those dangers.*

do much to increase readiness, but in some instances it may be appropriate for organizations to also facilitate care for families. There are many ways such a system could be implemented. One possible approach would be to organize resources such as: child care, elder care,<sup>53</sup> contacting other spouses periodically, and even functional emergency support. Another option would be for the organization to become a direct provider of mass care for employees and families by providing or supplementing food, shelter, child care, and pet sitting

on-site for responder's family members. It is possible that many of the services could be provided by volunteer teams organized before disasters or by the family members themselves<sup>54</sup> if proper training and resources were provided.<sup>55</sup>

### Approach #2- Focus on Employee Safety

The second most often cited set of concerns related to role tensions revolve around the personal safety of responders. While it is true that all emergency response professions have an element of risk involved, it is the responsibility of organizations to whatever extent possible mitigate those dangers. Furthermore, it is the obligations of organizations to honestly communicate and inform employees about the risks they are taking.

Most discussions of personal protective equipment were focused on public health concerns. Employers that expect responders to work should plan for vaccines, antiviral and other non-pharmaceutical protections such as masks, gloves, etc., that are appropriate for the particular hazards responders might face. These supplies should also be made freely available to responder families or, at a minimum, at a reduced cost whenever possible.<sup>56</sup> The concept is equally applicable in other types of events as well. Organizations should consider their likely threats and planned actions with a critical eye towards assessing what personal protective equipment is needed. Further,

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employees should be trained in the use of personal protective equipment that they are likely to need so that they are comfortable and familiar with their function.

In addition, every effort should be made to educate first-responders about infectious, radiological and other unconventional threats.<sup>57</sup> Because uncertainty is a key factor in role conflict and strain it is important to provide workers with the most up to date information in a timely manner. This could be accomplished better through planning. One organization could be tasked with collecting and disseminating threat information and establishing a toll-free number that workers, their families and even the public could call to get up-to-date information. Such planning could reduce disruptions and rumors by making needed information readily available.<sup>58</sup> Additional insights on this issue can be found in an extensive report by the Rand Corporation entitled: [Protecting Emergency](#)

[Responders: Community Views of Safety and Health Risks and Personal Protection Needs](#)<sup>59</sup>

*Studies show that one important factor that keeps role strain and conflict from evolving into role abandonment is the deep sense of responsibility that first responders typically have. These feelings can be further reinforced within organizations by clarifying role expectations and obligations*

### Approach #3- Reinforce Expectations and a Culture of Responsibility

Studies show that one important factor that keeps role strain and conflict from evolving into role abandonment is the deep sense of responsibility that first responders typically have. These feelings can be further reinforced within organizations by clarifying role expectations and obligations.<sup>60</sup> Of equal importance are not only knowing what is supposed to be done, but how it is supposed to be done.<sup>61</sup> While most agencies already know the importance of training and exercise, this finding reinforces the need. In addition, organizations should focus on rearticulating expectations as response operations start. Briefings could be held that not only assign tasks, but remind workers of the importance of their work and the range of expectations.

One additional related recommendation is for organizations to develop policies where co-workers expect and rely on each other's participation.<sup>62</sup> Supporting a sense of pride and camaraderie will reduce the potential for role related issues.<sup>63</sup> While it is not easy to contrive employee relationships, it is possible to provide opportunities for employees to connect not only professionally but personally.

## Approach #4- Channel Volunteer Potential

In the few instances when role abandonment has been documented it has also been noted that the phenomenon has had less of an impact on the provision of emergency relief than might be expected. Part of this reality can be attributed to the convergence of volunteers who are able to assume less complicated roles while emergency workers attended to the more highly skilled tasks.<sup>64</sup> It has been well documented that people typically react to disasters with a spirit of concern and generosity that leads to an increase in volunteer activity in the aftermath of a disaster. This leads to large numbers of people showing up at disaster sites.<sup>65</sup> Academics call this behavior convergence, and some even call this a ‘mass assault’ to stress the sheer numbers.<sup>66</sup> Upon arrival these volunteers participate in a wide variety of tasks including: debris clearing; collecting food, supplies and money; providing shelter; and offering medical and psychological aid, among other activities.<sup>67</sup>

Many professionals tend to view volunteers as an annoyance or liability due to their lack of formal skills and experience.<sup>68</sup> Despite the fact that many do not want to take on the task of managing these untrained volunteers in addition to their regular duties,<sup>69</sup> emergency management agencies should recognize that decades of research and experience show that helpers will arrive on the scene of a disaster...whether they are wanted or not. In any large scale event both trained permanent volunteers and untrained (emergent) volunteers will be a part of the response.<sup>70</sup> Given this reality, it is in the best interests of both governmental agencies and the affected community to consider how to best utilize this resource. A strong plan will help reduce the degree to which an agency is overwhelmed and will also better position an organization to turn these potential resources into an asset rather than a problem. This philosophy is the future of emergency management as Federal and state agencies embrace the concept of “Whole Community” Emergency Management. Building on and adapting the approach espoused by the California Governor’s Office of Emergency Services (2010), we propose a two part system be established including a Reserve Disaster Volunteer Program (RDVP) and a Convergent Volunteer Management Plan (CVMP). These systems should be focused on the following goals:

*Decades of research and experience shows that helpers will arrive on the scene of a disaster...whether they are wanted or not. It is in the best interests of both governmental agencies and the affected community to consider how to best utilize this resource.*

- 1) Fill needs
- 2) Minimize response and recover costs
- 3) Minimize disruption and
- 4) Provide for safety of community and volunteers, maximize volunteer

## Conclusions

This report has focused on willingness to report for duty and finds that role conflict and role strain are serious and significant problems across hazards, sectors, and time. Behavioral research on the issue of role abandonment on the other hand, suggests that, despite the perceptions of some, the phenomenon is a rare outcome that typically does not have a significant influence on response operations. Even so it is difficult to scientifically conclude that abandonment will not ever occur. It is always possible that an event could occur that is beyond the scope of our current investigations and which could produce a different pattern. Furthermore, it is important to take into account the ability of workers to report for some particular hazards because they themselves are directly affected. That being said, we believe that for most practical purposes abandonment will not be a significant problem. More importantly one of the most important conclusions is that our focus on role abandonment is likely misplaced. Instead, we should be focused on the prevalence of role conflict and strain. We know that both of these phenomena are common. Furthermore, it is logical to assume that actions taken to reduce these tensions will only serve to further buffer against the residual threat of role abandonment. As a result, we recommend that organizations stop analyzing these tensions as if they were rooted in problems with individual emergency workers, as most agencies commonly do, and instead consider how organizational design and structure might increase or decrease the tensions. Based on that assertion we recommend a four part approach to addressing role tensions that would include the development of:

1. a Family Support and Safety Framework;
2. a focus on Employee Safety Measures;
3. Reinforcing Expectations and a Culture of Responsibility

*There is no one correct answer how best to make use of volunteers. We emphasize the following strategies: building assessment of volunteer organizations capacities, volunteer training, and pre-event relationship building.*

4. and finally serious attention to Channeling Volunteer Potential.

We hope that these findings are useful and that their implementation is judged not only as feasible, but as important. We need to protect and support those that will protect and support our communities.

## Appendix I: Methodology

The report that follows resulted from the careful review of over one hundred and seventy five published papers, reports, and book chapters focused on role conflict, role strain, role abandonment, convergence, and responder support for these issues. The documents that were included in our final review were obtained through an extensive key word search of disaster literature that utilized the following keywords: first responder, responder, support, role abandonment, role conflict, report for duty, report for work, personal protective equipment, disaster, emergency, epidemic, pandemic, terrorism, nuclear, hazard, convergence, mass assault, professional, family support. The search was conducted between October 2010 and January 2011. No restrictions were placed on the date of publication range. The initial search targeted the following sources:

### Databases

- [E.L. Quarnatelli Resource Collection](#)
- [JSTOR](#)
- [Hazlit](#)
- [Google scholar](#)

### Organizational Publication Lists

- [The Heritage Foundation](#)
- [Hazard Reduction and Recovery Center Publications](#)
- [PERI scope](#)
- [Natural Hazard Center Quick Response Reports](#)
- [Social Science Research Network \(SSRN\) Home Page](#)
- [SSRN Electronic Library](#)
- [UCLA Center for Public Health and Disasters Newsletter](#)
- [DRC Institutional Repository](#)
- [Naval Post Graduate School Thesis Database](#)

### Disaster Journals

- [Natural Hazards Observer](#)
- [Australian Journal of Emergency Management-](#)

- [Center for Excellence in Disaster Management & Humanitarian Assistance Quarterly](#)
- [Journal of Crisis and Contingency Management](#)
- [Disaster Prevention and Management](#)
- [Disaster Recovery Journal](#)
- [Disaster Research](#)
- [Disasters: The Journal of Disaster Studies, Policy and Management](#)
- [Earthquake Spectra](#)
- [Emergency Management References](#)
- [FEMA Publications](#)
- [FEMA's Higher Education Articles and Papers](#)
- [Forced Migration Review](#)
- [Homeland Defense Journal](#)
- [Homeland Security Affairs](#)
- [IJMED](#)
- [Journal of Homeland Security and Emergency Management](#)
- [Journal of Media and Communication Studies](#)
- [Mass Emergencies](#)
- [Natural Hazards Review](#)

In addition to sources obtained in the initial searches, we also utilized a snowball approach where citations for every document were reviewed and additional studies and documents from outside the scope of the source list were obtained for analysis.

Phase two of the process involved the annotation and integration of each study into the final document. Once a source was identified a copy was obtained and trained research assistants were charged with reading and summarizing the content. All annotations were reviewed by this document's authors and revisions and clarifications were made as needed. The annotation process specifically focused attention on study method and design, research question, focal variables, hazards, and recommendations. Individual conclusions and insights from each annotation were sorted into themes and resorted until natural themes emerged. Once sorted the materials in each theme were reviewed as a section and were integrated into a narrative that captured the essence of the materials and typical examples were selected to illustrate broader patterns. In the recommendations section, examples and suggestions were highlighted if the authors felt that the solution had potential to address concerns that had been identified in previous documents.

## Appendix II: Clarifying Role Related Concepts

It is important to review a few terms that will be used throughout this document. Most of this report is about problems emergency personnel might encounter as they fulfill “roles.” **Role** is a term social scientists use to describe a set of expectations placed on someone because of their position in a group or people. (Ex. Father, emergency manager, etc.) We all have roles in life and it is not uncommon for us to have lots of different roles each with different sets of expectations. There are several terms that are used to describe how roles can lead to tension in our lives. It is important to distinguish between these different kinds of tensions so that we can describe how common each is and can talk about potential consequences. In this report, we are going to talk about three types of role problems: strain, conflict, and abandonment. **Role Strain** describes situations when it is difficult to fulfill the demands of a single role. Consider an emergency manager who hears about a chemical release thought to be a terrorist attack. As the news comes across the wire, he immediately needs to activate the EOC, call the mayor, assemble and send a situational assessment team, liaise with emergency services, and call a media briefing. It is expected that all of this will be done in a few hours. With little time and so many demands, he worries “How can I get this all done?” This is role strain. Another manifestation of role strain is when expectations dictate that a person put himself in harm’s way such as asking a technician at a radioactive plant to stay behind despite rising danger. It is only logical that such a request may cause tension between wanting to fulfill a responsibility and self-preservation. **Role Conflict** refers to the times when a person must deal with the difficulties of filling multiple roles (Killian 1952). In lay terms, these are the moments when we “wear two hats.” Consider again our emergency manager. In addition to thinking about all of the tasks above (as an emergency manager), he also is expected to protect his family (as a father). How can he meet both sets of needs? As a father he is expected to be with his family. As an emergency manager he is expected to get to work. How can he meet the demands of both sets of expectations? Finally, we will discuss Role Abandonment. **Role Abandonment** is less of a situation than it is a response to the two situations we already described. It is a label used to describe when a person dismisses the responsibilities

*Several terms are used to describe how roles can lead to tension in our lives. It is important to distinguish between these different kinds of tensions so that we can describe how common each is and can talk about potential consequences.*

associated with his role. In simple terms, a person decides to quit doing the things that are expected of him or her for one reason or another.

The research is clear that we need to separate role conflict and role strain as contexts from role abandonment which is one possible response among many. Let's return one more time to the example above and illustrate the difference. If our EM/Father thinks 1) I do not know if I can manage what this job expects of me; or 2) I do not know if I can be a good father and a good emergency

*The research is clear that we need to separate role conflict and role strain as context from role abandonment which is one possible response among many.*

manager right now; or 3) I can't manage job expectations, especially when I have so many demands as a father, then he is experiencing role strain, role conflict, or both. It is not until the moment that he quits his job and/or fails to appear that role abandonment has occurred. This is important, because there are many possible responses to these tensions that are not quite so drastic. The person might compartmentalize, he might delegate some responsibility, he might develop a hierarchy of obligations across all

roles, or he might even turn to others to develop mutual support (Friedman, 1986.) The reality is it is quite common in disaster for expectations to shift and change and for individuals to make adjustments or adaptations to their roles.<sup>71</sup> As anyone in emergency management knows, everyone does not respond the same way to stress and tension. We should expect that there be some level of variation in responses. Some people will do just fine, some will adapt, and some will not fare well. For most organizations, it is the prevalence that matters given that isolated incidents are likely to have little meaningful impact on the system's operation, it is widespread issues that are of most concern.

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<sup>1</sup> It should also be noted that individuals also play a big part in their own response and recovery.

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<sup>4</sup> Friedman, 1986

<sup>5</sup> Webb, 1998

<sup>6</sup> Drabek, 1984; Garaventa, 1984

<sup>7</sup> Rodgers, 1986

<sup>8</sup> Banks, Richards, Shah 2006

<sup>9</sup> Tranchina, 1991

<sup>10</sup> O'Sullivan, Amaratunga, Phillips, Corneil, O'connor, Lemyre and Down 2009

<sup>11</sup> Denlinger and Gonzenbach, 2003

<sup>12</sup> Ex. Quarentelli, 2008 and Kushma, 2007

<sup>13</sup> Masterson et. al 2009 ; Erikson, 1976)

<sup>14</sup> Mackler, Wilkerson, Cinti, 2007

<sup>15</sup> Rodgers, 1986

<sup>16</sup> Banks, Richards and Shah, 2006; Fritz, 1987

<sup>17</sup> Olson, 1990

<sup>18</sup> Duffin, 2006; Balicer, 2006; Iserson et al, 2008; Scanlon 2009

<sup>19</sup> Dynes, 1987; Quarantelli, 1992; Quarantelli, 2008

<sup>20</sup> Friedman, 1986

<sup>21</sup> White, 1962; Fritz, 1987

<sup>22</sup> Drabek, 1984

<sup>23</sup> Quarantelli, 1992

<sup>24</sup> Kushma, 2007

<sup>25</sup> Quarantelli, 2008

<sup>26</sup> Alexander and Wynia 2003

<sup>27</sup> Mackler, Wilkerson, Cinti, 2007

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- <sup>30</sup> Smith, Morgans, Qureshi, Buckle, Archer, 2008
- <sup>31</sup> Delaney, 2008
- <sup>32</sup> Smith, 2007
- <sup>33</sup> Hope, Durrheim, Barnet, Este, Kewley, Dalton, White, Kohlhagan, and Links 2010
- <sup>34</sup> Smith, 2007; Mackler, Wiklerson and Cinti 2007
- <sup>35</sup> Smith, 2007
- <sup>36</sup> Ex. Drabek, 1984; Quarantelli, 2008; Scanlon, 2009
- <sup>37</sup> Qureshi, Gershon, Sherman, Straub, Gebbie, McCollum, Erwin, and Morse 2005
- <sup>38</sup> See Delaney, 2008
- <sup>39</sup> Landahl and Cox, 2009
- <sup>40</sup> Dynes and Quarantelli, 1977, Landahl and Cox, 2009
- <sup>41</sup> Delaney, 2008
- <sup>42</sup> Qureshi et.al, 2005; Friedman 1986
- <sup>43</sup> Fritz, 1987; Sturdivants, 2009; DHHS, 2005 and 2007
- <sup>44</sup> <http://www.americanbar.org/content/dam/aba/migrated/legalservices/helpreservists/forms/checklist.authcheckdam.pdf>
- <sup>45</sup> Hope, Durrheim, Barnet, Este, Kewley, Dalton, White, Kohlhagan, and Links, 2010
- <sup>46</sup> [http://www.ready.gov/america/\\_downloads/responder/RRToolkit.pdf](http://www.ready.gov/america/_downloads/responder/RRToolkit.pdf)
- <sup>47</sup> Friedman 1986
- <sup>48</sup> Smith 2007
- <sup>49</sup> DHHS, 2005
- <sup>50</sup> DHHS, 2005; Laube-Morgan, Jerri. 1991
- <sup>51</sup> O'Sullivan, Amaratunga, Phillips, Corneil, O'connor, Lemyre and Down, 2009
- <sup>52</sup> Banks, Richards, Shah 2006
- <sup>53</sup> O'Sullivan, Amaratunga, Phillips, Corneil, O'connor, Lemyre and Down 2009
- <sup>54</sup> Banks, Richards, Shah 2006
- <sup>55</sup> Sturdivants, 2009
- <sup>56</sup> O'Sullivan, Amaratunga, Phillips, Corneil, O'connor, Lemyre and Down 2009
- <sup>57</sup> Mackler, Wilkerson, and Cinti, 2007
- <sup>58</sup> Auf der Heide, 2010
- <sup>59</sup> [http://www.rand.org/pubs/monograph\\_reports/2005/MR1646.pdf](http://www.rand.org/pubs/monograph_reports/2005/MR1646.pdf)
- <sup>60</sup> Mileti, 1985; Garaventa, 1984; Bornstein et al, 2009; Burtles, 2005
- <sup>61</sup> Hope, Durrheim, Barnet, Este, Kewley, Dalton, White, Kohlhagan, and Links 2010
- <sup>62</sup> Friedman 1986
- <sup>63</sup> Alexander and Wynia, 2003
- <sup>64</sup> Fritz, 1987
- <sup>65</sup> Tierney et al. 2001; Kendra and Wachtendorf 2001
- <sup>66</sup> Barton 1969
- <sup>67</sup> Wenger, 1991
- <sup>68</sup> Britton, Moran, and Correy 1994; Aleccia, 2010
- <sup>69</sup> Barsky et. al 2007
- <sup>70</sup> Britton, Moran, and Correy 1994
- <sup>71</sup> Webb, 1998