

A Delphi Study on Priorities – Lessons Learned from the Gulf Coast

Raj Sharman¹, Jin Ki Kim¹, H. Raghav Rao^{1,2} and Shambhu Upadhyaya²
The State University of New York, Buffalo, New York

¹*Department of Management Science and Systems, School of Management*

²*Department of Computer Science and Engineering, School of Engineering and Applied Sciences*

Abstract - As a nation we did learn a lot of lessons from the events on the gulf coast. Since budgets in local economies are limited, there is a need to prioritize what gets done. This paper presents the results of a Delphi study on the importance and urgency of the issues, based on the perception of first responders. The paper informs public policy in the area of disaster preparedness.

1. INTRODUCTION

From the dawn of civilization mankind has strived to better himself by learning from experiences (both good and bad). “Lessons Learned” is a more modern incarnation of this activity. After every major event, it is not uncommon in America to have a time of reflection – a phase called “Lessons Learned” where in we sit back and analyze the events we have experienced and learn a few lessons. This allows us to do the things we do, better than we currently do. In the aftermath of Hurricane’s Katrina and Rita, we did the same as a nation. Almost all major newspapers and television shows devoted time and resource towards this effort. We did learn several lessons, though most were opinions of a scattered number of experts, not based on any consensus.

Limited budgets call for some kind of prioritization in terms of resource allocation and time. There are only so many things that both money and time will allow us to accomplish. There is no formal study that deals with the issue of prioritization as far as adopting these lessons. This study integrates key lessons enunciated in major national news papers and television broadcasts with those obtained after discussions with experts.

regarding the urgency and importance of the lessons through a Delphi study. This paper therefore serves to inform policy and practice in the area of Emergency Management from a preparedness point of view.

In this study seventy seven first responders from the Western New York region provided their input. Most of them were incident commanders, fire chiefs, police chiefs, city, town and cal personnel. First responders at different levels in the organizational hierarchy, from all over the world have been watching how things were managed. There is a deep sense of

realization as to what they must do in their own communities. In this paper we capture and present their views using a Delphi consensus building process.

This paper is structured into five sections. Section two provides a brief theoretical background highlighting critical factors that affect decision making and execution during emergencies. The research methodology is detailed in section three. In section four we provide the results and analysis of the Delphi study. Section five forms the conclusion.

2. BACKGROUND

We view the lessons learned using the work of Kim et al (2005; 2006). Their work classifies the issues that affect the efficiency of decision making in the context of emergency management as belonging to one of the following factors: (a) technology, (b) process, and (c) people. The items considered as part of lessons learned in this study correspond to only those issues that were problematic and were enunciated by the national media or by domain experts.

We view the lessons learned using the work of Kim et al (Kim et al. 2005; Kim et al. 2006). Their work classifies the issues that affect the efficiency of decision making and effectiveness of execution as belonging to one of the following factors: (a) people, (b) process, and (c) technology. The items considered as part of lessons learned in this study correspond to only those issues that were problematic and were enunciated by the national media or by domain experts. The results therefore do not reflect all the items in this model.

The organizational goals of any emergency management plan/agency are embedded in its strategic objectives which leads it to the mission. Accomplishment of mission requires systematic and logistical ways to reach the strategic goals. The goals are then broken down with each layer of planning and are transformed into lower level tactical plans and activities. There are a few key areas that are unique to the organizational mission. Any failure to perform well in these areas becomes a major barrier to achieving the goals. These key areas can be described as a set of critical success factors (CSF) —the limited number of areas in which satisfactory results will ensure competitive performance for the organization and enable it to achieve its mission (Rockhart 1979).

In order to bring better coherence we categorized the lessons into three main critical factors: People, Process and Technology. This categorization is also based on the model proposed by Kim et al (Kim et al. 2005; Kim et al. 2006). However, we did not consider external factors as issues relating to such factors were not part of the lessons learned in the major media outlets. Since the major media outlets had input from experts in the field, we were comfortable with that position. Further the participants of the Delphi study had the option to add new issues. None of them added issues or lessons dealing with external factors thus validating our position.

The technology issue primarily relates to the issue of having good communications among the different types of first responders, between incident commanders and the EOC, between dispatch and first responders, and between emergency managers and the community. Paul Davidson of USA Today observed that during Hurricane Katrina and after the breach in the levee in New Orleans, with floodwaters surging, first responders scurried on foot to ferry messages among city police, state troopers and the National Guard (Davidson 2005). Sept. 11 highlighted the importance of wireless communications in an emergency. At Ground Zero during the height of the rescue efforts, thousands of New York firefighters, police, and emergency workers relied on wireless two-way radios, cell phones, PDAs, and other equipment to communicate with one another (Mcgee 2002). Local agencies often lack the money and to upgrade equipment. Federal aid is limited. So a critical need is often overlooked and this comes to haunt first responder during emergencies. Sometimes, responders relay messages through dispatchers, wasting precious seconds in an emergency. About ten states, including Indiana, Colorado, Michigan, Minnesota and Florida, have built statewide radio systems that city and county agencies may join. New York State has some pilot projects under experimentation. For the rest of the states communication is a major problem. Interoperability issues with regards to communications among first responders are problematic and hence there have been spectrum allocations in various frequency bands. Recently, some spectrum in the 800MHz band (821MHz-824MHz and 866MHz-869MHz) was allocated for interoperability. Communities have to upgrade their equipment in order to use these spectrums. It is critical to have the interoperability issue resolved but the barrier preventing adoption is the expense. There are other technology issues in the model proposed by Kim et al, but these were not highlighted in the lessons learned.

The next important factor relates to process. In terms of the lessons that were included in this study process issues relate mainly to : (a) preparedness and planning, and (b) coordination and information sharing. Pre-plans including evacuation plans, plans for suppliers and facilities, transportation plans, etc. are essential part of preparatory efforts for unexpected disasters and incidents. Plans should have flexibility for response and need to be reviewed periodically. In addition, information

sharing between first-responders and among cooperating agencies at different levels of the organizational hierarchy is necessary. Coordination between local, state, and federal agencies is a therefore a critical factor on the efficiency of the emergency response activities.

The final factor is the people factor. This includes issues such as (a) training Incident Response Coordinators to prioritize needs and dispatch resources to fulfill needs, (b) training the commanders to efficiently execute the plans, and (c) providing training to all levels of first responders.

It is necessary to point out that the critical factors discussed above may include in general many other issues as well. This study only included those issues that were part of lessons learned from the 2006 hurricanes on the gulf coast that were enunciated by the media or added as input from those experts who participated in the study.

2.1 Delphi methodology

In this study we use the Delphi method to arrive at a consensus of first responder perceptions. The Delphi study has been a popular tool used in information systems research [12, 13-15]. It has also been applied to formulating various governmental or corporate policies, forecasting the impact of technologies on industry performance, and estimating frequencies. The objective of the Delphi methodology is the reliable and creative exploration of ideas suitable information for decision making [28]. The Delphi technique was conceived as a way to obtain the opinion of experts without necessarily bringing them together face to face (Stuter 2003). The Delphi method is based on a structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback (Adler et al. 1996). The Delphi research method is a systematic and iterative consensus building process often used to estimate future phenomena or answer ill-structured questions. By conducting the Delphi study with the help of surveys where personalized information is not collected, anonymity of first responders is preserved. This anonymity allows participants to express or change their opinions without embarrassment and prevents interpersonal biases from interfering with the evaluation of presented ideas (e.g., influence of dominant individuals). Further it prevents the Delphi consensus method from degenerating to the "Alinsky Method" [9, 10]. The iterative feedback process retains the positive aspects of collaborative work, such as an increased degree of consensus, while reducing the negative aspects of group dynamics such as the expression of an unrefined idea or confined group thinking (Ray et al. 1990).

Adhering to the Delphi method described in the previous section, the study was conducted for three rounds using survey questionnaires. The iterative study was stopped after three rounds because of convergence of opinions. Personally identifiable information was not collected from the experts to

provide the emergency managers and first responder commanders the opportunity to express their opinions that may be different from those of their superior officers. According to Linstone and Turoff (Stuter 2003) the presence of disagreement is much more significant when large groups share similar positions. In order to ensure that the difference of opinion between the different types of first responders is not submerged we preserved group identity of the first responders as belonging to police chiefs, fire chiefs, emergency medical personnel, and emergency managers (Stuter 2003).

2.2 Survey Questionnaire

In the aftermath of Hurricanes Katrina and Rita the news media (both electronic and print) engaged in lessons learned activity. This provided a platform to immediately arrive at a filtered list of issues that was part of many of the “lessons learned” documents. For this study we only considered news media that had a national audience (Aguirre et al. 1995; Berke et al. 1993; Carney et al. 2005; Clark 2005; CNN 2005; Draper 2005; Mileti 1999; Mitchell 2005; Reynolds 2005; Stallings 2001; U.S. Department of Homeland Security 2006; Wenger et al. 1986; Zarocostas 2005). Further we also interviewed several first responders in Western New York regarding these lessons. The first survey questionnaire was developed based on these inputs (See Table 1 for survey questionnaire items). The survey questionnaire was modified after each round. Questions that scored very low were dropped and new questions based on suggestions from participants were added for the next round. The participants were asked to rate each issue based on two dimensions: “Importance” and “Urgency” on a 10 point scale.

The participants were primarily first responders who had responsibilities of managing critical incidents and planning for them. This included police chiefs, fire chiefs, medical first responders and city, town and parish emergency managers (as shown in Figure 1). In all 77 chiefs and managers from Western New York participated in the Delphi Study. This group represents experts who are in command during critical incidents and are very knowledgeable about the subject. This group watched the events before, during and after hurricanes Katrina and Rita and had reflected about issues needs to be addressed in their own backyards. Further, Western New York is on the Clarendon-Linden fault system and even though a major earthquake is a low probability event it is a high impact event. Western New York hosts a port city and is also a gateway to Canada. It is therefore on the frontline for terrorist intrusion from Canada as well as a point of entry for pandemic flu. The region is also host to a nuclear reactor, a major Power Plant supplying power to many regions of the U.S. and Canada. The region also includes one of the world major tourist attractions “The Niagara Falls”. The first responders therefore have to be prepared for major events. The Buffalo-Niagara region is listed as part of the federal government’s urban area security initiative. First responders have to be proactive in their preparation. The data set therefore is relevant and representative of many other cities in the U.S. which are

vulnerable. Figure 1 shows the demographic breakup of the participants in terms of first responders.

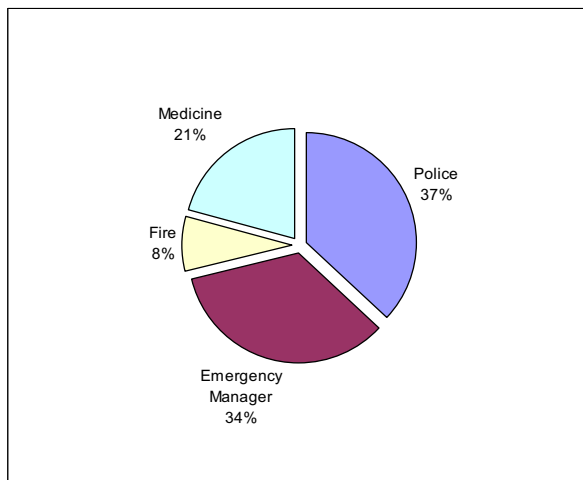


Figure 1: Delphi participants by first responder type

2.3 Survey Administration

Round One: In the first round, the questionnaire consisting of fourteen issues was administered to 19 police chiefs during a meeting of police chiefs. Police chiefs were requested to rate all of the issues based on two criteria: importance and urgency. “Importance” refers to the issues that will have a great impact on shaping emergency response plans in the future, and “Urgency” refers to the issues that should be addressed first regardless of their importance (i.e., the size of direct impact). These definitions were provided in the questionnaire to calibrate the study participants’ perception on the criteria. The police chiefs were also asked to add new issues they felt the questionnaire had not included but should have.

Round Two: The second round was administered to 58 first responders. These responders included predominantly city, town and county level emergency managers, fire chiefs, emergency medical and incident commanders from police departments in Western New York. Police chiefs (participated in round one) were not included in this round. Participants in this round were provided feedback based on the analysis of the responses from the first round. It is customary in a Delphi study to make the participants aware of the results of the previous round. However since we were dealing with different groups, in a typical Delphi study round one and two consist of the same experts and in that this is a slight variation from a typical Delphi study. The survey instrument consisted of thirteen questions from the first round (one question was dropped) for which the feedback from the first round was provided. Round two also contained three new lessons for which there was no feedback from the first round as they were appearing as part of the survey instrument for the first time.

Round Three: The third round was administered to all the experts who had participated in the first and second rounds. In all seventy-seven first responders participated in this round.

The participants were shown the results from the first two rounds. This round showed a convergence both in terms of importance as well as urgency. The convergence was quite substantial so this became the final round. Based on the responses from the second round one lesson was removed due to low scores and four new lessons were added based on feedback from experts who participated in the second round. All the items have been considered into the final round appearing in Table 1. In the next section we discuss the results of the Delphi study.

3. RESULTS AND ANALYSES OF THE DELPHI STUDY

In this section, we provide a discussion on the results for the entire group of seventy-seven domain experts who are primarily first responders from the Western New York area. The results of the analysis also include perceptions based on first responder types. Differences are to be expected because different groups have a different set of priorities. The different priorities stem from the different responsibilities each of the groups have during critical incidents. For example, police chiefs have the responsibility of securing the perimeter of the scene, conducting the criminal investigation and of preserving law and order. Fire chiefs are more concerned with the rescue operation, with extinguishing fires, etc. EMS personnel have the responsibility of administering first aid and other medical attention to the victims as well as to the perpetrators of critical incidents (when there are any at hand). Emergency managers are tasked with planning and execution during major disasters and usually operate from EOC centers.

3.1 Convergence

An important consideration in a Delphi study is the degree of convergence or consensus. This usually indicates the stopping point for the iterative process. If the degree of consensus is high, then the results may be considered credible. Accordingly, the success of a consensus-making process can be measured by the reduction in standard deviation throughout the process. To test the consensus level, we compared the standard deviation of each issue's importance and urgency ratings after the second round with their corresponding standard deviations after the third round (Preble 1984). Figures 2 and 3 visually depict the convergence of the opinions of responders. Standard deviations show a marked decline as we progress from the second round to the third round. Apart from this, the results show a polarization of the mean values. Figures 4 and 5 show that the mean values on the two dimensions of "importance" and "urgency" are stabilized after the second round. It is difficult to achieve a perfect consensus in this type of study because perception of the issues depends on many factors (Niederman et al. 1991). Therefore, we see that on some issues, we achieve a higher degree of consensus as compared to other issues.

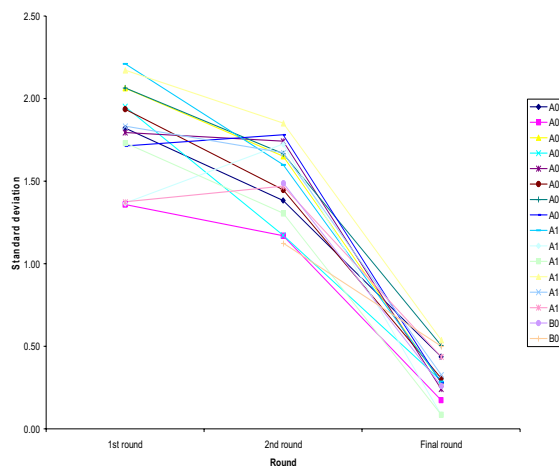


Figure 2: Standard deviation for the dimension "Importance"

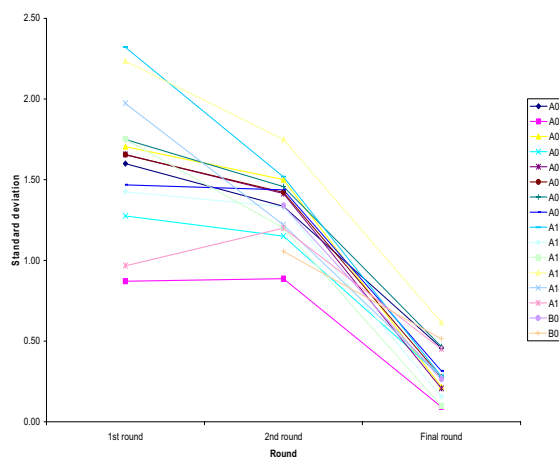


Figure 3: Standard deviation for the dimension "Urgency"

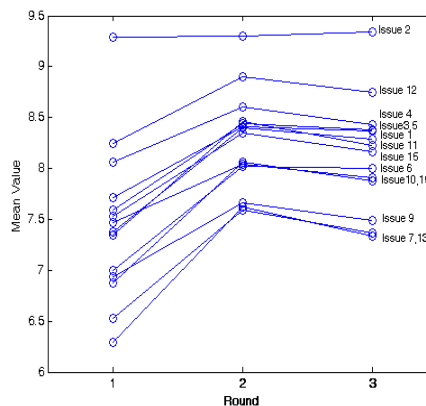


Figure 4: Mean value of scores for the dimension "Importance"

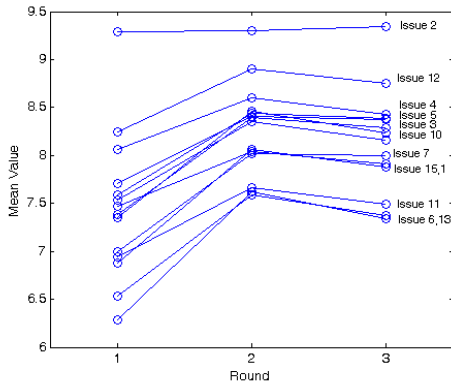


Figure 5: Mean value of scores for the dimension "Urgency"

3.2 Issue Assessment

In this section we present an analysis of the survey data. At the outset we focus on critical factors. The later part of this section is devoted to looking at the individual lessons and how they were rated. Figures 6 and 7 show how the entire group of experts rated each of the critical factors in terms of importance and urgency. The figure includes sub-factors as well to provide more detail.

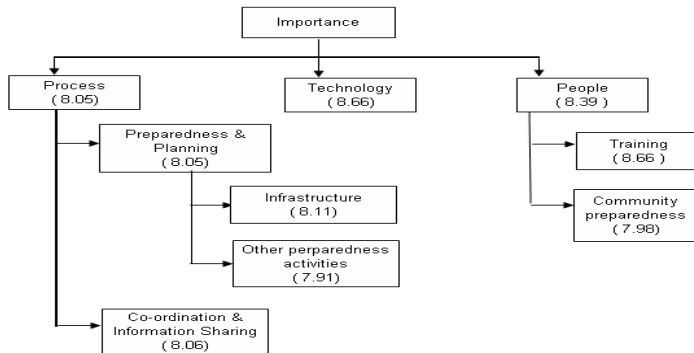


Figure 6: Importance of factors for the entire group of seventy-seven experts

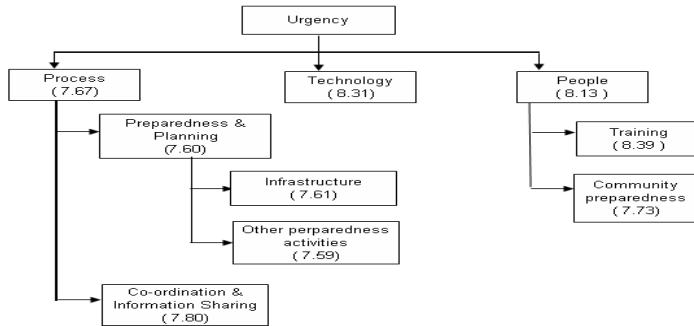


Figure 7: Urgency of factors for the entire group of seventy-seven experts

The results show that the most important factor to be addressed is the issue of having good technology. Technology issues mostly relate to communication channels. During major disasters, land lines are sometimes disrupted; at other times, wireless communication becomes difficult because the cell towers go down for a variety of reasons. Satellite communications also suffer as there is often insufficient power

to keep the phones charged for extended periods. It therefore makes sense to have alternative communication channels. Communication facilities in the US are built on a model that is commercially viable when there is no disaster. During disasters, the circuits are quickly overloaded due to high call volume to and from the disaster areas. Interoperability issues arise as a consequence of a multitude of factors ranging from the inability to use allocated communication channels (such as 800 MHz) due to outdated equipment to non-compliant standards being in use. Interoperability efforts such as those by Oasis with the Call Alert Protocol would serve to alleviate some of these problems. This study stresses the need to establish better technologies in general; specifically, it points to the need for better communication capabilities.

The Delphi results also indicate that people-related factors are more important than process factors. Training at all levels and community preparedness are essential for better disaster mitigation. Communities must learn to become more self-reliant, even to the extent, according to some emergency managers, of learning to shelter their families for several days during major disasters. Communities must be trained to help as volunteers when needed.

As mentioned earlier, a Delphi study tends to suppress the disparity that may exist between groups. In order to ensure that we get a comparison between the different types of first responders, we preserved group identities for the responders and this allowed us to analyze the data based on responder type. This Delphi study shows that different first responder groups have somewhat different focus and different priorities. The results in Tables 1 (importance) and 2 (urgency) reflect this difference in priorities in terms of critical factors.

Table 1: Importance scores on critical factors based on first responder types

| | Police | Emergency Manager | Medicine | Fire |
|------------------------------------|-------------|-------------------|-------------|-------------|
| PROCESS | 7.85 | 8.16 | 8.08 | 7.68 |
| Preparedness & Planning | 7.88 | 8.05 | 8.09 | 7.69 |
| Infrastructure | 7.92 | 8.07 | 8.12 | 7.78 |
| Other preparedness activities | 7.80 | 7.99 | 8.01 | 7.50 |
| Coordination & Information Sharing | 7.80 | 8.39 | 8.08 | 7.65 |
| TECHNOLOGY | 8.71 | 8.64 | 8.64 | 8.58 |
| Communication channels | 8.71 | 8.64 | 8.64 | 8.58 |
| PEOPLE | 8.25 | 8.63 | 8.41 | 7.72 |
| Training | 8.52 | 8.86 | 8.66 | 8.30 |
| Community preparedness | 7.82 | 8.27 | 8.04 | 6.85 |

Table 2: Urgency scores on critical factors based on First responder types

| | Police | Emergency Manager | Medicine | Fire |
|------------------------------------|---------------|--------------------------|-----------------|-------------|
| PROCESS | 7.45 | 7.85 | 7.77 | 7.20 |
| Preparedness & Planning | 7.44 | 7.69 | 7.74 | 7.05 |
| Infrastructure | 7.46 | 7.70 | 7.75 | 6.96 |
| Other preparedness activities | 7.42 | 7.68 | 7.72 | 7.22 |
| Coordination & Information Sharing | 7.48 | 8.15 | 7.84 | 7.50 |
| TECHNOLOGY | 8.34 | 8.36 | 8.29 | 8.03 |
| Communication channel | 8.34 | 8.36 | 8.29 | 8.03 |
| PEOPLE | 7.92 | 8.37 | 8.24 | 7.25 |
| Training | 8.18 | 8.61 | 8.45 | 7.83 |
| Community preparedness | 7.50 | 8.00 | 7.91 | 6.39 |

Table 3 provides detailed scores for each of the issues in terms of ‘Importance’ and ‘Urgency’. Communication channel remains the most important and urgent issue, while provision of training that includes all levels of first responders is a close second. Responders felt that the need for the state government to clarify roles and responsibilities for the different agencies was not important. This role of the government may be important in some states; however, it is not an issue in Western New York. ‘Preparedness’ and ‘planning’ scored lower as well, and this is perhaps because frontline managers of emergencies believe that adequate training already exists in the emergency workforce.

A key observation is that while all the different groups consider technology related issues as being the most important, Emergency Managers consider People issues almost equally important. On the ‘Urgency’ dimension City, Town and County Emergency Mangers place equal emphasis on people and technology issues. Other types of first responders rated “Technology” issues higher on the “Urgency” dimension.

During a major disaster, first responders at all the different levels become frontline executioners of the plan. Therefore first responders felt that training and preparation for disasters should be provided to all levels of first responders. The current perception is that training is provided to a few personnel. This is also true of many table top exercises. Without a large exercise, only a few get to participate in training. Therefore, if this issue is not addressed, a large majority of first responders would be left untrained during a major catastrophe.

Table 3: Scores for the entire group of seventy-seven experts on all of the issues

| ITEM | Importance | Urgency |
|---|-------------------|----------------|
| PROCESSES | 8.05 | 7.67 |
| Preparedness & Planning | 8.05 | 7.60 |
| <i>Infrastructure</i> | 8.11 | 7.61 |
| Disaster preparedness should include well thought out alternate designated sites to house evacuees. | 8.30 | 7.75 |
| Early evacuation mechanisms should be in place particularly to move those who do not have their own transportation. | 8.38 | 8.02 |
| Plans for suppliers and facilities in emergencies should be preset and tested regularly based on simulated exercises. | 7.51 | 7.09 |
| Transportation plan will be needed in emergencies. Transportation agencies outside the disaster site need to be identified and alerted as to the possibilities of being placed into action. | 8.26 | 7.57 |
| <i>Other preparedness activities</i> | 7.91 | 7.59 |
| National Response Plan should have flexibility to respond to catastrophic disasters and be ready to move in less than 72 hours. | 7.92 | 7.79 |
| Emergency plans should be thoroughly reviewed for its soundness in terms of its implementability for different types of emergencies. | 7.90 | 7.38 |
| Coordination & Information Sharing | 8.06 | 7.80 |
| The most critical rules and disaster management policies need to be disseminated to local emergency response chiefs on a regular basis as a part of a “Be prepared” initiative. | 8.38 | 8.03 |
| Coordination between local, state and federal governments and agencies is crucial to mitigate damages in emergencies. | 8.44 | 8.36 |
| State government should clarify departments and agencies’ roles and responsibilities. | 7.36 | 7.01 |
| TECHNOLOGY - Communication channel | 8.66 | 8.31 |
| Several alternate communication channels should be ready and pre-tested. | 9.33 | 9.04 |
| Communication channels must be kept open and cleared for direct communication between state and federal officials. | 7.99 | 7.57 |
| PEOPLE | 8.39 | 8.13 |
| Training | 8.66 | 8.39 |
| Incident response coordinator should be trained to prioritize needs and dispatch resources to fulfill needs. | 8.77 | 8.53 |
| Simulated exercises should include preparing the commanders for efficient execution of the plans. | 8.20 | 7.78 |
| Training and preparation for disasters should be provided to all levels of first responders. | 9.07 | 8.93 |
| Community Preparedness | 7.98 | 7.73 |
| Education on how to prepare for disasters and how to overcome them is needed on a regular basis. | 7.41 | 7.07 |
| The public should also prepare for disasters by themselves. | 8.62 | 8.50 |

Table 4: Ranking of Individual Lesson

| Issues | Responder group | | | | Urgency | | | |
|---|-----------------|----|----|----|---------|----|----|----|
| | P | E | M | F | P | E | M | F |
| Disaster preparedness should include well thought out alternate designated sites to house evacuees. | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| Several alternate communication channels should be ready and pre-tested. | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 |
| The most critical rules and disaster management policies need to be disseminated to local emergency response chiefs on a regular basis as a part of a “Be prepared” initiative. | 6 | 5 | 9 | 3 | 5 | 3 | 6 | 3 |
| Transportation plan will be needed in emergencies. Transportation agencies outside the disaster site need to be identified and alerted as to the possibilities of being placed into action. | 1 2 | 13 | 11 | 10 | 8 | 9 | 10 | 4 |
| Communication channels must be kept open and cleared for direct communication between state and federal officials. | 3 | 3 | 3 | 6 | 4 | 4 | 3 | 5 |
| Early evacuation mechanisms should be in place particularly to move those who do not have their own transportation. | 8 | 10 | 5 | 5 | 9 | 12 | 8 | 6 |
| Incident response coordinator should be trained to prioritize needs and dispatch resources to fulfill needs. | 4 | 4 | 4 | 11 | 3 | 5 | 4 | 7 |
| Plans for suppliers and facilities in emergencies should be preset and tested regularly based on simulated exercises. | 1 1 | 12 | 13 | 8 | 12 | 11 | 12 | 8 |
| Coordination between local, state and federal governments and agencies is crucial to mitigate damages in emergencies. | 5 | 7 | 8 | 4 | 6 | 7 | 7 | 9 |
| People have to prepare for disasters by themselves. | 1 6 | 14 | 15 | 15 | 16 | 14 | 16 | 10 |
| State government should clarify departments and agencies’ roles and responsibilities. | 7 | 6 | 6 | 12 | 7 | 6 | 5 | 11 |
| National Response Plan should have flexibility to respond to catastrophic disasters and be ready to move in less than 72 hours. | 1 0 | 8 | 10 | 9 | 10 | 8 | 9 | 12 |
| Emergency plans should be thoroughly reviewed for its soundness in terms of its implementability for different types of emergencies. | 1 3 | 11 | 12 | 13 | 13 | 13 | 13 | 13 |
| Education on how to prepare for disasters and how to overcome them is needed on a regular basis. | 9 | 9 | 7 | 7 | 11 | 10 | 11 | 14 |
| Having good plans does not immediately imply good execution. Simulated exercises should include preparing the commanders for efficient execution of the plans. | 1 4 | 16 | 14 | 14 | 14 | 16 | 14 | 15 |
| Training and preparation for disasters should be provided to all levels of first responders. | 1 5 | 15 | 16 | 16 | 15 | 15 | 15 | 16 |

P: police, E: emergency manager, M: medicine, F: fire

The two issues that rank high across all types of first responders are technology and people. However, on other issues, there is less correlation between importance and urgency. Table 4 shows how each of the first responder type perceived each of the issues on the two dimensions.

While first responders generally felt that both communications and training were urgent and important, other issues did not receive equal ranking on both dimensions.

4. CONCLUSION

The main contribution of this work is that it informs public policy in terms of needs, importance and urgency. This study provides an insight on what must be done immediately in this regard.

This study gains significant value from the fact that the participating group included Police Chiefs, Fire Chiefs, Senior EMS personnel and City, Town and County level emergency managers. When critical incidents occur, it is they who serve as frontline warriors. Their evidence is of compelling importance in prioritizing what needs to be done to ensure better preparedness in dealing with future disasters.

The findings of this study will aid researchers and policy makers better understand the field of emergency response from the first responder's perspective. Furthermore, the research draws its input not only from articles on 'Lessons Learned' that were published in the immediate aftermath of Hurricanes Katrina and Rita, but also from input from emergency managers. As a follow up to our study, we went back to the first responder community in Western New York and enquired about the changes they had made based upon the lessons learned. Here are some of the changes that are taking place: (a) Regional authorities are working to implement the 800 MHz communication system to improve interoperability. Our study validates this investment. (b) Development of a 'Human needs list' to address the infirm in Nursing Homes, and homeless has been accomplished (c) Development of Comprehensive Emergency Management Plan to deal with catastrophic earthquake event of magnitude 5 or higher on the Richter scale. (d) Development of plans to care for care givers.

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