

# **The Relationship between Socio-economic Conditions and the Impact of Natural Disasters on Rural and Urbanized Regions Level of Preparedness and Recovery**

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## **Abstract**

The capacity to survive and recover from the effects of a natural disaster depends on two major factors: the physical magnitude of the disaster and the socio-economic conditions of individuals or social groups who experience the crisis. In short, poverty is the central factor that will determine the level of vulnerability and hence the survival of a natural hazard turned disaster. Therefore, it is suggested that the lack of preparedness, ability to reunify, and then rebuild after a natural or created disaster remains problematic, especially for children and families already facing poverty conditions. The current research was designed to assess levels of preparedness and transit mobility in rural and urban regions during evacuation and reunification efforts when a natural disaster or terrorist attack occurs. Transportation was used as a variable of socioeconomic class or condition. The study focused on three primary research goals: 1 to identify if differences exist between urban and rural region transit evacuation and reunification efforts; 2. to examine the level of preparedness to evacuate due to personal resources and city or county assistance; 3. to examine the effects of Human Factors such as Stress, fatigue, and anger related accidents, and ability to rebuild after a disaster. Major outcomes of this study revealed that most participants of the study remain unprepared to survive a natural or created disaster, even though 50% of participants had some previous direct experience with natural disasters. Further, the study identified consistent concerns with poverty conditions as a major factor affecting their ability to prepare, evacuate, reunify, and rebuild after a natural disaster.

The intellectual merit of this project centers on the neglected community of disaster victims and their socioeconomic need for assistance in preparing and rebuilding following a disaster. The research is new and informative to the national and international communities, due to minimal published investigations regarding victims of natural disasters.

## **Introduction**

The poor, children, and individuals with disabilities are the most vulnerable to nature's wrath when hazards such as hurricanes, floods, earthquakes and tornado occur. The socio-economic conditions worsen after the disaster leaving the already impoverished poorer than they were before the natural disaster. The last few years have demonstrated that no place or no one in the world is immune from natural or created disasters. From the tsunami in India, from the devastation caused by hurricanes, fires, flooding, and cyclones in the United States, grave flooding in Europe and Asia, terrorist attacks in the United States and Europe, and wars in Iraq. Millions of people have lost their lives, and experienced devastation in their socio-economic stance due to disasters, natural or man-made. The poor are the most vulnerable and suffer the most under these conditions. During disasters, the level of adequate services and infrastructure further complicates the survival efforts for those most impoverished. Transportation is a major resource and used to evacuate. For the poor, lack of transportation, financial inability to



purchase city or public transportation makes evacuation impossible and leaves the poor at greater risk for fatalities during hazards turned disaster. Cities are highly vulnerable to natural crises and disasters. A sudden supply shortage of disaster safety supplies such as shelter, food, water, and medical resources, can leave a city and its citizens with many environmental and social burdens which can quickly lead to more serious medical, mental health, and social protective emergencies. The consequences of such crises are multiplied by poorly coordinated administration and planning. Natural disasters have become more frequent and more severe during the last two decades, affecting a number of large cities (see Figure 1). The United Nations Environment Program (UNEP) reports that, between 1980 and 2000, 75 per cent of the world's total population lived in areas affected by a natural disaster<sup>1</sup>. In 1999, there were over 700 major natural disasters, causing more than 100 billion dollars in economic losses and thousands of victims, mostly poor. Further, over 90 per cent of losses in human life from natural disasters around the world occurred in poor countries. Lately, most poverty conditions result from natural disasters due to limited level or preparedness to evacuate and preparedness to recover from a natural hazard turned disaster. The purpose of this study is to examine levels of preparedness and capacity to rebuild after a disaster has occurred.

### **Conditions of Poverty and Defined Poverty**

There are a number of direct and indirect causes of poverty in the United States. These are mental health and disability conditions, lack of education attainment and skill, substance abuse, domestic abuse, crime, limited job opportunities, and especially, natural or created disasters. Of the poor, most represent a significant subgroup of race and ethnic group, such as African American, Latino, and Hispanics. The salary of low-income families with children are used to measure the economic standards for this statistic which indicate that 21% of all children in the United States live in poverty, but 46% of African American children and 40% of Latino children live in poverty.<sup>2</sup> Compared to other countries, New Mexico presents the highest level of poverty, followed by Slovakia, and the United Kingdom. The United States ranks 5<sup>th</sup> in levels of poverty compared to other countries (see Figure 1). The poverty rate in the United States is one

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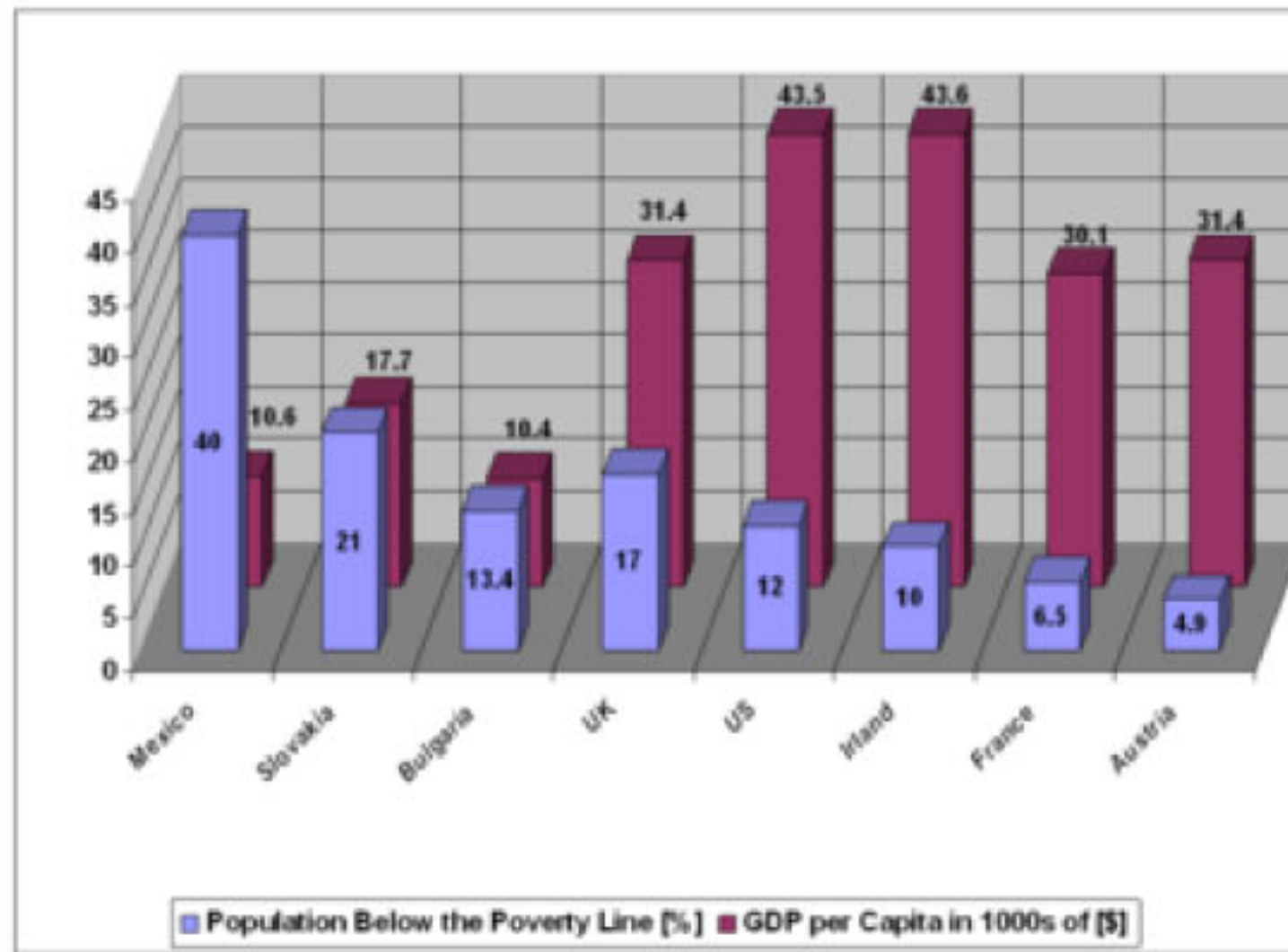
<sup>1</sup> [http://www.unisdr.org/eng/public\\_aware/world\\_camp/2005/2005-iddr.htm](http://www.unisdr.org/eng/public_aware/world_camp/2005/2005-iddr.htm). Retrieved on 2007-09-02.

<sup>2</sup> <http://www.U.S.GovernmentDoesRelativelyLittletoLessenChildPovertyRates>. Retrieved on 2007-09-02



of the highest among the industrialized developed world<sup>3</sup>. However, careful analysis shows that this is due to different measures of poverty in these nations.

Figure 1. Poverty Lines Cross Country



Source: [usgovinfo.about.com/od/censusandstatistics/a/factbook04.htm](http://usgovinfo.about.com/od/censusandstatistics/a/factbook04.htm)

In 2001 the poverty rate for minors in the United States was the highest in the industrialized world, with 14.8% of all minors and 30% of African American minors living below the poverty standards.<sup>4</sup> Additionally, the standard of living for those in the bottom 10% was lower in the U.S. than in any other developed nation.<sup>5</sup> In 2006, poverty rate for minors increased in the United States was reported as 21.9%. This is the highest child poverty rate compared to other developed industrialized countries. While these rates are reported, poverty in the U.S. should be viewed as cyclical, meaning families with children rise and fall below poverty standards as a result of many conditions, including social and environmental conditions, such as natural disasters (see Figure 2).

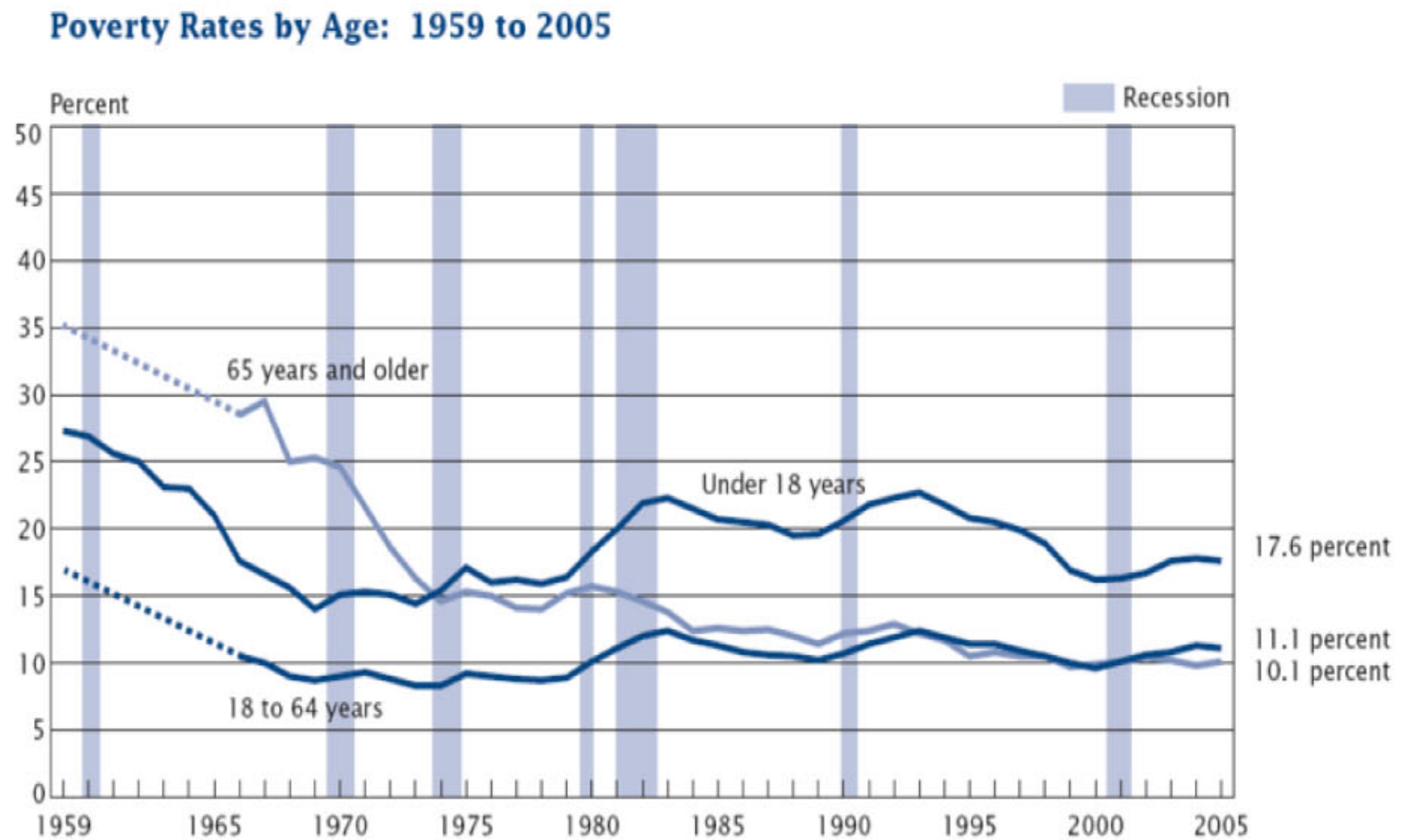
<sup>3</sup> <http://www.TheGuardian.Americanpovertyrateamongthehighestinthedevelopedworld>. Retrieved on 2007-05-11.

<sup>4</sup> <http://www.usgovinfo.about.com/od/censusandstatistics/a/factbook04.htm> Retrieved on 2007-05-11.

<sup>5</sup> <http://www.TheGuardian.Americanpovertyrateamongthehighestinthedevelopedworld>. Retrieved on 2007-05-11.



Figure 2.



Source: Retrieved from <http://www.US Census Bureau, report on income, poverty and insurance for 2005>. Retrieved on 05.13.07.

### Cities: Prepared or Hazards to Sustainable Use After Disasters?

Although urban and rural regions areas are experiencing sustainable growth, are they a help or a hazards in the case of preparing and rebuilding after a natural disaster. With the increased number of disaster declarations occurring nationally and internationally the impact on developing new cities and maintaining existing ones has become economically expensive due to an increasing populace. Between 2000 and 2030, the world’s urban population is expected to increase by 72 per cent, while the built-up areas of cities of 100,000 people or more could increase by 175 per cent.<sup>6</sup> Environmental sustainability is being waged due to increases in population growth, increases in the actual prevalence and prediction of natural disasters and created disasters, resource degradation, and waste generation. Ironically, these same cities are being held responsible for the sustainability of future of generations within these same

<sup>6</sup> <http://www.unfpa.org/pds/sustainability.htm> Retrieved on 2007-09-02.



potentially impacted and degrading cities. Unfortunately, the poor will be impacted the most as they are typically economically forced to live in substandard homes on less valued land. Because the poor have limited information and resources to prepare for natural and created disasters, their vulnerability to hazards and then disaster increase. They also have little information and resources, thus setting conditions for the recreation of the poverty cycle. When hurricane Katrina made landfall on the Gulf Coast of the United States on August 29, 2005, it killed over 2,800 people and left thousands of survivors homeless, mostly poor. Individuals in poverty were most affected by the hurricane. African-Americans and the elderly were more likely to reside in a flooded area and were more likely than non-elderly whites to die as a result of the flooding.

During disasters, poorly built homes, inadequate emergency services and infrastructure further complicates survival efforts. Health and social sustainability become greater risks and similarly accentuated. By comparison, the homes of the upper and middle class groups are constructed with more durable materials on stable terrain and residents are privileged to quicker response to needed services. Furthermore, these individuals typically have more resources to rebuild after a disaster.<sup>7</sup>

From a social and psychological point of view, providing for the land and shelter needs of poor men and women promotes human rights. It is critical for poverty alleviation, sustainable livelihoods and the reduction of gender inequalities. Within the United States, most city growth will occur within urban and rural areas, and many of the new urban cities will be poor. The form and direction of future city growth, as well as the way land is apportioned, utilized and organized, are all critical for economic growth and poverty reduction. Planning should include economic assistance for families that fall at or below poverty standards. Building and Planning officials and policymakers must take proactive actions to develop, maintain, and guarantee human rights of citizens who are impoverished. The Secretariat of the International Strategy for Disaster Reduction (ISDR) launched a global plea to assist the impoverished through microfinance, after a disaster has occurred. The application of “Microcredit” should be used to empower those with minimal ability to obtain financing to rebuild from traditional financial institutions. This method should be employed to reduce disaster risk and improve disaster management. By diversifying the income of high-risk populations and promoting disaster

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<sup>7</sup> <http://www.unfpa.org/pds/sustainability.htm> Retrieved on 2007-09-02.



insurance, microfinance can strengthen coping mechanisms before disasters, while hastening recovery afterwards. The call on governments at all levels, international organizations, civil society groups, and the private sector to implement this framework and invest in poverty reduction and disaster prevention, in order to build resilient communities and save lives.

### **Contra-flow and Evacuation Practices**

In the year 2004, to aid in systematized evacuation, transportation officials instituted what is known as “contra-flow evacuation.” Contra-flow evacuation is the use of both lanes of a highway at the same time. For the first time in history during hurricane Ivan, a 12-mile stretch of Interstate 10 (I-10) was used to facilitate the significantly increased outbound flow of traffic toward the northwest and Baton Rouge. In spite of this positive effort, the distance of the contra-flow was limited due short distances traveled and major traffic jams, which posed increased risk to the lives of citizens traveling.

Recent evacuation surveys show that two thirds of non-evacuees with the means to evacuate chose not to leave because they felt safe in their homes. Other non-evacuees with means relied on a cultural tradition of not leaving or were discouraged by negative experiences with past evacuations. Another, major challenge to evacuation is the extremely limited number of evacuation routes, which is the result of the same topography and hydrology responsible for the area’s high level of hurricane risk. Residents who did not have personal transportation were unable to evacuate even if they wanted to. The Collaboration among school districts, planning and zoning agencies, the Department of Transportation, and Highway Patrol will be used in the development of a Training Model for Schools, Families, and Communities to promote Safety and Cooperation during times of sudden crisis events.

### **Federal Transit Administration**

In 2003 the Federal Transit Administrations listed several considerations to improve both security and emergency preparedness during potential natural hazards. The goal of this program is to ensure that the nation’s public transportation systems: are prepared for and well-protected against attacks; respond rapidly and effectively to natural and human-caused threats and



disasters; appropriately support the needs of emergency management and public safety agencies; and can be quickly and efficiently restored to full capability. Public transit systems have historically provided assistance during crisis situations, spearheading repair and recovery efforts and rendering other services such as restoration of roadways, evacuation of victims, transportation of emergency personnel and in the wake of disastrous events, restoring mobility for both residents and recovery workers. Therefore, at a minimum, public transit agencies should have an established communication network with other emergency management personnel in their respective geographical locations in order to effect transportation and evacuation.<sup>8 9</sup> Therefore, planning for security and safety has assumed a major role in logistics and transportation and infiltrates every systemic level of operations. Assessing the risks and designing responses to incidents are now a major regional, national and international concern -- and an increasingly costly part of transportation and logistics systems planning.

This research project builds on the national emphasis of the Federal Transit Association (FTA) and examined levels of preparedness in both rural (families who are most at risk) and urban community evacuation transit policies and procedures for evacuation and reunification. What was observed is families who experience poverty are at greater risk in evacuation, reunification, and rebuilding after some form of disaster. Transportation is a measure of poverty and often families who are impoverished are challenged by reliable transportation or failure to have monetary means to afford to evacuate putting these families at greater risk for loss of life and tragedy. Lessons learned in the hurricane Katrina aftermath demonstrated and further identified transportation as an important factor in preserving human life in the case of natural disasters. Individuals from rural regions and who are impoverished are greater impacted because of poverty and lack of private transportation and limited to no ability to pay for public transportation. The important role of transportation to assist families most at-risk should be point of focus and used to improve the safety of children and families who are most impoverished and considered most at-risk before and after a disaster. Creative solutions are essential in order to maintain economic growth and protect public safety. Thus designing and meeting mandated regulations is vital to identifying high-technology and other responses to

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<sup>8</sup> Maxwell, D., & Watkins, B. (2003). Humanitarian information systems and emergencies in the Greater Horn of Africa: Logical components and logical linkages. *Disasters*, 27 (1), 72–90.

<sup>9</sup> Noam, E. M., & Sato, H. (1995). Kobe's lesson: Dial 711 for 'open' emergency communications. *Telecommunications Policy*, 19 (8), 595–598.



assess trade-offs between national security and the efficiency of the logistics and transportation systems. The elderly, individuals with disabilities, children and families located in rural geographical areas and those who are impoverished in both rural and urban communities with minimal resources and transportation to evacuate are in most critical need based on the results of this study.

### **Methodology**

#### **Research Purpose**

The use of safety programs and other innovative enhancements that promote public health and transit safety during emergency evacuation is needed to reduce further crises events during natural disasters and possible anti terrorist activity. The project focused on three primary research themes: To examine differences between impacted versus non-impacted transit evacuation and reunification efforts and, 2. to examine differences between levels of preparedness. Thus the research based project evaluated the overall level of preparedness of potentially at 'risk sites' with respect to how well they are equipped to cope with natural disasters including hurricanes, earthquakes, fire and flood. The study also sought to determine whether residents of areas with moderate to frequent experience with natural disasters were more adequately prepared to deal with crisis situations compared to residents of areas that despite being at risk may not have had recent experience with a natural disaster.

#### **Participant Population Selection and Sampling**

Participant selection was based on convenient sampling. Participants were drawn from major cities within the states of Florida, Northern United States, and Southern United States including, Texas and Louisiana. These cities met the inclusion criteria for this study based on poverty status, race and ethnic acceptability, geographical regions, and experience with a natural disaster, especially hurricanes (Fig. 1). In an effort to enhance comparative analyses, the cities were subdivided into four independent geographical regions. Participating cities within the state of Florida were sub divided into south (Miami, Tampa, St. Petersburg, Fort Lauderdale, Daytona and Orlando) and north (St. Augustine, Jacksonville, Tallahassee and Pensacola). It must be noted that despite their central geographical demarcation, Orlando and Daytona were included in



the southern category. The other two geographical regions were New Orleans, Louisiana and Houston, Texas. Furthermore, the geographical regions were defined as either **impacted sites**, meaning that the region experienced a major natural disaster within the past two years preceding the study or **non impacted sites**, if they did not experience a major natural disaster within the past 2 years preceding the study. Table 1 gives an illustration of the geographical regions and the number of respondents participating from each region. Approximately, 309 participants represented households across four geographical regions were represented in the participating sample. The gender of participants were commensurate, 143 females and 132 males. Ages of participants ranged from 10 to over 65 years of age. Age ranges were 10-19 (178), 20 – 35 (40), 36 – 45 (42), and 46 - 65 and older (50). While all racial groups were represented, the majority of participants were African American (211), White (34), Asian (12) and other (11). The economic levels were varied and included student income levels, professional level income, and retirees. Overall, the participant sample represents states and racial groups from which the sample was drawn. Caution should be taken when generalizing results from some states, due to limited sample representation. Notwithstanding the data results suggests a consistent stream of results indicating similar patterns of responses for participant regardless of geography (Table 2).

### **Apparati**

One instrument was used in this study to assess the level of preparedness to evacuate and reunify after a major disaster, natural or created: The *Evacuation and Reunification Readiness Scale* (ERRS) and The Trauma Symptom Checklist for Children and Adults (TSCA). The *Evacuation and Reunification Readiness Scale* (ERRS) is an assessment tool designed to measure levels of knowledge and actual emergency preparedness, evacuation, and reunification of children and families ages 12 to over 65 years. The ERRS is a 30- item survey instrument designed for this study using literature from the Federal Transit Authority's (FTA), psychological practices related to post-traumatic stress resulting from traumatic events, and literature pertaining to Declaration of Human Rights.<sup>10 11</sup> The questions were designed to measure the respondents' level of **preparedness**; for example whether or not their families conducted safety drills, owned first aid kits, or have strategies to **reunite** with families or gain

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<sup>10</sup> Human Rights Committee. *Consideration of Reports Submitted by States Parties under article 40 of the Covenant: Comments of the Human Rights Committee, United States of America* (1995).

<sup>11</sup> Zhang, D., Zhou, L., & Nunamaker, J. E., Jr. (2002). A knowledge management framework for the support of decision making in humanitarian assistance/disaster relief. *Knowledge and Information Systems*, 4 (3), 370–385.



safety during and after a disaster, respectively. The responses to the survey questions were arranged on a 3 point ordinal scale with a choice of 1 (coded yes) indicating that the respondent had taken positive steps to prepare for the eventuality of a disaster, 2 (coded no) indicating that the respondent had not made the necessary safety preparations and 3 (coded don't know) indicating that the respondent was unsure about his or her state of preparedness. Considering the serious nature of natural disasters, researchers considered not knowing one's level of preparedness to be a risk factor. Consequently, options 2 and 3 on the survey were collapsed into a single category (2) indicating that the respondent was not prepared. All surveys were distributed on site and collected on completion by the respondents. This method afforded the realization of a 100 percent return rate. Survey questions that were unanswered or impossible to be determined were treated as missing data. Scores on the ERRS will reflect the kind of specific training needed to improve the behavioral practices of family units when preparing for a natural or created disaster.

**Statistical Analysis:**

The level of preparedness was considered to be a function of readiness meaning participants had not taken the necessary proactive steps to confront a natural or created hazard in a manner to increase chances of survival and then reunite and rebuild after the crises. Efforts taken by city administrators to provide food, shelter, facilities and transportation to aid in evacuation and reunification were also taken into consideration as a measure of human rights consistent with the *Declaration of Human Rights*.<sup>12 13</sup> Since a benchmark value was not used as an index of preparedness, the differences in the proportion of positive and negative responses to the survey questions was used to determine whether the proportion of residents who had taken sufficient safety measures to be prepared was significantly higher compared to the proportion of residents who had not done so. These proportions were later expressed as percentages to provide a better understanding of the results. It is worth mentioning that lack of preparedness can simply be calculated as the difference between the level of preparedness and 1.

That is:

$$P_u = (1 - p_i)$$

*Equation 1*

where:

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<sup>12</sup> Human Rights Committee. *Consideration of Reports Submitted by States Parties under article 40 of the Covenant: Comments of the Human Rights Committee, United States of America* (1995).

<sup>13</sup>Protection of Internally Displaced Persons in Situations of Natural Disaster: A Working Visit to Asia by the Representative of the United Nations Secretary-General on the Human Rights of Internally Displaced Persons Walter Kälin, 27 February to 5 March 2005 at 13.



$p_u$  = the proportion of unprepared residents and

$p_i$  = the proportion of prepared residents.

The null hypothesis tested was formulated as follows:

**Ho:  $p_1 = p_2$**

***Equation 2***

That is:

1. The proportion of prepared residents ( $p_1$ ) and unprepared residents ( $p_2$ ) would be the same and

The proportion of residents in regions that had recent experience with a crisis situation ( $p_1$ ) would not be any better prepared to deal with future crisis situations compared to residents of regions that had no recent experience with similar crisis situations ( $p_2$ ). Since New Orleans, Louisiana had the most recent experience with a major crisis resulting from a natural disaster, it was used as the reference site (impacted site) for the necessarily take these precautions. With consideration, the alternative hypothesis was specified as:

**Ha:  $p_1 > p_2$**

***Equation 3***

That is, residents of impacted sites would be better prepared to deal with future natural disasters compared to residents of non impacted sites. The Chi square goodness of fit tests was used to test the first hypothesis of equal proportions and to make a reasonable determination about the overall level of preparedness of the population surveyed. However, due to the large number of survey questions, it was necessary to compute weighted averages for the preparedness items. These weighted averages were used to compute odds ratios to determine the likelihood of the impacted site making more adjustments to prevent future disasters compared to the non impacted sites. To test the second hypothesis, the Cochran-Mantel-Haenszel (CHM) option in SAS version 9.0 (SAS Institute, Cary, NC) was used to generate logits, (odds ratios) and 95 percent confidence intervals about the odds ratios.<sup>14 15</sup> This procedure is popularly used in case control studies and is outlined by.<sup>16</sup> In all comparisons, the most recently impacted site (New Orleans) was used as the case whereas the non-impacted sites were used as controls.

## **Results and Discussion**

**Experience with natural disasters:** Results of the study indicate that a majority of the respondents (55 percent) had previous experience with a major natural disaster. Most participants

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<sup>14</sup> Aalen OO. Non parametric inference for a family of counting processes. *Annals of Statistics* 1978;6:701-726

<sup>15</sup> SAS version 9.0 SAS Institute, Cary, NC **2007 SAS Institute Inc**

<sup>16</sup> Cody, R.P. & Smith, J.K. (1997) *Applied Statistics and the SAS Programming Language*: Englewood Cliffs, NJ: Prentice Hall, Prentice Hall.



reported experience with a hurricane. This finding is important since at least half of the respondents must have experienced a natural disaster in order to be suitable candidates for the impacted sites. The fact that almost half (44 percent) of the residents had not experienced a major crisis is also important since they too become suitable candidates for the non-impacted sites thereby providing the basis for a fair comparison.

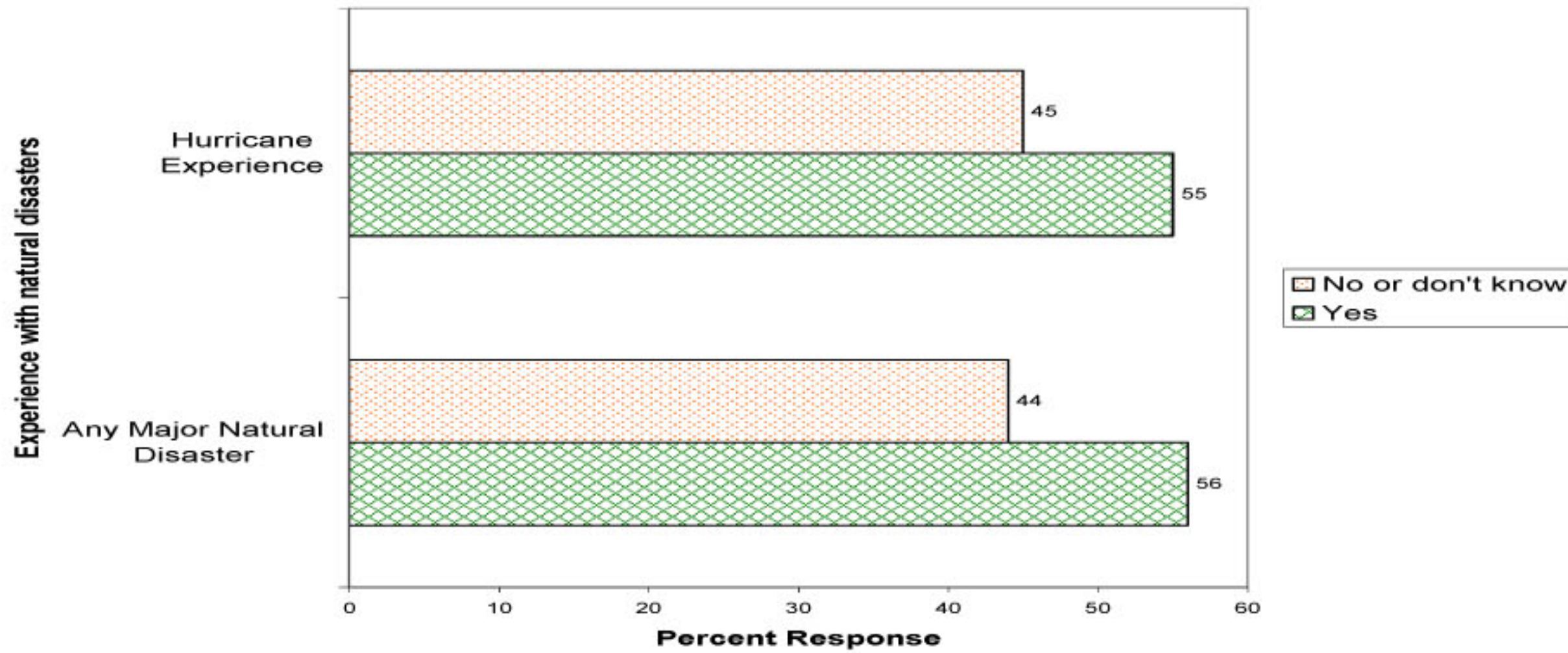


Fig.

1. Proportion of respondents with and without experience with a major storm

**Evaluating the overall level of preparedness:**

Based on the p-values for the chi square goodness of fit tests, the null hypothesis of equality in proportions for all except one of the preparedness indicators was rejected. This exception was the provision of potable water by the city. Since 92 percent of the general preparedness indicators produced significantly higher proportions of negative responses, it was concluded that there was sufficient evidence ( $p < 0.05$ ) that the overall population was not prepared to deal with crisis situations. Critical items were found lacking and are reported as follows:

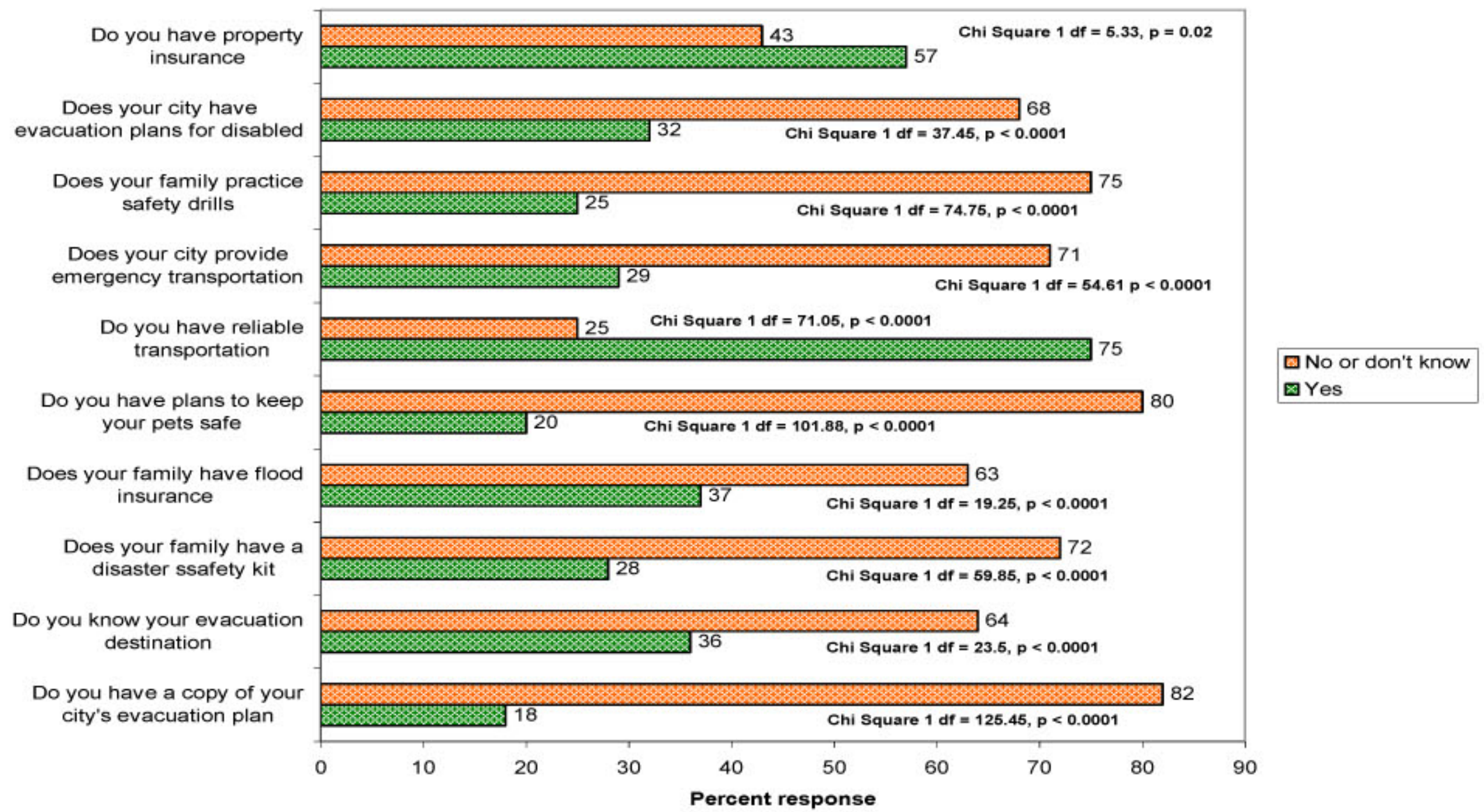
- Most residents did not have a copy of their city’s evacuation plan.
- Most lived in impoverished geographical locations within their city and could not report their prescribed evacuation site.
- Most reported not have home insurance to assist with rebuilding after a natural disaster.
- Most reported limited city transportation to assist with evacuation.
- Most families did not have disaster preparedness kits.
- Most families did not conduct disaster preparedness drills.
- Most families did not have reunification plans.



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- Most city governments did not provide essential facilities, including emergency transportation, 211 response programs, and mobile call centers and missing children websites among other things.

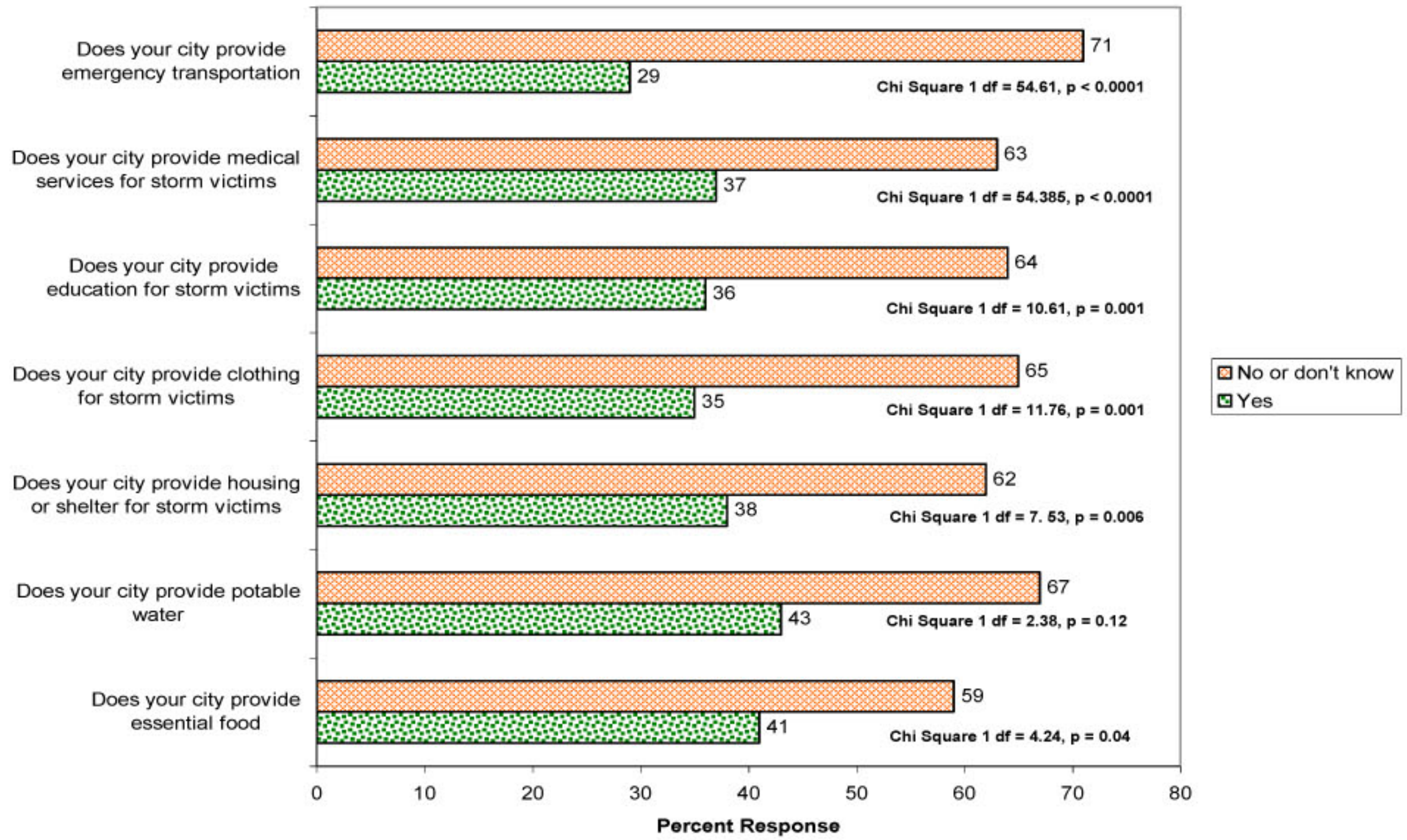
It was determined that a majority of residents were not concerned about safety for their pets and did not even believe that gentrification would occur following a major natural disaster. The shortcomings presented above are a summary of the region wide lack of preparedness identified by this study. Figures 2, 3 and 4 give a more detailed illustration of our findings.



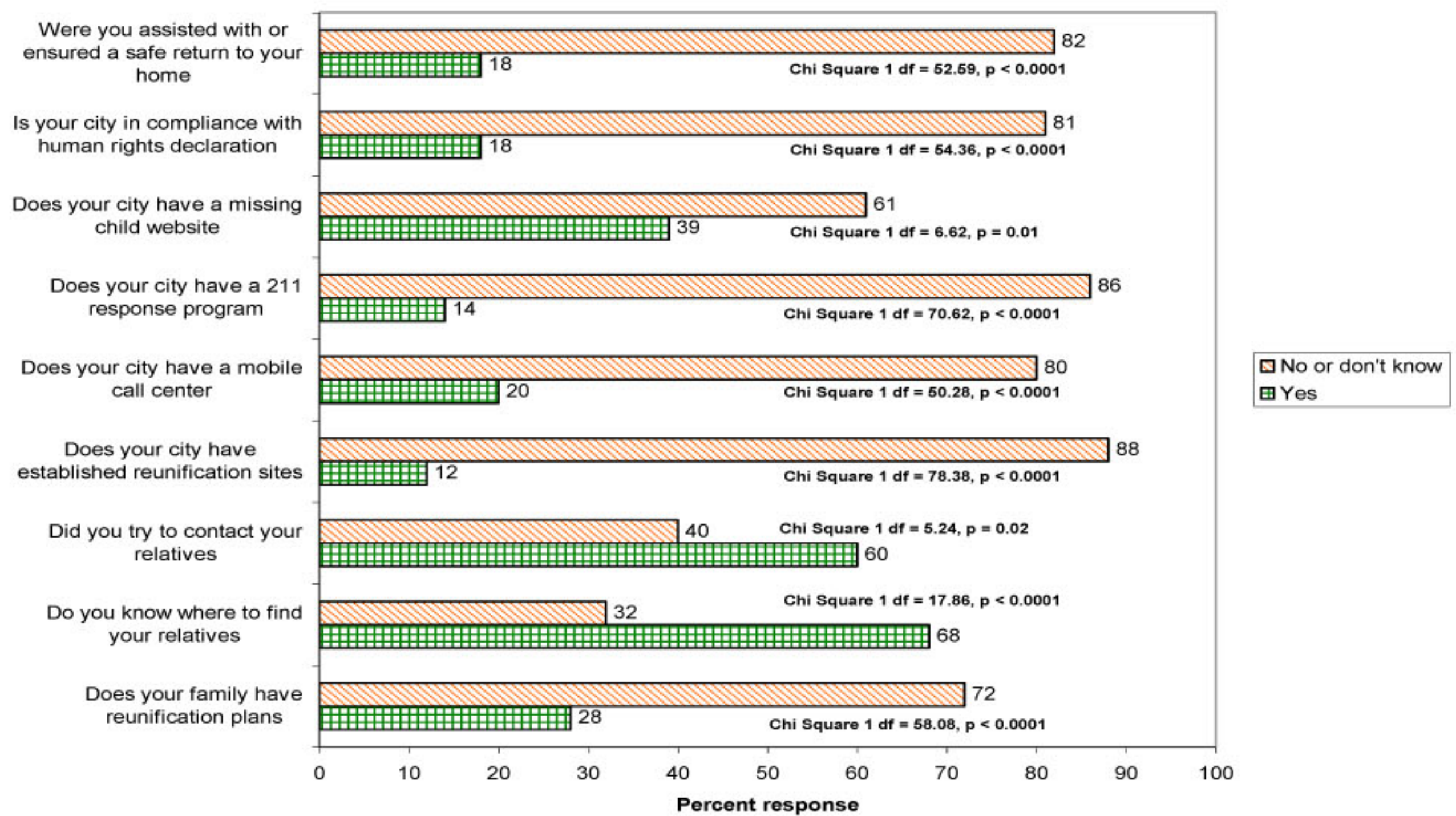
**Fig. 2. Proportion of positive and negative responses to preparedness indicators expressed as percentages**



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**Fig. 3. Proportion of positive and negative responses to preparedness indicators expressed as percentages**



**Fig. 4. Proportion of positive and negative responses to preparedness indicators expressed as percentages**



### **Evaluating regional levels of preparedness**

Evaluation of the odds ratios, and their associated 95 percent confidence intervals were helpful in determining whether the null hypothesis of equality in the level of preparedness of impacted and non-impacted sites within the first two to three years following a natural disaster should be rejected. Based on study findings, there was sufficient evidence to reject the null hypothesis when comparisons were made between New Orleans, Houston and north Florida. The results indicated that residents of New Orleans were approximately 3 times more likely to be prepared compared to residents of Houston, and those residing in northern Florida (Tables 4 and 6). However, no significant difference in the level of preparedness for residents of New Orleans and southern Florida (Table 5). This finding was not surprising since although south Florida has not experienced the type of devastation experienced in New Orleans within the past decade, history shows much evidence of crisis situations within that region especially in the wake of hurricane Andrew in 1991. Considering this, it is not alarming that residents of south Florida may have made similar adjustments to deal with natural disasters as residents along the Louisiana coast. In addition, south central Florida is the center of commerce within the state and residents within that region are more likely to take proactive measures against natural disasters such as flood and property insurance. Governments and corporations in these regions are also likely to implement measures that protect the infrastructure and industries that maintain the livelihood of the state.

Inter regional comparisons of the levels of preparedness of the non-impacted sites were also made. However, no significant differences between any of these sites with regards to their levels of preparedness. While no significant differences were found between impacted sites, it should be made clear, that compared to national practices of preparedness and participant sites remain unprepared for disaster preparedness and recovery.

### **Conclusion**

This research project will build on the national emphasis of FTA and examined rural and urban evacuation transit policies and procedures for evacuation and reunification. Research results are of immediate use and benefit to the Florida Department of Transportation (FDOT), the Federal Transit Administration, regional transportation planning groups, and public transportation agencies. This research further embraces the goals of FTA Safety and Security



Technology Program which places special emphasis on the coordination within the transit community, evaluation and deployment of technology, and other innovative programs that promote public health and transit safety. Evenmore, emphases on humanitarian assistance and care of citizens are emphasized, especially for citizens who are socio-economically disadvantaged in preparing and recovering from a natural disaster. Microfinance is a useful tool to enhance the lives of the poor, namely children, elderly, and the disabled after a disaster has occurred. Through its long-term goals of reducing poverty and supporting sustainable development, microfinance may reduce levels of vulnerability and risk fatalities of the poor to disasters.

The findings of the study are sufficient and assert the following conclusions:

1. The entire region surveyed is not adequately prepared to deal with natural disasters. Much work still needs to be done by governments and citizens alike to bring about a state of readiness to avert major crisis situations following natural disasters.
2. Residents within areas that have experienced crisis situations following natural disasters are more likely to make adjustments that can avoid future losses hence are more likely to be prepared compared to residents of non-impacted areas, however, more action should be taken to be better prepared consistent with national standards homeland security.

The findings of this study can serve as important guidelines to county and city legislators as well as state governments as they try to deal with the unpredictable nature of natural disasters. However, further research of a wider scope is necessary in order to better address the issue of disaster preparedness. It is also important that future studies address a wider audience not just for purposes of reliability but in an effort to find conclusive evidence supporting the readiness of citizens to deal with crisis situations. Research including this study demonstrates that individuals who are more economically challenged and or have cultural differences experience a greater level of difficulty in preparing and recovering from natural disasters. Economic conditions are consistently demonstrated as a variable that makes safety and recovery difficulty. Many social, medical, build and planning, and mental health interventions should be established to empower the families with children, the disabled, and the economically poor during threatened conditions, such as created or natural disasters.



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## Acknowledgement

The study reported in this paper was funded by a Cooperative Agreement FL-26-7103-00 from the Federal Transit Administration (FTA). The Cooperative Agreement was managed by Pauline D'Antignac from FTA. The authors would like to express a special thank you to the Federal Transit Association for serving as a funding source for this research project. Use of funds for this project assisted with designing, mounting, and implementing this research study. As a result, this international publication was afforded and will help lend a voice to the need for more services in the areas of transportation when assisting children, families, and the disabled to evacuate, reunify, and recover after a natural and or created disaster has occurred.

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