The Public's Preparedness for Hurricanes in Four Affected Regions

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SYNOPSIS

Objectives. The purpose of this article is to look at how prepared people in communities outside the main areas devastated by Hurricanes Katrina and Rita thought they were for those storms and for major hurricanes in the near future, what factors were related to why people did not evacuate, and what concerns people had in communities that took in evacuees from the hurricanes.

Methods. Telephone interviews were conducted with randomly selected adults in Baton Rouge, Houston, Dallas, and Mississippi/Alabama (excluding the immediate Gulf Coast) to assess respondents' knowledge, attitudes, and behaviors about hurricane preparedness and response to Hurricanes Katrina and Rita.

Results. The surveys found a sizeable proportion of respondents who might not, for a number of reasons, comply with future orders to evacuate. A substantial proportion reported that they were not prepared for another major hurricane and indicated a desire for more information about how to prepare for future hurricanes. In communities that reported taking in large numbers of evacuees, residents expressed concern about the impact of the evacuees on their community.

Conclusion. Evacuating communities involves a number of concrete problems that were not adequately addressed in the cases of Hurricanes Katrina and Rita. Responses to these surveys indicate a need for more comprehensive hurricane disaster planning.

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Two major hurricanes, Katrina (August 29, 2005) and Rita (September 24, 2005), made landfall in the Gulf Coast region of the United States four weeks apart. Katrina was the deadliest hurricane since 1928 and likely the costliest natural disaster on record in the U.S. The storm surge, strong winds, and heavy rains, along with storm-induced breeches in the levee system surrounding New Orleans, caused widespread destruction in Louisiana, Mississippi, Alabama, and Florida. The disaster was compounded when Hurricane Rita made landfall 26 days later near the Texas-Louisiana border, forcing evacuation of coastal regions of those two states and complicating post-Katrina relief efforts.[1]

The experience with Hurricanes Katrina and Rita raised serious questions about the level of hurricane preparedness at all levels of government, including important issues of public health service delivery. This article is an effort to provide information about the public's response to these hurricanes for those with public health responsibilities in order to prepare for future hurricanes. It builds on a substantial body of earlier research on how people and communities responded to hurricanes.[2–7]

In the time since these two hurricanes hit the Gulf Coast, a variety of research papers have been written about the impact of the storms on the areas most severely affected, especially New Orleans.[8–11] One area where there has been less study is how prepared potentially impacted populations were prior to the storms' arrivals, and how prepared they were to deal with evacuees who came to their communities in the aftermath of hurricanes.

The purpose of this study was to examine these preparedness issues in the communities that were outside the main areas devastated by Hurricane Katrina but close enough to have been potentially affected severely by Katrina and Rita. The aim is to answer six key questions: (*1*) What are the factors related to why people who are in the potential path of a major hurricane do not evacuate? (*2*) How prepared did people in potentially affected areas think they were for the recent hurricanes and how prepared do they think they are for hurricanes in the near future? (*3*) What did people do to help those who were affected by the hurricanes? (*4*) What proportion of people in affected areas felt stress and what did they do to cope with the stress? (*5*) What concerns did people have in communities that took in evacuees from the hurricanes? (*6*) How much interest did people in the affected areas have in obtaining information about preparedness for future hurricanes, and what sources of information would they be most likely to use about health problems associated with the Hurricanes Katrina and Rita?

METHODS

To determine the general public's knowledge, attitudes, and behaviors regarding disaster preparation, evacuation, and response in areas affected by the two hurricanes, the Harvard School of Public Health (HSPH), in collaboration with ICR/International Communications Research, conducted a survey from October 3–9, 2005, in four regions of the Gulf Coast.[12] Three of the regions (Baton Rouge, Houston, and Mississippi/Alabama, excluding coastal counties) were selected because they were heavily impacted by one or both of the hurricanes, but were outside the main area of devastation that would have been inaccessible for a phone survey at the time. Dallas was selected because we had originally expected that community to be affected by Hurricane Rita. Because the hurricane was expected to have a major effect on the area, but did not, the results from Dallas provide a useful comparison with data from the other three regions. This article also uses data from a national survey of adults, most of whom were largely unaffected by the hurricanes, as a comparison with results from the more affected areas.

International Communications Research conducted telephone interviews to assess respondents' knowledge, attitudes, and behaviors about disaster preparedness and response related to Hurricanes Katrina and Rita. The questionnaires were administered to adults aged ≥18 years, who were selected by using a fully replicated, stratified, single-stage, random-digit dialing sample of households nationally and in four regions of the Gulf Coast. An adult respondent was randomly selected within each household.

A total of 500 adults completed interviews in East Baton Rouge Parish, Louisiana; 505 in Harris Country (including Houston), Texas; 501 in Mississippi and Alabama, excluding but adjacent to counties near the Gulf that had been declared disaster areas and eligible for individual assistance as of September 3, 2005; and 500 in Dallas County, Texas.

The national survey of U.S. adults was conducted September 16–20, 2005, after Hurricane Katrina but before Hurricane Rita.[13] Telephone exchanges that were nonoperational due to the storm (including New Orleans and other affected areas in Louisiana, Alabama, and Mississippi) were excluded from the sampling frame. The excluded exchanges represent less than 2% of the population nationally. This exclusion of the most devastated areas enabled us to look at the responses of Americans who were less affected by the hurricanes. A total of 1,116 adults completed interviews. This total included an oversample of African Americans and Latinos so that the sample of

these groups would be of adequate size for subsequent statistical analyses.

For the national survey and for each of the four regions separately, the data were first weighted to account for the probability of household selection attributable to multiple telephone lines and the probability associated with the random selection of an individual household member. Following the application of the above weight, the sample was post-stratified and weighted by age, sex, race/ethnicity, and education to be representative of the adult population of the U.S. as a whole or the particular region.

RESULTS

Experience with Hurricanes Katrina and Rita

Large majorities in the Baton Rouge area (84%) and Houston/Harris County (71%) reported that their communities were threatened by one or both of the hurricanes (Table 1). This compares with about half of Mississippi/Alabama (47%) and 17% of Dallas County residents.[12] About three-fourths of Baton Rouge area residents (76%) reported that their community was damaged by the hurricane(s), compared with 37% of Houston/Harris County, 36% of Mississippi/Alabama, and 5% of Dallas County residents. A majority of residents in all four areas reported that there were currently people in their community who came there from somewhere else because of the hurricanes. Baton Rouge area residents (86%) were more likely than residents of Houston/Harris County (63%), Mississippi/Alabama (63%), and Dallas (66%) to report that they had such people in their community.

Evacuation

Studies from previous hurricanes suggest that in any given storm a portion of the population will not evacuate when told to by government officials and will require rescue and aid after the storm.[2–4,14] We tried to understand this phenomenon in two ways. In areas that were threatened by Hurricanes Katrina and Rita, we asked those who did not leave why they did not evacuate. Then, in a hypothetical question about a natural disaster such as a hurricane or flood, we asked people if they would evacuate if told to do so by government officials, and if not, why they would not leave.

Nearly half (47%) of residents of Houston/Harris County, the one area where there had been an official evacuation order, reported that they left their community because of the hurricane(s) (Table 2). This was significantly higher than the proportion of Baton Rouge area (20%), Mississippi/Alabama (6%), and Dallas County (7%) residents who reported leaving their communities.[12]

In the four regions, the top reasons given for not evacuating the community were they thought they would be safe at home (73% to 79%) and they thought the hurricane and its aftermath would not be as bad as they turned out to be (42% to 51%). Other reasons given by 20% or more respondents in at least one of the communities were worries that their property would be stolen or damaged if they left (20% to 31%), not being able to get gas (16% to 29%), not knowing where to go that would be safe to stay (11% to 21%), not being able to afford to leave (8% to 23%), trying but being unable to leave (6% to 21%), and not wanting to leave pets (10% to 22%). In addition, a substantial proportion of people who did not leave reported that they were physically unable to leave (5% to 11%) or had to care for someone who was physically unable to leave (8% to 16%).[12]

Respondents in the four regions were then asked if they would evacuate if during the next month another major hurricane threatened their community

Table 1. Experiences with Hurricanes Katrina and Rita

	Baton Rouge (n=500)	*Houston (n=505)*	*Mississippi/Alabama (n=501)*	*Dallas (n=500)*
Community was threatened or hit by Hurricane Katrina and/or Rita	84%[a]	71%[b]	46%[c]	17%
Community was damaged by Hurricane Katrina and/or Rita	76%[a]	37%[c]	36%[c]	5%
Have people in your community from somewhere else because of the hurricanes	86%[a]	63%	63%	66%

[a]Significantly higher percentage than in Houston, Mississippi/Alabama, and Dallas; $p<0.05$

[b]Significantly higher percentage than in Mississippi/Alabama, and Dallas; $p<0.05$

[c]Significantly higher percentage than in Dallas; $p<0.05$

SOURCE: Harvard School of Public Health/ICR poll, October 3–9, 2005. Storrs (CT): Roper Center for Public Opinion Research.

Table 2. Evacuation for Hurricanes Katrina and Rita and reasons for not evacuating

	Baton Rouge (n=500)	*Houston (n=505)*	*Mississippi/Alabama (n=501)*	*Dallas (n=500)*
Left community because of hurricanes Katrina and/or Rita	20%[a]	47%[b]	6%	7%
Among those from areas threatened by hurricane(s) who did not leave	(*n*=346)	(*n*=171)	(*n*=201)	(*n*=63)
Reasons for not leaving:				
Thought you would be safe at home	79%	78%	79%	73%
Thought hurricane and aftermath would not be as bad as they were	49%	49%	51%	42%
Worried your possessions would be stolen or damaged if you left	22%	31%[c]	20%	21%
Could not get gas	17%	29%[c]	17%	16%
Did not know where to go where it would be safe to stay	21%	17%	18%	11%
Could not afford to leave	18%	23%[d]	21%[d]	8%
Had no friends or family outside the area with whom you could stay	14%	18%	18%	14%
Not able to leave job	15%	14%	11%	17%
Did not trust what government officials told you to do	13%	14%	10%	18%
Did not want to leave pet	10%	22%[c]	12%	12%
Had to care for someone who was physically unable to leave	11%	16%[e]	8%	12%
Did not have car or know anyone who could give you a ride	13%[f]	6%	9%	6%
Waited too long and then couldn't leave town	10%[e]	19%[b]	4%	6%
Tried and were unable to leave	7%	21%[b]	8%	6%
Physically unable to leave	6%	6%	5%	11%

[a]Significantly higher percentage than in Mississippi/Alabama and Dallas; $p<0.05$

[b]Significantly higher percentage than in Baton Rouge, Mississippi/Alabama, and Dallas; $p<0.05$

[c]Significantly higher percentage than in Baton Rouge and Mississippi/Alabama; $p<0.05$

[d]Significantly higher percentage than in Dallas, $p< 0.05$

[e]Significantly higher percentage than in Mississippi/Alabama; $p<0.05$

[f]Significantly higher percentage than in Houston; $p<0.05$

SOURCE: Harvard School of Public Health/ICR poll, October 3–9, 2005. Storrs (CT): Roper Center for Public Opinion Research.

and government officials said they had to evacuate. Regardless of the area, a substantial minority of the public was not sure they would evacuate (i.e., they said they would stay, or it would depend, or they did not know if they would leave) (Table 3). Residents of Houston/Harris County, the one area where there had been an official evacuation order, were more likely to express uncertainty about evacuating (33%) than Baton Rouge area (19%) and Mississippi/Alabama (20%) residents. In both the Baton Rouge area (96% to 78%) and Houston/Harris County (80% to 56%), respondents who evacuated for Katrina and/or Rita were more significantly likely than those who did not evacuate to say that they would leave if told to do so by government officials in a future hurricane.[12]

Similarly, when Americans nationwide were asked whether or not they would leave if government officials said that they had to evacuate the area because there was going to be a serious hurricane or flood in the next few days, about one-fourth (24%) of the public was not sure if they would leave. Nationally, the top reasons given for not evacuating the community were they were worried their possessions would be stolen or damaged (39%), they would not be able to afford to

Table 3. Evacuation for future hurricane[a] and reasons for not evacuating

	National (n=1,116)	*Baton Rouge (n=500)*	*Houston (n=505)*	*Mississippi/Alabama (n=501)*	*Dallas (n=500)*
If government officials said you had to evacuate because of a hurricane (or flood[a])					
Would leave	76%	81%[b]	67%	80%[b]	74%
Would not/Depends (vol)/Don't know	24%	19%	33%[c]	20%	26%
Reasons for not evacuating, among those who said they would not leave/depends	(*n*=244)				
Worried your possessions would be stolen or damaged if you left	39%	NA	NA	NA	NA
Would not be able to afford to leave	26%	NA	NA	NA	NA
Would not want to leave pet	26%	NA	NA	NA	NA
Have to take care of someone physically unable to leave	20%	NA	NA	NA	NA
Would not be able to leave job	18%	NA	NA	NA	NA
Have medical/physical problems that would make it difficult to leave	14%	NA	NA	NA	NA
Do not have car or know anyone who could give you a ride	8%	NA	NA	NA	NA

[a]For the national survey, the reason was "a serious hurricane or flood."

[b]Significantly higher percentage than in Houston; $p<0.05$

[c]Significantly higher percentage than in Baton Rouge and Mississippi/Alabama; $p<0.05$

(vol) = response volunteered by the respondent

NA = not asked

SOURCE: Harvard School of Public Health/ICR polls; September 16–20, 2005 (national); October 3–9, 2005 (four regions). Storrs (CT): Roper Center for Public Opinion Research.

leave (26%), and they would not want to leave their pet (26%).[13]

Hurricane readiness

A substantial proportion of people surveyed in the four regions reported that they were less than fully prepared for the past hurricane(s) or another major hurricane in the near future.

Generally speaking, residents of the Baton Rouge area and Houston/Harris County were more likely than residents of the other two regions to report having been prepared for the most recent hurricane and being prepared for another major hurricane in the next month (Table 4). Baton Rouge area residents (54%) were more likely than Mississippi/Alabama (43%) and Dallas County (41%) residents to report that they and their family were very prepared before the last hurricane in their area.[12]

Table 4. Preparation for Hurricanes Katrina and Rita, and for future major hurricanes

	Baton Rouge (n=500)	*Houston (n=505)*	*Mississippi/Alabama (n=501)*	*Dallas (n=500)*
Before most recent hurricane in your area, you/your family were very prepared	54%[a]	48%	43%	41%
After Hurricane Katrina, took additional steps to prepare for another major hurricane	52%[a]	43%[a]	32%	23%
If there was another major hurricane in the next month:				
Think you/your family are very prepared	63%[a]	61%[a]	49%	49%
Have plan for how to get out of your community	62%[a]	67%[a]	51%	47%
Have plan for contacting family members	66%	77%[a]	60%	59%

[a]Significantly higher percentage than in Mississippi/Alabama and Dallas; $p<0.05$

SOURCE: Harvard School of Public Health/ICR poll, October 3–9, 2005. Storrs (CT): Roper Center for Public Opinion Research.

Baton Rouge area (52%) and Houston/Harris County (43%) residents were more likely than Mississippi/Alabama (32%) and Dallas County (23%) residents to report having taken additional steps after Hurricane Katrina to prepare for another major hurricane. About six in 10 Baton Rouge area (63%) and Houston/Harris County (61%) residents reported that they were very prepared if there were another major hurricane in the next month. This compares with 49% of Mississippi/Alabama and 49% of Dallas County residents. Baton Rouge area (62%) and Houston/Harris County (67%) residents were more likely than Mississippi/Alabama (51%) and Dallas County (47%) residents to report that they have a plan to get out of their community if there were another major hurricane in the next month. Houston/Harris County (77%) residents were more likely than Mississippi/Alabama (60%) and Dallas County (59%) residents to report that they have a plan to contact family members in such an event.

Steps taken by residents to help those affected by the hurricane(s)

Studies of past disasters have shown that a substantial share of services provided to people affected by hurricanes comes from people in surrounding communities.[4] Nearly half of Baton Rouge area residents (46%) reported having taken someone into their own homes who had to leave their community because of the hurricane(s) (Table 5). This compares with 21% of Houston/Harris County, 11% of Mississippi/Alabama, and 17% of Dallas County residents.[12] In the national survey, conducted shortly after Hurricane Katrina but before Rita, 6% of adults nationwide reported having offered to take such a person into their own homes.[13]

Residents of the four regions also reported having done the following things to help those affected by the hurricane: donated food, clothes, or money (76% to 83%); attended a special religious service or said prayers specifically for hurricane victims (50% to 65%); organized or worked for a fundraiser (20% to 30%); and volunteered time at a shelter (14% to 27%).[12] Nationally, after Katrina but before Rita, about two-thirds (65%) of Americans reported that they donated money and about one-third (32%) that they had donated clothes to help those affected by Hurricane Katrina. Six in 10 (60%) said they had attended religious services or said prayers specifically for hurricane victims, 17% that they had organized or worked for a fundraiser.[13]

Stress

A concern for officials involved in preparedness is how to help people with the stress they feel after a disaster like a major hurricane. We tried to measure how many residents of the four regions felt stressed and what they were doing to cope with this stress. Baton Rouge area

Table 5. Steps people have taken to help those affected by the hurricane

	National (n=1,116)	*Baton Rouge (n=500)*	*Houston (n=505)*	*Mississippi/Alabama (n=501)*	*Dallas (n=500)*
Donated food, clothes or money	NA	76%	83%a	76%	77%
Donated money	65%	NA	NA	NA	NA
Donated clothes	32%	NA	NA	NA	NA
Attended special religious services or said prayers specifically for hurricane victims	60%	65%[b]	55%	65%[b]	50%
Organized or worked for fundraisers for victims	17%	20%	23%	30%[c]	25%
Volunteered time at a shelter	NA	27%[d]	21%[d]	14%	14%
Took evacuee into your home (for national=offered to take)	6%	46%[e]	21%[f]	11%	17%[f]

[a]Significantly higher percentage than in Baton Rouge and Mississippi/Alabama; $p<0.05$

[b]Significantly higher percentage than in Houston and Dallas; $p<0.05$

[c]Significantly higher percentage than in Baton Rouge and Houston; $p<0.05$

[d]Significantly higher percentage than in Mississippi/Alabama and Dallas; $p<0.05$

[e]Significantly higher percentage than in Houston, Mississippi/Alabama, and Dallas; $p<0.05$

[f]Significantly higher percentage than in Mississippi/Alabama; $p<0.05$

NA = not asked

SOURCE: Harvard School of Public Health/ICR polls, September 16–20, 2005 (national); October 3–9, 2005 (four regions). Storrs (CT): Roper Center for Public Opinion Research.

(68%) and Houston/Harris County (59%) residents were more likely than Mississippi/Alabama (45%) and Dallas County (39%) residents to report that they had felt stressed because of the recent major hurricanes (Table 6).[12]

In all four regions, nearly everyone who said they were stressed reported engaging in one or more of five coping measures (consulting a website to learn how to protect yourself, taking anti-anxiety or anti-depressant medication, seeing a counselor, praying, or talking with family members about it) to deal with the stress. In addition, many people reported eating more, smoking more, and drinking more alcohol to deal with the stress. Among the overall adult populations of the four regions, Baton Rouge area (66%) and Houston/Harris County (57%) residents were more likely than Mississippi/Alabama (43%) and Dallas County (38%) residents to report that they had felt stressed and engaged in one or more coping measures to deal with the stress. In addition, Baton Rouge area (33%) and Houston/Harris County (25%) residents were more likely than Mississippi/Alabama (15%) and Dallas County (13%) residents to report that they had felt stressed and had eaten, smoked, or drunk more alcohol to deal with the stress.

Concerns about evacuees in local communities

In situations where a large number of people need to evacuate to other communities, one important consideration is how concerned the residents are with health problems and other burdens their community might face because of the presence of evacuees.

Among those who reported that there were people in their community who had come from elsewhere because of the hurricanes, from one-fourth to one-half believed that because of those people's presence the community would face an increase in infectious disease. Baton Rouge area residents (50%) were more likely than Houston/Harris County (32%), Mississippi/Alabama (25%), and Dallas County (36%) residents to believe this would be the case. Baton Rouge area residents (80%) were also more likely than Houston/Harris County (69%), Mississippi/Alabama (45%), and Dallas County (70%) residents to believe that their community would face a problem with a drain on community services and resources, which might cost taxpayers money.[12]

Interest in information about hurricanes

An important issue of preparedness is how interested the public would be in getting information about how to prepare for a disaster like a hurricane and how to evacuate. Another is where people are likely to look for post-hurricane information about the health problems that might arise.

A majority of respondents in each of the four regions said they would be very or somewhat interested in learning more from outside sources about what supplies to have on-hand in order to be prepared (57% to 66%) and how to evacuate if there was another major hurricane (61% to 69%) (Table 7). In all four regions, a higher proportion of African American than non-Hispanic whites said they were very or somewhat interested in learning more.[12]

Respondents were also asked how likely they would be to contact four government agencies as a source of

Table 6. Health concerns due to recent major hurricanes

	Baton Rouge (n=500)	*Houston (n=505)*	*Mississippi/Alabama (n=501)*	*Dallas (n=500)*
Have felt stressed because of recent major hurricanes, and have done the following things because of the stress:	68%[a]	59%[a]	45%	39%
Coping activities	66%[b]	57%	43%	38%
Additional consumption	33%[a]	25%[a]	15%	13%
Because of people who have come to your community due to the hurricanes, think community will face problems with:[c]	(*n*=419)	(*n*=311)	(*n*=321)	(*n*=318)
An increase in infectious diseases	50%[b]	32%	25%	36%
A drain on community resources	80%[b]	69%[d]	45%	70%

[a]Significantly higher percentage than in Mississippi/Alabama and Dallas; $p<0.05$

[b]Significantly higher percentage than in Houston, Mississippi/Alabama, and Dallas; $p<0.05$

[c]Among those who have people in their own community from somewhere because of the hurricanes

[d]Significantly higher percentage than in Mississippi/Alabama; $p<0.05$

SOURCE: Harvard School of Public Health/ICR poll, October 3–9, 2005. Storrs (CT): Roper Center for Public Opinion Research.

Table 7. Interest in information about hurricanes, by race

	Baton Rouge			Houston			Mississippi/Alabama			Dallas		
	Total (n=500)	*White (non-Hispanic) (n=267)*	*Black (non-Hispanic) (n=183)*	*Total (n=505)*	*White (non-Hispanic) (n=273)*	*Black (non-Hispanic) (n=81)*	*Total (n=501)*	*White (non-Hispanic) (n=327)*	*Black (non-Hispanic) (n=140)*	*Total (n=500)*	*White (non-Hispanic) (n=267)*	*Black (non-Hispanic) (n=90)*
Very/somewhat interested in learning about:												
What supplies to have on-hand to be prepared for another major hurricane	66%	54%	87%[a]	57%	50%	77%[b]	66%	59%	84%[c]	58%	48%	82%[d]
How to evacuate from your community if you needed to because of another major hurricane	69%	59%	87%[a]	66%	61%	76%[b]	65%	57%	86%[c]	61%	52%	79%[d]
Very/somewhat likely to contact the following sources for information about health problems due to the hurricane(s):												
Contact local health department or look at their website	54%	45%	69%[a]	53%	49%	62%[b]	56%	52%	67%[c]	52%	44%	70%[d]
Contact local emergency services like fire dept. or police	56%	41%	79%[a]	49%	42%	59%[b]	59%	55%	70%[c]	49%	44%	65%[d]
Contact state health department or look at their website	57%	46%	75%[a]	50%	45%	61%[b]	56%	52%	69%[c]	48%	42%	59%[d]
Contact CDC or look at their website	50%	41%	63%[a]	45%	38%	60%[b]	50%	42%	67%[c]	48%	43%	61%[d]

[a]Significantly higher percentage than Baton-Rouge non-Hispanic whites; $p<0.05$

[b]Significantly higher percentage than Houston non-Hispanic whites; $p<0.05$

[c]Significantly higher percentage than in Mississippi/Alabama non-Hispanic whites; $p<0.05$

[d]Significantly higher percentage than in Dallas non-Hispanic whites; $p<0.05$

SOURCE: Harvard School of Public Health/ICR poll, October 3–9, 2005. Storrs (CT): Roper Center for Public Opinion Research.

information about health problems due to the hurricanes. About half of people in the four regions said they would be very or somewhat likely to contact each of the agencies: their local health department (52% to 56%), local emergency services (49% to 59%), state health department (48% to 57%), and the Centers for Disease Control and Prevention (45% to 50%). In each of the four regions, a higher proportion of African American than non-Hispanic whites said they were very or somewhat likely to contact each of the four sources. Regression analysis indicates that race rather than income, age, or gender was the main correlate with these variables.

DISCUSSION

These findings indicate that more has to be done to prepare for the problems that people say might prevent them from evacuating during a natural disaster and for the sorts of problems that actually kept people from leaving during the recent Gulf hurricanes without additional preparedness and planning. A sizeable minority of respondents might not comply with future government orders to evacuate if another major hurricane threatened their community.

People will fail to comply for two sets of reasons. Some will not evacuate because they do not trust the reliability of the forecast or believe their home can safely survive the storm. For this group, specific education messages need to focus on the damage done to populations that ignored evacuation orders prior to major hurricanes and remained in these areas. The goal is to use past experiences to convince potential non-evacuees that the price can be very high if they ignore these orders. Improving the reliability of forecasts will help over the long term, but not in the immediate future, where the accuracy of forecasts is still likely to be questioned. Compliance is likely to increase over the years as accuracy improves.

The second group might not comply with an evacuation order because they need specific information and services to aid them in their evacuation efforts. In order to maximize the potential for future evacuation by this group, local and state areas need to have detailed evacuation plans and contingency plans in place well in advance of community-wide threats such as major hurricanes. The planning should involve being prepared for a disparate list of issues in different communities: worries that their property would be stolen or damaged if they left, not being able to get gas, not knowing where to go that would be safe to stay, not being able to afford to leave, and not wanting to leave pets. A substantial proportion of people who did not leave reported that they had a physical disability or cared for someone who did. The evacuation capacity of state and local programs needs to include the capacity to assist with the evacuation of vulnerable populations. Of note, a substantial proportion of people in Houston, a city that tried to evacuate a larger share of its population than the other regions did, experienced problems getting gas or trying to leave but not being able to.

A substantial proportion of respondents in all of these areas reported that they are not prepared for evacuation from a future hurricane. We recommend an increased and sustained effort to engage people in advance of natural disasters to have a plan for preparation, evacuation, and contacting family members.

In the four Gulf regions we surveyed, particularly in Baton Rouge, many people reported taking in evacuees. Moreover, among those residents who said there were evacuees in their community, many were concerned that the presence of the evacuees would cause an increase in infectious disease in their community and would cause a strain on local resources. Research conducted in communities that received evacuees from Hurricane Katrina showed that the magnitude of the people involved overwhelmed state and local capabilities to assist evacuees and also began to put a strain on community services.[11,15]

Feelings of stress were widespread in the four regions, and additional eating, smoking, and drinking were found. Public health systems should include increased education about positive countermeasures to stress following natural disasters. In addition, there is a need to increase the availability of mental health services in these areas.

Respondents indicated a desire and need for accurate information preceding and following a natural disaster. African American residents of all four regions appear to want more information from outside sources about hurricanes. We recommend that well-researched and culturally appropriate health messages be developed in advance of the public's need.

It is instructive that even communities that have experienced recent and very real threats by natural disasters still have insufficient plans and capacity in place regarding disaster preparation and readiness. Response to this survey indicates a substantial need for action in three areas: more assistance for disaster planning, increased positive coping strategies for stress following disasters, and quality information available to a wide audience in order to prepare and minimize impact. There is a clear potential role for public health to provide this information.

The findings and conclusions in this report are those of the authors and do not necessarily express the views of the Centers for Disease Control and Prevention.

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