

Second Wind:

The Impact of Hurricane Gustav on Children & Families Who Survived Katrina

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Gulf Coast Child & Family Health Study

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As an NCDP Research Brief, the contents of this report are solely the responsibility of the authors and do not necessarily represent the views of The Children's Health Fund or The Merck Foundation. Please address all correspondence to Dr. David Abramson, NCDP Director of Research, Columbia University Mailman School of Public Health, 215 West 125th Street Suite 303, New York NY 10027, dma3@columbia.edu

Executive Summary

The category 2 Hurricane Gustav made landfall on the Louisiana Coast on Sept. 1, 2008, nearly three years to the day after Hurricane Katrina, resulting in an evacuation of approximately 2 million people and considerable property damage. Although it did not match the intensity or consequence of Hurricane Katrina, the experience of anticipating and responding to Hurricane Gustav had the potential to trigger emotional and physical consequences among a population previously traumatized or displaced by Hurricane Katrina. Gustav also had the potential to exert a considerable impact upon the overall economic, social, and emotional recovery of these populations.

The Gulf Coast Child and Family Health Study (G-CAFH), a randomly-sampled post-Katrina longitudinal cohort study of 1,079 displaced and impacted households in Louisiana and Mississippi, was uniquely positioned to examine the evolving impact of Gustav upon a previously traumatized population. G-CAFH researchers were in the final stages of the third round of interviews with the study group when Hurricane Gustav struck, thus allowing for comparable pre- and post-event data for approximately 700 respondent households. Further information on the study, including previous reports and peer-reviewed research articles, may be found at www.gcafh.org.

In particular, the research team was interested in the following issues:

- **Evacuation:** People's response to the event itself – did they evacuate, and if so, where and how did they evacuate? How did people decide whether to evacuate or not? For those who did, what was the economic impact of the evacuation?
- **Recovery Impact:** What was the impact on post-Katrina recovery amongst this group, particularly since Hurricane Gustav may have set some people even further back in their efforts to recover their homes and their lives?
- **Psychological Impact:** What was the emotional impact on adults and children: among adults, did Hurricane Gustav trigger Katrina-related post-traumatic stress disorder symptoms? Among children, did Hurricane Gustav lead to newly experienced behavioral or emotional problems?
- **Health Effects:** What were the health consequences of Hurricane Gustav on children, particularly those who needed access to medications and medical care?

Within three weeks of Hurricane Gustav, the G-CAFH field team had reassembled after their own evacuation and begun re-contacting the 718 respondents whom they had recently interviewed as part of the third round of the study. Of these 718 respondents, 528 were located and interviewed (a 73.5% retention rate). Respondents received a \$20 gift card for participating in this study supplement, which had received approval by the Columbia University Medical Center Institutional Review Board.

Key Findings

- **Evacuation:** Given the considerable media attention, warnings from weather officials, mandatory evacuation orders from elected officials, and past experience with Hurricane Katrina, approximately 84% of the people living in mandatory evacuation areas decided to evacuate. Among those who elected not to evacuate, the top reason cited was that, "the storm and its aftermath wouldn't be bad." When asked if they would obey future mandatory evacuation orders, 18% of those who evacuated said they were only "somewhat likely" or "not at all likely" to obey, whereas 52% of the non-evacuees said they were somewhat or not at all likely to obey. If these findings are extrapolated proportionately to the larger population, as many as 25% might not obey a future evacuation order. The average cost for those who did evacuate in response to Gustav, taking in to account food, shelter, and transportation, was \$484. Over 80% of those surveyed said they had difficulty paying for the evacuation.
- **Recovery Impact:** Nearly a quarter of those surveyed reported that their recovery from Katrina had worsened as a result of Gustav. Over half the people surveyed said that they had lost income as a result of Gustav, and 5% indicated they had lost their job. Study participants in Louisiana were more likely to have reported that they lost income than were Mississippi participants.
- **Psychological Impact:** Among both adults and children, financial and housing circumstances were significantly associated with emotional and behavioral impacts of Gustav. The prevalence of Post-Traumatic Stress Disorder (PTSD) among adults was nearly three times higher among people in households earning less than \$10,000 annually when compared to individuals in households earning over \$20,000. Similarly, among children, those living in unstable housing were two and a half times as likely to have emotional or behavioral problems as those in stable housing.
- **Health Impact:** Approximately one-quarter of children needed medication during or after Hurricane Gustav, and most (87%) had no problems getting it. Twenty-eight percent had a condition that required on-going medical care, but very few parents reported having any problems accessing care (7%). Slightly over 10% of children experienced an illness or injury that required care during or immediately after Gustav, and virtually all children received the necessary medical care.

Study Background

The Gulf Coast Child and Family Health Study (G-CAFH) is an ongoing research effort conducted by Columbia University's **National Center for Disaster Preparedness** (NCDP) in partnership with **The Children's Health Fund** (CHF) and with researchers at the **Louisiana State University School of Public Health**. This study supplement was underwritten by a generous grant from **The Merck Foundation**. The project has chronicled the physical and mental health consequences of the initial hurricane and traced the path to recovery experienced by 1,079 randomly sampled individuals in Louisiana and Mississippi since Hurricane Katrina. Initial findings from the study pointed to serious mental health needs for affected children, and led to the development and deployment of mobile mental health units by CHF alongside their primary medical care mobile units in New Orleans, Baton Rouge, and Gulfport/Biloxi.

Introduction

Hurricane Gustav approached the Gulf Coast states of Louisiana and Mississippi in the final week of August 2008 alternating between an "extreme" category 4 storm and a "catastrophic" category 5 storm on the Saffir-Simpson scale. As it looped northwestward through the Gulf of Mexico, with windspeeds over 155 miles per hour, projections by the US National Weather Service's National Hurricane Center indicated potential landfall along a wide swath of the Gulf Coast, from High Island, Texas east to the Alabama-Florida border. In anticipation of the hurricane's landfall, officials in nineteen parishes in Louisiana and the three coastal Mississippi counties ordered a mandatory evacuation of all residents, encompassing a potential total population of 2,350,000¹. An estimated 13,000 households in the projected path were still living in FEMA travel trailers, either on private property or in group settings such as trailer parks².

The National Hurricane Center's warnings in the days leading up to landfall predicted winds that could reach sustained speeds of up to 115 miles per hour, "extremely dangerous" storm surges, and isolated tornadoes. Louisiana governor Bobby Jindall, anxious not to repeat any of the hurricane missteps of his predecessor Kathleen Blanco, initiated an aggressive communication campaign to urge all those in the storm's projected path to evacuate. Among elected officials, New Orleans mayor Ray Nagin was perhaps the most emphatic. Two days prior to landfall, Mayor Nagin said at a news conference that Hurricane Gustav was the "mother of all storms." He went on to say to the city's residents and visitors, "You need to be scared, you need to be concerned, and you need to get your butts moving out of New Orleans. This is the storm of the century."

According to administrative records and newspaper accounts, as illustrated in Table 1, the resulting evacuation was among the largest in recent US history, second only to that of 2005's Hurricane Rita in Texas. Most of the people in Hurricane Gustav's projected path had experienced Hurricane Katrina as well. When the hurricane did make landfall at Cocodrie, Louisiana on September 1, 2008, it had weakened to a Category 2 hurricane, with windspeeds of approximately 100 miles per hour. The hurricane followed a northwesterly path, and over a three-day period resulted in 48 storm-related deaths and approximately \$4.1 billion in losses in Louisiana alone.



Figure 1. Hurricanes Gustav and Katrina Storm Tracks

¹ Louisiana parishes under mandatory evacuation orders included the following: Allen, Assumption, Calcasieu, Cameron, Iberia, Jefferson, Lafourche, Orleans, Plaquemines, St. Bernard, St. Charles, St. John, St. Martin, St. Mary, St. Tammany, Tangipahoa, Terrebonne, Vermillion, and Washington; Mississippi counties included Hancock, Harrison, and Jackson. Population estimates of 2,354,405 were mainly drawn from the US Census American Community Survey (2005-2007), reflecting post-Katrina population estimates, and for St Bernard and Cameron parishes from the 2006 US Census Total Population Estimates.

² According to data published by the FEMA Gulf Coast Recovery Office, there were 13,324 active households living in group, commercial, or private trailers as of Aug. 28, 2008

Among those in the path were 718 members of Columbia University's Gulf Coast Child & Family Health Study who had completed in-person interviews with the study's field staff over the course of the 2008 summer. These 718 members represented a portion of the 1,079 respondents comprising the full study cohort of Katrina-displaced and affected individuals established in 2006 (see Table A2). The study team decided to re-deploy rapidly in order to assess the impact of Hurricane Gustav on this population, which previously had been so extensively affected by Hurricane Katrina. Within three weeks the field team began re-contacting respondents, and over the course of 18 days was able to locate and re-interview 528 respondents. The data in this report are drawn from their interviews.

Table 1. Largest Evacuations in United States Since 1990³

Year	Event	Total # Evacuated
2005	Hurricane Rita ⁴	2,500,000
2008	Hurricane Gustav⁵	2,000,000
1999	Hurricane Floyd	1,761,192
1998	Hurricane Georges	1,563,000
2008	Hurricane Ike ⁶	1,200,000
2005	Hurricane Katrina⁷	1,000,000
1992	Hurricane Andrew	650,000
1996	Hurricane Fran	500,000
1998	Hurricane Bonnie	350,000
2002	Hurricane Lili	330,000
2001	World Trade Center Destruction	300,000
1994	Hurricane Gordon	300,000
1993	Hurricane Emily	250,000
1996	Hurricane Bertha	250,000

Evacuation Decisions, Logistics, and Economic Impacts

Given the urgent warnings and mandatory evacuation orders, and their recent experience with Hurricane Katrina, 84% of the study group living in mandatory evacuation areas evacuated prior to Hurricane Gustav's landfall (see Table A4 in the Appendix). Among those who did not evacuate, a little under half had not evacuated prior to Hurricane Katrina, either. Among the households who did evacuate prior to Hurricane Gustav, approximately two-thirds had evacuated prior to Hurricane Katrina and one-third had not (see Table A4). There were few statistically significant demographic differences between those who evacuated and those who did not (Table A3), although in Louisiana the likelihood of evacuating increased with household income, and in both states those individuals still living in group trailer sites were *less* likely to evacuate than those living in homes or on private property.

As illustrated in Table 2, it is evident that among those who did evacuate, their experience with Hurricane Katrina and the mandatory evacuation calls were significant motivators. Among those who did not evacuate, over one-third did not regard the impending storm as being

³ For all events with dates on or before 2003, Dotson, Lori and J. Jones, "Identification and Analysis of Factors Affecting Emergency Evacuations, Vol 2," Sandia National Laboratories, Contract # NUREG/CR-6864, SAND2004-5901

⁴ New York Times, September 24, 2005, "Storm And Crisis: The Evacuation; 'Katrina Effect' Pushed Texans Into Gridlock."

⁵ New York Times, August 31, 2008, "2 Million Flee Storm; G.O.P. Cuts Back."

⁶ Office of Governor Rick Perry, Press Release September 23, 2008, <http://governor.state.tx.us/news/press-release/11301/>

⁷ Wolshon, Brian and Ben McArdle, "Temporospatial Analysis of Hurricane Katrina Regional Evacuation Traffic Patterns," *Journal of Infrastructure Systems*, Vol. 15, No. 1, March 1, 2009. Authors attribute this estimate to FEMA and former LA Governor Blanco.

sufficiently dangerous to warrant an evacuation. This finding raises challenging questions about the efficacy of risk communication among specific sub-groups, since a variety of apparently trusted sources (news media, local elected officials, hurricane experts) all offered similar messages with varying degrees of urgency regarding the storm’s potential strength. Also telling are the other top reasons offered for not evacuating – that people did not have the financial means, or that they felt compelled to protect their homes and possessions. As described later in this report, the financial burden of evacuation can be extremely onerous to those without financial means or resources, and this evacuation barrier is understandable. Prior experiences with Hurricane Katrina may have sensitized people to the potential for lawlessness and civic disorder in a hurricane’s aftermath, leading people to decide to stay behind to protect their homes.

Table 2. Rationale for Evacuation Decisions

Top 5 reasons why people DID evacuate, n=410	Top 5 reasons why people DID NOT evacuate, n=118
<i>Because of Katrina experience (50.7%)</i>	<i>Thought the storm wouldn't be bad (38.1%)</i>
<i>Calls for evacuation by local officials (44.2%)</i>	<i>Didn't have financial means to leave (24.6%)</i>
<i>Statements by weather officials (29.5%)</i>	<i>Wanted to protect house (16.1%)</i>
<i>Because of emergency authorities (15.4%)</i>	<i>Just didn't want to leave (13.6%)</i>
<i>Friends & family convinced them (12.4%)</i>	<i>Didn't have transportation (10.2%)</i>

Note: Multiple responses were possible, so percentages will not add to 100%

When asked about their likelihood of evacuating in the event of a future hurricane (see Table 3), given a similar mandatory evacuation order, over half of those who did not evacuate for Hurricane Gustav are only “somewhat” likely to obey or would not obey at all. Nearly one-fifth of those who did evacuate for Gustav might not evacuate when ordered to do so in the future. If these proportions were generalized to the larger population, as much as one-quarter of the population might not evacuate despite mandatory orders to do so and personal experience of the devastating consequences of catastrophic hurricanes⁸.

People with children evacuated at the same rate as those without (see Table A10). Similarly, their reasons for not evacuating were similar to those expressed by households without children – the storm wouldn’t be that bad, no financial means, and no transportation (see Table A5).

Figure 1 and Table A4 illustrate that most of the respondents who did evacuate remained

Table 3. Likelihood of Obeying Future Mandatory Evacuation Orders

	Among those who...	
	Evacuated	Did NOT Evacuate
N	408	117
<i>Very likely to obey (%)</i>	81.9	47.9
<i>Somewhat likely to obey (%)</i>	11.0	36.8
<i>NOT likely to obey (%)</i>	7.1	15.4

nearby in the region, having evacuated an average of 167 miles from their homes. Approximately two-thirds of Mississippians evacuated within their own state with a little over an additional 15% evacuating to Alabama. Among Louisianians, approximately one-third

remained within the state, an additional 15% evacuated to Mississippi, and then another third went to Alabama, Georgia, or Texas. Surprisingly, very few people in the study cohort used

⁸ Estimated as (.181 somewhat/not likely x .777 who evacuated) + (.522 somewhat/not likely x .223 who did evacuate) = .257

public transportation to effect their evacuation (only 16 households among the 528). The average size of evacuation parties was approximately five, with an average of two adults, one child, and two others not formally part of the respondent's household. There were differences in the evacuation parties between those households living in "stable" versus "unstable" housing (*unstable* being defined as living in a travel trailer, or living in a place where one was uncertain if one could stay for a year or more). Within each state, the households living in unstable housing tended to have larger evacuation parties (5.6 people in Louisiana, versus 5.1 among stably housed Louisiana households; 5.1 in Mississippi, versus 3.9 among stably housed Mississippi households), and were also slightly more likely to have non-household members as part of their evacuation party.

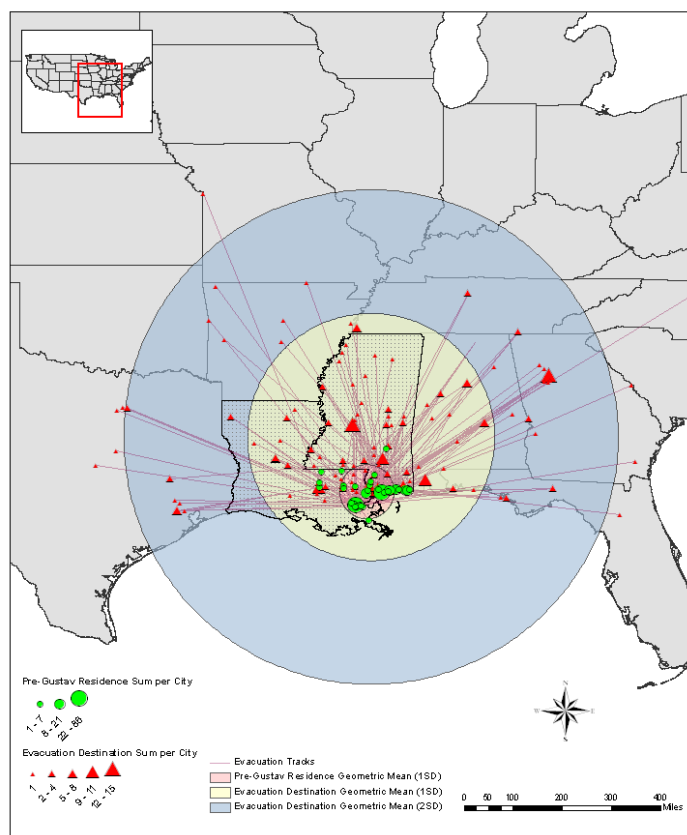


Figure 2. Evacuation Routes of G-CAFH Cohort

Evacuation Costs

Evacuation costs were a significant issue for many of the members of the study group. As detailed in Table A6, the overall cost for evacuating – considering food, shelter, and transportation costs⁹, but not adjusting for differences in the number of days evacuated or the number of people in an evacuation party – ranged from a mean of \$371 for Mississippi households living in stable housing to \$572 for Louisiana households living in unstable housing. This difference in cost was clearly related to the duration of the evacuation, which varied from an average of 3.4 days among stably housed Mississippians to 5.9 days for unstably housed Louisianians. These represented out-of-pocket expenses, and were not generally reimbursable. Food was generally the largest single expense among the three.

Examining the average evacuation cost per person per day, as illustrated in Table 4, does illustrate one interesting finding – that there is slightly less variation between the states and the housing circumstances, and that it may be possible to use such a figure in evacuation planning and household preparedness campaigns. Notwithstanding that these amounts are specific to the Gulf Coast during a summertime of high gasoline prices, and that they are restricted to three major cost items (transportation, food, and shelter), emergency planners might consider a rule-of-thumb of \$25 per person per day for an estimated five-day evacuation to cover most costs associated with an evacuation. That would suggest that a family of four would need to have a minimum of \$500 available, preferably in cash.

⁹ Transportation costs included gasoline, tolls, fares, and evacuation-associated repairs. According to the Energy Information Administration, average retail price for regular gas was \$3.62 in the week of Sep 1, 2008 http://www.eia.doe.gov/oil_gas/petroleum/data_publications/wrqp/mogas_history.html

Given these costs, it is not surprising how many people reported that they had a great deal of difficulty paying for the evacuation, ranging from 70.0% of stably housed Mississippians to a high of 88.6% of unstably housed Louisianians (Table A6). Although most people did not report many days in which they had problems securing food, water, or shelter, a large number reported having lost income as a result of Hurricane Gustav. As illustrated in Table A7, over 60% of Louisiana respondents said that they had lost income in their households, and as many as 7.7% of unstably housed Louisianians reported having lost their jobs as well, regardless as to whether they evacuated. Although fewer people in Mississippi reported having lost income, it was still a sizeable proportion – 45.6% of the unstably housed and 51.9% of the stably housed. A large majority of the study participants reported that their homes sustained very little or no damage (87.7%), while 8.5% reported that their home was seriously damaged, 1.7% said their home was destroyed, and 2.0% had not yet seen their homes at the time of the interview.

Table 4. Average evacuation cost per person per day

	Cost	n
Overall	\$ 20.42	410
<i>Louisiana, unstably housed</i>	\$ 17.55	146
<i>Louisiana, stably housed</i>	\$ 21.78	69
<i>Mississippi, unstably housed</i>	\$ 19.57	135
<i>Mississippi, stably housed</i>	\$ 27.75	60

Emotional Impact and Recovery

When asked to describe what effect Hurricane Gustav had on their ongoing recovery from Hurricane Katrina, the study participants described a complex set of issues that often included financial, psychological, and logistical problems. Financially, the costs of evacuating, repairing or replacing Gustav-damaged property, or making up for lost income, contributed to an unending cycle of impoverishment and indebtedness. Funds that had been set aside for Katrina

repairs were used for Gustav-related costs. Many participants described the emotional effects of imagining that they might be re-living their Katrina experience of loss and displacement. And practically, a number of people described post-Katrina cottages and trailers that were damaged, or in rare cases destroyed. In order to quantify the magnitude of Katrina-related post-traumatic stress disorder (PTSD), the study participants were given a ten-item PTSD screener¹⁰. Participants were asked how often in the past three weeks they had experienced upsetting memories, dreams, feelings

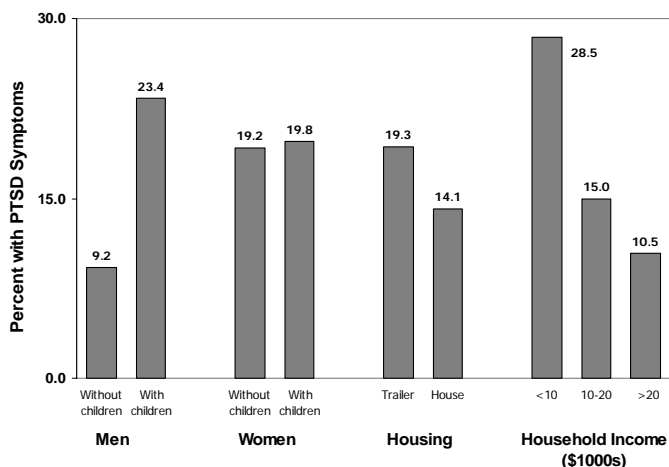


Figure 2. Post-Traumatic Stress Disorder Differences

¹⁰ The ten-item screener includes five arousal and five re-experiencing factors, modified by Brewin et al ("Brief screening instrument for post-traumatic stress disorder," CR Brewin, S Rose et al, *Brit Jnl of Psychiatry* (2002) 181:158-162) from Foa's PTSD Symptom Scale-Self Report ("Reliability and validity of a brief instrument for assessing post-traumatic stress disorder," EB Foa, DS Riggs, CV Dancu, *Jnl of Traumatic Stress* (1993) 6:459-473).

or reminders of Hurricane Katrina, how often they had experienced reactions such as a quickened heartbeat or stomach churning when reminded of Katrina, and whether they had difficulty sleeping or concentrating, how often they were irritable or jumpy, and whether they had a heightened awareness of danger to themselves or others. Individuals who reported having experienced at least six of these ten symptoms an average of two or more times per week were characterized as displaying symptoms consistent with a PTSD diagnosis. As illustrated in Table A7 and Figure 3, nearly one-fifth of respondents living in unstable housing circumstances had symptoms consistent with Katrina-associated PTSD; in Louisiana, those in unstable housing were more than twice as likely to report these PTSD symptoms as were people living in stable housing conditions. It is clear from Figure 3 that some groups fared worse than others – in particular, people whose household income was less than \$10,000 annually were far more likely to report PTSD symptoms (28.5%) than were people earning more than \$20,000 annually (10.5%).

Respondents were also asked to characterize their situation in Gustav's aftermath as compared to their circumstances prior to the hurricane. Approximately one-quarter said that their situation was worse than it had been before the hurricane, 70% said their situation was similar to what it had been previously, and about 5% said their situation was better. Generally speaking, respondents living in unstable housing were more likely to report that their situation had worsened since Gustav (26.4% in Louisiana and 24.7% in Mississippi) than were those living in stable housing (18.8% and 19.0%, respectively).

Child Health

Many children are adaptive and highly resilient in the face of the types of stressors presented by hurricane evacuations. A number of the parents in the study described their children's reactions to the Gustav evacuation and experience of the storm in positive terms: children who were excited by the adventure of the evacuation, curious about the spectacle of a major storm, or who viewed the entire episode as an unplanned vacation from school. Moreover, a number of parents noted that their children were happy to return home, and were relieved when they found little or no damage to their homes or possessions. On the other hand, about one-fifth of the parents and caregivers highlighted specific problems expressed by their children – among these children a number of them were anxious or scared of the storm, depressed, or distressed about their upset routines. Several parents noted that their children tried to pack and take all their possessions, and a few noted an increased incidence of respiratory problems. As illustrated in Table A8, 24.7% of households reported having at least one child who experienced new emotional or behavioral problems that emerged after Hurricane Gustav. When parents were asked about specific children, the most common problem noted was being nervous or afraid (30.8%, overall).

Among all families, there were no differences between the two states in the proportion of children experiencing emotional or behavioral problems. There were, however, statistically significant differences in the proportions of children experiencing at least one emotional or behavioral symptom by housing status within each state. Children in unstable housing were far more likely to have had a parent report one of these emotional or behavioral symptoms than were children living in stable housing. A multivariate regression analysis was conducted to determine which factors were most likely to be associated with children's emotional or behavioral problems (see Table A9). This analysis examined the impact of socio-demographic

characteristics, such race, income or state; household characteristics such as parental mental health, unstable housing, and size of household; community characteristics related to perceived safety and the parent's sense of social engagement with the local community; and Katrina-specific characteristics associated with the number of times the family has moved since the hurricane and whether or not they evacuated for Hurricane Gustav. Each of these factors was weighed equally, holding all other factors constant. According to this analysis, parents were over 3 times as likely to report that their children had any emotional or behavioral symptoms if they themselves had poor mental health and over twice as likely to report these emotional or behavioral issues if they had weak social support networks. Although these findings of children's mental health are so dependent upon parental reports, which themselves are influenced by emotional and psychological factors, they do suggest the primacy of household stability – regardless where that household is. Conversely, it suggests that strengthening the parent's mental health, sense of community, and (re)establishment of informal social supports would likely have a large impact on the children.

In terms of physical health problems, approximately one-quarter of the children needed medication at some point during or after the hurricane, and overall 13.1% of parents or caregivers reported having difficulties obtaining medications when they were needed. The major problems noted were not knowing where to go to get or fill a prescription, and not having enough money for the medication (Table A8).

Table 5. Children experiencing at least one emotional/behavioral symptom

	Percent	n
Overall	41.6	219
<i>Louisiana, unstably housed</i>	53.3	77
<i>Louisiana, stably housed</i>	31.4	35
<i>Mississippi, unstably housed</i>	40.7	81
<i>Mississippi, stably housed</i>	23.1	26

Note: Symptoms included being sad or depressed, feeling nervous or afraid, having problems sleeping, or having problems getting along with other children

A slightly larger proportion of children, ranging from 25.9% in Mississippi to 30.0% in Louisiana, had pre-existing health conditions that needed on-going care. Among those children, 11.7% in Louisiana experienced difficulty obtaining care (mainly because parents or caregivers did not know where

to go to obtain it), although no Mississippi parents reported problems receiving care. Overall, 12.8% of the children in both states experienced an illness or injury requiring medical care during or immediately after the hurricane, and again only Louisiana children reported difficulties obtaining care (it should be noted that these children experiencing problems obtaining care only represent 4 out of 257 children, and should not be regarded as sufficiently large enough to be generalized to a population estimate).

Conclusions

This study of how a group of Hurricane Katrina survivors was affected by Hurricane Gustav illuminates the ongoing vulnerability – and lack of recovery – among a subset of Gulf Coast residents. Although Gustav inflicted significant damage to parts of the Gulf Coast it was not as disastrous as if it had landed as a Category 4 or 5 hurricane, or if the levees had not held. Still, the threat of Gustav had a psychological impact on a previously traumatized population, and the evacuation and property damage had an economic impact as well. Those who were particularly vulnerable -- because of their housing or economic instability, or their social circumstances –

fares worse both psychologically and economically. Those who were only partway down the path toward post-Katrina recovery seemed to have slipped even further behind.

The research literature suggests that individual and household recovery from disasters is a long-term process that may be measured by how far a survivor has traveled along three trajectories: (a) permanent relief from the disaster itself, both the event-generated stressors (such as injuries sustained during an event) and response-generated stressors (such as evacuation and displacement); (b) restoration or development of material, emotional, and social resources (such as economic stability, housing equity, or social support); and (c) renewal of a capacity for economic and social growth. The last suggests that an individual or household has the potential for future-planning; specifically, that there is sufficient certainty and stability in their lives that they are not buffeted by daily survival pressures, but can instead engage in activities that contribute to individual and social growth. The recovery process does not demand that a survivor achieve each of these goals, but that he or she progresses substantially along those paths. The absence of such progress may be regarded as an ongoing vulnerability. In addition to being vulnerable to daily social and economic pressures, these survivors are particularly vulnerable to unexpected future shocks such as subsequent emergencies or disasters. There can be little planning, preparation, or mitigation when one is struggling with day-to-day survival demands.

A significant proportion of the people surveyed for this report expressed that vulnerability – or ongoing lack of recovery from Katrina – in a variety of ways: through their evacuation decisions and the impacts upon them, through the differential psychological effects manifest in both adults and children, and through their self-appraised sense of recovery.

Evacuation decision-making was influenced by people's trust in authorities, but much of that trust had eroded during and after Hurricane Katrina, assuming it had existed at all. Social science literature speaks of "dynamic pressures"¹¹ and "acculturative stress" to explain why marginalized groups – particularly the poor and segregated ethnic minorities – have little access to critical social information sources, little trust in government, and little faith in science, all of which influence the decisions people make. It has been well-established that many of the Katrina survivors still struggling to recover from that storm, even three years later, have been among the poorest or most disenfranchised.

A number of people who decided not to evacuate did so because of financial constraints, and those who did evacuate suffered economic consequences related to the transaction costs of the evacuation (chiefly food, shelter, and transportation) and the opportunity costs (lost wages and jobs). The "out-of-pocket" costs of \$484 for an average five-day evacuation, and the fact that over half the people surveyed lost income as a result of the storm, clearly contributed to the economic pressures felt by so many. Nearly 60% of the people surveyed reported an annual household income under \$20,000 (which would translate to a *maximum* of \$385 per week in gross revenue; among those earning less than \$20,000 annually, nearly half earn less than \$10,000, or approximately \$190 per week). Given such financial fragility, it is hardly surprising that Gustav exacted such an immediate economic cost, and had such a dampening effect on ongoing Katrina recovery for individual households.

¹¹ Wisner, B. (2004). Assessment of Capability and Vulnerability. Mapping vulnerability : disasters, development, and people. G. Bankoff, G. Frerks and D. Hilhorst. London ; Sterling, VA, Earthscan Publications: xix, 236 p.

Economic and housing circumstances were clearly associated with mental health effects of Gustav as well. Among adults, it was striking that individuals in households earning less than \$10,000 a year were nearly three times as likely to express PTSD symptoms as were those adults from households earning over \$20,000 a year. And children who lived in unstable housing were two and a half times as likely to exhibit Gustav-related emotional and behavioral issues, according to their parents and caregivers.

Altogether, these findings of the impact of Gustav on Katrina-survivors suggest that vulnerability may follow some people wherever they go. Some of these study participants lived in New Orleans' Lower Ninth Ward or poor communities on the Mississippi Gulf Coast prior to Katrina, and have since been displaced or resettled across the region. Their failure to recover has prolonged their vulnerability, and has made them easy targets for a "second wind" such as Hurricane Gustav.

APPENDIX

Study Design

Sampling and Subject Enrollment

A stratified cluster sampling strategy was used to enroll subjects in to the study in two phases: the first in Louisiana in February 2006, the second in Mississippi in August 2006. Using lists of congregate housing sites obtained from FEMA we stratified the lists by type of site (FEMA group sites, commercial trailer sites, and hotels) and by size (1-25, 26-50, 51-100, 101+ residential units). Congregate sites were selected within each substratum using a probability proportional to size strategy without replacement. Overall, twenty-six sites were selected as primary sampling units: twelve FEMA group sites, ten commercial trailer sites, and four hotel sites. In addition to sampling the displaced population living in congregate settings, we supplemented the sample frame in Mississippi with an areal sample. Using FEMA damage assessment maps and databases of the state's three coastal counties hardest hit by the hurricane, the team randomly selected 150 of 650 census blocks (primary sampling unit clusters) which had been characterized by FEMA as having sustained moderate, extensive or catastrophic damage. This sampling strategy yields a cohort representative of the approximately 50,000 individuals who had been displaced to congregate settings in Louisiana and Mississippi (i.e., trailer parks and hotels) as well as approximately 26,000 people who were living in the most extensively-damaged areas of the Mississippi Gulf Coast, post-Katrina.

As illustrated in Table A1, a total of 4,284 households were sampled as secondary sampling units. Nine hundred and eight-five households were deemed ineligible because they were clearly destroyed, vacant, abandoned, or under construction, leaving 3,299 eligible households. Among those, 1,587 households had an eligible adult present to whom the study was presented; at the remaining 1,712 households, no contact was made despite repeated efforts. Among the 1,587 contacted households, 1,082 agreed to be enrolled in the longitudinal study, corresponding to a response rate of 32.8% (1,082 / 3,299) and a cooperation rate of 68.1% (1,082 / 1,587). A bias analysis was conducted to identify significant differences between respondents who agreed to be followed longitudinally and those who did not. Individuals who did not report their household income and respondents in Louisiana were statistically less likely to agree to be followed up, and individuals with poor mental health scores were more likely to agree to be followed. No other socio-demographic or displacement factors were statistically significant.

An eligible adult respondent was sought at each sampled household who (a) lived at that site, and (b) was the "primary caregiver," someone who could knowledgably report upon the health issues of all the individuals in the household. Upon enrollment and completion of the baseline interview, respondents received small gifts for adults and children, valued at approximately \$15 per household. At the first follow-up interview, respondents received a \$30 gift card and at the second follow-up interview they received a \$35 gift card. A verbal informed consent was acquired from respondents at the first two interview rounds and a written informed consent was obtained at the last interview round.

Data collection

At baseline, selected data were collected on all household members (e.g., age, gender, relationship to respondent, school attendance, chronic health conditions). In addition, a Kish sampling strategy was used to randomly select one child in the household for more detailed questions. Domains of interest included pediatric and adult health status; the prevalence of chronic medical conditions among sampled households; access to health care and services, including health insurance coverage; primary medical, specialty, and dental care needs among sampled children; the prevalence of behavioral conditions and learning disabilities among children; household characteristics such as social and economic resources; social service needs; a brief history of the residents' displacement after the hurricanes; and the demographics of the displaced population.

The first follow-up survey, ***G-CAFH Wave 2***, was conducted as a telephone interview between 20 – 23 months after Hurricane Katrina. The survey instrument repeated baseline measures and added measures of social support networks, self-efficacy and locus of control, community engagement (pre- and post-Katrina), and attitudes towards police and criminal justice systems. Among the 1,082 respondents eligible for follow-up, 8 had died and 803 were found and interviewed, for a 75.1% follow-up rate. A bias analysis revealed that the factors most associated with attrition were the absence of a working telephone and having lived at a trailer park that closed down in between the baseline and follow-up interviews. Socio-demographic characteristics such as race/ethnicity, income, age, housing situation, or state of residence were not independently associated with follow-up attrition.

A second follow-up survey, ***G-CAFH Wave 3***, was conducted as an in-person survey between June – August 2008, and was suspended when Hurricane Gustav was imminent. As with earlier survey instruments, the Wave 3 survey included repeated measures that captured health access and service utilization, mental health, child health and social networks, and included validated measures of a "sense of community," self-efficacy, and post-traumatic growth. Twenty-four community-based interviewers in Louisiana and Mississippi were recruited and trained, and a field office was established at the Louisiana State University School of Public Health to coordinate the field work. When the field effort was suspended in the last week of August, 718 among the 1,055 eligible respondents in the cohort had completed the survey. Six weeks after the hurricane had passed, the field team resumed data collection for a brief three-week period, interviewing an additional 59 respondents. The completed round of data collection thus encompassed 777 individuals. As illustrated in Table A1, we retained 74.5% of respondents in this round. Only 14 people refused to participate, for a 1.9% refusal rate.

The ***G-CAFH Gustav Supplement*** was conducted as a telephone interview between Sep. 25 – Oct. 13, 2009. Eligible respondents for this supplemental survey included the 718 participants who had completed G-CAFH Wave 3 prior to Hurricane Gustav's landfall. Among those eligible for the supplement, 528 completed the interview, a 73.5% retention rate.

Survey Instrument

The survey instrument for the G-CAFH Gustav Supplement was divided into six sections: (1) Evacuation, Event Response, and Return; (2) Recovery Impact; (3) Adult Emotional Impact; (4) Child Emotional Impact; (5) Child Medical Impact; and (6) Adult Medical Impact. Validated scales and measures were used wherever feasible, including the Medical Outcome Study's Short Form-12 (SF 12 v2), among whose scales is the mental health component summary score

(MCS), a well-regarded measure of mental health distress and disability, as well as the Trauma Screening Questionnaire, a ten-item scale highly correlated with Post-Traumatic Stress Disorder symptoms. The survey was conducted by trained interviewers as a telephone interview, and required 15 – 25 minutes to administer. Respondents completing the survey received a \$20 WalMart gift card. The survey and consent process was reviewed and approved by the Columbia University Medical Center Institutional Review Board (IRB protocol AAAB-8668).

Table A1. Sampling Response and Recruitment (GCAFH, 2006-2008)

	<i>Total</i>	<i>Louisiana</i>	<i>Mississippi</i>
Wave 1 Baseline (6-12 Months Post-Katrina)			
Sampled households	4284	1600	2684
Ineligible at baseline	985	0	985
Eligible at baseline	3299	1600	1699
Households no response/no contact	1712	781	931
Contacted	1587	819	768
Agreed to follow up, and interviewed	1079	555	524
Agreed to baseline only, and interviewed	170	114	56
Not Available	169	41	128
Refused	171	111	60
Response rate ^a (%)	32.6	34.6	30.8
Longitudinal Cooperation rate ^b (%)	67.9	67.5	68.2
Baseline Cooperation rate ^c (%)	78.6	81.4	75.5
Refusal rate ^d (%)	10.8	13.6	7.8
Wave 2 (20-23 Months Post-Katrina)			
Eligible	1079	555	524
Agreed to follow up, and interviewed	803	393	410
Refused	14	6	8
Deceased	9	6	3
Incarcerated	2	0	2
Not available/not found	251	150	101
Retention rate ^e (%)	75.2	71.6	79.0
Refusal rate ^d (%)	1.3	1.1	1.5
Wave 3 (33-38 Months Post-Katrina)			
Total eligible from baseline	1079	555	524
Ineligible from prior wave	24	13	11
Eligible	1055	542	513
Agreed to follow up, and interviewed	777	403	374
Refused	14	5	9
Deceased	13	9	4
Incarcerated	8	1	7
Not available/not found	243	124	119
Retention rate ^e (%)	75.1	75.8	74.5
Refusal rate ^d (%)	1.4	0.9	1.8
Gustav Supplement (33-38 Months Post-Katrina)			
Eligible	718	355	363
Agreed to follow up, and interviewed	529	267	262
Refused	18	11	7
Deceased	2	0	2
Incarcerated	0	0	0
Not available/not found	169	77	92
Retention rate ^e (%)	73.9	75.2	72.6
Refusal rate ^d (%)	2.5	3.1	1.9

Notes: ^aResponse rate = (agreed to follow-up/total eligible). ^bLongitudinal Cooperation rate = (total agreed and followed-up/contacted). ^cBaseline Cooperation rate = (total interviewed/contacted). ^dRefusal rate = (refused/contacted).

^eRetention rate = (interviewed/(eligible-deceased-incarcerated)).

Table A2. Cohort Summary (G-CAFH, 2008) [Row Percentages]

	Baseline (2006)		Sampling Frame (Jun-Aug 2008)		CAFH Plus (Oct 2008)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
State						
<i>Louisiana</i>	555	51.4	355	49.4	260	49.2
<i>Mississippi</i>	524	48.6	363	50.6	269	50.8
Total	1079		718		529	
Gender						
<i>Male</i>	439	40.7	276	38.4	201	38.0
<i>Female</i>	640	59.3	442	61.6	328	62.0
Total	1079		718		529	
Households with Children under 18						
<i>Yes</i>	426	39.5	295	41.1	220	41.6
<i>No</i>	653	60.5	423	58.9	309	58.4
Total	1079		718		529	
Race						
<i>Black</i>	516	49.4	340	48.8	249	48.5
<i>White</i>	458	43.8	317	45.5	239	46.6
<i>Latino</i>	35	3.4	18	2.6	12	2.3
<i>Other</i>	36	3.4	22	3.1	13	2.5
Total	1045		697		513	
Household Income						
<\$10,000	316	30.1	190	27.2	128	24.9
\$10,000-20,000	345	33.0	228	32.7	170	33.1
\$20,000-35,000	183	17.5	133	19.0	105	20.4
\$35,000-50,000	95	9.0	65	9.3	46	9.0
\$50,000+	78	7.4	57	8.2	45	8.7
<i>Refused/Don't know</i>	31	3.0	25	3.6	20	3.9
Total	1048		698		514	
Housing Stability^a						
<i>Stable</i>			379	52.8	267	50.5
<i>Unstable</i>			339	47.2	262	49.5
Total			718		529	

Notes: ^a*Housing Stability* definition: since Hurricane Katrina, respondent is living or has lived in a self-reported permanent and stable home, excluding any trailers, and does not plan on moving in the next year.

Table A3. Hurricane Gustav Evacuation Demographics (G-CAFH, 2008)

	<i>Louisiana</i>	<i>Mississippi</i>	Total
Total Evacuated (n)	215	196	411
Household Status (%)			
<i>Households with kids < 19 yrs</i>	81.3	80.0	79.9
<i>All other households</i>	78.5	72.3	76.1
Income (%)			
<\$10,000	72.0	72.9	70.4
\$10,000-20,000	79.2	79.0	79.1
\$20,000-35,000	85.9	75.6	81.7
\$35,000-50,000	83.3	61.3	72.1
\$50,000+	90.0	83.9	86.3
Housing Status (%)			
<i>Unstable^a</i>	78.7	75.0	76.8
<i>Stable</i>	82.1	74.6	78.6
Number of Prior Hurricanes (%)			
1-5	76.4	77.4	76.8
6-10	83.7	71.4	77.0
10+	85.2	76.6	80.5
Katrina Housing History (%)			
<i>Group trailer site</i>	85.7	81.8	82.8
<i>Private trailer</i>	83.3	84.2	83.9
<i>House</i>	81.3	73.6	78.0
<i>Other</i>	62.5	66.7	66.0

Notes: ^a*Housing Stability* definition: since Hurricane Katrina, respondent is living or has lived in a self-reported permanent and stable home, excluding any trailers, and does not plan on moving in the next year.

Table A4. Hurricanes Katrina & Gustav Evacuation Statistics Among People Living in Mandatory Evacuation Areas (G-CAFH, 2008)

		Gustav		
Katrina	<i>Evacuated^b</i>	<i>Evacuated^b</i>	<i>Did Not Evacuate</i>	<i>Total</i>
	<i>Did Not Evacuate</i>	n (%) ^a	264 (58.0)	40 (8.8)
	n (%)	118 (26.0)	33 (7.2)	151 (33.2)
Total		382 (84.0)	73 (16.0)	455 (100.0)

Notes: ^aEach percentage listed is the number of respondents in a given cell divided by the total n. ^b*Evacuation* is defined as having left residence before the arrival of the Hurricane.

*p<0.05, **p<0.01, ***p<0.001 significant difference across all groups.

Table A5. Decision Making Evacuation Statistics (G-CAFH, 2008)

	<i>Louisiana</i>		<i>Mississippi</i>		Total	
	<i>Unstable^a</i>	<i>Stable</i>	<i>Unstable</i>	<i>Stable</i>		
Why Evacuate (%)	Total (n)	100	115	105	91	411
<i>Personal Experience from Katrina</i>		45.0	47.8	50.5	61.5	50.1
<i>Calls for evacuation by local officials (eg mayor)</i>		47.0	52.2	40.0	40.7	45.3
<i>Statements by weather officials</i>		24.0	28.7	32.4	35.2	29.9
<i>Emergency authorities (FEMA, DHS)</i>		19.0	11.3	15.2	19.8	16.1
<i>Friends/family convinced them</i>		14.0	11.3	11.4	18.7	13.6
<i>Personal Experience from other hurricane</i>		5.0	2.6	10.5	9.9	6.8
<i>Fear of levees breaking, flooding, or wind</i>		5.0	5.2	2.9	6.6	4.9
<i>Other</i>		7.0	63.1	8.6	4.4	6.6
Why Not Evacuate (%)	Total (n)	27	25	35	31	118
<i>Thought the storm wouldn't be that bad</i>		29.6	48.0	40.0	54.8	43.2
<i>Didn't have the financial means</i>		18.5	32.0	25.7	32.3	27.1
<i>Protect home and possessions</i>		14.8	8.0	22.9	16.1	16.1
<i>Just didn't want to leave</i>		7.4	8.0	17.1	25.9	15.3
<i>Did not have transportation</i>		11.1	8.0	14.3	6.5	10.2
<i>Had to take care of someone who was unable to leave</i>		11.1	8.0	2.9	6.5	6.8
<i>Needed to take care of pets</i>		3.7	0.0	5.7	9.7	5.1
<i>Other*</i>		40.7	28.0	14.3	12.9	22.9
Why Not Evacuate for Households with Children (%)	Total (n)	10	11	10	13	44
<i>Thought the storm wouldn't be that bad</i>		40.0	36.4	40.0	38.5	38.6
<i>Didn't have the financial means</i>		20.0	36.4	40.0	46.2	36.4
<i>Protect home and possessions</i>		20.0	9.1	20.0	23.1	18.2
<i>Did not have transportation</i>		20.0	9.1	30.0	7.7	15.9
<i>Just didn't want to leave</i>		0.0	0.0	10.0	15.4	6.8
<i>Other</i>		40.0	27.3	33.3	15.4	27.3
Among All, Would Obey Future Evacuation Orders (%)	Total (n)	126	140	139	121	526
<i>Very likely</i>		69.8	72.2	76.2	79.3	74.3
<i>Somewhat likely</i>		17.5	15.0	18.0	16.5	16.7
<i>Not very likely</i>		4.8	6.4	2.9	1.7	4.0
<i>Not likely at all</i>		7.9	6.4	2.9	2.5	5.0

Notes: ^a*Housing Stability* definition: since Hurricane Katrina, respondent is living or has lived in a self-reported permanent and stable home, excluding any trailers, and does not plan on moving in the next year.

*p<0.05, **p<0.01, ***p<0.001 significant difference across all groups.

Table A6. Evacuation Logistics (G-CAFH, 2008)

	Louisiana		Mississippi		Total
	Unstable ^a	Stable	Unstable	Stable	
	127	140	140	122	529
When did you Evacuate? (%)					
Before hurricane hit	76.4	81.4	72.9	73.8	76.2
After hurricane hit	2.4	0.7	2.1	0.8	1.5
Did not evacuate from mandatory evacuation location	4.7	5.0	20.0	22.1	12.9
Did not evacuate from all other locations	15.7	12.9	1.4	3.3	8.3
Was away / Vacation	0.8	0	3.6	0	1.1
Size of Party Evacuated (#)					
Mean # in evacuated party ^b	6.1	4.9	4.9	4.4	5.1
Mean # of children	1.2	1.0	1.2 [†]	0.7	1.1
Mean # of adults	1.0	1.0	1.2	1.0	1.1
Mean # not part of household	2.8	1.8	1.5	1.7	1.9
Evacuation Mode (%)*					
Private transportation	92.9	93.9	99.0	100.0	96.3
Public transportation	7.1	6.1	1.0	0.0	3.7
Evacuation Destination (%)					
Louisiana	36.0	32.2	5.7	1.1	19.5
Mississippi	11.0	21.7	66.7	68.1	40.9
Alabama	15.0	9.6	11.4	19.8	13.6
Georgia	15.0	11.3	2.9	2.2	8.0
Texas	11.0	9.6	1.0	0	5.6
Other locations	12.0	15.7	12.4	8.8	12.4
Evacuation Cost					
Mean cost of transportation** (\$)	205.38	169.26	144.64	124.44	159.84
Mean cost of food (\$)	210.06	211.58	180.26	154.71	191.75
Mean cost of shelter*** (\$)	157.72	210.16	93.37	91.11	141.35
Mean total cost*** (\$)	573.16	591.00	418.26	370.56	493.65
Mean # days evacuated***	6.1	5.4	4.3	3.5	4.9
Mean total cost per person per day (\$)	15.48	22.56	19.95	24.02	20.49
Difficulty paying for evacuation** (%)	89.4	82.9	81.7 [†]	69.2	81.0

Notes: ^aHousing Stability definition: since Hurricane Katrina, respondent is living or has lived in a self-reported permanent and stable home, excluding any trailers, and does not plan on moving in the next year. ^bMean number in evacuated party includes respondent.

*p<0.05, **p<0.01, ***p<0.001 significant difference across all groups.

[†]p<0.05, ^{††}p<0.01, ^{†††}p<0.001 significant difference within state.

Table A7. Household Impact (G-CAFH, 2008)

	<i>Louisiana</i>		<i>Mississippi</i>		Total
	<i>Unstable^a</i>	<i>Stable</i>	<i>Unstable</i>	<i>Stable</i>	
Total (n)	127	140	140	122	529
Average # Days After Gustav Hit:					
<i>Had problems with water</i>	0.7	0.6	0.6	0.7	0.6
<i>Had problems with food^{***}</i>	1.2	1.4	0.5	0.3	0.9
<i>Had problems with shelter</i>	0.3	0.3	0.2	0.1	0.2
<i>Had problems with safety^{**}</i>	0.7 [†]	0.3	0.5 ^{††}	0.1	0.4
Economic Impact in Household (%)					
<i>Lost a job</i>	7.1	6.4	4.3	2.5	5.1
<i>Lost income*</i>	60.3	60.7	47.9	46.7	54.0
Housing Damage					
<i>Damage</i>	12.5	9.4	10.1	7.7	10.4
Trauma Score Questionnaire (TSQ)					
<i>Mean Score^{***}</i>	7.9 ^{†††}	5.4	8.2 [†]	6.4	7.0
<i>Have PTSD^b (%)^{**}</i>	23.6 ^{***}	7.9	22.1	14.8	17.0
Recovery from Hurrigan Katrina (%)					
<i>Better than before Gustav</i>	6.3	7.1	2.9	4.9	5.3
<i>Worse than before Gustav</i>	28.4	20.0	27.1	18.0	23.4
<i>Same as before Gustav</i>	64.6	72.1	68.6	76.2	70.3
<i>Other</i>	0.8	0.7	1.4	0.8	1.0

Notes: ^a*Housing Stability* definition: since Hurricane Katrina, respondent is living or has lived in a self-reported permanent and stable home, excluding any trailers, and does not plan on moving in the next year. ^bPTSD is defined as scoring >6 on the 12-item TSQ scale.

*p<0.05, **p<0.01, ***p<0.001 significant difference across all groups.

[†]p<0.05, ^{††}p<0.01, ^{†††}p<0.001 significant difference within state.

Table A8. Child Impact (G-CAFH, 2008)

	<i>Louisiana</i>	<i>Mississippi</i>	<i>Total</i>
Total (weighted n^b)	257	236	493
Mental Health Since Gustav (%)			
<i>New Emotional or Behavioral Problems</i>	25.0	27.1	26.0
<i>Very sad or depressed</i>	26.9	17.4	22.3
<i>Nervous or afraid</i>	33.1	28.4	30.8
<i>Problems sleeping</i>	22.6	19.9	21.3
<i>Problems getting along with other children</i>	15.6	11.0	13.4
Medical Issues During Gustav (%)			
<i>Needed Medication during Gustav</i>	28.4	20.8	24.8
<i>Had problems getting medication if needed</i>	15.1	10.2	13.1
<i>Specific problems getting medication^c :</i>			
<i>Didn't know where to go to get prescription</i>	54.6	0	37.5
<i>No insurance**</i>	0	100.0	31.3
<i>Didn't know where to go to fill prescription</i>	45.5	0	31.3
<i>No access to medical records</i>	9.1	0	6.3
<i>No money*</i>	9.1	100.0	37.5
<i>Other</i>	18.2	0	12.5
Pre-existing Conditions^a(%)			
<i>Need on-going care</i>	30.0	25.9	28.0
<i>Had problems getting on-going medical care</i>	11.7	0	6.5
Urgent Care (%)			
<i>Illness or Injury that required medical care</i>	10.9	14.8	12.8
<i>Did NOT receive care for Illness or injury</i>	14.3	0	6.4

Notes: ^a*Pre-existing conditions* are defined as any health condition which existed before Hurricane Gustav. ^b*Weighting* is used to adjust responses to the number of children in the household according to number of children in household one week before Hurricane Gustav.

^cBased on eight respondents before weighting.

*p<0.05, **p<0.01, ***p<0.001 significant difference across all groups.

Table A9. Factors Associated with Children's Reported Emotional Health Symptoms Post-Gustav (G-CAFH, 2008)

	<i>Odds Ratio</i>	<i>P value</i>	<i>95% Confidence Intervals</i>
Socio-demographics			
<i>Black</i>	0.92	0.839	0.43, 1.97
<i>Household income <\$10,000</i>	1.26	0.550	0.59, 2.71
<i>Louisiana</i>	1.52	0.270	0.72, 3.21
Household Characteristics			
<i>Unstable housing^a</i>	1.69	0.140	0.84, 3.39
<i>Poor parental mental health^b</i>	3.25	0.000	1.70, 6.23
<i>No stable wage-earner</i>	1.16	0.682	0.56, 2.37
<i>Lack of parental social support network</i>	2.36	0.020	1.15, 4.85
<i>Number of people in household</i>	0.86	0.195	0.69, 1.08
<i>Problems with rent/utilities/food</i>	1.42	0.298	0.73, 2.78
Community Characteristics			
<i>Unsafe neighborhood</i>	1.83	0.114	0.86, 3.90
<i>Low sense of social engagement</i>	0.95	0.292	0.85, 1.05
Event/Response Characteristics			
<i>Number of times moved since Katrina</i>	1.08	0.242	0.95, 1.24
<i>Evacuated for Gustav</i>	1.00	0.996	0.45, 2.22

Notes: ^a*Housing Stability* definition: since Hurricane Katrina, respondent is living or has lived in a self-reported permanent and stable home, excluding any trailers, and does not plan on moving in the next year. ^bMCS score <42.

Table A10. Household Composition and Evacuation Decisions (G-CAFH, 2008)

	<i>Households with...</i>			<i>Total</i>
	<i>Children Ages 0-5</i>	<i>Children Ages 6-18</i>	<i>All Others</i>	
Total (n)	66	117	267	450
Evacuated (%)				
<i>Yes</i>	87.9	88.0	82.8	84.9
<i>No</i>	12.1	12.0	17.2	15.1