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One Year Later: Mental Illness Prevalence and Disparities among New Orleans Residents Displaced by Hurricane Katrina

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Abstract

Objectives—We examined mental health status among displaced New Orleans residents in the fall of 2006, one year after Hurricane Katrina.

Methods—We used data from the Displaced New Orleans Residents Pilot Study, which measured the prevalence of probable mild or moderate and serious mental illness among a representative sample of people who resided in New Orleans at the time of the hurricane, including people who evacuated the city but did not return. We also analyzed disparities in mental health status by race, education, and income.

Results—We found high rates of mental illness in our sample and major disparities in mental illness by race, education, and income. Severe damage to or destruction of an individual's home was a major covariate of mental illness.

Conclusions—Property loss accounted for most of the disparity in mental illness between blacks and whites.

Keywords

Mental health; socioeconomic factors; race/ethnicity; environment; surveys; Hurricane Katrina; New Orleans

Hurricane Katrina struck New Orleans, Louisiana, on the morning of August 29, 2005. The city's population of 455,000[1] was displaced by the storm and flooding that followed. The devastation, disruption, chaos, and despair caused by the hurricane were expected to have a significant effect on the mental health of the survivors, and results to date suggest that this was indeed the case.[2,3]

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Contributors
Both authors originated the study, interpreted the data, and contributed to the writing. N. Sastry conducted the data analyses and wrote the initial draft, and designed and directed the Displaced New Orleans Residents Pilot Study with the help of M. VanLandingham and others.

Human Participant Protection
This study was approved by the institutional review board of the RAND Corporation. The data for this study contained no personal identifiers and are publicly available at http://www.rand.org/labor/projects/dnors. The Displaced New Orleans Residents Pilot Study was approved by the institutional review boards of the RAND Corporation and RTI International.

Early studies of the mental health effects of Hurricane Katrina suggested that displaced New Orleans residents experienced high rates of distress in the initial period following the hurricane,[4–6] although not all of these studies collected reliable measures of mental health status or included representative samples. Little is known about the intermediate- and longer-term mental health effects of Hurricane Katrina. This is largely attributable to the difficulty of collecting current information from a representative sample of the pre-hurricane population of New Orleans, which has hampered research on many Katrina-related topics of high scientific and policy relevance.[7,8]

Following other natural, human-made, and technological disasters, initially-elevated rates of mental health—most commonly assessed by rates of post-traumatic stress disorder—have generally fallen during the first year after the event and then declined more slowly. This has been found, for example, in studies of survivors of a Turkish earthquake,[9] the September 11, 2001 attack in New York City,[10] and the 2000 tsunami in Southeast Asia.11 However, in other cases the prevalence of mental illness remained stable or increased over time, often when exposure to stress continued.12›13 These latter findings are consistent with results from New Orleans one year after Hurricane Katrina, which have identified substantially elevated rates of mental illness among, for example, the local Vietnamese-American population[14] and community college students (C. Paxson, PhD, J. Rhodes, PhD, M. Waters, PhD, E. Fussell, PhD, C.E. Rouse, PhD, unpublished data, 2008).

We used data from the Displaced New Orleans Residents Pilot Study (DNORPS) to examine the mental health status of hurricane survivors, both those who had returned to New Orleans and those who were still living elsewhere, who were assessed during the fall of 2006, approximately one year after Hurricane Katrina. In addition, we described and analyzed disparities in mental health status by race, education, and income.

We focused on the population of the City of New Orleans and on disparities because of the widespread devastation that occurred there and the likelihood of major disparities among the city's diverse population.[5,15] Previous research has found significantly higher prevalence of mental illness among socially and economically disadvantaged populations,[16] although prevalence of mental illness among racial and ethnic minorities has not been as high as would be expected from their disadvantaged socioeconomic status.[17] Research on disparities in post-disaster mental health by socioeconomic status and race has been scarce.[18–20] Our analysis also builds on previous research on the mental health effects of Hurricane Katrina that considered the population of the entire affected region.[2,3]

METHODS

Fieldwork for DNORS began in mid-September 2006 and ended in November 2006.[21] The study's aim was to determine the feasibility of collecting representative data on the current status of people who resided in New Orleans at the time of Hurricane Katrina, and to examine their location, well-being, and plans.

Data Collection

DNORPS interviewed residents drawn from a stratified, area-based probability sample of pre-Katrina dwellings in the City of New Orleans. To ensure adequate coverage of areas that experienced different effects of the hurricane using a small sample, we divided the city into three strata by flood depth: no flooding, low-flood depth (<4 feet of flooding), and high-flood depth (4+ feet of flooding). DNORPS used an implicit stratification procedure to achieve an even distribution of the sample within each stratum by three potentially important factors: geographic location (by census tract), racial composition (percentage of the population at the block level that was black), and homeowners versus renters (block-level

proportion of dwellings that were owner-occupied). Dwelling units were the primary sampling unit and there was no geographic clustering of sampled dwellings, which provided high statistical power for a given sample size because design effects were minimized.

DNORPS drew a sample of 344 pre-Katrina residences in New Orleans. Fieldwork focused on tracing the residents of sampled homes through mail, telephone, and in-person contacts. An extensive array of electronic database searches and state-of-the-art tracing techniques aided efforts to obtain updated information on sampled individuals' whereabouts. Approximately two-thirds of the sampled residents were located, and 80% of these were successfully contacted and asked to complete a questionnaire. Questionnaires were successfully completed for just under 90% of the contacted residents, a very high cooperation rate. The final response rate was 51%, and the sample was representative of the City of New Orleans at the time of Hurricane Katrina.[21]

The main reason for not completing an interview was that the resident could not be located. We were unable to locate approximately one-third of all eligible residents (some of whom may, in fact, have been ineligible). The remaining residents who were not interviewed refused, could not be contacted, or were randomly selected for work to stop. It was more difficult to locate survivors from areas that had flooded because a higher fraction of these people no longer resided in the sampled dwellings. However, there was little variation across strata in contact rates, and cooperation rates did not vary greatly by stratum.

The area-based sample design of DNORPS permitted a multivariate logistic regression analysis of fieldwork outcomes,[21] with covariates based on area-characteristics at the block and block-group level from the 2000 Census.[22] There were few systematic differences in fieldwork outcomes across any of the fieldwork stages—with the exception of locating sampled residents. Location rates were higher for residents in blocks with a higher median population age and in tracts with a lower fraction of nonfamily households. None of the covariates describing race or socioeconomic status were statistically significant. These findings provided additional confirmation that the sample was representative.

The DNORPS sample comprised 144 respondents. Each respondent participated in a short (~15 minutes) interview by mail, by telephone, or in person. A ten-page questionnaire requested a roster of all pre-Katrina household residents and collected information on their evacuation and resettlement experience, current location, plans to return to or remain in New Orleans, and health and well-being. Information was also collected on residents' basic demographic and socioeconomic characteristics and on housing characteristics and damage. The sample was geocoded, allowing area characteristics to be appended to individual records. Sample weights were constructed to adjust for the sampling scheme and to ensure representativeness.

Measures

We used the six-question K6 scale of non-specific mental illness to screen for anxiety and mood disorders in the past 30 days.[23,24] The K6 is widely used in the United States to screen for mental illness and was used in previous research on the psychological effects of Hurricane Katrina.[2,3]

Respondents were asked how often (none, a little, some, most, or all of the time) during the past 30 days they felt nervous, hopeless, restless or fidgety, depressed, that everything was an effort, and worthless. Answer categories were coded from 0 (none of the time) to 4 (all of the time) and summed. The resulting K6 score was used to classify respondents into three categories: no mental illness (score: 0–7), probable mild or moderate mental illness (MMI; score: 8–12), and probable serious mental illness (SMI; score: 13–24). Respondents in the

SMI category had at least one anxiety or mood disorder as defined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* [25] in the past 30 days and suffered from a severe impairment; those with MMI met the criteria for a *DSM-IV* anxiety or mood disorder but not for SMI.[24]

We considered it important to examine MMI because of its high prevalence and the high rates of subsequent SMI among individuals in this category.[26] The K6 classification scheme was based on a previous validation study[24] and a clinical reappraisal study.[26] These studies indicate that the K6 classification scheme has appropriate psychometric properties.

The covariates in our analysis included the respondent's age, sex, race, education, place of birth, and pre-Katrina marital status and employment status. We also examined housing characteristics, including the type of dwelling, whether the unit was owned or rented, and the extent of damage from Hurricane Katrina and the subsequent flooding.

Analysis

We first examined weighted cross-tabulations of mental health status and their statistical significance using Rao-Scott sample design-based F-tests.[27] Next, we estimated generalized ordered logistic regression models to control for race, education, and economic status simultaneously and to examine background factors that might account for the observed disparities. We used sample weights and calculated design-based standard errors using jackknife estimation that adjusted for the stratified sampling scheme.

We used ordered logistic regression because the outcome variable took three categorical values arranged from better to worse. This model extends the standard two-outcome logistic regression model to multiple outcomes and was fit to the cumulative probabilities of the outcome variable. The generalized version of the ordered logistic model allowed us to relax and test the proportional odds assumption of the standard model.[28] For covariates for which the test of the proportional odds assumption was rejected, we estimated non-proportional effects. This allowed the estimated covariate effects to differ between contrasts of the first outcome to the second two outcomes combined and contrasts of the first and second outcomes combined to the third outcome. This approach resulted in our estimating a partial proportional odds model that provided a parsimonious specification and the best model fit.[29]

The estimated parameters included the covariate effects and two cutpoints that together defined the three outcome categories. The constant was absorbed into the cutpoints and was not estimated separately. The exponentiated coefficients from the model are interpreted as odds ratios; less formally, the exponentiated covariates represented the likelihood of having a worse mental health status outcome for both sets of contrasts. The first set of covariate effects reflected the odds of being in the probable SMI group, compared with being in the combined group of persons without mental illness and with probable MMI, relative to the omitted reference category (because all of the covariates in the model were categorical). The second set of covariate effects show the odds of being in the combined probable SMI and MMI groups compared to being in the non-mentally ill group. In cases where the proportional odds assumption was appropriate, both sets of covariate effects are the same; but the two sets of parameter estimates differ for covariates that were found to have non-proportional effects.

RESULTS

Summary statistics for our sample are presented in Table 1. More than half of the respondents (56%) were black; the overwhelming majority of the remainder were white, so we combined other race categories with whites. Only one-third of respondents (35%) had at

least some college education; two-thirds (65%) had a high school diploma or less education. Almost half of respondents were aged 20 to 49 years, approximately one-third were adults younger than 40 years, and approximately one-fifth were 65 years or older. Female respondents made up somewhat more than half the sample. Three-fifths of respondents (59%) were unmarried.

In the month before Hurricane Katrina, almost three-quarters of respondents were employed; 9% were unemployed and 17% were out of the labor force (mostly retirees or students). Three out of five respondents owned their homes before Hurricane Katrina, and the remaining two-fifths were renters. Approximately two-thirds of respondents' homes were badly damaged or rendered uninhabitable by Hurricane Katrina. We combined these two groups because a preliminary analysis revealed they had almost identical levels of mental illness.

Figure 1 shows the distribution of K6 scores in the DNORPS sample, as well as the three outcome categories. Approximately one-fifth of the sample (19%) had probable MMI and another one-fifth (20%) had probable SMI. Thus, at one-year after Hurricane Katrina, a total of 39% of respondents were classified as having had any *DSM-IV* anxiety or mood disorder in the past 30 days.

The majority of respondents had symptoms of nervousness and found everything to be an effort at least some of the time in the past 30 days. Fewer than 25% of respondents reported feelings of worthlessness, and a majority reported never feeling hopeless or depressed.

Table 2 shows cross-tabulations of the three-category mental health indicator with each of the covariates. We observed large and statistically significant disparities in mental health status by race, employment status, and housing damage. Blacks had substantially higher rates of SMI than did whites and others: almost one-third of blacks (31%) but only 6% of whites and others were classified with probable SMI. Interestingly, both racial groups had similar levels of probable MMI, approximately 20%.

Unemployed individuals had extremely poor mental health, with only 11% classified as not having a mental illness; almost half were classified as having probable MMI and 39% as having probable SMI. By contrast, individuals who were out of the labor force had very low rates of SMI. Hurricane survivors whose homes were badly damaged, including those whose homes were completely destroyed, had high rates of both MMI (23%) and SMI (27%). By contrast, more than four-fifths of individuals whose homes were either undamaged or damaged but habitable were not mentally ill.

We observed other statistically significant disparities in mental illness associated with income, education, and place of birth. Individuals living in tracts with average income in the bottom quartile for the sample had substantially higher rates of SMI than did those in the top three quartiles. Respondents with a high school education or less had rates of MMI and SMI that were roughly twice as high as rates for those with more than a high school education (27% versus 15% for MMI and 30% versus 15% for SMI). The 71% of individuals who were born in Louisiana had substantially higher rates of SMI than did those born elsewhere, but similar rates of MMI.

We observed no disparities in mental health by home ownership or renter status in New Orleans prior to Hurricane Katrina. Less than half the sample (42%) remained displaced from the city in the fall of 2006; among this group, 51% suffered from MMI (25%) or SMI (26%). Only 31% of displaced residents who had returned to the city suffered from MMI (15%) or SMI (16%). Differences between these two groups were not statistically significant

and returnee status was not included as a model covariate because of the difficulty of interpreting the effects of such post-Katrina behaviors.

Our generalized ordered logistic regression results were based on five separate models (Table 3). The first three models included each of the three main socioeconomic variables—race, income, and education—on its own. The fourth model included these three variables simultaneously, and the final model added all of the other covariates to the fourth model. The models include non-proportional covariate effects for race, education, and sex, based on the results of a set of Wald tests (results not shown) that assessed the appropriateness of the proportional odds assumption for each model covariate. The estimated effects for race, education, and sex are thus different when comparing no mental illness to either MMI or SMI and when comparing either no mental illness or MMI to SMI. The estimated parameter effects for all of the remaining covariates are proportional across both sets of contrasts.

The regression results reveal large and statistically significant disparities in mental health for each socioeconomic measure examined on its own. For all three socioeconomic variables, disadvantaged individuals experienced odds of having mental illness or more severe mental illness that were at least three times higher than non-disadvantaged individuals. For instance, blacks had an odds ratio of 7.80 for being classified as having probable SMI compared to having MMI or not having mental illness and an odds ratio of 3.14 for having any mental illness compared to having none.

Model 4 controlled for all three socioeconomic measures simultaneously. In this model, the only variable that retained a statistically significant effect was race: blacks had a substantially higher likelihood of experiencing probable SMI compared to having MMI or not having mental illness, but no statistically significant difference for being classified as having any mental illness compared to having none. The estimated effects for income and education were substantially smaller in Model 4 than when these variables were considered on their own. This finding indicates that higher levels of probable SMI among those with less income and education was in large part attributable to the disproportionately high numbers of blacks with these demographic characteristics.

In the final model, which includes the full set of variables, a statistically significant effect emerged for education and the effect of race became insignificant. Individuals with a high school education or less experienced a four-times higher likelihood of having mental illness compared to those with more than a high school education. However, there was not a significant difference by education in the likelihood of experiencing SMI compared to MMI or no mental illness. Only a single variable was statistically significant in Model 5 at the .01 level: housing damage. We found a major deleterious effect on mental health for individuals who had their dwelling in New Orleans severely damaged or destroyed by Hurricane Katrina. The odds of being classified as having probable SMI (compared with having probable MMI or no mental illness) or as having any mental illness (compared with none) was more than six times as high for individuals who lost their home in the disaster.

The effect of adding the housing damage variable—as well as the other covariates in the model—was to substantially reduce the odds ratio for mental illness between blacks and whites and, in particular, resulted in a non-significant difference in the likelihood of probable SMI between blacks and whites. Thus, a major reason for the higher levels of serious mental illness among blacks in New Orleans in the aftermath of Hurricane Katina was that they were much more likely to have their dwelling in the city severely damaged or destroyed. The likelihood of having a home damaged or destroyed by Katrina was significantly ($p<.01$) higher for blacks in the sample (81%) compared to whites (47%). Previous research found that almost all of the neighborhoods in New Orleans that were

predominantly black (75–100%) at the time of Census 2000 were damaged (J.R. Logan, PhD, unpublished data, 2006).

Model 5 also provided some evidence that middle-aged individuals had higher rates of mental illness than either younger or older individuals and that men had lower rates of probable SMI than women.

Conclusions

Our results revealed very high levels of mental illness among residents of New Orleans who survived Hurricane Katrina. In our sample of these individuals, we determined that nearly 40% had probable mental illness one year after the storm, and half of these illnesses were classified as severe. These rates were substantially higher than rates of mental illness prior to Hurricane Katrina in the Gulf States region, according to results from the National Comorbidity Study Replication conducted between 2001 and 2003, which were estimated at 6% for SMI and 10% for MMI, and 16% for any mental illness.[3] Furthermore, our findings are consistent with results suggesting that the prevalence of mental illness may not have declined in the year following Hurricane Katrina,[13] which differs from the pattern found in most previous research on mental illness following disasters.[30]

The results from estimating generalized ordered logistic regression models suggested that observed socioeconomic disparities in mental illness—especially the disparity between blacks and whites—were largely accounted for by other factors. However, individuals with less education had higher rates of mental illness, but not serious mental illness, after controlling for other factors. Our findings suggested that a particularly important factor underlying the observed socioeconomic disparities in mental illness—and, possibly, underlying the levels of mental illness—was the effect of severe damage to individuals' homes in New Orleans. This effect may have been economic, because, for most families who owned their home, equity in their property represented their largest wealth component. Uninsured property losses from flooding were therefore potentially devastating, while flood insurance was unlikely to have been sufficient to cover household contents or the loss of use of a home. Nearly half of the housing units in New Orleans were rental units, according to the 2000 Census.[1] Renters may not have faced the same financial losses as homeowners, but individuals whose rented dwellings were severely damaged or destroyed were forced to find new housing and likely had major personal property losses.

Apart from the financial losses, survivors whose housing was severely damaged or destroyed housing may have been unable to return to their neighborhoods or even to their city. This may have affected their social ties, employment, and other factors. Permanent displacement from home and community likely posed a long-term psychological hardship, especially for the many New Orleans residents who had spent their entire lives in the city.[31,32] Even residents who were able to return to the city after losing their housing may have suffered similar psychological effects.

Our finding that property loss was a major covariate of mental illness in New Orleans differs from previous findings by Galea et al.[2] who found that for residents of metropolitan New Orleans, the effects of property loss were less important than the effects of physical illness, injury, and physical adversity (which we did not measure). Galea et al. considered this finding unexpected. However, they reported similar results to ours for areas outside of metropolitan New Orleans. These differences may be explained by timing: Galea et al.'s data were collected 5 to 7 months after Katrina while ours were collected 1 year after the hurricane. Other recent studies focusing on New Orleans have found negative effects of Katrina-related economic losses on mental health.[14]

Limitations to our study included the modest sample size, which affected the overall statistical power of the analysis as well as our ability to accurately identify the effects of certain less-common situations—such as unemployment before the hurricane. Although cooperation rates were very high, the moderate contact rates and possibly selective overall response rates in the DNORPS sample may have affected the results in unknown ways. The results may also have been affected by the use of the K6 mental illness screening scale rather than a diagnostic instrument, even though the K6 scale has been validated and widely used in previous research.[23,24] Finally, the mental health effects ascribed to housing loss might instead be accounted for by other closely-associated—but unmeasured—factors caused by Hurricane Katina, such as a physical injury to the respondent or a friend or family member or other adverse experiences associated with the evacuation and resettlement. For example, housing damage was strongly related to flood depth in New Orleans,[33] which, in turn, was associated with mortality risk.[34] Thus, housing damage may serve as a proxy for having experienced the death of a family member or neighbor. These limitations will likely be ameliorated in analyses of data from new surveys now being designed that build on our experiences and results from DNORPS.

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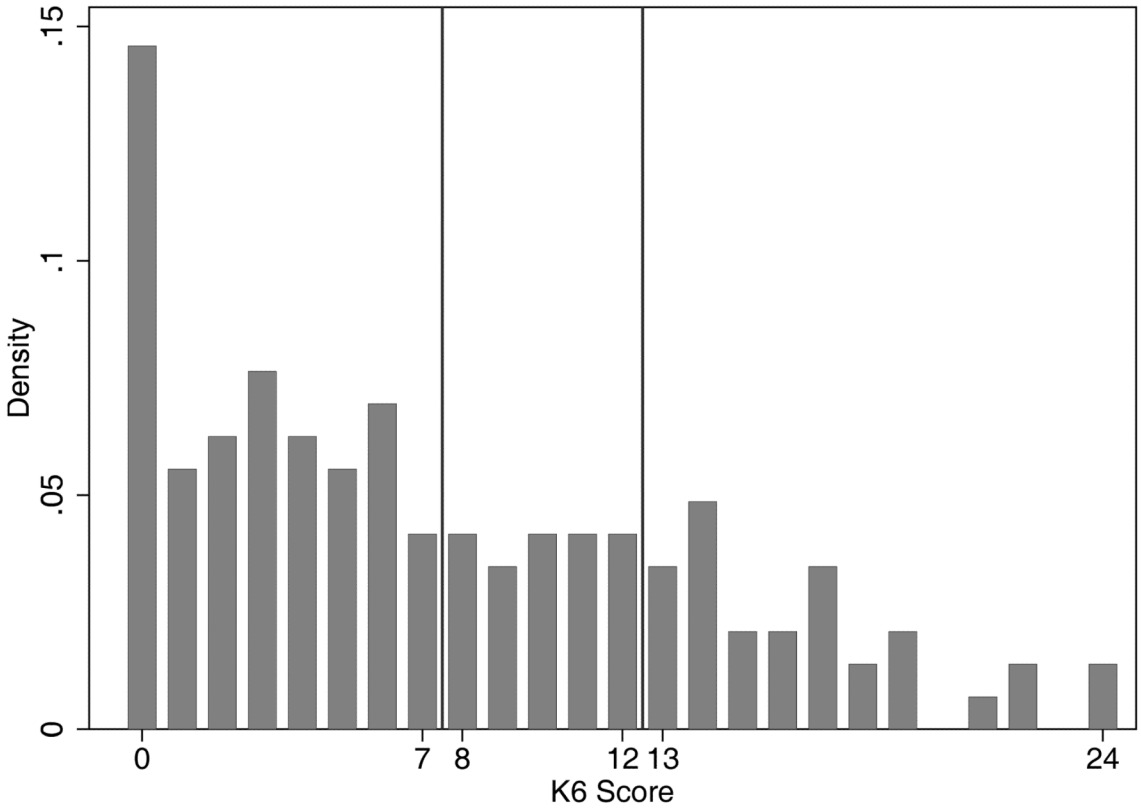

Figure 1. K6 Scores for DNORPS sample by Probable Mental Illness Categories

See file "174854_Sastry_F1.eps" for figure.

The figure needs labels in the three sections created by the two vertical lines as follows:

1. Non-case (61%)
2. Probable mild/moderate mental illness (19%)
3. Probable serious mental illness (20%)

Table 1

Weighted Summary Statistics of DNORPS Respondent Characteristics

Variable	Percent in category
Race	
Black	56%
White/other	44%
Education	
High school or below	65%
More than high school	35%
Age	
20–39 years	34%
40–64 years	47%
65+ years	19%
Sex	
Female	59%
Male	41%
Place of birth	
Louisiana	71%
Elsewhere	29%
Marital status (in 2005)	
Unmarried	59%
Married	41%
Employment status (in 2005)	
Employed	73%
Unemployed	9%
Out of labor force	17%
Housing tenure (in 2005)	
Owned	60%
Rented	40%
Housing damage	
Undamaged/livable	34%
Badly damaged/unlivable	66%
Number of observations	144

Table 2

Weighted Cross-Tabulations of Probable Mental Illness by DNORPS Respondent Characteristics

	Probable Mental Illness				
Variable	**Non-case**	**Mild/moderate**	**Serious**	**Total**	**Design-based F-test statistic**
Race					
Black	49%	19%	31%	100%	7.47***
White/other	75%	19%	6%	100%	
Income quartile					
Bottom quartile	40%	22%	38%	100%	3.54**
Top three quartiles	67%	18%	15%	100%	
Education					
High school or below	43%	27%	30%	100%	3.87**
More than high school	70%	15%	15%	100%	
Age					
20–40 years	70%	16%	14%	100%	2.07
40–64 years	50%	19%	31%	100%	
65+ years	69%	25%	6%	100%	
Sex					
Female	54%	19%	27%	100%	2.94
Male	71%	20%	9%	100%	
Place of birth					
Louisiana	55%	19%	26%	100%	3.09**
Elsewhere	74%	20%	6%	100%	
Marital status (in 2005)					
Unmarried	59%	15%	26%	100%	2.45
Married	63%	26%	11%	100%	
Employment status (in 2005)					
Employed	66%	13%	22%	100%	5.86***
Unemployed	11%	49%	39%	100%	
Out of labor force	66%	31%	3%	100%	
Housing tenure (in 2005)					

Variable	Probable Mental Illness			Total	Design-based F-test statistic
	Non-case	Mild/moderate	Serious		
Owned	61%	21%	18%	100%	0.25
Rented	60%	17%	23%	100%	
Housing damage					
Undamaged/livable	81%	11%	7%	100%	8.16***
Badly damaged/unlivable	50%	23%	27%	100%	
Full sample	61%	19%	20%	100%	

Note:

** $p<.05$;

*** $p<.01$

Table 3

Generalized Ordered Logistic Regression Estimates of Probable Mental Illness among DNORPS Respondents

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
A. No mental illness compared to MMI or SMI										
Race										
Black	3.14**	(1.42)	.	.	.	.	2.01	(0.96)	0.60	(0.46)
White/other†	.	.	.	.	.	.	.	.	.	.
Income quartile										
Bottom quartile	.	.	3.15**	(1.61)	.	.	1.96	(1.09)	2.00	(1.27)
Top three quartiles†	.	.	.	.	.	.	.	.	.	.
Education										
High school or below	.	.	.	.	3.19**	(1.45)	2.17	(1.09)	4.10**	(1.70)
More than high school†	.	.	.	.	.	.	.	.	.	.
Age										
20–40 years†	.	.	.	.	.	.	.	.	.	.
40–64 years	.	.	.	.	.	.	.	.	3.14**	(1.69)
65+ years†	.	.	.	.	.	.	.	.	.	.
Sex										
Female†	.	.	.	.	.	.	.	.	.	.
Male	.	.	.	.	.	.	.	.	0.60	(0.33)
Place of birth										
Louisiana	.	.	.	.	.	.	.	.	1.35	(0.91)
Elsewhere†	.	.	.	.	.	.	.	.	.	.
Marital status (in 2005)										
Unmarried†	.	.	.	.	.	.	.	.	.	.
Married	.	.	.	.	.	.	.	.	1.01	(0.58)
Employment status (in 2005)										
Employed†	.	.	.	.	.	.	.	.	.	.
Unemployed	.	.	.	.	.	.	.	.	1.81	(1.55)

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
Out of labor force	.	.	.	.	.	.	.	.	0.70	(0.54)
Housing tenure (in 2005)										
Owned†	.	.	.	.	.	.	.	.	.	.
Rented	.	.	.	.	.	.	.	.	0.81	(0.46)
Housing damage										
Undamaged/livable†	.	.	.	.	.	.	.	.	.	.
Badly damaged/unlivable	.	.	.	.	.	.	.	.	6.29***	(3.81)
B. No mental illness or MMI compared to SMI										
Race										
Black	7.80***	(4.09)	.	.	.	.	6.16***	(3.48)	2.36	(1.76)
White/other†	.	.	.	.	.	.	.	.	.	.
Income quartile										
Bottom quartile	.	.	3.15**	(1.61)	.	.	1.96	(1.09)	2.00	(1.27)
Top three quartiles†	.	.	.	.	.	.	.	.	.	.
Education										
High school or below	.	.	.	.	2.43*	(1.24)	1.23	(0.65)	1.50	(1.00)
More than high school†	.	.	.	.	.	.	.	.	.	.
Age										
20–40 years†	.	.	.	.	.	.	.	.	.	.
40–64 years	.	.	.	.	.	.	.	.	3.14**	(1.69)
65+ years†	.	.	.	.	.	.	.	.	.	.
Sex										
Female†	.	.	.	.	.	.	.	.	.	.
Male	.	.	.	.	.	.	.	.	0.24**	(0.14)
Place of birth										
Louisiana	.	.	.	.	.	.	.	.	1.35	(0.91)
Elsewhere†	.	.	.	.	.	.	.	.	.	.
Marital status (in 2005)										

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
Unmarried†	.	.	.	.	.	.	.	.	.	.
Married	.	.	.	.	.	.	.	.	1.01	(0.58)
Employment status (in 2005)										
Employed†	.	.	.	.	.	.	.	.	.	.
Unemployed	.	.	.	.	.	.	.	.	1.81	(1.55)
Out of labor force	.	.	.	.	.	.	.	.	0.70	(0.54)
Housing tenure (in 2005)										
Owned†	.	.	.	.	.	.	.	.	.	.
Rented	.	.	.	.	.	.	.	.	0.81	(0.46)
Housing damage										
Undamaged/livable†	.	.	.	.	.	.	.	.	.	.
Badly damaged/unlivable	.	.	.	.	.	.	.	.	6.29***	(3.81)
Model F-test (df)	8.01***	(2)	5.02**	(1)	3.26*	(2)	3.52***	(5)	2.79***	(14)

Notes: SEs were calculated with jackknife estimation that adjusted for the stratified sampling scheme.

† Reference category

* $p<.10$;

** $p<.05$;

*** $p<.01$

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