Mental Health Services Utilization by Children Displaced by Hurricane Katrina

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Abstract

Objective: While previous studies have investigated the effects of disasters on the prevalence and severity of mental health conditions of children, less is known regarding their effects on the mental health services utilization. This study examined changes in utilization by children with pre-existing conditions who were displaced from Louisiana to Texas following Hurricane Katrina.

Method: A retrospective analysis was performed on Medicaid claims data for 101,950 children from 2004 to 2006. Pre-post changes for the displaced children were compared to those for three control groups: two comprised of children who remained in Louisiana and one of Texas children.

Results: The decreases in the proportion of children who had a prescription filled and the average days supply per child were significantly larger for the displaced group than the control groups. The decreases in both measures were larger for the two most common medication classes: stimulants and antidepressants. By contrast, the changes in the proportion of children with a psychiatric services encounter and the average number of psychiatric services encounters per child did not vary systematically across the displaced and control groups.

Conclusions: The contrast between the medication and encounter results reveals a potential gap in post-Katrina provision of care. While the encounter findings indicate that, on average, displaced children did not experience a disruption in provider visits, the medication estimates suggest that they often did not obtain pharmaceutical treatment. Future disaster responses may be improved by addressing logistical impediments faced by disaster victims in filling their prescriptions for mental health medications.

Introduction

Disasters have been found to lead to greater mental health services utilization by adults. Terrorist events[1,2,3], hurricanes[4,5,6,7,8], and other natural disasters[9] have been associated with increased use of mental health services and medications by adults in the months after the disaster. Disasters are also associated with increases in the prevalence[10,11,12,13] and worsening[14,15] of pre-existing conditions.

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However, relatively little is known regarding mental health services utilization effects on children. Given how children rely on adults who are dealing with the stress and challenges of recovering from the disaster, it is possible that their mental health needs may go unmet. Further, previous studies have found that children react differently to disasters than adults. Their mental health status appears to be linked to anxiety about the event, whereas adults' status is related to their exposure.[16] This suggests that children may be more likely to develop posttraumatic stress symptoms than major depression or generalized anxiety disorder.[14]

This paper investigated post-disaster mental health utilization by children in the context of Hurricane Katrina. The 2005 storm was responsible for roughly 1200 deaths and $108 billion in damages.[17] Approximately 1.5 million people in the Gulf of Mexico region were forced to evacuate.[18] In response to the mass displacement, 17 states issued emergency Medicaid waivers that provided short-term health insurance to low-income evacuees.[19] The largest such waiver was TexKat, which covered almost 60,000 individuals and provided a maximum of six months of care from September 2005 to June 2006.[20]

This study investigated utilization by children with pre-existing, chronic mental health conditions who were displaced to Texas by Hurricane Katrina. The analysis consisted of a pre-post retrospective study of Medicaid claims data. Utilization by the displaced children was compared to that of three multiple plausible control groups: two groups of Louisiana children who were not displaced and children who lived in Texas. Based on findings in adults, we anticipated that utilization of both mental health services and medications increased among children.

Methods

Data

Individual-level Medicaid Analytic Extract (MAX) claims data for 2004–2006 were employed in the analysis. The data contained both enrollment and encounter information. The sample began with children aged 18 or younger at the time Hurricane Katrina struck. The sample was then limited to children who had a claim January 2004 through December 2004 that included a diagnosis for conditions that were relatively chronic, require long-term treatment, and were unlikely to go into remission even in the presence of treatment. By focusing on these conditions, it was possible to better able to isolate the utilization effects of displacement and not allow the estimates to be confounded by utilization changes due to remission. The conditions analyzed were: bipolar (ICD-9 296.0, 296.4, 296.5, 296.6, 296.80), other nonorganic psychoses (ICD-9 298), pervasive developmental disorders (ICD-9 299), post-traumatic stress disorder (ICD-9 309.81), disturbance of conduct not elsewhere classified (ICD-9 312), hyperkinetic syndrome of childhood (ICD-9 314), schizophrenia (ICD-9 295), and depression (ICD-9 296.2, 296.3, 300.4, 311).

The sample was further limited to children who qualified for the TexKat or control groups based partly on zip code information contained in the enrollment data. The TexKat group consisted of children who lived in a FEMA-designated disaster county[21], were displaced to Texas following Katrina, and were enrolled in TexKat for at least one month. Three control

groups were created to isolate the effects of displacement. The control group LA-Disaster consisted of children who lived in a disaster zip code prior to Katrina but did not relocate to Texas. The second control group, LA-Nondisaster, also consisted of children who did not relocate to Texas but who lived in a Louisiana county that was not declared a disaster area. The last group, TX, was comprised of children who were enrolled in Texas Medicaid. The final sample included 101,950 children.

The pre-period was January 2005 – June 2005 (2005H1), while the post-period was January 2006 – June 2006 (2006H1). The study excludes the July – December periods because of the unreliable data in the second half of 2005 due to the immediate impact and disruption of Katrina. To minimize the potential for not observing treatment outside of Medicaid, the sample was limited to children who were enrolled in Medicaid for each of the pre-period and post-period months.

The outcomes of interest included mental health medication and service utilization. As the claims data report filled prescriptions, the two medication outcomes were based on fill measures: the proportion of children with at least one filled prescription and the average number of days supply per child[22]. The relevant drugs were identified based on the 2006 Texas Health and Human Services Commission drug formulary[23] listing of psychotropic drugs while the National Drug Code for each was obtained from Truveen Health Analytic's RED BOOK database.[24]

Encounters were measured by the proportion of children with at least one encounter and the mean number of encounters per child. Encounters were included in the sample if they contained one of the relevant ICD-9 diagnosis codes and were of one of the following types: psychiatric services, physician office, emergency department, and inpatient hospital. Psychiatric services encounters were defined as having MAX type of service code of 53 ("Psychiatric Services Excluding Adult Day Care") and were comprised of outpatient psychotherapeutic services not provided by a physician. Physician office encounters were identified by MAX type of service code 8 ("Physicians") and place of service code 11 ("Office") and included services such as diagnosis, medication management, and care of comorbidities. Emergency department encounters were identified as encounters with place of service code 23 ("Emergency Room – Hospital) and inpatient encounters as those with MAX type of service code 1 ("Inpatient Hospital").

Analyses

Pre-post inferential tests were performed which compared changes in the utilization measures between the TexKat and control groups. In addition to all drugs, the medication analysis analyzed outcomes by drug class: stimulants, antidepressants, mood stabilizers, antipsychotics, sedatives and hypnotics, anxiolytics, and miscellaneous. The encounter analysis was performed by encounter type.

The analysis was performed in Stata 14.1.[25] Approval for this study was received from the University of South Florida Institutional Review Board.

Results

Table 1 summarizes the demographic and diagnostic characteristics of the TexKat and control groups. The groups had a similar gender composition with roughly 30% female. Likewise the age distributions were similar, as roughly two-thirds of the children in each group were ages 10 through 18. However, the racial/ethnic composition differed considerably across the groups. While the TexKat group was over 90% black, the two LA groups were less than half of that percentage while the TX group was less than one-quarter. To account for this discrepancy, in addition to the analyses below of all children in the groups, another set of analyses were performed that limited the samples to black children. The results were largely unchanged and are available in the appendix.

The percentage of children with hyperkinetic syndrome of childhood ranged from approximately 70 to 80% across the four groups. Two notable contrasts across the groups were the relatively high percentages of disturbance of conduct NEC in the TexKat group and depression in the TX group.

Medications

The proportions of children who received at least one prescription are reported in Table 2. The rows detail the medication class, while the column sets correspond to the group. For instance, for all medications, .578 of the children in the TexKat group had a prescription filled in 2005H1 while .384 had a prescription filled in 2006H1, resulting in a change of −.194. The corresponding change in the LA-Disaster counties was −.123. The p-value of a test of equivalence of the TexKat and LA-Disaster changes was less than .001.

The 2005H1 proportions by medication class were relatively similar across the TexKat and control groups. The vast majority of 2006H1 proportions were smaller than the respective 2005H1 proportions, likely reflecting general treatment attrition.[26] However, the decreases in 2006H1 were generally significantly larger for the TexKat group. In the all medications group, the TexKat drop was anywhere from 50% to 300% greater than for the control group, with p-values of .001 or less. This pattern was present for stimulants, antidepressants, mood stabilizers, and antipsychotics. The proportion of children who had a filled prescription for an antidepressant fell by over 60%. Antidepressant usage was relatively widespread across diagnoses, with the proportion of children with an antidepressant prescription ranging from .12 for hyperkinetic to .50 for schizophrenia.

Table 3 assesses medication utilization via the mean number of days supply. The structure of the table is similar to Table 2. For instance, across all medications, the mean days supply for the TexKat group was 105.8 in 2005H1 and 63.0 in 2006H1, resulting in a drop of 42.8 days. For all medications, the decreases ranged from approximately twice to four times as large and were all statistically significantly. As was the case for the proportions in Table 2, for stimulants and antidepressants the 2005H1 TexKat values were somewhat less than those of the control groups while the drops were larger. The results by medication class were relatively consistent with those in Table 2, except for mood stabilizers for which the decreases were not statistically significantly different for the LA-Disaster and TX groups.

Encounters

Table 4 features the proportion of children who had at least one encounter and follows the structures of Tables 2 and 3. A different picture emerged for encounters relative to medications. For psychiatric services, the drop for the TexKat group was smaller than the drops for the two LA groups, albeit not statistically significantly smaller. Further, the 2005H1 and 2006H1 proportions for TX were much greater than those in the other groups. By contrast, the decrease in the TexKat physician office proportion differed statistically from the decreases in the control groups. The mean number of encounters per child are shown in Table 5. The TexKat increase in psychiatric services was much less than those in the LA-Disaster and TX groups while the decrease is physician office encounters was significantly greater than in the control groups.

Discussion

The results indicated that many children with pre-existing mental health conditions who were displaced by Katrina may have suffered a disruption in their medication treatments. Both in terms of the proportion of children with a filled prescription and average days supply, the TexKat group experienced significantly larger drops than the control groups. Both the proportion of children who had at least one prescription of any medication filled and the average days supply fell by roughly a third. Further, the decreases in both measures were larger for the TexKat group than the control groups for the two largest drug classes: stimulants and antidepressants.

However, an interesting divergence emerged in the findings for encounters. In regards to psychiatric services, the proportion decrease in the TexKat group was nominally less than in the LA groups and similar to that of the TX group. The mean number of encounters for this type increased for the TexKat group from 2005H1 to 2006H1. By contrast, the decrease in the mean number of physician office encounters for the TexKat group was greater than for the control groups.

Potential explanations for our results other than Hurricane Katrina were investigated. One possible cause was differences in drug coverage between Medicaid in Louisiana and Texas. For instance, higher co-pays in Texas relative to Louisiana could have caused a drop in utilization when children were displaced to Texas. However, in 2006 Louisiana Medicaid had co-pays ranging from $0.50 to $3 per prescription, while Texas Medicaid did not have any.[27] Another difference that could have potentially explained the larger drops for the TexKat group was differences in formularies. If the Texas formulary was more restrictive than Louisiana's, the larger drops could have been due to a decreased availability of covered medications. However, the analysis above was based on the Texas formulary, so that any medications only available in Louisiana were not included in the analysis and thus could not have caused the larger drops in the TexKat group.

Another possible cause outside of Katrina for the larger TexKat medication decreases was differences in physician prescribing behavior. For instance, the larger drops in the TexKat group may have reflected that Texas physicians generally prescribed less medications that those in Louisiana. However, the somewhat similar 2005H1 medication proportions across

the LA and TX control groups provided indirect but arguably weak evidence that state-level physician prescribing behavior differences were not responsible for the larger decreases in the TexKat group.

While we can't preclude all other potential causes for our findings, it seems likely that that the direct and indirect effects of Katrina were largely responsible. For instance, treatment was likely disrupted for some children due to encountering a new environment. The larger drops could have been due to difficulties faced by families in getting prescriptions filled. While the psychiatric services encounter results suggested that TexKat did an admirable job at assisting families, the medication results suggest that families may have been unfamiliar with pharmacy options and unable to get their prescriptions filled.

Further, providers who were relatively unfamiliar with TexKat children may have been less likely to prescribe medications. If caregivers were unable to specify their child's treatment regimen while in Louisiana, Texas providers may have withheld or reduced medications until they became more familiar with the child's needs. Even if a treatment history was available, Texas providers may have chosen to observe the child for a period before prescribing medications.

Finally, families displaced by Katrina faced daunting emotional and logistical challenges. These families were uprooted from their homes and communities and had to establish new social, cultural, and financial connections in their new environments. It is understandable that some families may have found it impossible to perfectly adhere to medications for their children.

Given the uncertainty regarding the precise cause or causes of the discrepancy in medication utilization between the TexKat and control groups, it is difficult to precisely identify changes to future disaster responses that would avoid similar outcomes. Further, it is unlikely that a single "magic bullet" exists that would eliminate the problem. However, given that communication is common to the many of the potential causes outlined above, outreach efforts could be very effective. For instance, public health officials could provide special guidance to providers noting the logistical issues faced by disaster victims and that they should make special efforts to ensure that any prescriptions they write get filled in a timely manner. Additionally, public service announcements and other marketing could be directed at parents of displaced children. Given the many challenges they face in the aftermath of a disaster, information provided to help them obtain medications for their children could provide significant results.

This study has several strengths. First, the topic of mental health utilization by children after disasters is understudied yet crucially important, especially given the challenging circumstances in those environments. Also, the claims data employed provides more detail and accuracy than survey data. By limiting the analyses to children with pre-existing conditions, the results do not conflate the effects of utilization by children who developed conditions only after the storm. The pre-post analysis of changes in utilization controls for differences in levels and provides a more accurate estimate of the potential effect of the

disaster. Finally, mental health utilization is a key aspect of disaster response that can have far-reaching effects.

However, several limitations should be noted. While the control groups provide insight rarely found in disaster studies, the displacement status was not randomly assigned and thus causal inference is not possible. There are likely unobservable characteristics correlated with displacement that prevent a causal interpretation of the differences in utilization.

Also, there were likely significant systemic differences between Louisiana and Texas that impacted the pre-post changes we estimated. The two states may have varied in physician practice, Medicaid reimbursement, and other aspects in ways that could have influenced diagnosis, prescription, and service provision. These variations may partially explain, for instance, the larger percentages in Texas of children diagnosed with depressions, bipolar illness, and PTSD shown in Table 1 or the prescription rates shown in Table 2. These differences imply that the pre-post changes for TexKat children may have been partially influenced by non-Katrina factors. For instance, the decrease in the proportion of children with a physician office visits for the TexKat group may be at least partially due to pre-existing interstate differences as evidenced by the relatively low Texas rate in 2005H1. Unfortunately, our data do not allow us to isolate the impact of these differences.

Further, while claims data potentially improve upon survey data, they are imperfect. Given Medicaid is operated at the state level, data recording differences may be present across Louisiana and Texas. However, that concern is somewhat mitigated as the data are processed by the federal government prior to release to researchers. There may also be errors in the 2006 data due to the aftermath of Katrina. However, the exclusion of data for more than four months after the storm lessens possible contamination. Also, the data only represent fee-for-service (FFS) claims. While Louisiana Medicaid was almost entirely on a FFS basis, urban Texas areas were served by managed care organizations (MCOs). Thus, the estimates may suffer from sample selection bias if the children in MCO plans significantly differ from children in FFS regions. However, the TexKat waiver provided coverage on a FFS basis and thus the claims for the TexKat group should be relatively complete. Finally, the average days supply outcome used here is an imperfect measure of therapy duration.

Conclusions

The courage and resourcefulness of responders to Hurricane Katrina's devastating impact was remarkable. Despite those efforts, victims faced hardships that they were unable to overcome. This study found that while displaced children with pre-existing mental health conditions generally appeared to have maintained the number of encounter visits after the storm, their rate of medication utilization dropped relative to control groups. The findings suggest potential benefits of a greater emphasis on ensuring that psychotropic medications are available to disaster victims with mental health conditions.

Supplementary Material

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Disclosures and Acknowledgements:

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Table 1

Demographic and diagnositic characteristics of the TexKat and Control Groups

| Characteristic | TexKat | | Control groups | | | | | |
| | | | LA-Disaster | | LA-Nondisaster | | TX | |
	N	%	N	%	N	%	N	%
Total	536		26,097		16,028		59,289	
Gender								
Female	165	30.8	8,033	30.8	5,007	31.2	20,113	33.9
Male	371	69.2	18,062	69.2	11,020	68.8	39,176	66.1
Unknown	0	.0	2	.0	1	.0	0	.0
Age								
0–4	7	1.3	409	1.6	313	2.0	1,893	3.2
5–9	176	32.8	7,592	29.1	4,660	29.1	18,483	31.2
10–14	237	44.2	11,854	45.4	7,293	45.5	25,028	42.2
15–18	116	21.6	6,242	23.9	3,762	23.5	13,885	23.4
Race / Ethnicity								
Black	496	92.5	11,545	44.2	6,695	41.8	12,144	20.5
White	24	4.5	13,130	50.3	8,319	51.9	17,536	29.6
Hispanic	11	2.1	84	.3	94	.6	27,484	46.4
Asian	2	.4	26	.1	24	.1	131	.2
Other	3	.6	1,312	5.0	896	5.6	1,994	3.4
Diagnoses								
Bipolar	18	3.4	841	3.2	349	2.2	5,865	9.9
Other nonorganic psychoses	17	3.2	582	2.2	329	2.1	1,413	2.4
Pervasive developmental disorders	17	3.2	868	3.3	508	3.2	2,880	4.9
PTSD	10	1.9	195	.7	169	1.1	3,578	6.0
Disturbance of conduct NEC	113	21.1	3,471	13.3	2,034	12.7	9,045	15.3
Hyperkinetic syndrome of childhood	392	73.1	21,285	81.6	12,796	79.8	41,600	70.2
Schizophrenia	4	.7	215	.8	109	.7	619	1.0
Depression	75	14.0	3,732	14.3	2,438	15.2	15,412	26.0

Table 2

Change in the proportion of children who received at least one prescription for the TexKat and control groups.

| Medication class | TexKat (N=536) | | | Control groups | | | | | | | | | | | |
| | | | | LA-Disaster (N=26,097) | | | | LA-Nondisaster (N=16,028) | | | | TX (N=59,289) | | | |
	2005H1[a]	2006H1[b]	Change	2005H1[a]	2006H1[b]	Change	p[c]	2005H1[a]	2006H1[b]	Change	p[d]	2005H1[a]	2006H1[b]	Change	p[e]
All	.578	.384	−.194	.668	.545	−.123	<.001	.630	.534	−.095	.001	.645	.586	−.058	<.001
Stimulants	.424	.291	−.132	.496	.402	−.094	.050	.452	.379	−.073	.001	.423	.370	−.052	<.001
Anitdepressants	.147	.054	−.093	.147	.110	−.037	<.001	.155	.128	−.027	<.001	.197	.172	−.025	<.001
Mood stabilizers	.104	.071	−.034	.086	.078	−.008	.020	.074	.070	−.004	.004	.149	.146	−.003	.015
Antipsychotics	.073	.041	−.032	.060	.049	−.011	.027	.066	.058	−.008	.019	.145	.151	.006	.004
Sedatives and hypnotics	.049	.032	−.017	.052	.046	−.006	.367	.054	.047	−.006	.374	.086	.077	−.009	.580
Anxiolytics	.015	.011	−.004	.017	.017	−.001	.631	.014	.013	−.001	.678	.024	.026	.003	.393
Miscellaneous	.069	.065	−.004	.091	.083	−.008	.714	.078	.074	−.004	.974	.103	.100	−.003	.982

[a] January 2005 - June 2005.

[b] January 2006 - June 2006.

[c] p-value of a test of the equivalence of the change in proportions for the TexKat group and the LA disaster counties control group. df=26,631.

[d] p-value of a test of the equivalence of the change in proportions for the TexKat group and the LA non-disaster counties control group. df=16,562.

[e] p-value of a test of the equivalence of the change in proportions for the TexKat group and the Texas control group. df=59,823.

Table 3

Change in the mean days supply per child for the TexKat and control groups.

Medication class	TexKat (N=536)			LA-Disaster (N=26,097)				Control groups							
								LA-Nondisaster (N=16,028)				TX (N=59,289)			
	2005H1[a]	2006H1[b]	Change	2005H1[a]	2006H1[b]	Change	p[c]	2005H1[a]	2006H1[b]	Change	p[d]	2005H1[a]	2006H1[b]	Change	p[e]
All	105.8	63.0	−42.8	122.6	100.1	−22.5	<.001	114.3	101.0	−13.3	<.001	163.5	150.4	−13.0	<.001
Stimulants	45.9	28.1	−17.8	61.6	50.3	−11.3	0.019	55.7	48.5	−7.2	<.001	54.2	48.1	−6.1	<.001
Anitdepressants	15.1	5.0	−10.1	15.5	11.6	−3.9	<.001	17.0	13.8	−3.2	<.001	23.8	20.7	−3.1	.001
Mood stabilizers	11.3	8.3	−3.0	10.5	9.3	−1.2	.188	9.4	9.4	.0	.030	22.0	21.5	−.5	.204
Antipsychotics	10.2	5.7	−4.5	7.1	5.9	−1.2	.007	8.0	7.3	−.7	.005	20.8	21.7	.9	.008
Sedatives and hypnotics	2.9	1.7	−1.2	2.5	2.3	−0.2	.187	2.5	2.3	−.2	.147	7.2	6.6	−.7	.680
Anxiolytics	.8	.9	.1	1.2	1.1	−0.1	.737	.9	.8	−.1	.641	1.9	2.1	.2	.839
Miscellaneous	6.9	5.8	−1.1	10.2	9.5	−.6	.713	9.0	8.8	−.2	.453	12.6	12.5	−.1	.481

[a] January 2005 - June 2005.

[b] January 2006 - June 2006.

[c] p-value of a test of the equivalence of the change in mean days supply for the TexKat group and the LA disaster counties control group. df=26,631.

[d] p-value of a test of the equivalence of the change in mean days supply for the TexKat group and the LA non-disaster counties control group. df=16,562.

[e] p-value of a test of the equivalence of the change in mean days supply for the TexKat group and the Texas control group. df=59,823.

Table 4

Change in the proportion of children who had at least one encounter for the TexKat and control groups.

| | TexKat (N=536) | | | Control groups | | | | | | | | | | | |
| | | | | LA-Disaster (N=26,097) | | | | LA-Nondisaster (N=16,028) | | | | TX (N=59,289) | | | |
Encounter type	2005H1[a]	2006H1[b]	Change	2005H1[a]	2006H1[b]	Change	p[c]	2005H1[a]	2006H1[b]	Change	p[d]	2005H1[a]	2006H1[b]	Change	p[e]
Psychiatric services	.201	.162	−.039	.170	.120	−.050	.533	.217	.159	−.057	.319	.547	.543	−.004	.103
Physician office	.351	.157	−.194	.430	.353	−.077	<.001	.411	.336	−.075	<.001	.168	.149	−.019	<.001
Emergency department	.028	.030	.002	.024	.023	−.001	.710	.027	.024	−.002	.666	.020	.020	.000	.796
Inpatient	.028	.017	−.011	.020	.018	−.001	.222	.024	.024	.000	.203	.034	.034	.000	.284

[a] January 2005 - June 2005.

[b] January 2006 - June 2006.

[c] p-value of a test of the equivalence of the change in proportions for the TexKat group and the LA disaster counties control group. df=26,631.

[d] p-value of a test of the equivalence of the change in proportions for the TexKat group and the LA non-disaster counties control group. df=16,562.

[e] p-value of a test of the equivalence of the change in proportions for the TexKat group and the Texas control group. df=59,823.

Table 5

Change in the mean encounters per child for the TexKat and control groups.

Encounter type	TexKat (N=536)			LA-Disaster (N=26,097)				Control groups							
								LA-Nondisaster (N=16,028)				TX (N=59,289)			
	2005H1[a]	2006H1[b]	Change	2005H1[a]	2006H1[b]	Change	p[c]	2005H1[a]	2006H1[b]	Change	p[d]	2005H1[a]	2006H1[b]	Change	p[e]
Psychiatric services	.718	.875	.157	.767	1.091	.324	.437	.878	2.021	1.143	.001	3.626	5.641	2.016	<.001
Physician office	.914	.267	−.647	.986	.792	−.194	<.001	.950	.777	−0.173	<.001	.323	.291	−.032	<.001
Emergency department	.062	.050	−.011	.046	.045	−.002	.641	.051	.045	−.006	.792	.025	.026	.001	.322
Inpatient	.037	.019	−.019	.023	.022	.000	.070	.029	.028	−.001	.110	.042	.042	.000	.187

[a] January 2005 - June 2005.

[b] January 2006 - June 2006.

[c] p-value of a test of the equivalence of the change in means for the TexKat group and the LA disaster counties control group. df=26,631.

[d] p-value of a test of the equivalence of the change in means for the TexKat group and the LA non-disaster counties control group. df=16,562.

[e] p-value of a test of the equivalence of the change in means for the TexKat group and the Texas control group. df=59,823.