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Emergency Department Utilization in the Texas Medicaid Emergency Waiver Following Hurricane Katrina

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Objective: To estimate the enrollment and emergency department (ED) utilization in TexKat, the Texas Medicaid emergency waiver implemented following Hurricane Katrina.

Data Sources: Individual-level enrollment and utilization data from the 2005 Medicaid Analytic Extract.

Study Design: Descriptive analysis is performed on variables that describe enrollment levels, the demographic characteristics of enrollees, and the most common diagnoses in ED visits. A Poisson regression model is also employed to quantify the factors related to an enrollee's probability of having an ED visit and the average number of ED visits.

Principal Findings: There were 44,246 individuals enrolled in TexKat in 2005. Roughly 13% of these enrollees had at least one ED visit during the sample period, with one quarter of these individuals having more than one visit. Across all enrollees the most common diagnosis was "other upper respiratory infection," but there were significant differences in diagnosis patterns across racial/ethnic groups. The regression analysis suggests little difference in ED utilization across genders, but significant contrasts across racial/ethnic and age groups.

Conclusions: As very little is known about Medicaid emergency waivers, our analysis may provide important information to policymakers who have to react quickly following a disaster. Our findings may help providers estimate potential increases in ED utilization and prepare for relatively common diagnoses. Furthermore, the analysis across racial/ethnic groups may help government officials identify important areas for outreach among vulnerable populations.

Key words: Medicaid, emergency department, Section 1115 waivers, racial disparities

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Introduction

Section 1115 of the Social Security Act provides the Secretary of Health and Human Services (HHS) relatively broad authority to grant waivers that release states from certain provisions of federal Medicaid law. One type of waiver is an emergency waiver, which has been issued to assist states in quickly providing short-term Medicaid coverage to low-income individuals in emergency situations. Given the vulnerability of this population, and the chaos and negative health effects that often accompany emergencies, these waivers can play a vital role in mitigating the negative consequences of these events. Medicaid is well-suited to provide short-term coverage to low-income individuals, as the administrative structure is already in place and it is oriented to the health needs of the poor (Buck & Kamlet, 1993).

This study analyzes the emergency department (ED) utilization of individuals enrolled in TexKat, a Texas emergency waiver program that provided coverage to individuals affected by Hurricane Katrina. To address the health care needs of these individuals, on September 15, 2005 Texas was granted an emergency waiver by the federal government to provide Medicaid coverage to evacuees (Texas Health and Human Services Commission, 2006). The Deficit Reduction Act of 2005 appropriated $2 billion to Medicaid for certain health care costs related to Hurricane Katrina, including funding the Medicaid expansion as well as an uncompensated care pool for evacuees (GAO, 2007).

This study is unique in that it is, to the authors' knowledge, the first analysis of individual-level claims data from an emergency waiver. Recently available Medicaid claims data allow us to track each enrollee's utilization throughout the first several months of TexKat enrollment under the emergency waiver. This initial period of the waiver is arguably the most important. It is during this period when emergency services are most in demand, when individuals are dealing with the initial trauma of leaving their homes, and when they are least informed about how to obtain health care in their new surroundings.

Medicaid Emergency Waivers and TexKat

Medicaid emergency waivers were used after Hurricane Katrina struck the United States in August 2005. Immediately following Katrina, over 1.5 million individuals evacuated from the Gulf Coast (Groen & Polivka, 2008). Overnight, cities like Houston prepared for the influx of Katrina evacuees and set up temporary shelters that were also equipped to provide medical care. Over 22,000 patients received medical care in Houston-area shelters during the two week period after Katrina (Edwards, Young, & Lowe, 2007; Gavagan et al., 2006; Sirbaugh et al., 2006).

Exhibit 1. TexKat Eligibility, Compared to Louisiana Medicaid and United States Average

Population	TexKat waiver Income as % FPL	Louisiana Medicaid Income as % FPL	U.S. Medicaid, average Income as % FPL
Children	≤ 200%	≤ 200%	≤ 133% (100% kids 6+)
Pregnant women	≤ 185%	≤ 200%	≤ 133%
Parents	≤ 100%	≤ 26%	≤ 68%
Adults without dependent children	Not eligible	Not eligible	Not eligible

Federal Poverty Level (FPL) $16,090 for a family of three in 2005.
SOURCE: TexKat waiver data from GAO Report (GAO, 2007), LA and U.S. data from Kaiser State Medicaid Fact Sheets.

The Centers for Medicare & Medicaid Services (CMS) issued seventeen waivers that allowed states to provide Medicaid coverage to individuals affected by Katrina (Rudowitz & Schneider, 2006). The largest such waiver was implemented in Texas. Known as TexKat, this waiver served almost 60,000 individuals and covered more than $56 million dollars in expenditures (Texas Health and Human Services Commission, 2006). Phase I of the program provided urgent medical care for evacuees while Phase II focused on longer term coverage. TexKat covered a wide range of services, including inpatient and outpatient hospital services, mental health facility services, physician services, and drug prescriptions. Individuals could enroll in TexKat between October 1, 2005 and January 31, 2006 and were eligible for up to five months of Medicaid coverage. Evacuees were eligible to register for Medicaid or CHIP without many of the traditional administrative requirements for verification and enrollment, as they did not have the usual documentation because of the hurricane. Exhibit 1 details the eligibility guidelines for TexKat relative to Louisiana Medicaid and the national average. Almost all of those enrolled in TexKat (97%) were from Louisiana (Texas Health and Human Services Commission, 2006).

Hurricane Katrina evacuees have been found to have significant levels of chronic disease (Brodie, Weltzien, Altman, Blendon, & Benson, 2006; Coker et al., 2006; Kessler, 2007), persistent physical and mental health issues (Mortensen, Wilson, & Ho, 2009), excess morbidity, (Burton et al., 2009) and excess mortality (Stephens et al., 2007). These effects have been largely concentrated in minorities (Adeola, 2009; Lee, Shen, & Tran, 2008; Rhodes et al., 2010). A June 2006 Gallup survey of dislocated individuals in Texas reported that 37% indicated that their current health status was poor or fair, as compared to 20% prior to Katrina (Gallup, 2006). In terms of mental health, 40% responded that their current status was poor or fair while prior to Katrina only 15% rated their status in those categories. The only known analysis of their ED use examined hospital data from Houston, Texas (Mortensen & Dreyfuss, 2008).

Data

The data used in this analysis are from the Medicaid Analytic Extract (MAX) created by CMS. Each state reports their Medicaid data to CMS, who then compiles the data across the various formats and completes various checks to confirm the accuracy of the data. Researchers then must submit a detailed application to request the data, which includes information regarding

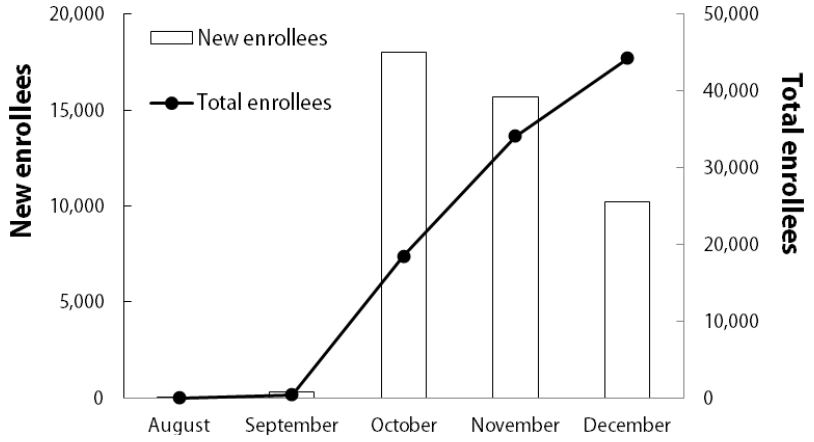
how the data will be used and security measures to be employed. These steps imply that the MAX data are released with a lag of several years, which explains why these data for the TexKat waiver have only recently become available. MAX data traditionally exclude managed care claims; however, all TexKat enrollees were enrolled in fee-for-service Medicaid. A study of mental health service use that used the Texas MAX data found the data have a high quality and completeness score (3.5 out of 4) (Verdier, Cherlow, Mason, Buck, & Teich, 1999).

The sample includes all TexKat enrollees from August through December 2005.[1,2] The MAX enrollment and encounter files are merged to obtain both demographic and utilization data for each enrollee. In the analysis below, we follow the approach outlined in Hennessy et al., (2010) to identify ED visits.[3]

Descriptive Analysis

Exhibit 2 depicts the number of TexKat enrollees by month. While the program initially accepted enrollees in October, retroactive coverage was provided back to August 24, 2005. While the largest number of individuals enrolled was in October, the program continued to expand in November and December.

Exhibit 2. Number of new and total TexKat enrollees by month.



SOURCE: Authors' estimates from 2005 MAX data.

Exhibit 3 details demographic information regarding the enrollees. The data are disaggregated by whether the individual had an ED visit during August through December 2006. Roughly 5,600 of the 44,246 enrollees had at least one ED visit. Approximately six out of every 10 enrollees were female and more than half were younger than 19 years old. The enrollees were overwhelmingly Black, while Whites, Hispanics, and Asians together comprised roughly 12.5% of all enrollees.

Exhibit 3. Demographic characteristics by age group (means, standard deviations in parentheses)

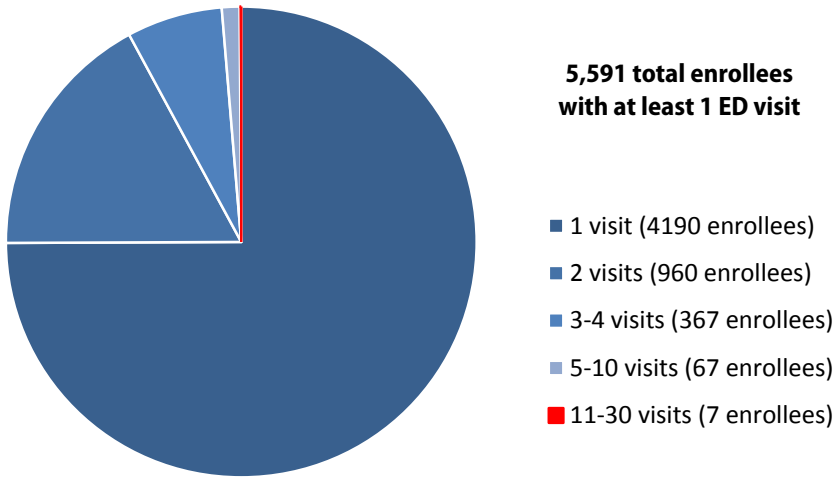
	Enrollees without an ED visit		Enrollees with at least 1 ED visit		All enrollees	
	Count	Percent	Count	Percent	Count	Percent
Total	38,667	100.0%	5,579	100.0%	44,246	100.0%
Gender						
Female	23,170	59.9	3,586	64.3	26,756	60.5
Male	15,497	40.1	1,993	35.7	17,490	39.5
Age group						
00-08	10,691	27.6	1,458	26.1	12,149	27.5
09-18	10,526	27.2	751	13.5	11,277	25.5
19-34	9,192	23.8	1,538	27.6	10,730	24.3
35-64	8,258	21.4	1,832	32.8	10,090	22.8
Race						
Black	33,303	86.1	4,954	88.8	38,257	86.5
White	1,917	5.0	371	6.6	2,288	5.2
Hispanic	1,221	3.2	137	2.5	1,358	3.1
Asian	1,807	4.7	89	1.6	1,896	4.3
American Indian	308	0.8	22	0.4	330	0.7
Unknown	111	0.3	6	0.1	117	0.3
Enrolled in LA Medicaid in 2005						
Yes	17,844	46.1	2,154	38.6	19,998	45.2
No	20,823	53.9	3,425	61.4	24,248	54.8

SOURCE: Authors' estimates from 2005 MAX data.

There are indications of differences across enrollees who had and who did not have an ED visit. Relative to those who did not have an ED visit, those who did were more likely to be female, aged 35-64, and be Black or White. These differences are explored in greater detail in the regression analysis below.

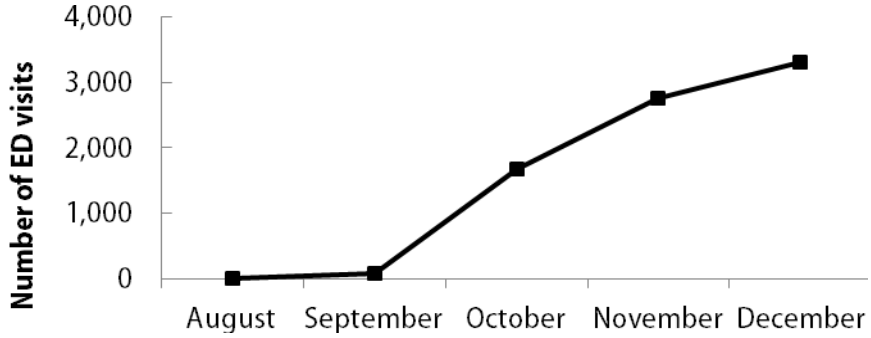
The number of ED visits for those enrollees who had at least one visit is detailed in Exhibit 4. Three quarters of these enrollees had only one visit, with roughly 17% having two visits. Of the 5,591 enrollees with at least one visit, over 1% had five or more. Exhibit 5 displays the number of ED visits over time. While Exhibit 2 indicates a decline in new enrollments in December, Exhibit 5 suggests that there was only a slight decrease in the rate of increases in ED visits.

Exhibit 4. Number of emergency department visits for those enrollees with at least one visit.



SOURCE: Authors' estimates from 2005 MAX data.

Exhibit 5. Number of emergency department visits by month.



SOURCE: Authors' estimates from 2005 MAX data.

The diagnoses from the ED visits are summarized in Exhibit 6. These diagnoses groups are based on the Clinical Classifications Software (CCS). CCS is a diagnosis and procedure categorization scheme developed and sponsored by the Agency for Healthcare Research and Quality (AHRQ). It collapses codes into a manageable number of clinically meaningful categories. Some of the visits included multiple diagnoses, thus there are more diagnoses than ED visits. The groups listed in Exhibit 6 are the top 10 across all enrollees. For comparison purposes, the numbers of these diagnoses are also listed for Blacks and Whites. The top three diagnoses were other upper respiratory infection, abdominal pain, and fever of unknown origin.

Exhibit 6. Most common diagnoses.

	All enrollees		Blacks		Whites	
Description	Count	Percent	Count	Percent	Count	Percent
Other upper respiratory infection	717	7.6	635	7.7	51	7.0
Abdominal pain	394	4.2	346	4.2	20	2.7
Fever of unknown origin	382	4.1	349	4.2	21	2.9
Essential hypertension	375	4.0	352	4.3	9	1.2
Skin and subcutaneous tissue infection	340	3.6	302	3.7	30	4.1
Asthma	303	3.2	282	3.4	13	1.8
Other lower respiratory disease	286	3.0	229	2.8	43	5.9
Otitis media & related conditions	284	3.0	250	3.0	18	2.5
Back problem	260	2.8	197	2.4	53	7.3
Sprain & strain	235	2.5	203	2.5	23	3.2
Other	5,810	61.9	5,072	61.7	448	61.5
Total	9,386	100.0%	8,217	100.0%	729	100.0%

Diagnoses displayed are the top 10 for all enrollees. The top 10 diagnoses for blacks and whites differ slightly.
SOURCE: Authors' estimates from 2005 MAX data.

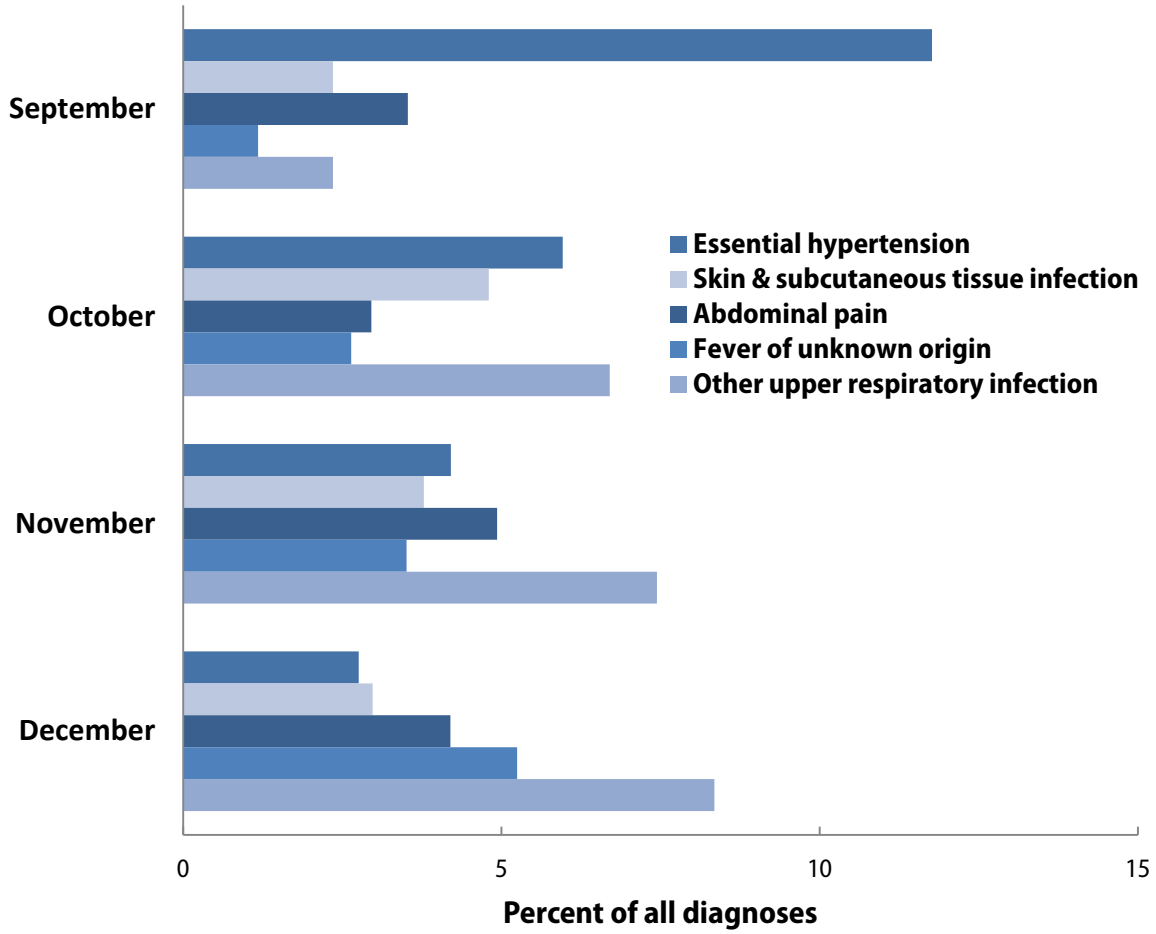
The top 10 diagnosis groups across all enrollees account for slightly less than 40 percent of all diagnoses. Other upper respiratory infection is the most common group by a considerable margin. Many of the groups contain standard ambulatory conditions, such as cough, stomach pain, fever and ear ache. Almost all of the top 10 are similar to those found in a study examining Houston-area hospitals (Mortensen & Dreyfuss, 2008), with repeat prescriptions notably absent in this analysis. Acute bronchitis and urinary tract infection were in the top 10 diagnoses in the Houston-area analysis, but not in this MAX data analysis, whereas essential hypertension, other lower respiratory disease, and sprain and strain are not in the top 10 in the Mortensen & Dreyfuss analysis. The difference in diagnoses could reflect the timing of ED visits, as the majority of visits in the Houston data occurred in September. In the current analysis, the majority of visits occurred in October.

Given the large representation of African Americans among all enrollees, the proportions of diagnoses for all enrollees and Blacks are quite similar. However, interesting differences exist across the proportions for Blacks and Whites. The proportions for abdominal pain, fever of unknown origin, essential hypertension, and asthma are considerably higher for Blacks than Whites. The relationship is reversed for other lower respiratory disease and back problem.

Exhibit 7 details the monthly distribution of the top five diagnoses over the sample period. The total number of diagnoses in September is only 85, so less weight should be placed

on the percentages for that month. However, focusing on the percentages beginning in October, there is a steady increase in fevers and respiratory infections and a decrease in hypertension diagnoses.

Exhibit 7. Number of selected diagnoses by month.



SOURCE: Authors' estimates from 2005 MAX data.

Regression Analysis

The regression analysis investigates the factors related to the frequency of ED visits per enrollee. The sample is the 44,246 TexKat enrollees analyzed in the preceding descriptive analysis. The dependent variable is the number of visits while enrolled in TexKat. Poisson regressions are estimated, in which the number of months enrolled is employed as an offset to account for the varying lengths of enrollment in the waiver.[4]

The explanatory variables in the analysis are the demographic characteristics reported in the MAX data. Specifically, indicator variables are employed that reflect the enrollee's gender

and race/ethnicity. An indicator variable is also included that reflects whether the individual was enrolled in Medicaid previously in 2005. To allow for varying effects by age, the sample is split into roughly quartiles and a separate regression is estimated for each group. Given the binary variables included, the estimates measure the effects of deviations from the baseline case of a Black female not previously enrolled in Medicaid.

Exhibit 8 contains the results from the Poisson regressions. Each column contains the estimates for a different age group. The estimates are the incidence rate ratios, which in the current context measure differences in the rate of the average number of visits per month relative to the baseline case. For instance, the first point estimate for the 0-8 age group indicates that a Black male not previously enrolled in Medicaid has, on average, roughly 1.02 times the rate of average visits than a Black female not previously enrolled in Medicaid.

Exhibit 8. Poisson regression estimates using number of visits as dependent variable.

Explanatory Variable	Incidence Rate Ratios			
	0 - 8 years	9-18 years	19-34 years	35-64 years
Number of observations	12,149	11,277	10,730	10,090
Gender (male)	1.019	0.867	0.876*	1.023
	(0.063)	(0.080)	(0.061)	(0.067)
White	1.111	1.252	1.100	1.303*
	(0.139)	(0.233)	(0.126)	(0.177)
American Indian	0.714	0.097**	0.561	0.285***
	(0.234)	(0.097)	(0.263)	(0.116)
Asian	0.355***	0.194***	0.188***	0.315***
	(0.096)	(0.062)	(0.052)	(0.057)
Hispanic	0.722*	0.972	0.320***	0.760*
	(0.137)	(0.221)	(0.078)	(0.107)
Unknown race	0.584	0.000003***	0.399	0.0000002***
	(0.248)	(0.000)	(0.380)	(0.000)
Previously enrolled in LA Medicaid	0.883**	1.989***	1.145**	0.525***
	(0.054)	(0.188)	(0.066)	(0.045)

***p<0.01, **p<0.05, *p<0.10

The estimates above are based on a Poisson regression where the dependent variable is the number of emergency department visits and the number of months in TexKat is used as the offset variable. The top number in each cell is the incidence rate ratio and the bottom number is the clustered standard error.

SOURCE: Authors' estimates from 2005 MAX data.

The first row of Exhibit 8 indicates that while gender generally does not have a statistically significant association with the rate of emergency department visits, the estimates for the middle two age groups are of a relatively large absolute magnitude. The estimates for Whites are all larger than 1, indicating that Whites generally have a higher rate of ED visits, especially for the 35-64 age group. However, the largest differences exist for the other three

racial/ethnic groups. The estimates for American Indians are based on a relatively small number of observations and should probably be discounted. However, the estimates for Asians and Hispanics are based on larger groups and thus the findings of their lower rates of ED visits have credence.[5]

The next to last row of Exhibit 8 contains interesting findings in regard to the effects of previous Medicaid enrollment. All of the estimates are statistically significant, yet the magnitudes vary significantly by age group. Previous enrollment is associated with lower rates of ED visits for the youngest and oldest cohorts, while it is associated with higher rates for the middle two cohorts.

Discussion

To the authors' knowledge, this study is the first analysis of a Medicaid emergency waiver using individual-level claims data. The scope of Hurricane Katrina and the affected populations make this waiver an important example in which to attempt to gain insight into the characteristics of the individuals and the ailments that they presented. Further, ED utilization is especially important given the disruptions in provider networks for displaced individuals.

We find that enrollment was limited in the month immediately following Katrina, but then increased dramatically thereafter. In our sample period, roughly 13% of all enrollees had at least one ED visit and the most common diagnosis was other upper respiratory infections. Interesting differences in diagnostic patterns exist across Blacks and Whites, where asthma was more common among Blacks and back problems were more common among Whites. Our regression analysis indicates similar utilization levels across genders, but significant differences across racial/ethnic and age groups and depending on whether the individual was previously enrolled in Medicaid in that year.

The literature on ED utilization after Katrina is scant and limited to the Mortensen & Dreyfuss analysis of the effect of evacuees on EDs in the Houston-area. Their analysis used hospital administrative data from 25 of the 37 EDs in Harris County. The current analysis complements the Mortensen & Dreyfuss analysis in many respects. The current analysis documents the ED utilization patterns of all evacuees in the state of Texas, rather than only Houston, and uses the Clinical Classification Software used by AHRQ, rather than only primary diagnosis. Mortensen & Dreyfuss identified evacuees by patient ZIP Code, whereas the current analysis uses Medicaid enrollment data with a flag indicating TexKat enrollment.

Several interesting comparisons with the previous study are worth noting. The Mortensen & Dreyfuss analysis documents that the majority of the ED visits took place in September, immediately follow Katrina. The claims data used in the current analysis document relatively few ED visits in September. This is likely a reflection of a combination of reimbursement strategy, delayed enrollment into TexKat, and other factors. The $2 billion

allocated to health care spending in the wake of Katrina included funds to reimburse providers for uncompensated care costs. Although enrollment in TexKat was retrospective, it could be that evacuees delayed their enrollment in TexKat, so their ED services may have initially been reimbursed with these more general uncompensated care funds. The differences in utilization between the administrative datasets suggest that one dataset alone does not provide a comprehensive picture of ED utilization in the wake of a hurricane. Another contributing factor is that following the hurricane, more basic needs took precedence over health insurance. Immediate medical needs were met at the emergency shelters, so the need for health insurance coverage was not immediately necessary. Processing delays might also account for some of the delays in enrollment.

There are several limitations to this paper. As the discussion above suggests, administrative claims data are imperfect. For instance, the Texas MAX data include both procedure and revenue code fields. However, for records where the procedure coding system is listed as ICD-9-CM, the procedure code field is populated with revenue code data, while the revenue code field consists of the value "8888" for all observations. This issue has been noted elsewhere (Verdier et al., 1999). Therefore, for these records it is not possible to determine the procedures provided; thus, our analysis relies exclusively on diagnosis data.[6] Another limitation is that we are not able to calculate a positive predictive value, or precision rate, for the proportion of enrollees correctly allocated a diagnosis as we lack a "gold standard" dataset to use to compare sensitivity (see, for example, Koroukian, Cooper, & Rimm, 2003). Differential diagnostic misclassification is possible in this setting and could bias our results. For instance, Vernacchio et al., (2004) find that black and Asian infants are less likely to be diagnosed with otitis media than White children. Such under-reporting for non-White groups can bias our non-White estimates downwards. Lastly, claims data are not a rich source of contextual data, so it is not possible to delve deeper into a better understanding of differential rates across race and ethnicity.

Emergency Medicaid waivers are not without critics. As Exhibit1 demonstrates, populations who do not fall under traditional (pre Patient Protection and Affordable Care Act) eligibility categories, such as childless adults, were excluded from the waiver. Other concerns include different eligibility rules across states, resulting in confusion, and that the waivers provide no guarantee of full federal funding for states serving evacuees (Park, 2005). Some have argued that a national public program with rules that are federally administered and uniform nation-wide (such as Medicare) is better suited, particularly for multi-state emergencies (Calicchia , Greene, Lee, & Warner, 2005).

Nevertheless, our results may assist policymakers in future Medicaid emergency waivers. For instance, our findings may help providers estimate potential increases in ED utilization and prepare for relatively common diagnoses. Additionally, the analysis across racial/ethnic groups may help government officials identify important areas for outreach among certain populations.

Further research could add additional insight into Medicaid emergency waivers. Analyses of other service settings could provide additional guidance as to where waiver enrollees obtain care. When the data become available, the analysis in this paper could be extended to the entire waiver period to obtain a complete picture of utilization.

Endnotes

[1] As noted above, TexKat coverage lasted through June 2006. However, the 2006 data were not available at the time of this analysis. As such, our analysis can be considered as focused on ED utilization in the months immediately following Katrina.

[2] Individuals for whom gender was reported as unknown are excluded from the analysis. These cases represented 8 of the 44,429 total enrollees.

[3] Specifically, we use the following criteria: CPT procedure codes 99281-99285, 99288, 99291, and 99292; HCPCS codes G0380-GO384 and G8354; place of service code 23; and UB92 revenue codes 450-452, 456, 459, and 981.

[4] Tobit regressions were also estimated in which the dependent variable is the average number of visits per month enrolled. Those results are very similar to those described below.

[5] There are very few observations for which the race is unknown, thus those estimates are included only for completeness.

[6] However, for those records listed as ICD-9-CM we were able to identify ED visits by using the revenue codes listed in the procedure code.

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Disclosures
This project has been approved by the Centers for Medicare & Medicaid Services Privacy Board; Data Use Agreement number 20696.

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