

The Health Effects of Disasters on Children and Seniors: Evidence from Hurricane Katrina

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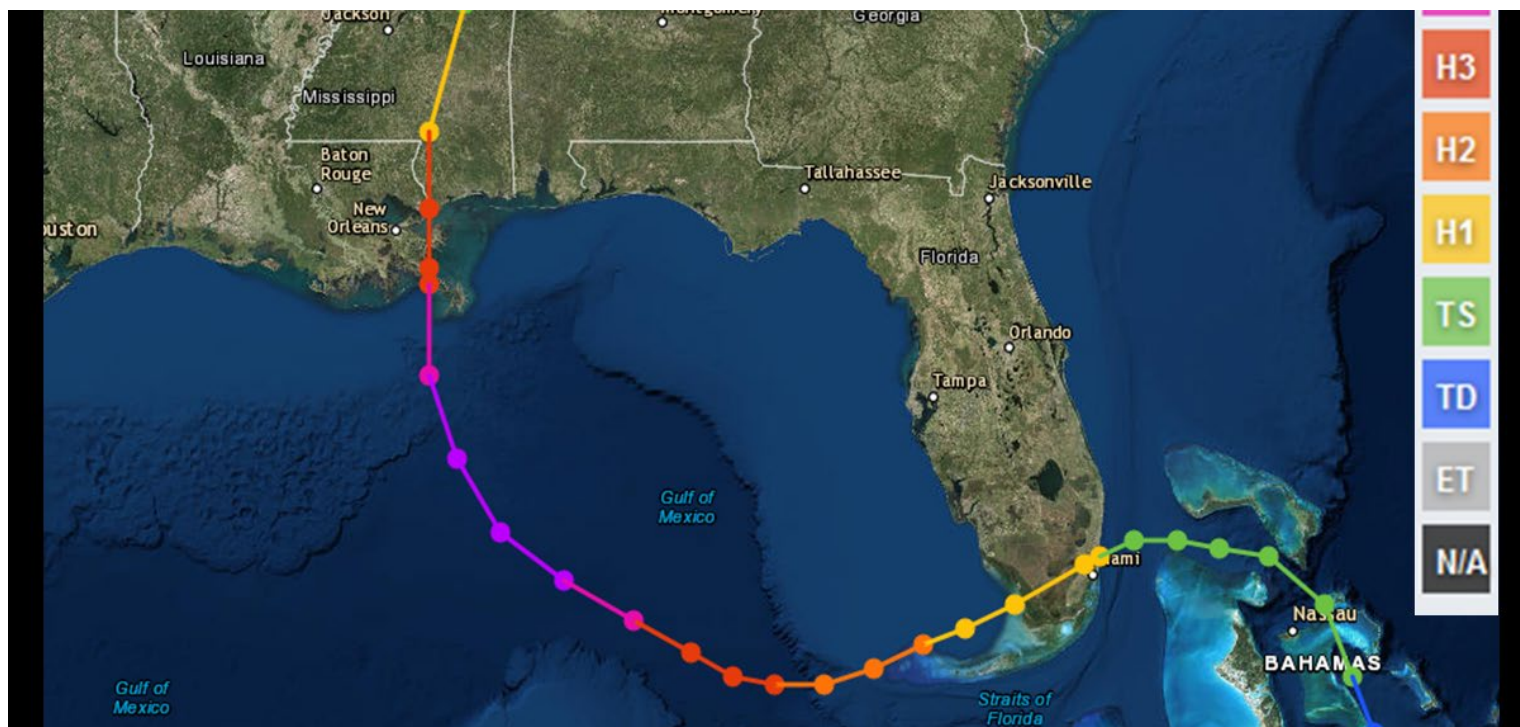
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Acknowledgements

- Children analyses
 - Supported by the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health under award number R03HD079758. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
- Seniors analyses
 - Supported by the National Institute on Aging of the National Institutes of Health under award number R03AG050065. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

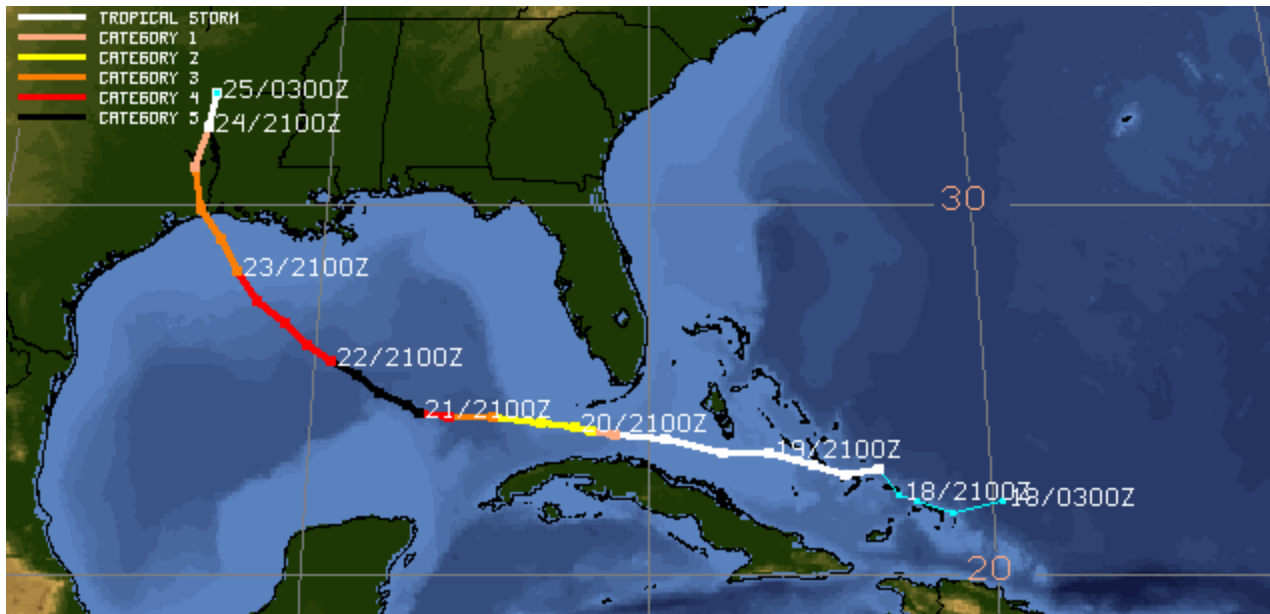
Background - Katrina

- Summer 2015
- Over 1800 people killed (top 5)
- Property damage in excess of \$80b (costliest)



Background - Rita

- ~4 weeks after Katrina
- Roughly 125 people killed
- Property damage ~\$18b



Background

- Previous research on health effects of Katrina & Rita
 - Emphasis on short-term effects
 - Much on access, some on outcomes
 - Vast majority survey-based
- General findings
 - Increased rates of acute & chronic conditions
 - Barriers to access

Background

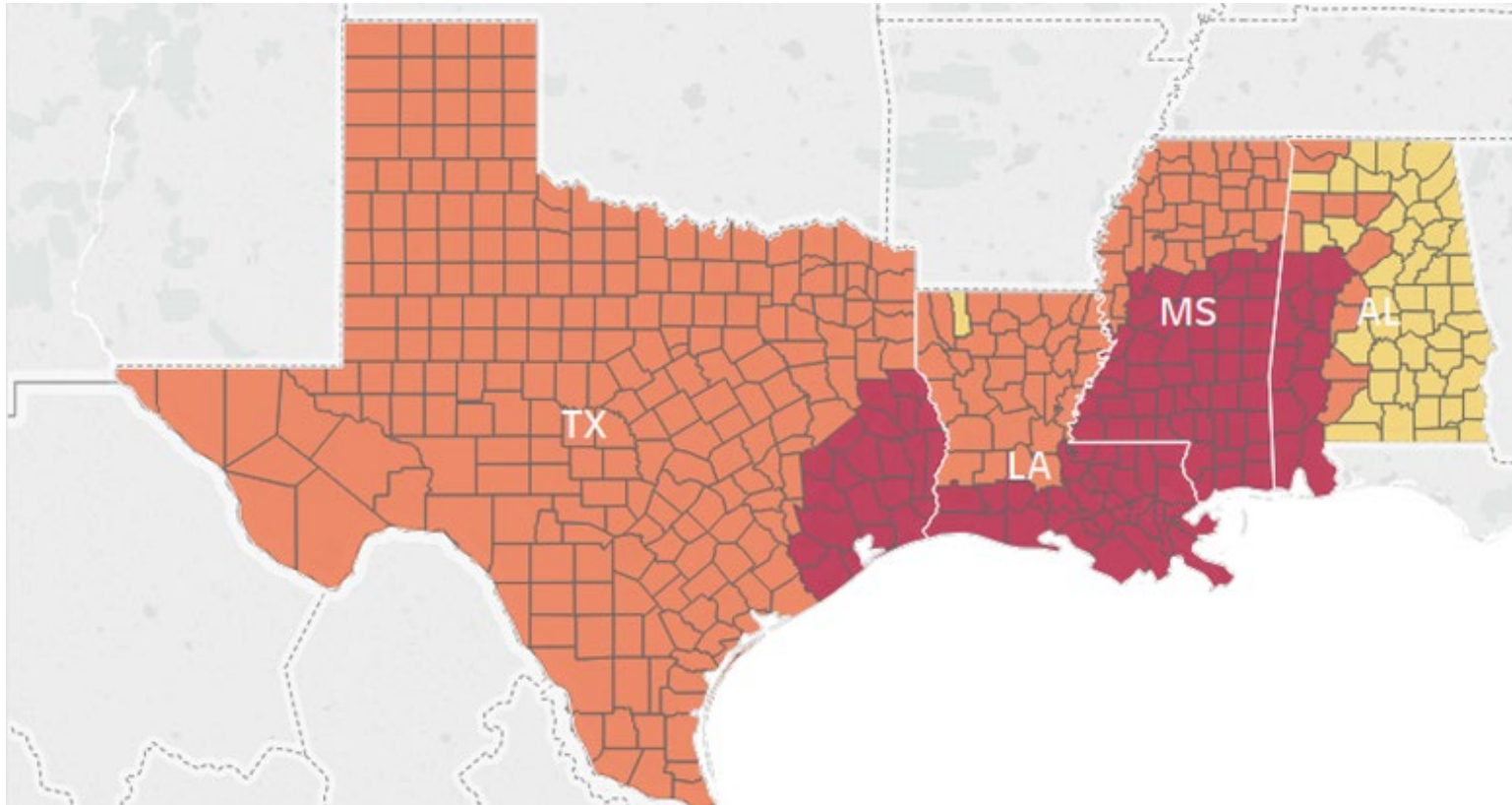
- My projects
 - Children
 - Investigate children enrolled in emergency Medicaid waiver (TexKat)
 - Diabetes, asthma, mental health
 - Seniors
 - Those with diabetes
 - Maintenance screenings, ED visits & hospitalizations, mortality

Data

- Medicaid & Medicare data
 - Enrollment
 - Claims
 - Co-morbidities
 - Mortality

Data

- Define affected & control subjects by
 - County-level FEMA assistance level
 - State of residence (2004)



Children: Diabetes

- Citation
 - “Diabetes Care Provided to Children Displaced by Hurricane Katrina” (w Karoline Mortensen). *Disaster Medicine and Public Health Preparedness*. 2015;9(5):480–483.
- Screenings analyzed
 - HbA1C, Microalbumin, Thyroid
- Complication analyzed
 - DKA diagnosis
- Time periods
 - Pre-Katrina: Jan 2004 – Aug 2005
 - TexKat: Sep 2005 – Jun 2006
 - Post-TexKat: Jul 2006 – Dec 2006

Children: Diabetes

TexKat (n=43)	Control (n=742)	Diff
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HBA1C test

Prior to Katrina	0.31	0.31	0.00
During TexKat	0.45	0.45	0.00
Post TexKat	0.42	0.61	-0.19

Microalbumin test

Prior to Katrina	0.11	0.09	0.03
During TexKat	0.14	0.10	0.04
Post TexKat	0.09	0.13	-0.04

TexKat (n=43)	Control (n=742)	Diff
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Thyroid test

Prior to Katrina	0.22	0.24	-0.01
During TexKat	0.31	0.26	0.05
Post TexKat	0.28	0.32	-0.04

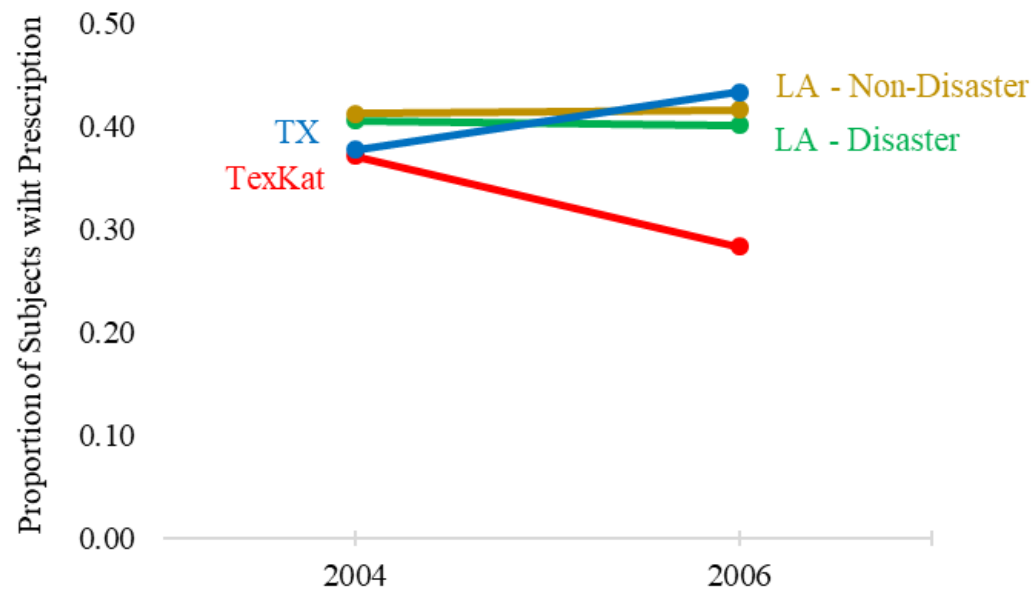
DKA diagnosis

Prior to Katrina	0.07	0.07	0.00
During TexKat	0.11	0.09	0.02
Post TexKat	0.14	0.09	0.05

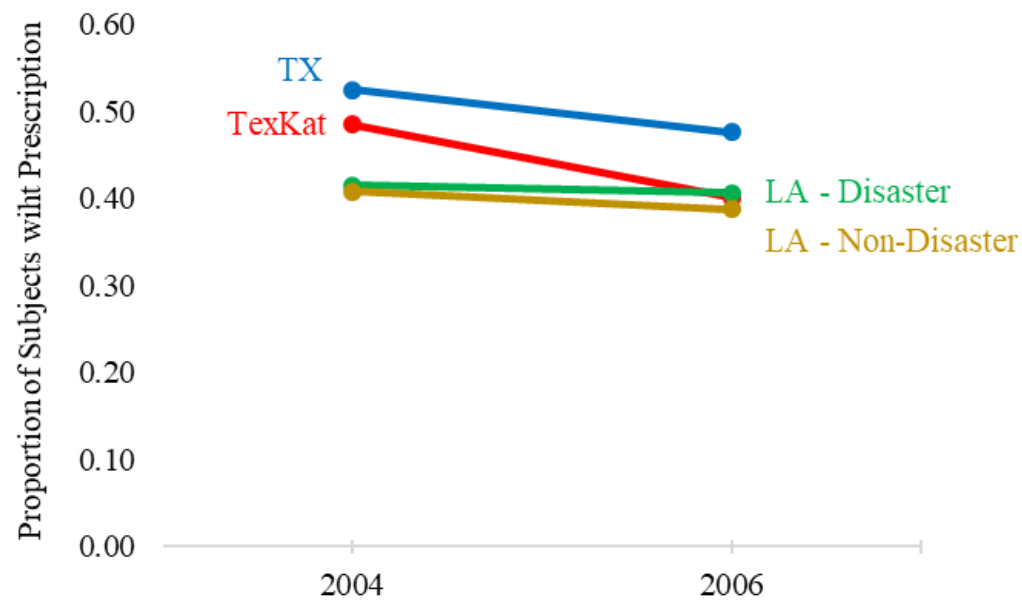
Children: Asthma

- Citation
 - “Healthcare utilization by children with asthma displaced by Hurricane Katrina”. *Journal of Asthma*. 2018;55(4):416–423.
- Prescription types
 - Controller, quick-relief
- Encounter types
 - Inpatient, emergency dept, outpatient, inpatient
- Subject groups
 - Texkat, LA-Disaster, LA-Nondisaster, TX

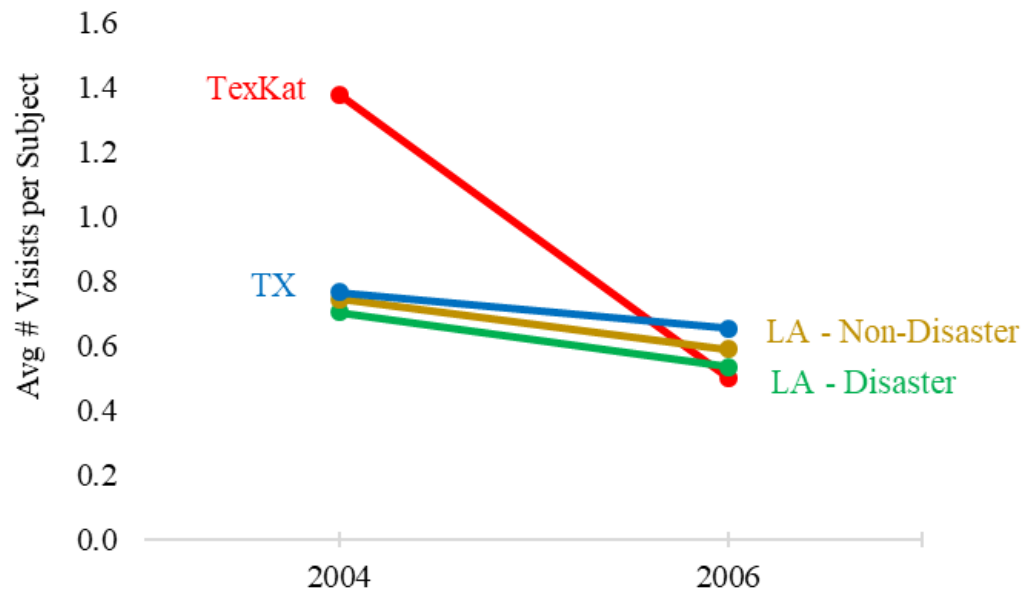
Controller



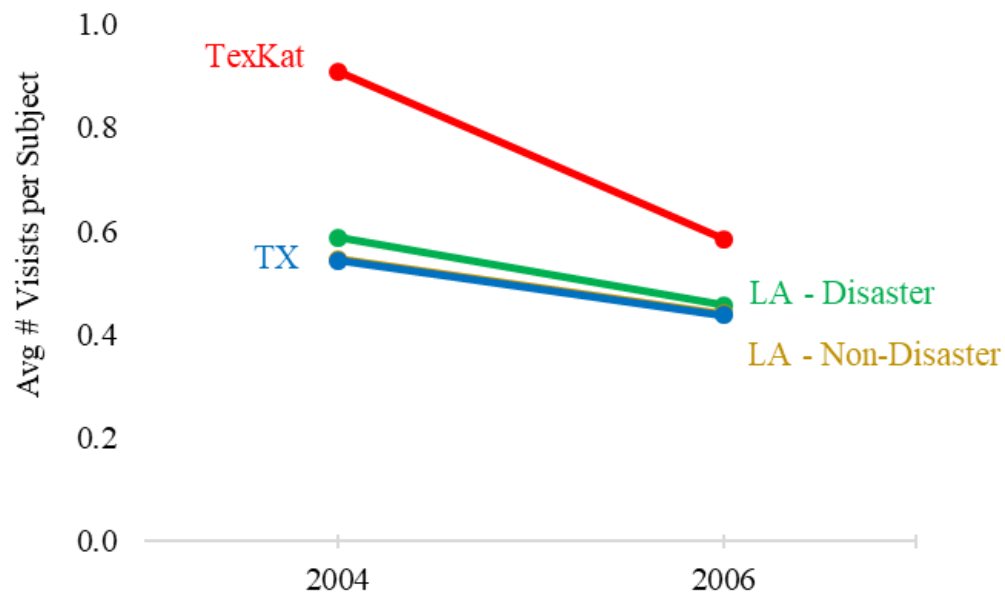
Quick-Relief



Office



Emergency Department



Children: Mental Health

- Citations
 - “Utilization of Mental Health Services by Children Displaced by Hurricane Katrina” (w/ Sean Gregory & Eric Storch). *Psychiatric Services*. 2019;69(5):580–586.
- Prescription types
 - Stimulants, antidepressants, mood stabilizers, antipsychotics
- Encounter types
 - Psychiatric service, physician office, emergency dept, inpatient

Children: Mental Health

Proportion of children with 1+ filled prescriptions for psychotropic medications (2005H1 vs 2006H1)

	TexKat		LA-Disaster			LA-Nondisaster			TX	
Medication class	Change		Change	p ^c		Change	p ^d		Change	p ^e
All	-.194		-.123	<.001		-.095	.001		-.058	<.001
Stimulants	-.132		-.094	.050		-.073	.001		-.052	<.001
Anitdepressants	-.093		-.037	<.001		-.027	<.001		-.025	<.001
Mood stabilizers	-.034		-.008	.020		-.004	.004		-.003	.015
Antipsychotics	-.032		-.011	.027		-.008	.019		.006	.004
Sedatives and hypnotics	-.017		-.006	.367		-.006	.374		-.009	.580
Anxiolytics	-.004		-.001	.631		-.001	.678		.003	.393
Miscellaneous	-.004		-.008	.714		-.004	.974		-.003	.982

Children: Mental Health

Proportion of children with 1+ encounters by
encounter type
(2005H1 vs 2006H1)

	TexKat	LA-Disaster		LA-Nondisaster		TX	
Encounter type	Change	Change	p	Change	p	Change	p
Psychiatric services	-.039	-.050	.533	-.057	.319	-.004	.103
Physician office	-.194	-.077	<.001	-.075	<.001	-.019	<.001
Emergency department	.002	-.001	.710	-.002	.666	.000	.796
Inpatient	-.011	-.001	.222	.000	.203	.000	.284

Seniors: Diabetes Screenings

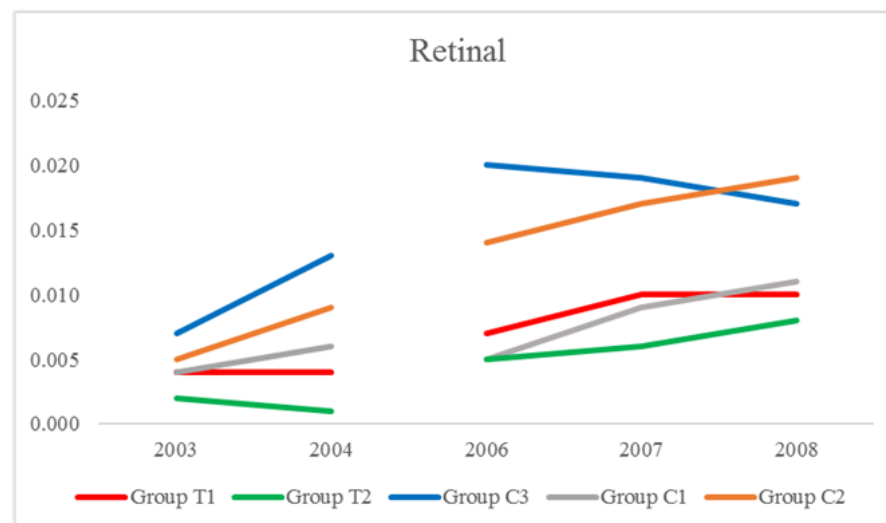
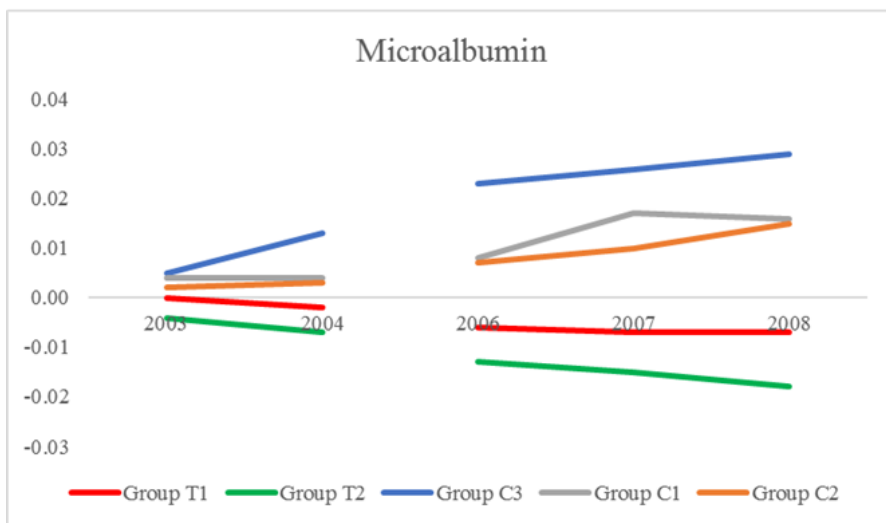
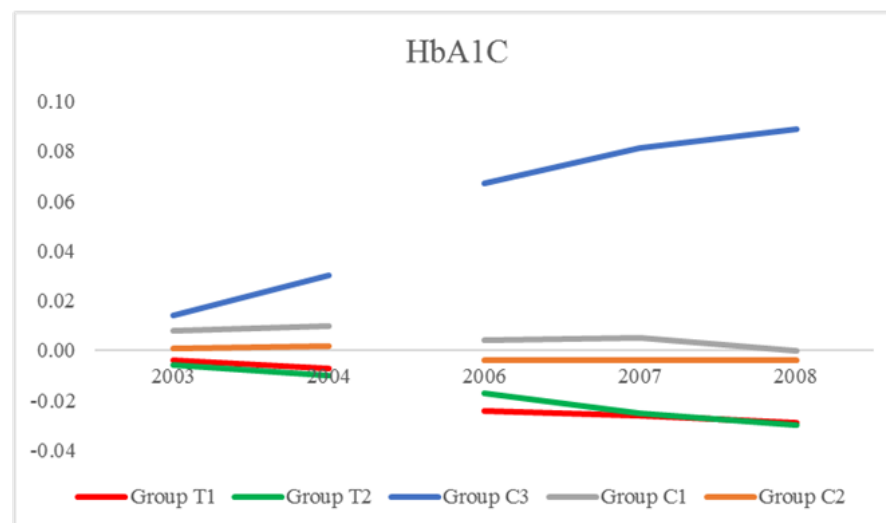
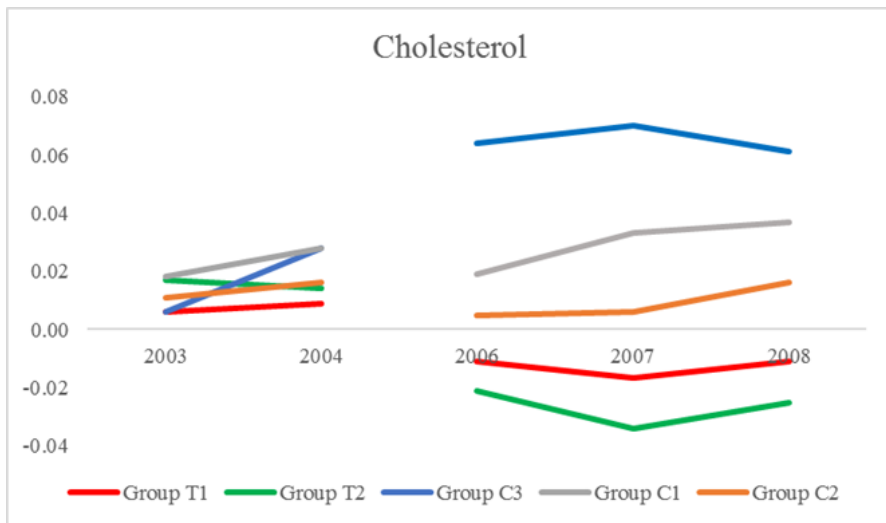
- Citation
 - “Long-Term Effects of Disasters on Health Care Utilization: Hurricane Katrina and Older Individuals with Diabetes” (w Lijuan Feng), *Disaster Medicine & Public Health Preparedness*, Forthcoming.
- Screenings analyzed
 - Cholesterol
 - HbA1C
 - Microalbumin
 - Retinal
- Time periods
 - Pre: 2002-2004
 - Post: 2006-2008

Seniors: Diabetes Screenings

- Assignment based on
 - Pre-Katrina state
 - FEMA declaration for pre-Katrina county of residence
 - Hurricane Katrina vs Hurricane Rita
 - Level (individual assistance, public assistance, none)

Group	Pre-Katrina State	FEMA Decl: Storm	FEMA Decl: Level
Treatment T1	Any	Katrina	Individual
Treatment T2	LA	Either	Individual
Control C1	MS	Either	Public
Control C2	TX	Either	Public
Control C3	AL	Either	None

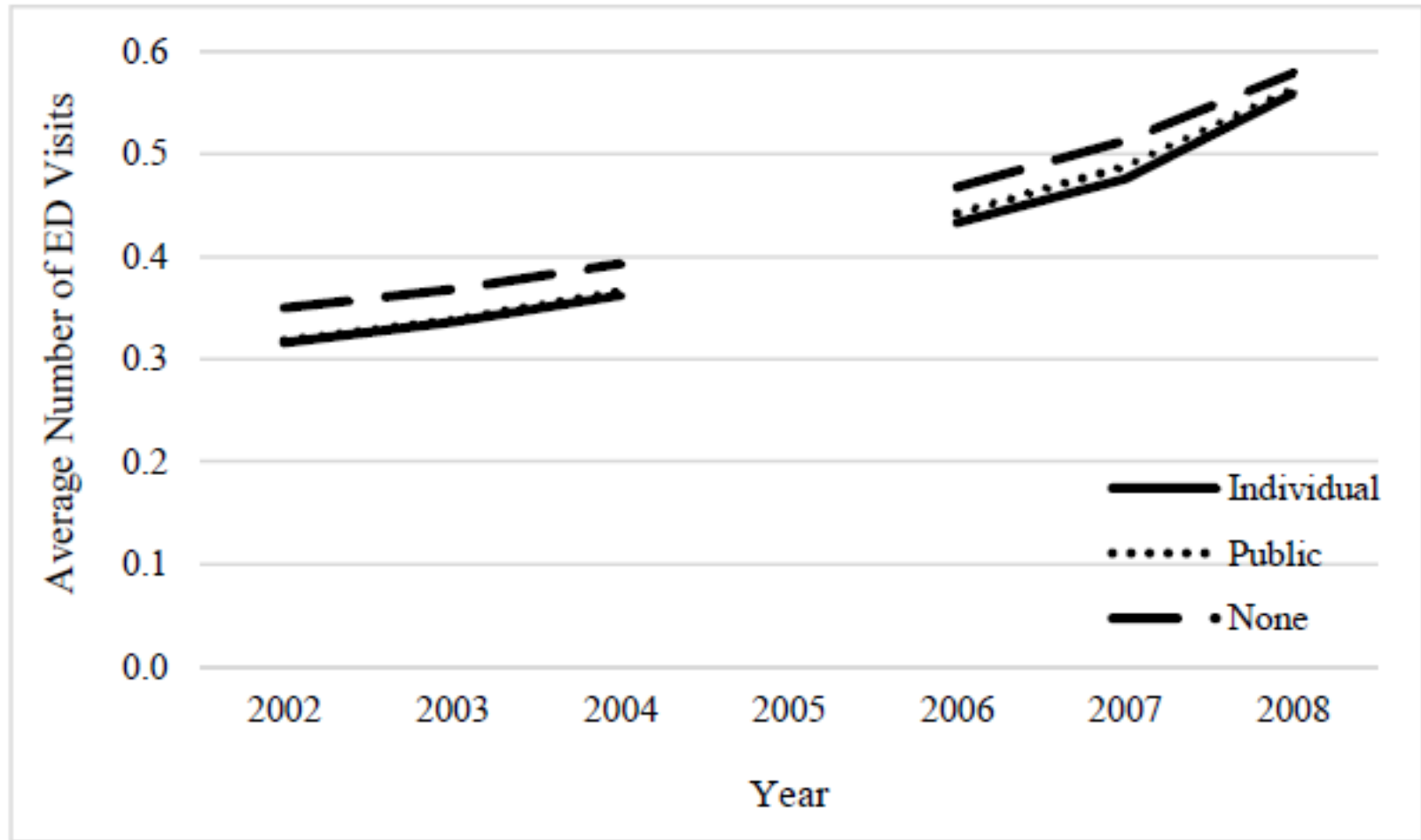
Seniors: Diabetes Screenings



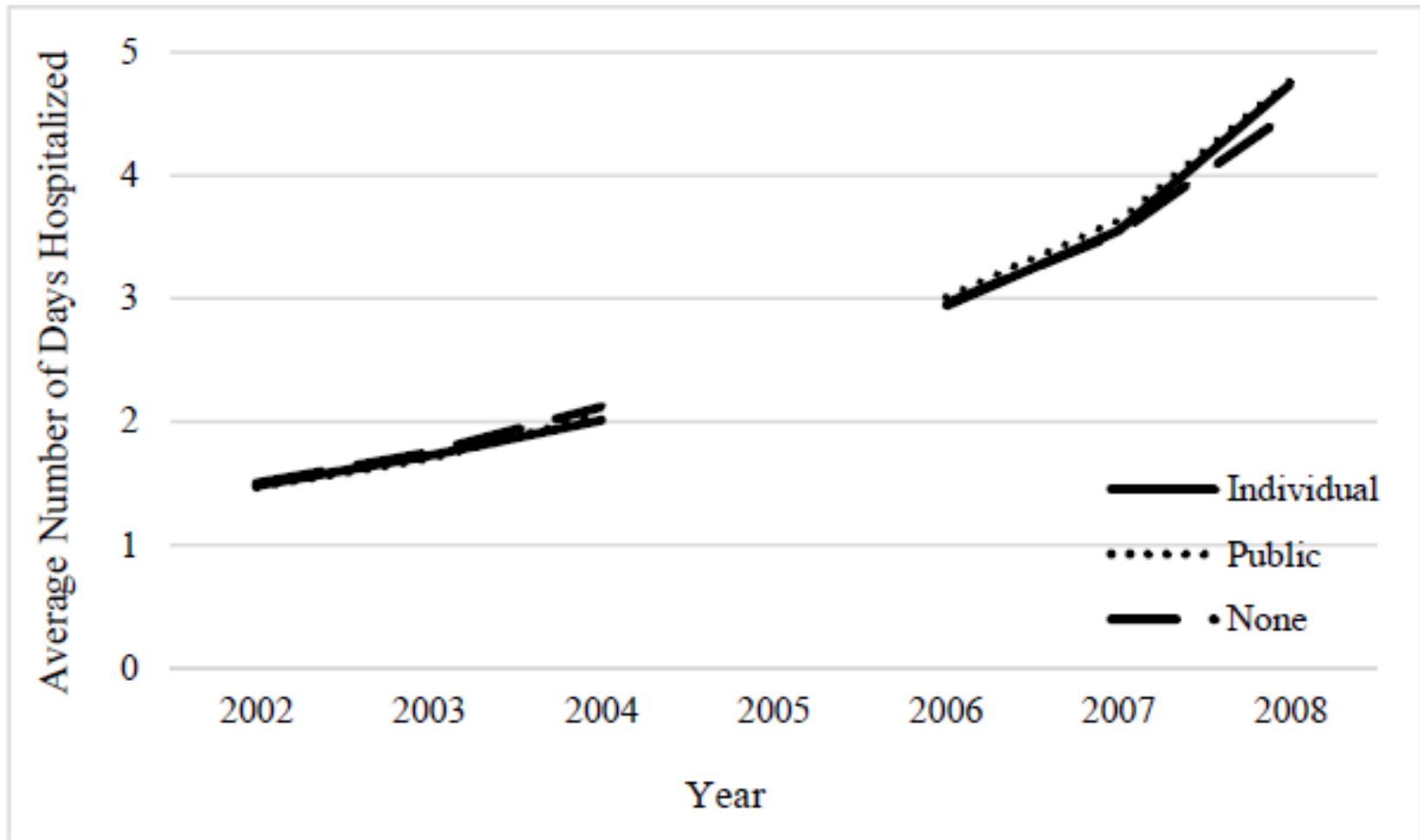
Seniors: ED Visits & Hospitalizations

- Citation
 - “Emergency Department Visits by and Hospitalizations of Senior Diabetics in the Three Years Following Hurricanes Katrina and Rita”, [looking for a home].
- Outcomes analyzed
 - Emergency department visits
 - Hospitalizations
- Groups
 - Individual assistance
 - Public assistance
 - No assistance

Seniors: ED Visits & Hospitalizations



Seniors: ED Visits & Hospitalizations



Seniors: Mortality

- Citation
 - “The Long-Term Effects of Disasters on Seniors with Diabetes: Evidence from Hurricanes Katrina and Rita” (w/ Ross Andel & Archana Sudha), *Diabetes Care*, Conditional acceptance.
- Affected & unaffected one-to-one propensity-matched
 - Demographic characteristics
 - Coverage
 - Chronic conditions (27)

Seniors: Mortality

- Types of mortality
 - All-cause
 - By-cause
 - Diabetes mellitus
 - Major cardiovascular disease
 - Nephritis
- Affected subjects also differentiated by whether &, if so, where the individual moved after hurricanes

	One month	One year	Three years	Full period
All (n = 170,328)				
All-cause	1.395 (1.298; 1.155)	1.132 (1.107; 1.158)	1.087 (1.070; 1.104)	1.100 (1.083; 1.116)
Diabetes mellitus	1.077 (0.837; 1.386)	0.911 (0.845; 0.983)	N/A	N/A
Heart disease	1.348 (1.206; 1.508)	1.146 (1.107; 1.186)	N/A	N/A
Nephritis†	1.574 (1.091; 2.273)	1.258 (1.124; 1.409)	N/A	N/A
Did not move to different county (n = 161,729)				
All-cause	1.401 (1.303; 1.508)	1.119 (1.094; 1.146)	1.073 (1.055; 1.090)	1.083 (1.066; 1.099)
Moved to different county (n = 8,599)				
All-cause	0.951 (0.695; 1.300)	1.242 (1.129; 1.366)	1.262 (1.180; 1.349)	1.405 (1.312; 1.503)
Moved to affected county (n = 4,312)				
All-cause	1.095 (0.719; 1.668)	1.298 (1.137; 1.482)	1.361 (1.239; 1.496)	1.570 (1.423; 1.732)
Moved to unaffected county (n = 4,287)				
All-cause	0.886 (0.544; 1.442)	1.257 (1.094; 1.444)	1.183 (1.075; 1.303)	1.315 (1.195; 1.446)

Limitations of Analyses

- Don't know location at precise time of storm
- Concern re data immediately after storms
- Coding imperfections
- Medicaid churn
- Don't have data for Medicare Advantage enrollees
- Confounding of effects of Katrina & Rita
- Historic extremity of Katrina

That being said... possible takeaways

- Transition / extended assistance to emergency waiver enrollee
- Despite reductions in preventive or maintenance care, didn't always observe negative repercussions
- Differences may emerge years after disaster
- Yet, no evidence of mortality differences after initial shock
- → More research needed