

RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

Emergency department use and hospitalization for COPD and asthma in older adults, following Hurricane Sandy, New Jersey, 2012

Polly Thomas, MD
Mangala Rajan, MBA
Christina Tan, MD, MPH
Amy Davidow, PhD

*Rutgers New Jersey Medical School
Rutgers School of Public Health
New Jersey Department of Health*

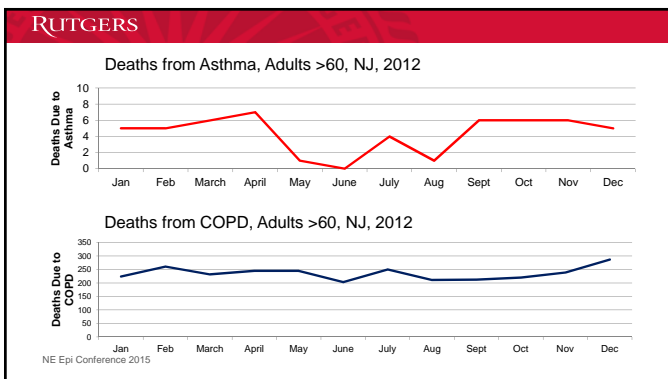
RUTGERS

Background: Asthma and COPD in Older Adults

- Asthma: Chronic disease with hyper-reactive airways
- Chronic Obstructive Pulmonary Disease (COPD):
 - Two main types: chronic bronchitis and emphysema, lung damage usually from smoking
- Care:
 - Access to outpatient support, daily medications, oxygen, nebulizers, other electrical equipment
 - Environmental control (e.g. avoiding inhalation of particulates, airborne chemicals)
- Management easily disrupted during / following severe weather or other disaster
- Surveys indicate the majority of older adults are not prepared for disasters*
- Hospitalizations for asthma and COPD are considered preventable**

**Al-Rousan 2014 **AHRQ*

NE Epi Conference 2015



RUTGERS

Objective

- Determine rates of and factors associated with Emergency Department (ED) use and hospitalization for respiratory complications (asthma and COPD) among adults older than 60 following Hurricane Sandy in New Jersey (NJ)

NE Epi Conference 2015

Methods

- Data Sources:
 - NJ Hospital Discharge Data Collection System Data on inpatient admissions and ED visits
 - ED visit: visit that ends in discharge from the ED
 - Hospital admission: hospital stay, might have been admitted from ED or elsewhere
 - Adults > 60 years
 - 2008-2012
- US Census 2010 data by municipality to generate rates

NE Epi Conference 2015

Variables:

- From Hospital and ED discharges:
 - Demographics (sex, ethnicity, age group)
 - Admission/discharge dates
 - ICD9 coded diagnoses
- Municipality Level of impact
 - Calculated based on a composite score:
 - duration of power outage, extent of residential and commercial municipal damage, FEMA municipal assistance*
- Sandy period: October 28-December 28 2012
- Pre-hurricane period: December 29 2011– October 27 2012

**Hoopes Halpin 2014*

NE Epi Conference 2015

Outcome variables

- ED visits and inpatient hospital admissions for Asthma and COPD:
 - Asthma and COPD defined according to the Preventable Quality Indicator system*
- ED visits and hospitalizations were examined separately

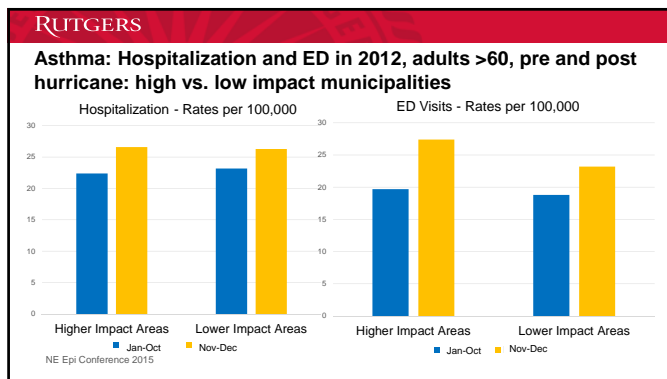
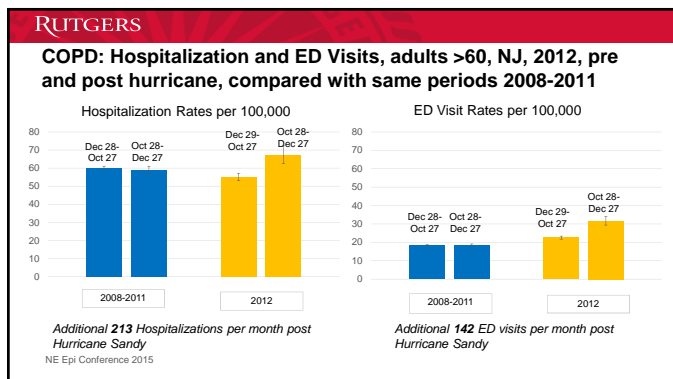
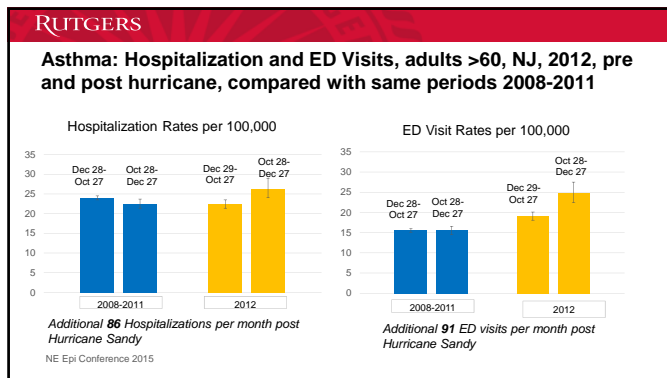
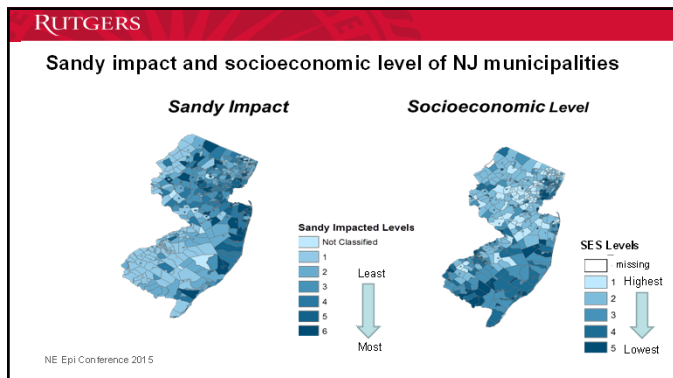
* *Agency of Healthcare Research and Quality , 2007*

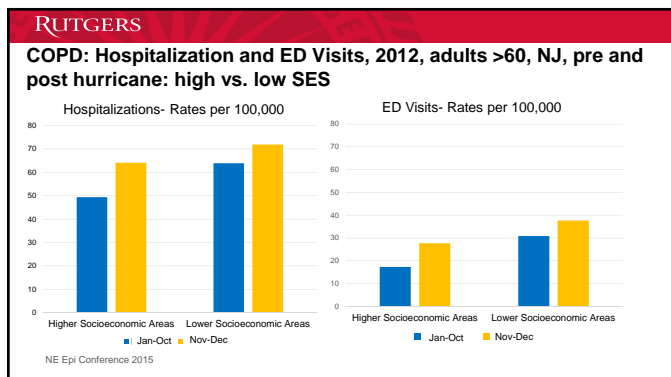
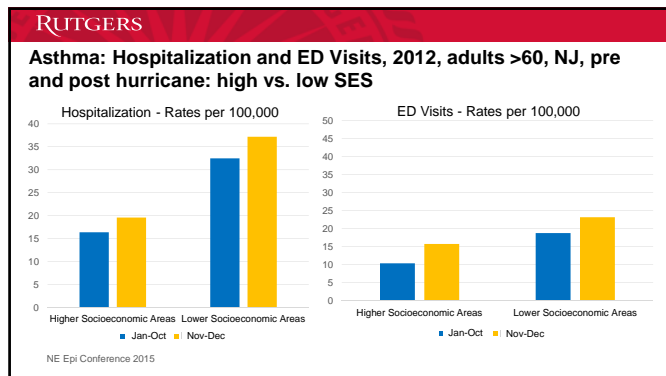
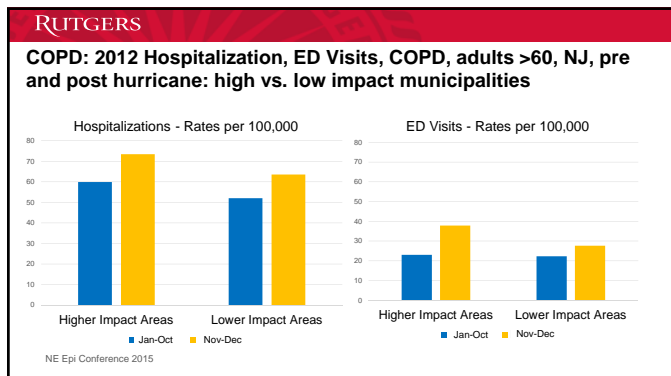
NE Epi Conference 2015

Analysis

- ED and hospitalization rates:
 - During 2 months following hurricane: (10/28/2012-12/27/12)
- Compared to:
 - Pre-hurricane rates in 2012: (12/28/2011-10/27/12)
 - Rates 2008-2011 (combined): (12/28-10/27, 10/28-12/27)
- Low socioeconomic status (SES):
 - Municipalities where > 40% of households were poor or asset constrained
- Associations of rates with Sandy Impact and SES levels were tested using Poisson regression

NE Epi Conference 2015





RUTGERS

Asthma: Hospitalizations, ED Visits - 2012: Rates per 100,000

	High Impact		Low Impact	
	Pre Hurricane	Post Hurricane	Pre Hurricane	Post Hurricane
Hospitalizations				
Men	12.8	18.6	14.8	16.8
Women	28.0	32.7	27.4	28.7
61-74 years	19.1	23.7	19.4	24.7
75+ years	26.2	32.4	30.5	29.4
Low SES	27.0	35.7	36.2	38.1
Not Low SES	18.0	20.9	14.7	18.6
ED Visits				
Men	17.4	22.2	15.1	17.3
Women	21.4	31.4	21.5	27.7
61-74 years	23.1	32.1	21.3	26.6
75+ years	12.8	18.2	13.8	16.8
Low SES	31.0	37.6	34.0	40.3
Not Low SES	12.6	21.0	8.8	12.1

Red numbers: >30% increase

NE Epi Conference 2015

RUTGERS

COPD: Hospitalizations, ED Visits - 2012: Rates per 100,000

		High Impact		Low Impact	
		Pre Hurricane	Post Hurricane	Pre Hurricane	Post Hurricane
<i>Hospitalizations</i>	Men	58.5	70.8	53.8	61.3
	Women	61.0	75.6	50.8	65.4
	61-74 years	42.8	53.6	38.6	51.3
	75+ years	93.7	112.8	78.5	87.6
	Low SES	60.0	70.2	66.7	73.4
	Not Low SES	59.9	75.6	42.7	57.0
<i>ED Visits</i>	Men	21.9	36.0	24.0	26.4
	Women	23.9	39.3	21.1	28.7
	61-74 years	20.8	31.1	20.4	26.4
	75+ years	27.6	51.4	26.1	30.2
	Low SES	24.5	36.1	35.2	38.9
	Not Low SES	22.1	39.0	14.0	20.2

Red numbers: >30% increase

NE Epi Conference 2015

RUTGERS

Ratios of Rates, pre- and post- Hurricane Sandy in 2012, High Impact Municipalities

Models	Asthma Hosp	Asthma ED Visits	COPD Hosp	COPD ED Visits
Pre-post in 2012* (Post rates higher)	1.2 (1.1-1.5)	1.4 (1.2-1.6)	1.2 (1.1-1.4)	1.7 (1.5-1.9)
Gender (Female rate higher)	2.1 (2.0-2.2)	1.4 (1.3-1.5)	1.1 (1.0-1.1)	1.0 (1.0-1.1)
SES (Poorer communities' rate higher)	1.2 (1.1-1.3)	1.3 (1.3-1.4)	1.0 (1.0-1.1)	1.2 (1.1-1.2)

*No significant difference for Jan-Oct compared with Nov-Dec, 2008-2011

NE Epi Conference 2015

RUTGERS

Conclusions

- Hospitalizations and ED visits for COPD and asthma increased in the two months following Hurricane Sandy
 - Greatest increases were in ED visits
- Baseline admission and ED visit rates are higher for women, older adults (over 75) and those in poorer neighborhoods
 - Increases following the hurricane occurred in all groups
- Primary care providers and others caring for older adults with respiratory compromise should consider disaster response planning as part of patient management

NE Epi Conference 2015

RUTGERS

New Jersey Hurricane Sandy Study Team

<p>NJ Department of Health</p> <ul style="list-style-type: none"> Christina Tan, MD Stella Tsai, PhD Hui Gu, MS Prathit Kulkarni, MD Ken O'Dowd, PhD <p>NJ Department of Human Services</p> <ul style="list-style-type: none"> Yunqing Li, PhD 	<p>Rutgers (RBHS)</p> <ul style="list-style-type: none"> Amy Davidow, PhD Joanna Burger, PhD Susan German, MPH Michael Gochfeld, MD, PhD Frank Kemp, BS Soyeon Kim, ScD Clifton Lacy, MD Steven Marcus, MD Elizabeth Marshall, PhD Marian Passannante, PhD Mangala Rajan, MBA Bruce Ruck, PharmD Pauline Thomas, MD
--	---

NE Epi Conference 2015

20



RUTGERS

References

1. Hoopes Halpin S. (2014). The Impact of Super Storm Sandy on New Jersey Towns and Households. <http://ndatabank.newark.rutgers.edu/special/sandy>
2. Department of Health and Human Services, Agency for Healthcare Research and Quality. AHRQ Quality Indicators. Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Version 3.1 (March 12, 2007). <http://www.qualityindicators.ahrq.gov>
3. Paul, L. A., et al. (2014). "The associations between loss and posttraumatic stress and depressive symptoms following Hurricane Ike." *J Clin Psychol* 70(4): 322-332.
4. Uscher-Pines, L., et al. (2009). "Disaster-related injuries in the period of recovery: the effect of prolonged displacement on risk of injury in older adults." *J Trauma* 67(4): 834-840.
5. Aldrich, N. and W. F. Benson (2008). "Disaster preparedness and the chronic disease needs of vulnerable older adults." *Prev Chronic Dis* 5(1): A27.
6. Ford, E. S., et al. (2006). "Chronic disease in health emergencies: in the eye of the hurricane." *Prev Chronic Dis* 3(2): A46.
7. Sutherland, E. R. and R. M. Cherniack. "Management of chronic obstructive pulmonary disease." *New England Journal of Medicine* 350(26): 2689-2697.
8. CDC. (2012). "Identifying vulnerable older adults and legal options for increasing their protection during all-hazards emergencies: a cross-sector guide for states and communities. 2012." from <http://www.cdc.gov/other/securements/legals.pdf>.
9. Pfifer, J. F., et al. (1988). "The impact of natural disaster on the health of older adults: a multiwave prospective study." *J Health Soc Behav* 29(1): 65-78.
10. Niewoehner, D. E. "Clinical practice. Outpatient management of severe COPD." *New England Journal of Medicine* 362(15): 1407-1416.
11. Franklin, W. "Treatment of severe asthma." *New England Journal of Medicine* 290(26): 1469-1472.
12. Al-Rousan TM, Rubenstein LM, Wallace RB. Preparedness for natural disasters among older US adults: a nationwide survey. *American Journal of Public Health*. 104(3):506-11. 2014 Mar.

NE Epi Conference 2015