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

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

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)
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

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

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

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)
• 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
Sandy impact and socioeconomic level of NJ municipalities

Asthma: Hospitalization and ED Visits, adults >60, NJ, 2012, pre and post hurricane, compared with same periods 2008-2011

COPD: Hospitalization and ED Visits, adults >60, NJ, 2012, pre and post hurricane, compared with same periods 2008-2011
COPD: 2012 Hospitalization, ED Visits, COPD, adults >60, NJ, pre and post hurricane: high vs. low impact municipalities

Asthma: Hospitalization and ED Visits, 2012, adults >60, NJ, pre and post hurricane: high vs. low SES

<table>
<thead>
<tr>
<th></th>
<th>High Impact</th>
<th>Low Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>12.8</td>
<td>16.8</td>
</tr>
<tr>
<td>Women</td>
<td>26.0</td>
<td>29.7</td>
</tr>
<tr>
<td>65-74 years</td>
<td>19.1</td>
<td>19.4</td>
</tr>
<tr>
<td>75+ years</td>
<td>26.2</td>
<td>30.5</td>
</tr>
<tr>
<td>Low SES</td>
<td>27.0</td>
<td>36.2</td>
</tr>
<tr>
<td>Not Low SES</td>
<td>16.0</td>
<td>18.6</td>
</tr>
</tbody>
</table>

Red numbers: >30% increase

<table>
<thead>
<tr>
<th></th>
<th>Pre Hurricane</th>
<th>Post Hurricane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>17.4</td>
<td>22.2</td>
</tr>
<tr>
<td>Women</td>
<td>21.4</td>
<td>27.7</td>
</tr>
<tr>
<td>65-74 years</td>
<td>23.1</td>
<td>26.6</td>
</tr>
<tr>
<td>75+ years</td>
<td>12.8</td>
<td>16.8</td>
</tr>
<tr>
<td>Low SES</td>
<td>31.0</td>
<td>40.3</td>
</tr>
<tr>
<td>Not Low SES</td>
<td>12.8</td>
<td>12.1</td>
</tr>
</tbody>
</table>
**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.

**New Jersey Hurricane Sandy Study Team**

- **NJ Department of Health**
  - Christina Tan, MD
  - Stella Tsai, PhD
  - Hui Gu, MS
  - Priyadi Kulkarni, MD
  - Ken O’Dowd, PhD

- **NJ Department of Human Services**
  - Yunqing Li, PhD

**Rutgers (RBHS)**

- Amy Davidow, PhD
- Joanna Burger, PhD
- Susan German, MPH
- Michael Gochfeld, MD, PhD
- Frank Kemp, BS
- Sooyeon Kim, ScD
- Clifton Lacy, MD
- Steven Marcus, MD
- Elizabeth Marshall, PhD
- Mariah Passamante, PhD
- Mangala Rajan, MBA
- Bruce Risk, PharmD
- Pauline Thomas, MD
References


