Extreme Weather & Population Health Impacts

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Key Question:
What are the effects of natural disasters on population health?

- Injuries/mortality
- Infectious diseases
- Acute illnesses
- Chronic illnesses
- Psychological illnesses
Exposure to weather-related disasters lead to distress, flooding, contaminated water, debris, and disruptions to essential infrastructure.
Data

Disasters (extreme weather events):
- SHELDUS (Spatial Hazard and Loss Database for the United States)
- County-level
- Major disasters including hurricanes, cyclones, floods, thunderstorms, etc.

Hospitalizations
- Comprehensive set of inpatient and ED databases
- All NC counties, all-payer
- Multi-year: 2011-2018
- Diagnoses and procedure codes
- Inpatient: 8 M observations
- ED: 33 M observations
Preliminary Findings

• Main outcome of interest:
  • Rate of hospitalizations per 10,000 population in NC affected vs unaffected counties within a month of an extreme weather event.

• Inpatient hospitalizations
  • Cardiovascular diseases ↑
  • Diabetes ↑
  • Gastrointestinal diseases ↑

• ED admissions
  • Asthma ↑
  • Gastrointestinal diseases ↑
Conclusions and Future Research

- Increase in hospitalizations for chronic and acute illnesses such as asthma, CVE, diabetes and GI.
- No effect on respiratory illnesses and mental health.
- These results shed light on impact of disasters on population health.
- No effect on mental health, etc. – exploration of effect of disasters on community infrastructure and healthcare system.
- Future analyses: include South Carolina, Florida.
Thank You!

• East Carolina University
• Center for Natural Hazards Research
## Preliminary Results (NC Inpatient)

<table>
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<tr>
<th></th>
<th>(1) Asthma</th>
<th>(2) Respiratory Illnesses</th>
<th>(3) Cardiovascular Event</th>
<th>(4) Diabetes</th>
<th>(5) Mental Health</th>
<th>(6) Gastrointestinal Illnesses</th>
<th>(7) Fibromyalgia</th>
<th>(8) All</th>
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<tbody>
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## Preliminary Results (NC Emergency Dept)

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<td>Gastrointestinal Illnesses</td>
<td>Fibromyalgia</td>
<td>All</td>
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Econometric Analysis

- Asthma
- Respiratory illnesses
- Cardiovascular illnesses
- Mental health
- Water-borne illnesses

- Outcomes: Rate of hospitalizations per 10,000 population
  \[ y_{c,t} = \alpha + \beta \text{Disaster}_c + \gamma \text{Post}_t + \theta \text{Post}_t \times \text{Disaster}_c + \Gamma \text{X}_{ct} + \tau_t + \eta_c + e_{c,t} \]

- Controlling for county unemployment rate, per capita damages
- County FE, time FE
Next Steps ..

Add more states - SC, NJ, FL

Event study

Temperature, precipitation, flooding, wind speeds (HURDAT)

First Street API

R – Weather data