ASSOCIATIONS BETWEEN AIR POLLUTION AND HOSPITAL ADMISSIONS IN NEW YORK STATE

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Introduction

• Models + satellite products + ground-based measurements + health data = opportunity!
  • Effects of policy on air pollution
• Multi-pollutant air pollutant health analysis ($O_3$, $PM_{2.5}$, $NO_2$) over New York State over the past decade
• Today: association between daily exposure to $PM_{2.5}$ and inpatient cardiovascular/respiratory hospital admissions in NYS from 2002-2012
  • No satellite products for now – stay tuned!
Methods

• Exposure assessment
  • Daily county-average PM$_{2.5}$ data from EPA
  • Meteorological data from the NASA

• Outcome assessment: daily inpatient cardiovascular/respiratory admissions from NYS DOH

• Statistical analysis: overdispersed Poisson regression models
  • Indicator variables for counties
  • Temperature (3 df), relative humidity (3 df), and long-term and seasonal trends (5 df per year)
### Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Min</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$ (µg/m$^3$)</td>
<td>246,428</td>
<td>9.77</td>
<td>0.25</td>
<td>5.57</td>
<td>8.24</td>
<td>12.27</td>
<td>99.74</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>246,428</td>
<td>9.05</td>
<td>-25.29</td>
<td>0.80</td>
<td>9.48</td>
<td>18.09</td>
<td>31.54</td>
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<tr>
<td>RH (%)</td>
<td>246,428</td>
<td>79.32</td>
<td>26.16</td>
<td>73.75</td>
<td>80.45</td>
<td>86.44</td>
<td>100.86</td>
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<td>RESP Admissions</td>
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<td>1.62</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>2.00</td>
<td>39.00</td>
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<td>CVD Admissions</td>
<td>246,428</td>
<td>6.83</td>
<td>0.00</td>
<td>1.00</td>
<td>2.00</td>
<td>5.00</td>
<td>115.00</td>
</tr>
</tbody>
</table>

Inpatient Respiratory Admissions (New York City), 2002-2012

Inpatient Cardiovascular Admissions (New York City), 2002-2012
Results

Per 10 $\mu$g/m$^3$ increase in PM$_{2.5}$:
Conclusions

- $\text{PM}_{2.5}$ may increase both cardiovascular and respiratory admissions in NYS
- Effect estimates are larger during the summer: potential role of secondary $\text{PM}_{2.5}$ species
- Next steps:
  - Other pollutants (ozone, $\text{NO}_2$), nonlinear effects
  - Additional exposure models, identify source-specific exposure patterns
  - Effects from implementing emission reductions
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