COMMUNITY URBANIZATION AND HOSPITALIZATION OF ADULTS FOR ASTHMA

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Asthma

Not just a childhood disease
60% Æ children
40% Æ adults of which 80% did not have asthma as a child

Phenotypes of asthma
Based on etiologic factors—late onset
Based on clinical factors—steroid resistance

A critical public health issue
Well-documented disparities
Costs associated with morbidity—20% of annual DMEs for all health care in the US
Managed effectively, but no cure

Risk factors for asthma

• Atopy
• Gender:
  children Æ males
  adults Æ females
• Family history
Risk factors for asthma morbidity

- Current age-young children, older adults
- Age of onset-females who develop asthma as an adult
- Co-morbidities-chronic bronchitis, sinusitis
- Obesity
- Race/ ethnicity
- Health care access
- Environmental factors

Environmental factors that influence asthma morbidity

- Housing
- Urban vs rural
- Cold weather
- Air quality
- Traffic-related pollution

How is asthma morbidity measured?

- BRFSS
- NHIS
- NHANES
- NHDS
- PA Cost Containment project
  Mandated by law-1994
  Includes all discharges in PA
  Timely availability
Rationale for this study?

Asthma is not a reportable disease → low mortality rate

History of environmental concerns (i.e., air quality)

CDC’s objectives for improving environmental health tracking (i.e., asthma) → Environmental Health Indicators Project

Local data source for all asthma-related discharges

Few studies have investigated risk factors for asthma morbidity in adults 19-64 years-most studies done in children and those >65

Increasing interest in geographic health disparities: the urban vs. rural environment

Hypothesis

The degree of urbanization influences asthma morbidity in adults

Methods

Data from PA Cost Containment Council 1999-2001
Adults 19-64 years of age (n=4,689)
6 select counties in PA that represented the diversity of geography and population density in the Commonwealth

Definition of urbanization based on:
  - Population size*
  - Population density*
  - Miles of roads and highways w/in the county**
  - Daily vehicle miles traveled**

County-specific rates in relation to degree of urbanization
  - Age-adjusted and age-x gender-specific

Poisson regression to model the county-specific risk conferred by degree of urbanization for adult asthma hospitalization rates (signif.=0.05)

Controlled for multiple admissions within a calendar year

* source: US Census Bureau
** source: PA DOT
Results
1. Selection of counties

2. Rank of urbanization

3. County specific age–adjusted adult asthma hospitalization rates
5. Results of statistical analysis

<table>
<thead>
<tr>
<th>CO-VARIATE</th>
<th>RELATIVE RISK</th>
<th>p-VALUE</th>
<th>CONFIDENCE INTERVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>3.34</td>
<td>0.0001</td>
<td>2.60-4.31</td>
</tr>
<tr>
<td>Age group</td>
<td>1.17</td>
<td>0.016</td>
<td>1.03-1.33</td>
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<tr>
<td>County rank</td>
<td>1.05</td>
<td>0.131</td>
<td>0.99-1.12</td>
</tr>
</tbody>
</table>

χ² = 46.02, p = 0.05

Influence of SES?

χ² = 46.02, p = 0.05
Summary of findings

Selected indices of urbanization were consistent, with respect to rank:

- Adult asthma hosp \( \downarrow \) w/ \( \downarrow \) of urbanization
- However, SES appears to be a strong confounder
- Gender- and age-specific trends \( \rightarrow \) similar to other studies
- Regional air quality should be considered in both urban and rural settings

Future directions

- Continued surveillance for asthma hospitalizations in these counties
- Inclusion of acute care events (i.e. ED, office visits)
- Evaluation of traffic density by GVW
- Inclusion of additional counties
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Websites of interest

• NIH
Asthma research at NIEHS http://www.niehs.nih.gov/airborne/home.htm
Asthma educational resources from NHLBI/NAEPP
http://www.nhlbi.nih.gov/about/naepp/

• University of Pittsburgh Center for Rural Public Health Practice “Bridging the Health Divide: The Rural Public Health Research Agenda”
http://www.upb.pitt.edu/crhp/Bridging%20the%20Health%20Divide.pdf

• CDC
National Environmental Public Health Tracking Program
http://www.cdc.gov/nceh/tracking/
Environmental Public Health Indicators Project
http://www.cdc.gov/teh/indicators

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