Background/Objective

Nationally, black children are four times as likely to visit the emergency room for asthma problems relative to white children. (3)

In Allegheny County, Black children are also disproportionately more likely to have asthma relative to white children.

Emergency department (ED) visits for asthma are considered preventable and an unnecessary cost to the healthcare system. Children’s ED visits for asthma have increased in the U.S.

Aim:
Explore the role of environmental pollution, healthcare access, and social vulnerability in relation to asthma ED visits in Allegheny County, PA

RESULTS: MAPS & SPATIAL ANALYSIS (QGIS, GEODA)

Map 1: Environmental Pollution Associated with Asthma-related Events in Children (<18) in Allegheny County

Map 2: Relationship between Access to Primary Care Physicians and Asthma Specialists, and Asthma Emergency Department Visits in Allegheny County

Map 3: Local G* Cluster Map of Count of Specialists in Allegheny County

Table 1: Linear Regression of Environmental Pollution Associated with Percent Asthma ED Visits in Children (<18)

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Percent Asthma ED Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bus Stops</td>
<td>0.006*</td>
</tr>
<tr>
<td>Neighborhood Vulnerability Z Score</td>
<td>0.09**</td>
</tr>
<tr>
<td>Smoking Rate</td>
<td>2.97**</td>
</tr>
<tr>
<td>Sum of Traffic</td>
<td>&lt;0.001 *</td>
</tr>
<tr>
<td>Model Fit: R^2 = 0.21</td>
<td></td>
</tr>
</tbody>
</table>

*p value <0.05  **p value <0.01 (Queen Matrix Contiguity)

Map 4: Role of Vulnerability in Regions with High and Low Asthma ED Visits

Map 5-7: Local G* Cluster Maps of Communities with High and Low Asthma Emergency Department Visits

FINDINGS

- Factors of environmental pollution are clustered in the City of Pittsburgh: there are more bus stops, traffic, and neighborhood pollution (higher ranks of older houses, poor houses, and housing vulnerability)

- ED visits are high in the City of Pittsburgh and regions outside of the City

- Asthma specialists are significantly higher than average in the City of Pittsburgh and lower than average outside of the City

- Areas with higher than average ED visits have higher than average Black children, lower income, higher social vulnerability, and lower neighborhood pollution

Future Directions

- Poisson Regression of covariates and ED/Asthma event count or improving model fit for linear regression
- Analyzing other covariates such as air quality, locations of air monitors, confirmed list of asthma specialists, and other aspects of indoor pollution
- Targeting high-risk municipalities, such as Wilkinsburg, for tailored asthma interventions to reduce asthma ED visits

POLICY RECOMMENDATIONS

Map 4: Analyzing Asthma Burden in Wilkinsburg in Relation to Air Pollution and Access to Parks

- Policy on Air Pollution Tracking and Regulation in Borough, and Policy on Asthma Management in Local Schools Could Decrease Asthma Emergency Department Visits

- Areas with higher than average ED visits have higher than average Black children, lower income, higher social vulnerability, and lower neighborhood pollution

- Targeting high-risk municipalities, such as Wilkinsburg, for tailored asthma interventions to reduce asthma ED visits

References


Data Sources

- Air Emission Plants: Western Pennsylvania Regional Data Center
- Social Vulnerability: CDC
- Primary Care, Prov: University of Pittsburgh Graduate School of Public Health, Department of Epidemiology
- Supportive Services: Allegheny County
- Open Access EM: OAEM
- City/County Health Department/Programs/Air Quality/Asthma Utilization, Solid Rock Christian Academy
- CDC Social Vulnerability Matrix: https://www.cdc.gov/nchs/fastats/asthma.htm
- Air Quality/Asthma Utilization, Solid Rock Christian Academy
- Wilkinsburg: https://www.alleghenycounty.us/Health

Future Directions

- Targeting high-risk municipalities, such as Wilkinsburg, for tailored asthma interventions to reduce asthma ED visits

- Policy recommendations
- Policy on Air Pollution Tracking and Regulation in Borough, and Policy on Asthma Management in Local Schools Could Decrease Asthma Emergency Department Visits