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Title: Examining the Role of Environmental Pollution, Healthcare Access, and Social Vulnerability in Children's Asthma Emergency Department Visits in Allegheny County, Pennsylvania in 2017

Background: As of 2018, 5.5 million children in the U.S have asthma. Nationally, Black children are more likely to visit the emergency room for asthma problems relative to white children. 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. The increased rate of ED visits highlights a significant need to understand the population of asthma patients and the social and environmental problems that surround their health statuses. This project explored environmental factors, healthcare access, and social vulnerability in relation to asthma emergency department visits in Allegheny County, PA.

Methods: Primary data sources (bus stops, traffic rates, smoking rates, etc.) were accessed from the Western Pennsylvania Regional Data Center (WPRDC) from August 2020 to December 2020. Mapping and spatial analyses were conducted in QGIS and GeoDa, respectively. Spatial techniques included Global Moran's I, LISA statistics, and OLS Regression.

Results:

More bus stops ( $p=0.016$ ), less traffic ( $p=0.03$ ), higher smoking rates ( $p<0.01$ ), and more neighborhood vulnerability ( $p<0.01$ ) per census tract were all significantly associated with mean percent ED visits in 2017 for Allegheny County using linear regression analysis. Local  $G^*$  cluster maps (at significance of 0.05 level) produced the following findings: Areas outside of the City of Pittsburgh have significantly less access to asthma specialists; Wilksburg and Penn Hills have significantly higher asthma events and ED visits and significantly higher proportions of Black children than nearby municipalities; Neighborhood vulnerability was significantly higher in municipalities without significant numbers of ED visits.

Conclusion:

There is a need for more asthma specialists and/or asthma management programs outside of the City of Pittsburgh. High-risk municipalities should be targeted for tailored asthma interventions to reduce asthma ED visits.