

TRAFFIC-RELATED EXPOSURES AND HEALTH OUTCOMES OF CHILDREN WITH ASTHMA LIVING BOTH NEAR AND FAR FROM HIGHWAYS

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Background and aims: Proximity to major roads has been associated with respiratory disorders and other adverse health effects. However, the understanding of traffic-related exposures and the associated health impacts is incomplete.

Concentrations can vary dramatically spatially and temporally, and a fine spatial scale is needed to resolve traffic-related pollutants such as PM, black carbon (BC), NO_x, and VOCs. This paper describes results obtained in recent and ongoing exposure and epidemiological studies in Detroit, Michigan.

Methods: We first explore the use of Medicaid data to investigate associations of acute asthma outcomes among Detroit children and proximity to major roads using a population-matched case-control analysis over a three year period, conditional linear regression, and both linear and nonlinear relationships with distance. We then present the design and preliminary results from an ongoing case-control study in which children with asthma were selected on the basis of residential proximity to major highways in Detroit, and which utilized seasonal health measurements, e.g., spirometry, and a variety of exposure assessment approaches.

Results: In the Medicaid data, asthma events were associated with proximity to primary roads with an odds ratio of 0.97 (95% CI: 0.94, 0.99) for a 1 km increase in distance, implying that asthma events were less likely as the distance between the residence and a primary road increases. In the field study, air quality impacts associated with traffic were observed in both time series and spatial studies, e.g., BC levels were elevated at monitors very near highways during the rush hour period, as well as on transects obtained across major roads.

Conclusions: There is moderately strong evidence of elevated risk of asthma close to major roads, based on case-control study, though increments of traffic-associated pollutants measured near the roads were generally modest.