

Abstracts 25 August 2024

ISEE 2024: 36th Annual Conference of the International Society of Environmental Epidemiology

Traffic emissions and greenspace exposure and associations with respiratory outcomes among urban children and adolescents in India

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Location: ISEE Conference Abstracts Volume 2024, Issue 1 <https://doi.org/10.1289/isee.2024.1251>

Abstract

BACKGROUND AND AIM Asthma and related respiratory conditions are increasing in urban regions in India, and urban cities are experiencing increasing traffic-related air pollution (TRAP) levels. A cross-sectional study was designed to investigate the association of TRAP on respiratory symptoms and visits made to general practitioners/emergency department/hospitalisation due to acute asthma exacerbations in children and adolescents, and we also aimed to understand whether low greenspaces surrounding the schools impacted this association.

METHOD The trucks passing near the child's residence were used as a surrogate marker for measuring exposure to heavy TRAP. Normalised Difference Vegetation Index (NDVI) was used to measure greenspace at 100m and 200m surrounding the school. Mixed-effect logistic regressions were used to understand the association between exposures and respiratory outcomes.

RESULTS TRAP exposure due to trucks passing at residences was associated with allergic rhinitis (AR) in children [ORa=1.396, 95% CI (1.016, 1.920); p=0.040] and adolescents [ORa=1.258(1.032, 1.535); p=0.023], and the areas of low greenspace were associated with an increased prevalence of AR and coughing in children and adolescents (p<0.05). No associations between TRAP exposures and the odds of unplanned visits to general practitioners/emergency department/hospital admissions were observed in young children. Trucks passing near residences and greenspaces (within 200m) strongly interacted with childhood respiratory symptoms in urban areas. Low greenspaces had an increased risk of asthma and related respiratory outcomes.

CONCLUSIONS Our findings suggest that exposure to TRAP near residences is increasingly harmful in children and adolescents, while greenspaces can modify the effect. Further studies in different locations in India are needed to verify our findings based on the causal mechanisms.

