

# Effect of Residential Greenness on Respiratory and Allergic Diseases among Children in a Chinese City

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## ABSTRACT

**INTRODUCTION:** Research on the impacts of natural environments, including greenness and green space, has mainly been conducted in the U.S. and in Europe, and a few studies have assessed associations with asthma and allergic diseases. The substantial differences in the urban form between China and western countries make it essential to understand the role of greenness in Chinese settings. Our objective was to investigate the relationship between neighborhood greenness and children's respiratory and allergic health in a Chinese city.

**METHODS:** Middle school students (n= 5,643) and their guardians from 12 schools in Suzhou, China were enrolled. Annual and seasonal average Normalized Difference Vegetation Index (NDVI) in four buffers (100, 200, 500, 1,000 m) and distance to the nearest park were calculated for each home address. Logistic regression was performed to test associations between each greenness measure and self-reported doctor diagnoses of asthma,

pneumonia, rhinitis and eczema, after adjusting for age, sex, parental education, family history, and environmental tobacco smoke.

**RESULTS:** No statistically significant associations were observed with NDVI-based measures, however, living close to a park was associated with increased odds of asthma, pneumonia, rhinitis and eczema. Odds ratios for the furthest quartile of distance to a park compared to the closest were 0.68 (95% CI: 0.50, 0.92), 0.90 (95% CI: 0.73, 1.11), 0.93 (95% CI: 0.75, 1.17), 0.80 (95% CI: 0.64, 0.99) for asthma, pneumonia, rhinitis and eczema, respectively.

**CONCLUSIONS:** We observed living close to a park increases the odds of a number of respiratory and allergic outcomes, but did not observe associations with surrounding greenness. This suggests that the health effect of residential greenness may vary for different urban forms. This complexity needs to be understood when designing infrastructure for residential green space.