

DOES THE PRECISION OF GEOCODING AFFECT ASSOCIATIONS BETWEEN OUTDOOR AIR POLLUTION AND LUNG FUNCTION IN ADULTS?

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Background and aims: Different techniques of geocoding can lead to important differences in distance between the true and the geocoded location. To which extent such differences can impact the estimates of air pollution effects on health outcomes has not been studied. The objective is to assess the differences in health estimates of home outdoor air pollution on lung function using 2 geocoding techniques (spatial interpolation versus parcel matching).

Methods: FEV1% predicted was assessed between 2001-2007 for 393 adults living in Grenoble, France, from the follow-up of the Epidemiological study on the Genetics and Environment on Asthma (EGEA) and the European Community Respiratory Health Survey (ECRHS). Home addresses were geocoded automatically using a map developed with spatial interpolation technique and manually using the cadastral map and geocoding the building's center. Annual concentrations of NO₂ (2004) and PM₁₀ (2008) estimated at the home addresses, using a dispersion model with a 10m² grid, were combined to time-specific measures from the permanent air quality monitoring stations to capture temporal variations in exposure. Linear regressions, adjusted for sex, age, BMI, active smoking, ETS, occupational group, atopy and asthma were conducted.

Results: Medians concentrations (µg/m³) were 34 (IQR 31-38) for NO₂ and 31 (29-33) for PM₁₀ using the automatic geocodes and 33 (31-36) for NO₂ and 30 (29-32) for PM₁₀ using the manual geocodes. The median distance in meters between the two techniques was 29 (IQR 14-59). For a 10µg/m³ increase in NO₂ and PM₁₀, FEV1% predicted decreased by 2.42 (p=0.06) and 8.96 (p=0.05) using the automatic geocodes, and by 2.71 (p=0.09) and 12.32 (p=0.02) respectively using the manual geocodes.

Conclusion: These first results suggest that a more precise geocoding technique has a minimal impact on the assessment of NO₂ and PM₁₀ effects in lung function.

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