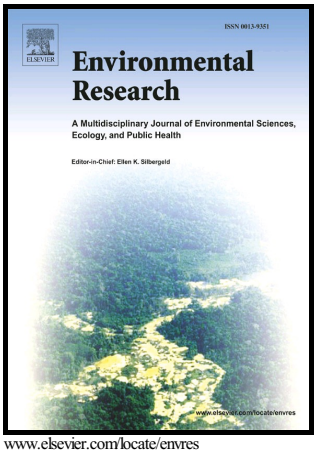

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ABSTRACT

Studies assessing socio-economic disparities in air pollution exposure and susceptibility are usually based on a single air pollution model. A time stratified case-crossover study was designed to assess the impact of the type of model on differential exposure and on the differential susceptibility in the relationship between ozone exposure and daily mortality by socio-economic strata (SES) in Montreal. Non-accidental deaths along with deaths from cardiovascular and respiratory causes on the island of Montreal for the period 1991-2002 were included as cases. Daily ozone concentration estimates at participants' residence were obtained from the five following air pollution models: Average value (AV), Nearest station model (NS), Inverse-distance weighting interpolation (IDW), Land-use regression model with back-extrapolation (LUR-BE) and Bayesian maximum entropy model combined with a land-use regression (BME-LUR). The prevalence of a low household income (< 20,000/year) was used as socio-economic variable, divided into two categories as a proxy for deprivation. Multivariable conditional logistic regressions were used considering 3-day average concentrations. Multiplicative and additive interactions (using Relative Excess Risk due to Interaction) as well as Cochran's tests were calculated and results were compared across the different air pollution models. Heterogeneity of susceptibility and exposure according to socio-economic status (SES) were found. Ratio of exposure across SES groups means ranged from 0.75 [0.74-0.76] to 1.01 [1.00-1.02], respectively for the LUR-BE and the BME-LUR models. Ratio of mortality odds ratios ranged from 1.01 [0.96-1.05] to 1.02 [0.97-1.08], respectively for the IDW and LUR-BE models. Cochran's test of heterogeneity between the air pollution models showed important heterogeneity regarding the differential exposure by SES, but the air pollution model was not found to influence heterogeneity regarding the differential susceptibility. The study showed air pollution models can influence the assessment of disparities in exposure according to SES in Montreal but not that of disparities in susceptibility.