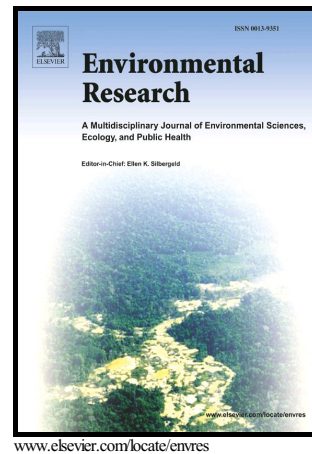


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Socioeconomic and Particulate Air Pollution
Correlates of Heart Disease Risk

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ABSTRACT

How does risk of heart disease depend on age, sex, smoking, income, education, marital status, and outdoor concentrations of fine particulate matter (PM_{2.5})? We join data available from the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance (BRFSS) System for years 2008-2012 to US Environmental Protection Agency (EPA) data on county-specific concentrations of fine particulate matter (PM_{2.5}) to quantify associations among these variables and to explore possible causal interpretations. Low income is identified as a direct cause of increased heart disease risk in this data set. The effect depends on age and sex: it is most pronounced for men under age 70 and for women under age 80. Income is significantly associated with all of the other variables examined and confounds the association between PM_{2.5} and heart disease risk. This association is significant in regression models that exclude income, but not in regression models that include it, both in the data set as a whole and in the subset of observations with PM_{2.5} < 15 µg/m³. Causal directed acyclic graph (DAG) models and non-parametric model ensemble partial dependence plots confirm

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