

LONG-TERM EXPOSURE TO TRAFFIC PARTICLES AND REPEATED MEASURES OF ATHEROSCLEROTIC PROGRESSION

Elissa Wilker, *Beth Israel Deaconess Medical Center & Harvard School of Public Health, USA*

Brent Coull, *Harvard School of Public Health, USA*

Alexandros Gryparis, *University of Crete, Greece*

Pantel Vokonas, *VA Boston Healthcare System and Department of Medicine, USA*

Joel Schwartz, *Harvard School of Public Health, USA*

David Sparrow, *VA Boston Healthcare System and Department of Medicine, USA*

Background and Aims: Recent evidence suggests that long-term chronic exposure to ambient pollution may contribute to atherosclerotic progression, but evidence from human studies is limited. We investigated the association between long-term exposure to traffic particles and carotid intima media thickness (CIMT), a marker of atherosclerotic burden, with a repeated measures analysis of men residing in the Boston area.

Methods: We estimated individual-level exposure to traffic particles (black carbon) at home addresses for 1 year prior to the baseline using a validated spatio-temporal model. Predictions are based on meteorological factors, as well as measures of land use at a given location. We examined the association between CIMT and log-transformed black carbon using a mixed effects model with random subject intercepts and covariates including medical history, indicators of socioeconomic position and seasonality.

Results: A total of 380 participants provided a baseline visit between 2004 and 2008. There were 2 and 3 follow up visits on 340 (90%) and 260 (68%) study participants. The mean \pm SD age and CIMT at baseline were 75.9 ± 6.4 and 0.99 ± 0.18 , respectively. CIMT was log-transformed to improve the normality of the distribution. In our analyses, an interdecile difference (equivalent to $0.48 \mu\text{g}/\text{m}^3$) of log-transformed black carbon at baseline was associated with a 5.6% (95% CI: 1.2 – 10.1) higher CIMT. A penalized spline for black carbon showed deviation from linearity on the log scale, particularly at higher black carbon exposures, which were associated with higher CIMT.

Conclusions: Long-term exposures to traffic particles are associated with longitudinal measures of CIMT in a community-dwelling population of older men. This study provides further evidence for the potential role of long-term exposure to particles in advancing atherosclerosis and we observed detectable differences in effect size across a range of low levels of exposure.