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CORE 2. EPIDEMIOLOGY AND PREVENTION OF CV DISEASE:
PHYSIOLOGY, PHARMACOLOGY AND LIFESTYLE
SESSION TITLE: ENVIRONMENTAL AND PHYSIOLOGICAL RISKS FOR
CVD

Abstract 15418: Long Term Air Pollution Exposure and Blood Pressure in the Sister Study

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Originally published 28 Mar 2018 | Circulation. 2018;126:A15418

Abstract

BACKGROUND: Exposure to air pollution has been associated with cardiovascular (CV) morbidity & mortality. There is evidence that acute exposure to fine particulate matter air pollution (PM_{2.5}) and diesel exhaust (over hours to days) is associated with increases in arterial blood pressure (BP), and conflicting evidence that long term exposure to oxides of nitrogen is associated with blood pressure, but few large studies have focused on the long term effect of both exposure to PM_{2.5} and oxides of nitrogen on BP. Associations with blood pressure may help to explain the CV effects of air pollution. We examined the cross-sectional relationship between long-term (annual average) residential air pollution exposure and blood pressure in the National Institute of Environmental Health Sciences' Sister Study, a large US cohort study investigating risk factors for breast cancer & other outcomes.

METHODS: This analysis included 43,629 women (aged 35-74), all with sisters with breast cancer (enrolled 2003 to 2009). Geographic information systems contributed to satellite-based nitrogen dioxide (NO₂) and PM_{2.5} predictions at geocoded participant residences. Generalized additive models were used to examine the relationship between pollutants and measured blood pressure, adjusted for CV disease risk factors and medications, and including thin plate splines for potential spatial confounding. **RESULTS:** After adjustment, a 10 µg/m³ increase in PM_{2.5} was associated with a 1.2 mmHg increase in systolic BP (95%CI: 0.5, 1.8; p < 0.001), a 1.0 mmHg increase in pulse pressure (95%CI: 0.5, 1.5; p < 0.0001), and a 0.5 mmHg increase in mean arterial pressure (95% CI: 0.0, 1.0; p = 0.03), but no significant association with diastolic BP. A one IQR increase in NO₂ was associated with a 0.3 (95% CI: 0.1, 0.4; p < 0.0001) mmHg increase in pulse pressure. **CONCLUSIONS:** Long term PM_{2.5} and NO₂ exposures were associated with significant increases in blood pressure. On a population scale, such air pollution related increases in blood pressure could in part account for the significant increases in cardiovascular disease morbidity and mortality seen in prior studies.

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