

# Air pollution linked with blood pressure in London teens

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The research suggests that in adolescents living in London, U.K., exposure to higher levels of the pollutant nitrogen dioxide was associated with lower systolic blood pressure, while exposure to higher levels of particulate matter (PM<sub>2.5</sub>) was associated with higher systolic blood pressure. Credit: Mario La Pergola, Unsplash, CC0 ([creativecommons.org/publicdomain/zero/1.0/](https://creativecommons.org/publicdomain/zero/1.0/))

In a new analysis involving adolescents living in London, exposure to higher levels of the pollutant nitrogen dioxide was associated with lower systolic blood pressure, while exposure to higher levels of particulate matter (PM<sub>2.5</sub>) was associated with higher systolic blood pressure. Alexis Karamanos of King's College London and colleagues present these findings in the open-access journal *PLOS ONE* on February 8, finding that these associations are stronger for girls than for boys.

Exposure to air pollutants is linked to greater risk of cardio-respiratory disease, hospital visits, and death. Adolescents' rapidly growing bodies may be particularly susceptible to long-lasting effects of exposure to [air pollutants](#), including effects on [blood pressure](#). However, most prior studies on air pollution and blood pressure have focused on adults.

To better understand these associations in adolescents, Karamanos and colleagues analyzed data collected as part of the Determinants of Adolescent Social Well-Being and Health (DASH) study, which tracks the well-being of thousands of ethnically diverse London schoolchildren over time. For this analysis, they used data on 3,284 adolescents in DASH to examine associations between blood pressure and exposure to pollution in the form of [nitrogen dioxide](#) and PM<sub>2.5</sub>; exposures were estimated based on annual mean levels of pollutants where each participant lived.

The researchers found that greater estimated exposure to nitrogen dioxide was associated with lower systolic blood pressure, and greater estimated exposure to PM<sub>2.5</sub> was associated with higher systolic blood pressure. These associations were stronger in girls than in boys. No evidence of a relationship between nitrogen dioxide/PM<sub>2.5</sub> and diastolic blood pressure was observed.

For example, a 1µg/m<sup>3</sup> increase in nitrogen dioxide was associated with a 0.30 mmHg (95% CI 0.18 to 0.40) decrease in systolic blood pressure

for girls and 0.19 mmHg (95% CI 0.07 to 0.31) decrease in systolic blood pressure for boys. Meanwhile, a  $1\mu\text{g}/\text{m}^3$  increase in  $\text{PM}_{2.5}$  was associated with a 1.34 mmHg (95% CI 0.85 to 1.82) increase in systolic blood pressure for girls and 0.57 mmHg (95% CI 0.04 to 1.03) increase in systolic blood pressure for boys. The associations between pollutants and blood pressure were consistent regardless of ethnicity, body size, or socioeconomic status.

Eighty percent of the adolescents studied were from ethnic minority groups, and the residential estimates suggest that these adolescents were exposed to higher levels of the pollutants than their white peers.

The researchers call for further studies to help confirm and clarify these findings, particularly among young people from different socioeconomic backgrounds. They also note that levels of nitrogen dioxide and  $\text{PM}_{2.5}$  in London remain well above World Health Organization Guidelines, suggesting opportunities to reduce pollution and improve lifelong health for adolescents in the city.

Seeromanie Harding, from King's College, London, adds, "This [longitudinal study](#) provides a unique opportunity to track exposures of [adolescents](#) living in deprived neighborhoods. Given that more than 1 million under 18s live in neighborhoods where [air pollution](#) is higher than the recommended health standards, there is an urgent need for more of these studies to gain an in-depth understanding of the threats and opportunities to [young people](#)'s development."

**More information:** Associations between air pollutants and blood pressure in an ethnically diverse cohort of adolescents in London, England, *PLoS ONE* (2023). [DOI: 10.1371/journal.pone.0279719](https://doi.org/10.1371/journal.pone.0279719)

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