

# AIR POLLUTION AND ADVERSE BIRTH OUTCOMES: AN INTERNATIONAL ANALYSIS OF WORLD HEALTH ORGANIZATION GLOBAL SURVEY ON MATERNAL AND PERINATAL HEALTH

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**Background and Aims:** Inhaling fine particles (PM<sub>2.5</sub>), one component of air pollution, into the deep regions of the lung can induce oxidative stress and inflammation, and may contribute to onset of preterm labor. The aim of this research was to examine the relationship between PM<sub>2.5</sub> and adverse birth outcomes among 22 countries in the World Health Organization Global Survey on Maternal and Perinatal Health from 2004-2008.

**Methods:** Global PM<sub>2.5</sub> estimates from remote sensing data were developed to produce long-term average values (2001-2006). Clinics were geocoded, and PM<sub>2.5</sub> levels were generated in 50 kilometer radius circular buffers around each clinic. We used generalized estimating equations to determine the relationship between clinic-level PM<sub>2.5</sub> levels and preterm birth and low birthweight at the individual level, adjusting for seasonality and potential confounders at the individual, clinic and country levels. Region-specific and country-specific associations were also investigated.

**Results:** When looking across all countries and adjusting for seasonality, PM<sub>2.5</sub> was not associated with preterm birth or low birthweight. Higher PM<sub>2.5</sub> was associated with higher odds of low birthweight in African countries. In China, the country with the largest range of particulate levels, higher PM<sub>2.5</sub> was associated with higher odds of preterm birth and low birthweight, with some evidence of a threshold effect when comparing the fourth quartile to the first quartile of PM<sub>2.5</sub> (Odds Ratio [OR] = 1.79; 95% Confidence Interval [CI]: 0.97-3.31 and OR = 1.60; CI: 1.02-2.51 for preterm birth and low birthweight, respectively).

**Conclusions:** Looking at the relationship between fine particles and adverse birth outcomes across countries and within countries with a large range of particulate levels gives additional insight into the potential causal mechanisms between air pollution and adverse birth outcomes.