

PARTICULATE AIR POLLUTION EXPOSURE AND C-REACTIVE PROTEIN DURING EARLY PREGNANCY

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Background and Aims: It is not well understood how air pollution leads to adverse pregnancy outcomes. One pathway may be through C-reactive protein, a biomarker of systemic inflammation that has been reported to increase the risk of preterm delivery. We examined whether air pollution influences serum concentrations of C-reactive protein in early pregnancy.

Methods: We studied 1696 pregnant women in Allegheny County, PA, from 1997 through 2001. C-reactive protein concentrations were assayed in blood collected before the 22nd week of gestation. We estimated levels of particles of less than 10 μm (PM_{10}) and less than 2.5 μm diameter ($\text{PM}_{2.5}$), carbon monoxide, nitrogen dioxide, sulfur dioxide, and ozone at the maternal ZIP code using Kriging interpolation for measurements obtained from ambient stations. Employing logistic regression we evaluated associations between air pollution and high C-reactive protein concentrations (≥ 8 ng/ml).

Results: Among non-smokers, observed 9.2 $\mu\text{g}/\text{m}^3$ increase in PM_{10} (averaged over 28 days prior to the blood sample) was associated with an odds ratios of 1.41 for high C-reactive protein concentrations (95% confidence interval = 0.99 – 2.00). Similarly, a 4.6 $\mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ was associated with an odds ratio of 1.47 (1.05 – 2.06). The odds ratio was 1.49 (0.75 – 2.96) per 7.9 ppb increase in ozone during summer. We saw no associations in smokers or for other air pollutants, and no evidence for effect-measure modification by obesity.

Conclusions: PM_{10} , $\text{PM}_{2.5}$, and ozone exposures were associated with increased C-reactive protein concentrations in early pregnancy, suggesting that these air pollutants contribute to inflammation and thereby possibly to adverse pregnancy outcomes.