

Trimester specific PM_{2.5} exposure and fetal growth in Ohio, 2007–2010



Air pollution has different components in it that can be harmful to humans, including particles and gases. The smallest particles in air, also called PM_{2.5}, can cross into our blood after we breathe them into our lungs and cause inflammation in our bodies. When pregnant women breathe in these particles, it can lead to inflammation in the placenta and may reduce the nutrient supplies from the mother to the baby. Some scientists have wondered whether women who live in places with higher air pollution would give birth to babies that are smaller than they should be.

We looked into this question with Ohio data from 2007 to 2010. The Environmental Protection Agency measures daily air pollution levels in more than 50 monitoring stations in Ohio. We matched pollution data to address information from Ohio birth certificates. Overall, we looked at more than 200,000 births and linked mothers' air pollution levels during pregnancy to their babies' birth weights. We examined air pollution during each week of pregnancy, each trimester of pregnancy, and for the entire pregnancy.

Women with higher air pollution exposure in their third trimester had up to 9% higher odds of their babies being born too small compared to women with lower exposure. Exposure during weeks 30-35 of pregnancy were particularly harmful. Higher first and second-trimester air pollution was not associated with babies being born too small in this study. Babies born too small are at higher risk for health problems throughout their lives. These problems include diabetes, heart disease, and hormone problems. Ohio women in the study did not have very high air pollution exposure compared to other places in the world. For example, average levels of the smallest particles in the air are about 4.5 times higher in India than for the women in our study. In addition to clean air policy changes, we can reduce our exposure to air pollution by staying indoors when the air quality index is poor, replacing home air filters frequently, and using air filtration devices in living rooms and bedrooms.

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