

Study will explore air pollution's impact on the developing fetus

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New research will seek to understand the biological mechanisms that are triggered by exposure to air pollution during pregnancy and lead to lower birth weight in newborns, placing them at greater risk for chronic conditions such as coronary heart disease and hypertension later in life. The research will be conducted in Beijing by an international team of researchers.

Air pollution is a significant global [public health risk](#) and is estimated to contribute to 3.2 million premature deaths per year. According to the World Health Organization, 9 out of every 10 people across the globe, including 100 million Americans, breathe unhealthy air.

The new \$2.49 million National Institute of Environmental Health Sciences-sponsored study will be led by David Rich, Sc.D., M.P.H., an associate professor in the University of Rochester Medical Center (URMC) Department of Public Health Sciences, and Jim Zhang, Ph.D., with Duke University.

The study builds [upon research conducted by the team during the Beijing Summer Olympics in 2008](#). That study looked at birth weights of children from mothers whose late-term pregnancy coincided with the Chinese government's extraordinary efforts to reduce air pollution during the Games. They found that these newborns were, on average, 23 grams heavier than those born during the period immediately before and after the games when the [air pollution levels](#) were much higher.

While scientists have suspected that air pollution may be promoting inflammation in mothers and impacting the development of the placenta and the delivery of nutrition to the fetus, the precise [biological mechanisms](#) by which air pollution may impair fetal growth and lead to low [birth weight](#) are largely unknown.

Working with the Beijing Obstetrics and Gynecology Hospital and the Chinese Research Academy of Environmental Sciences, the researchers will follow 660 Chinese women from early pregnancy until delivery.

The researchers will measure both ambient levels of air pollution in Beijing and internal doses of air pollution in the pregnant women. The team will collect blood and urine samples from the mothers at multiple time points during pregnancy, as well as cord blood and placental tissue at birth. The goal of the research is to measure biomarkers of inflammation and oxidative stress, placental growth, changes in gene function, and metabolic dysfunction, and evaluate whether exposure to [air pollution](#) impacts these mechanisms and, ultimately, birth weight.

Other collaborators in the study include Richard K. Miller, Sally Thurston, and Timothy Stevens with UPMC, Susan Murphy with Duke University, Kaibo Liu with the Capital Medical University and Beijing Obstetrics and Gynecology Hospital, and Jinliang Zhang and Zhipeng Bai with the Chinese Research Academy of Environmental Sciences.

Provided by University of Rochester Medical Center

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