

Children's cognitive ability can be affected by mother's exposure to urban air pollutants

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A study by the Columbia Center for Children's Environmental Health (CCCEH) carried out in Krakow, Poland has found that prenatal exposure to pollutants can adversely affect children's cognitive development at age 5, confirming previous findings in a New York City (NYC) study.

Researchers report that [children](#) exposed to high levels of [polycyclic aromatic hydrocarbons](#) (PAHs) in Krakow had a significant reduction in scores on a standardized test of reasoning ability and intelligence at age 5. The study findings are published today online in [Environmental Health Perspectives](#).

PAHs are released into the air from the burning of fossil fuels for transportation, heating, energy production, and from other combustion sources.

"The effect on intelligence was comparable to that seen in NYC children exposed prenatally to the same [air pollutants](#)," noted Frederica Perera, professor of Environmental Health Sciences and director of the CCCEH at the Mailman School of Public Health, and senior author. "This finding is of concern because IQ is an important predictor of future academic performance, and PAHs are widespread in urban environments and throughout the world."

"These results contribute to the cumulative body of published evidence linking ambient air pollution levels and adverse health effects in children

and are clearly relevant to public health policy," says Susan Edwards, study lead author.

The study included a cohort of 214 children who were born to healthy, non-smoking Caucasian women in Krakow, Poland between 2001 and 2006. During pregnancy, the mothers completed a questionnaire, wore small backpack personal air monitors to estimate their babies' PAH exposure, and provided a blood sample and/or a cord blood sample at the time of delivery. The children were followed through the age of 5 when they were tested using the Raven Coloured Progressive Matrices (RCPM) Test of reasoning ability and intelligence. The researchers accounted for other factors such as second-hand smoke exposure, lead and mother's education. Study participants exposed to air pollution levels below the median (17.96 nanograms per cubic meter) were designated as having "low exposure," while those exposed to pollution levels above the median were identified as "high exposure."

The present finding confirms the CCCEH's previous report in 2009 that prenatal exposure to PAHs adversely affected children's IQ at age 5 in a cohort of children of nonsmoking African American and Dominican American women in NYC (Perera et al, 2009).

"Air pollution knows no boundaries," said Linda Birnbaum, director of the National Institute of Environmental Health Sciences, which funded the study. "Researchers around the globe are finding that [air pollution](#) is harmful to children's development."

Provided by Columbia University's Mailman School of Public Health

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