Pregnant women who are exposed to high levels of air pollution may be putting their children at increased risk of developing anxiety, depression and attention problems, a new study finds.

In urban areas, nearly everyone is exposed to pollution, particularly to compounds called polycyclic aromatic hydrocarbons (PAHs) — the byproduct of burning fossil fuels, tobacco and other organic material. Exposure to PAHs in car exhaust and cigarette smoke can be detected in the air and in the blood, and researchers reporting this week in the journal *Environmental Health Perspectives* say that 100% of the New York City women participating in a study of children's environmental health had detectable levels of PAH in their homes.

Even more concerning, the scientists, led by Dr. Frederica Perera at Columbia University, showed for the first time that expectant women exposed to higher levels of air pollution, and those with the highest levels of PAH in their blood, were more likely to have children who developed anxiety, depression and attention problems by age 6 or 7.

"Our study provides new evidence that prenatal exposures to these air pollutants, at levels commonly encountered in New York City and other urban areas, may adversely affect child behavior," says Perera.

The trial is a continuation of Perera's work investigating the factors that can influence fetal development. In the first stage of this research, Perera reported in 2011 that higher levels of PAH in cord blood was linked to more symptoms of anxiety, depression and attention disorders in children at ages 3 and 5; her current findings extend that effect out to older children.

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While numerous studies in animals have documented a variety of developmental outcomes related to prenatal exposure to common environmental pollutants, few have looked at how these compounds can influence human development in utero. (In adults, exposure to pollution has been linked to heart disease and in children, to lower IQ.)

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Perera's biggest challenge was to account for the effect of the many other environmental factors, beyond pollution, that can affect human behavior, and try to ensure that she was zeroing in just on the relationship between a mother's exposure to PAHs and her child's later behavioral outcomes. So she measured and then controlled for the effect of secondhand smoke, lead, bisphenol A (BPA) and other known neurotoxins that are also thought to contribute to anxiety, depression and attention disorders in children. "There is always the possibility of unmeasured factors that could have also played a role," Perera says. "But we have taken practical steps to control for as many factors as we could."
Even after the adjustments, the correlation between PAH exposure and behavioral problems remained strong. Which leaves the worrisome question of what parents, particularly expectant mothers, should do to minimize the risks from PAH.

While much of our exposure is beyond our control, particularly in traffic-heavy urban areas where fuel-burning cars are unavoidable, there are some things that moms-to-be can do to protect themselves and their unborn children: Minimize exposure to secondhand smoke. Make sure that rooms are well ventilated when grilling or smoking meats at home. Eat lots of fruits and vegetables that are high in antioxidants, which can counteract some of the harmful effects of PAHs on the genetic integrity of cells. “You can’t draw conclusions from our results about any single child, or conclude that exposure to PAH causes behavioral symptoms later,” says Perera. “But the results do add to existing evidence that these exposures could have deleterious effects in children.”

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