

# Study suggests air pollution breathed in the months before and after conception increases chance of birth defects

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A team of researchers with the University of Cincinnati and Cincinnati Children's Hospital has found evidence that indicates that pre-and post-

pregnant women living in an area with air pollution are at an increased risk of giving birth to babies with birth defects. In their paper published in *The Journal of Pediatrics*, the groups describe the details of their study, what they found, and also offer some advice to pregnant women.

Logic suggests that breathing polluted air can cause health problems, particularly lung ailments—less clear is what impact breathing such air during pregnancy might have on [babies](#). In this new effort, the researchers sought to learn more about the impact on babies when pregnant women breathe a particular type of pollution just before and after conception. The team focused on [fine particles](#) in the air of a type called PM 2.5. It is made up of tiny particles and water drops smaller than 2.5 microns. A common source is automobile exhaust, but it can also come from smoke and other sources.

The team looked at data from 290,000 babies born in the state of Ohio from the years 2006 to 2010 and then compared what they found with measurements taken of air pollution across the state during the same time period. They found that those women living in areas with higher than average amounts of such pollutants, just prior to or just after conception, experienced higher rates of birth defects in their babies.

The team found that overall, the women in the study were exposed to 13.79 mcg of PM 2.5 per cm of air ( $\text{ug}/\text{m}^3$ ) in the months before and after conception. They further found that for women living within 5K of a pollution testing station, for each  $10 \text{ ug}/\text{m}^3$  increase in the particulates, there was an associated 19 percent rise in birth defects. They also found an apparent connection between kinds of [birth defects](#) and air pollution—malformations of the abdomen and hypospadias in boys.

The researchers note that their study was limited to women breathing [polluted air](#) while at home and thus did not include such factors as their exposure are work, during commuting, etc. They suggest, however, that

their conclusions were strong enough to indicate that women planning to get pregnant, or who have recently become pregnant, take measures to remove [air pollutants](#) from their homes.

**More information:** Sheng Ren et al. Periconception Exposure to Air Pollution and Risk of Congenital Malformations, *The Journal of Pediatrics* (2017). [DOI: 10.1016/j.jpeds.2017.09.076](https://doi.org/10.1016/j.jpeds.2017.09.076)

## Absract

### Objective

To evaluate the association between increased exposure to airborne fine particulate matter (PM<sub>2.5</sub>) during the periconception period with risk of congenital anomalies.

### Study design

Using birth certificate data from the Ohio Department of Health (2006-2010) and PM<sub>2.5</sub> data from the US Environmental Protection Agency's 57 monitoring stations located throughout Ohio, the geographic coordinates of the mother's residence for each birth were linked to the nearest PM<sub>2.5</sub> monitoring station and monthly exposure averages were calculated. The association between congenital anomalies and increased PM<sub>2.5</sub> levels was estimated, with adjustment for coexistent risk factors.

### Results

After adjustment for coexisting risk factors, exposure to increased levels of PM<sub>2.5</sub> in the air during the periconception period was modestly associated with risk of congenital anomalies. Compared with other periconception exposure windows, increased exposure during the 1 month before conception was associated with the highest risk increase at lesser distances from monitoring stations. The strongest influences of PM<sub>2.5</sub> on individual malformations were found with abdominal wall defects and hypospadias, especially during the 1-month preconception.

### Conclusions

Increased exposure to PM<sub>2.5</sub> in the periconception period is associated

with some modest risk increases for congenital malformations. The most susceptible time of exposure appears to be the 1 month before and after conception. Although the increased risk with PM<sub>2.5</sub> exposure is modest, the potential impact on a population basis is noteworthy because all pregnant women have some degree of exposure.

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