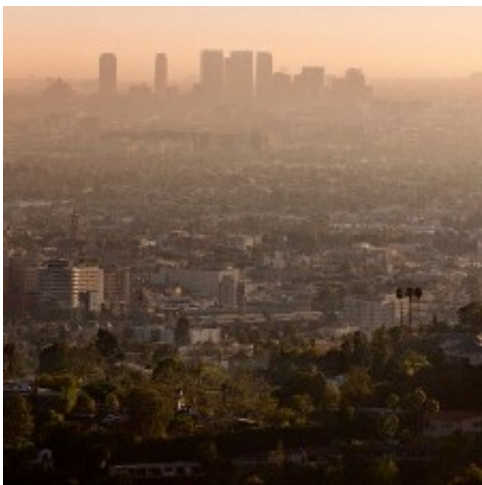


# Smoke signals: New evidence links air pollution to congenital defects

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The health effects of air pollution are a major concern for urban populations all over the world. Children, the elderly, and people with impaired respiratory systems (such as asthmatics) tend to be especially sensitive to the impact of exposure to ozone, nitrogen dioxide, sulphur dioxide, and particulate matter.

A recent study by Tel Aviv University researchers provides new evidence linking high [exposure](#) to [air pollution](#) to an increased risk of congenital malformations. The research, published in *Environmental Research*, was led by Prof. Liat Lerner-Geva of TAU's Sackler Faculty of Medicine and School of Public Health and the Gertner Institute for

Epidemiology and Health Policy Research, Dr. Adel Farhi of the Gertner Institute for Epidemiology and Health Policy Research, in collaboration with Prof. Itzhak Benenson of TAU's Department of Geography and Human Environment and Prof. Yinon Rudich of the Weizmann Institute of Science. The nationwide study is the first to assess the association between different modes of conception-assisted reproductive technology (ART) versus spontaneous conception (SC)—and the risks of exposure to air pollution to each.

"Our results suggest that exposure to higher levels of air pollution during pregnancy is associated with various adverse pregnancy outcomes," said Prof. Lerner-Geva. "While our study mainly followed SC infants, we also had the opportunity to assess a small sample of pregnancies that were conceived through ART, and observed a higher impact of air pollution—particularly with regard to [ozone exposure](#). This is clearly a uniquely susceptible population that should be further explored."

## **Statistics link pollution to defects**

For the study, funded by the Environmental Health Fund (EHF), the research team analyzed data on 216,730 born in Israel between 1997 and 2004. Air pollution data, including levels of sulfur dioxide (SO<sub>2</sub>), particulate matter (PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), and ozone (O<sub>3</sub>), were obtained from air monitoring stations for the study period. Using a geographic information system, exposure to air pollution during both the first trimester and the entire pregnancy was assessed for each woman according to her place of residence.

The researchers found that exposure to PM<sub>10</sub> and NO<sub>x</sub> pollutants throughout full-term pregnancies were associated with an increased risk of congenital malformations, with specific defects evident in the circulatory system (from PM<sub>10</sub> and NO<sub>x</sub> exposure) and genital organs (from NO<sub>x</sub> exposure). They also discovered that exposure to SO<sub>2</sub> and

O3 in ART pregnancies were associated, although not significantly, with a higher risk of congenital defects.

"Considering the worldwide decline in fertility, and the increasing number of children born through ART treatments, our findings about their [increased risk](#) of [congenital malformations](#) are very relevant," said Prof. Lerner-Geva. "It is essential we continue to evaluate this unique population."

According to Prof. Lerner-Geva, a national ART registry has been established in Israel to provide important data on all ART cycles. This database will serve as a basis for a future larger study to identify susceptible subpopulations at higher risk of adverse pregnancy outcomes. Prof. Lerner-Geva is currently engaged in a more detailed assessment of environmental exposure during pregnancy.

Provided by Tel Aviv University

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