

Exposure to air pollution during pregnancy is associated with growth delays

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Prenatal exposure to air pollution has been linked to various adverse effects on children's health, including lower birth weight and respiratory and neurodevelopmental problems. However, very little is known about how air pollution affects physical growth in the first years of life. A new study by the Barcelona Institute for Global Health (ISGlobal), a centre supported by the "la Caixa" Foundation, has found an association between exposure to air pollution during pregnancy and delays in physical growth in the early years after birth.

The Spanish study, published in *Environment International*, analysed data from more than 1,700 mother-child pairs from Asturias, Gipuzkoa, Sabadell and Valencia enrolled in the birth cohort of the INMA Environment and Childhood Project.

The researchers estimated the exposure to nitrogen dioxide (NO₂) and [fine particulate matter](#) (PM_{2.5})—two of the most common traffic-related air pollutants in cities—during the first trimester of pregnancy, using models based on levels of these pollutants measured in the study area. The evolution of the children's body mass index (BMI)

from birth to age four years was recorded. Height and weight were measured at four years of age.

The results showed that greater exposure to particulate matter during the first trimester of pregnancy was associated with a higher risk of lower weight and body mass index at four years of age. Results for NO₂ exposure were similar but did not reach statistical significance.

"This prospective study suggests that exposure to air pollution during pregnancy may be associated with delays in physical growth in the first years of life," commented ISGlobal researcher Serena Fossati, lead author of the study. "The implication of our findings is that [prenatal exposure](#) to air pollutants has a lasting effect on growth after birth and that this parameter should be followed up at later ages."

The biological mechanisms underpinning the adverse effects of air pollution on childhood growth "remain unclear," according to ISGlobal researcher Martine Vrijheid, the study coordinator. "The hypotheses we are considering include [oxidative stress](#) and inflammation, interference with thyroid hormones, induction of cell death due to DNA damage, and an increased risk of respiratory diseases and other health problems that could delay growth."

"What is clear is that the adverse effects of air pollution begin in the prenatal phase, so [pregnant women](#) should be considered a priority group in public health policies aimed at reducing the population's exposure to [air pollution](#)," concluded Vrijheid.

More information: Serena Fossati et al, Prenatal air pollution exposure and growth and cardio-metabolic risk in preschoolers, *Environment International* (2020). [DOI: 10.1016/j.envint.2020.105619](#)

Provided by Barcelona Institute for Global Health

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