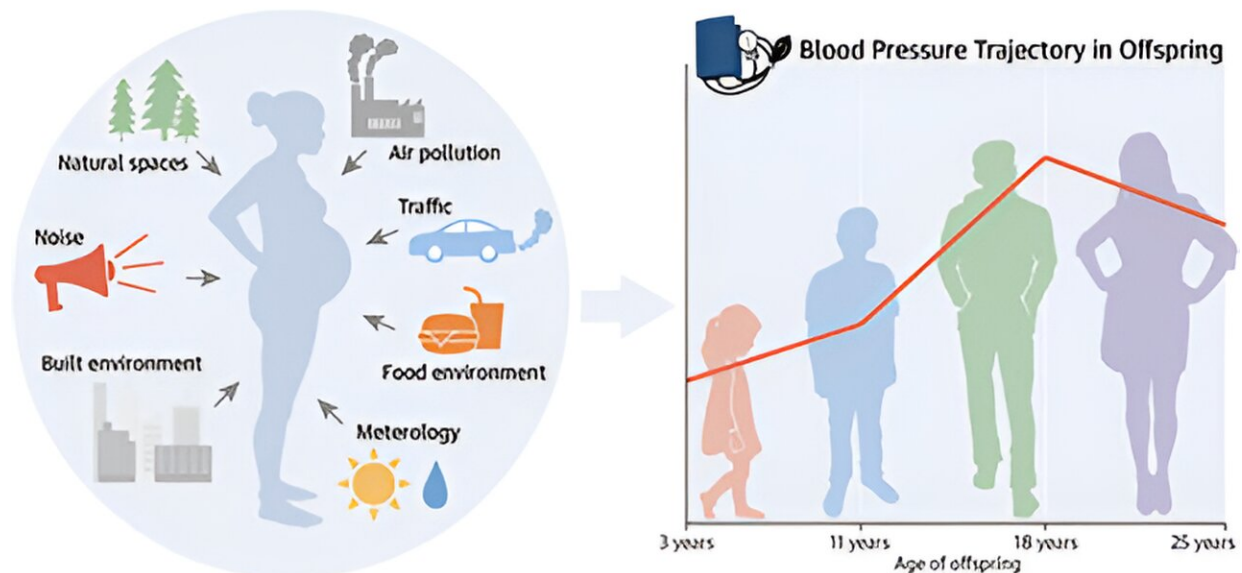


Exposure to high humidity and temperature in pregnancy could influence blood pressure changes in childhood

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Higher prenatal humidity was associated with a faster increase in blood pressure in childhood. Higher prenatal temperature was associated with a slower increase in blood pressure in childhood. Prenatal outdoor temperature and humidity potentially modulate blood pressure trajectories, particularly in childhood.

Association between prenatal urban environment and blood pressure trajectories from childhood to early adulthood. Credit: LongITools

Outdoor humidity and temperature levels during pregnancy could affect

the future blood pressure of the unborn child, according to new research by the University of Bristol, published in *JACC: Advances*.

The study, part of the [LongITools project](#), has shown that exposure to relative [humidity](#) and temperature levels during [pregnancy](#) was related to [blood pressure](#) changes in the children.

Higher [relative humidity](#) in pregnancy was associated with a steeper increase in blood pressure, and [prenatal exposure](#) to higher temperature with a slower increase in blood pressure, especially in [childhood](#) from age 3 to 10 years. Although an increase in blood pressure is normal during this age range, these weather-related factors were associated with a different rate of increase, especially in childhood.

Previous studies have primarily measured blood pressure at a single time point, predominantly focusing on single exposures, notably air pollution. In this study, using repeated blood pressure measures, researchers aimed to assess the association of a range of prenatal urban environmental exposures with changes in systolic and diastolic blood pressure from childhood to early adulthood.

The study analyzed repeated blood pressure measurements in over 7,000 participants aged between 3 and 24 years from Bristol's [Children of the 90s](#) study, a world-leading [longitudinal study](#), to assess the relationship of various characteristics of the urban environment in pregnancy with blood pressure from childhood to early adulthood.

Analyses were repeated in four independent European cohorts of over 9,000 individuals in Finland, France, and the Netherlands.

The research team explored 43 different measures of noise, air pollution, built environment, natural spaces, traffic, meteorology, and unhealthy food environment and found that prenatal outdoor temperature and

humidity could influence changes in blood pressure, especially in childhood.

The study showed that:

- Higher humidity was associated with a faster increase and higher temperature with a slower increase in [systolic blood pressure](#) in childhood.
- Higher humidity was associated with a faster increase in diastolic blood pressure in childhood.

In the UK cohort, higher levels of air pollution were associated with a faster increase in diastolic blood pressure in childhood and a slower increase in adolescence, but this association was not replicated in other cohorts.

There was little evidence of an association of other urban environmental exposures with changes in systolic or [diastolic blood pressure](#).

Dr. Ana Gonçalves Soares, Research Fellow in Epidemiology in the Bristol Medical School: Population Health Studies and MRC IEU and lead researcher, said, "Children with higher blood pressure are more likely to have higher blood pressure as adults, which can increase the risk of heart disease and stroke as well as kidney disease and vascular dementia."

"Previous studies have already shown that some urban environmental exposures during pregnancy are associated with blood pressure in childhood. We expanded that further and explored whether these environmental exposures are also associated with trajectories (changes) of blood pressure from childhood to early adulthood."

"The findings suggest that humidity and temperature during pregnancy

could change the child's blood pressure. Further work is needed to be carried out to understand how weather-related conditions during pregnancy can affect the child's blood pressure to inform strategies to prevent cardiovascular disease in later adulthood related to prenatal environmental exposures."

More information: Ana Gonçalves Soares et al, Prenatal Urban Environment and Blood Pressure Trajectories From Childhood to Early Adulthood, *JACC: Advances* (2024). DOI: [10.1016/j.jacadv.2023.100808](https://doi.org/10.1016/j.jacadv.2023.100808)

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Provided by University of Bristol

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