

As nights warm, study flags possible prenatal link to autism risk

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A new study from Tulane University found that children of mothers exposed to higher nighttime temperatures during pregnancy had a higher risk of being diagnosed with autism. (Photo by Shutterstock)

Higher nighttime temperatures during pregnancy may be associated with a higher risk of autism diagnosis in children, according to a new study led by researchers at Tulane University.

The study, published in [Science of the Total Environment](#), examined nearly 295,000 mother-child pairs in Southern California from 2001-2014 and found that warmer

overnight temperatures were linked to increased autism risk during two key periods of pregnancy: early pregnancy and late pregnancy.

Children of mothers exposed to higher than typical nighttime temperatures during weeks 1-10 of pregnancy had a 15% higher risk of being diagnosed with autism. Exposure during weeks 30-37 was associated with a 13% higher risk.

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— David Luglio

Extreme temperatures that saw an increased associated risk of autism diagnoses among children were classified as above the 90th percentile (3.6°F hotter than the average) and 99th percentile (5.6°F higher than average). These relative increases resulted in what researchers called a 'significant' association between hotter-than-average nights experienced by pregnant women and autism diagnoses for their children.

The findings add to a growing body of research exploring how environmental factors — including air pollution and wildfire smoke — may influence fetal neurodevelopment. As global temperatures rise, this study is the first to examine how temperature can impact that development. On average, nighttime temperatures have risen [three times faster](#) than daytime temperatures in California, the site of the study, according to California's Office of Environmental Health Hazard Association. And heat continues to be something for California residents to monitor, with nine of the state's 10 hottest years on record [occurring since 2014](#).

"Heat waves are becoming more frequent, and people may only think of the dangers of daytime heat exposure," said [Mostafijur Rahman](#), assistant professor of environmental health sciences at the [Celia Scott Weatherhead School of Public Health and Tropical Medicine at Tulane University](#). "These results indicate a strong association between high nighttime temperatures during pregnancy and autism risk in children and show that we need to think about exposure to heat around the clock."

The study compared weekly outdoor temperature estimates at residential addresses with autism outcomes in children.

The association held even after the researchers accounted for factors such as neighborhood conditions, vegetation and fine-particle air pollution. The study was unable to account for other factors such as access to air conditioning.

Researchers did not find the same association with daytime temperatures, potentially due to people spending more time away from home during the day, making it more difficult to measure actual heat exposure.

“A key takeaway is that we identified specific windows when a mother and her developing child can be most affected by exposures to higher nighttime temperatures,” said lead author David Luglio, a post-doctoral fellow with the Celia Scott Weatherhead School of Public Health and Tropical Medicine. “This is critical and hopefully can help mothers prepare accordingly.”

The study did not examine how higher temperatures at night could impact prenatal neurodevelopment. Luglio said it’s possible that higher temperatures at night can disrupt sleep for pregnant mothers. [A previous study](#) found that too little sleep for pregnant women can be linked with higher risk of their children experiencing neurocognitive delays.

“Extreme heat exposure during pregnancy has been linked to a range of adverse health outcomes, including prenatal neurodevelopment delays and complications with an embryo’s development of a central nervous system,” Luglio said. “The goal of our study was to specifically explore the link between prenatal heat exposure and autism diagnoses for the first time.”

The study was conducted in collaboration with Kaiser Permanente Southern California, University of Southern California, Harvard University, the Icahn School of Medicine at Mount Sinai, and Sonoma Technology, Inc.