

# Studies link air pollution to mental health issues in children

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Three new studies by scientists at Cincinnati Children's Hospital Medical Center, in collaboration with researchers at the University of Cincinnati, highlight the relationship between air pollution and mental health in

children.

A study to be published Sept. 25 in *Environmental Health Perspectives* found that [short-term exposure](#) to ambient [air pollution](#) was associated with exacerbations of psychiatric disorders in [children](#) one to two days later, as marked by increased utilization of the Cincinnati Children's emergency department for psychiatric issues. The study also found that children living in disadvantaged neighborhoods may be more susceptible to the effects of air pollution compared to other children, especially for disorders related to anxiety and suicidality.

The lead authors of this study are Cole Brokamp, Ph.D., and Patrick Ryan, Ph.D. They are researchers in the division of Biostatistics and Epidemiology at Cincinnati Children's.

"This study is the first to show an association between daily outdoor air pollution levels and increased symptoms of psychiatric disorders, like anxiety and suicidality, in children," says Dr. Brokamp. "More research is needed to confirm these findings, but it could lead to new prevention strategies for children experiencing symptoms related to a psychiatric disorder. The fact that children living in high poverty neighborhoods experienced greater health effects of air pollution could mean that pollutant and neighborhood stressors can have synergistic effects on psychiatric symptom severity and frequency."

Two other Cincinnati Children's studies were recently published that also link air pollution to children's [mental health](#):

- A study published in *Environmental Research* found an association between recent high traffic related air pollution (TRAP) exposure and higher generalized anxiety. The study is believed to be the first to use neuroimaging to link TRAP exposure, metabolic disturbances in the brain, and generalized

anxiety symptoms among otherwise healthy children. The study found higher myoinositol concentrations in the brain—a marker of the brain's neuroinflammatory response to TRAP.

- The lead authors of this study are Kelly Brunst, Ph.D., a researcher in the department of Environmental Health at the University of Cincinnati, and Kim Cecil, Ph.D., a researcher at Cincinnati Children's.
- A study published in *Environmental Research* found that exposure to TRAP during [early life](#) and across childhood was significantly associated with self-reported depression and anxiety symptoms in 12 year olds. Similar findings have been reported in adults, but research showing clear connections between TRAP exposure and mental health in children has been limited.

The lead authors of the study are Kimberly Yolton, Ph.D., director of research in the division of General and Community Pediatrics at Cincinnati Children's, and Dr. Ryan.

"Collectively, these studies contribute to the growing body of evidence that exposure to air pollution during early life and childhood may contribute to depression, anxiety, and other mental health problems in adolescence," says Dr. Ryan. "More research is needed to replicate these findings and uncover underlying mechanisms for these associations."

**More information:** *Environmental Health Perspectives* (2019).  
[ehp.niehs.nih.gov/doi/10.1289/ehp4815](http://ehp.niehs.nih.gov/doi/10.1289/ehp4815)

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