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HEALTH

Asthma puts too many kids in ER. Study explores tie to climate change.

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Key Points

- Researchers from UW-Milwaukee and UW-Madison are studying the link between air pollution and asthma-related school nurse visits at MPS.
- They'll use satellite data to estimate nitrogen dioxide levels across Milwaukee, and simulate how climate solutions like electric buses and bike lanes could reduce asthma complications.
- Asthma is a big problem in Milwaukee. Twice as many public school children have asthma than their peers across the U.S., on average.
- This research is meant to illustrate the multiple benefits of climate change solutions.

Better bike lanes, electric buses and more charging stations for electric cars – these are all ways cities can reduce greenhouse gas emissions and mitigate climate change.

But for those who think curbing the planet's warming is a lofty goal, two Wisconsin researchers are trying to show how these actions can improve human health – and perhaps prevent Milwaukee residents from scoring worst in the nation in one key measure.

Amy Kalkbrenner, professor of environmental health sciences at UW-Milwaukee, and Tracey Holloway, professor of environmental studies and atmospheric and oceanic sciences at UW-Madison, are working together to understand the link between air pollution and asthma-related visits to school nurses in Milwaukee Public Schools.

Kalkbrenner will use that information to simulate which climate change solutions would have the greatest positive impact on children's asthma attacks.

Their work is especially significant in Wisconsin's largest city. Milwaukee had the nation's highest rate of asthma-related emergency department visits in the Asthma and Allergy Foundation of America's 2025 Asthma Capitals report. Public school children are about twice as likely to have asthma as their school-aged peers across the U.S.

Further, racial and economic disparities in asthma treatment and outcomes are stark.

More: Asthma afflicts 6 million children, many of whom grow up in poor neighborhoods. Most frustrating: It can be controlled.

More: Air pollution worse and more dangerous to urban dwellers with asthma, new study finds

Kalkbrenner said the researchers' approach could help reframe discussions about climate change solutions to show positive health benefits could be realized "even on short-term time scales."

The study is among the first projects of the Center for Health, Energy and Environmental Research at UW-Madison. The center launched in September 2024 with a $3.8 million grant from the National Institutes of Health, and is aimed at exploring the effects of different types of energy generation on human health.

The researchers will focus on nitrogen dioxide, an air pollutant that is typically produced when cars, trucks, power plants and other equipment burn fuel. It is found in high concentrations in urban areas near heavily traveled roads. Exposure to nitrogen dioxide in the air increases children's risk of developing asthma and can increase the odds of an asthma attack.

Holloway and her colleagues are using satellite imagery to estimate daily nitrogen dioxide levels over each square kilometer of Milwaukee. People don't know much about nitrogen dioxide trends because there are only a handful of monitoring stations for it on the ground in southeast Wisconsin, she said. This satellite data can provide a much closer look across the city.

Holloway has been using satellite data on pollutants for years to share with the state Department of Natural Resources, but this is the first time it will be used for an epidemiological assessment.

"It's exciting to be advancing new methods in a way that helps our own community," she said.

This spring, Kalkbrenner and her team will compare the air pollution data to school nurse visits during the 2023-2024 school year among kindergartners through 8th graders across Milwaukee Public Schools. She'll look both at the air quality around a child's school and around their home. About 5% of district schools are excluded from the study because they don't report school nurse visits, she said.

Over the summer and into the next school year, Kalkbrenner will examine how different climate change solutions could reduce asthma complications, including whether these potential actions would occur citywide or in specific areas. She'll also study which actions could make the most difference for children who suffer most from asthma.

The potential solutions she will simulate will be chosen from discussions with local groups that work on air quality and health issues.

Hopefully, the study will furnish evidence for which potential solutions have the greatest return on investment, Kalkbrenner said.

The study will build on work already being done to better understand air pollution and its health impacts on Milwaukee residents, like the MKE FreshAir Collective, which places air monitoring sensors in neighborhoods around the city, and the Love My Air initiative, which provides air quality data and education to schools.

Through federal grants from the U.S. Environmental Protection Agency, the school district is also adding 150 electric school buses to its fleet in the next three to four years. David Fifarek, senior director of transportation services at Milwaukee Public Schools, said the initiative is aimed at lowering greenhouse gas emissions and reducing asthma risks.

Taking action to slow climate change is important, said Caitlin Warlick-Short, coordinator of the Center for Health, Energy and Environmental Research. But it's not the only point of this research, or the center's work overall – it's an additional benefit.

"We're looking at things that help promote choices that will improve the community's lives in lots of ways," Warlick-Short said.

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