

Up to 38 percent of all annual childhood asthma cases in Bradford may be caused by air pollution

March 27 2018



Charting the full chain of impact -- from the source of air pollution through the pathways in which it impacts health. Credit: Center for Advancing Research in Transportation Emissions, Energy, and Health carteeteh.org

New research highlights the impact of traffic-related air pollution on childhood asthma. The study also shows traffic-related air pollution could be specifically responsible for up to 24% of the total number of cases.

An international team of researchers has used a newly developed model to assess the impact exposure to nitrogen oxides—gases that make up air pollution—has on the development of [childhood asthma](#).

Their study, published today in *Environment International*, used a model that knits together four distinct models of [traffic](#), emissions, atmospheric dispersion and health impact assessments in Bradford. This allowed the researchers to chart the full chain of impact—from the source of air pollution through the pathways in which it impacts children's health.

The results indicate that up to 38% of all annual childhood asthma cases in Bradford may be attributable to air pollution. More specifically, the model estimates showed that 12% of the annual childhood asthma cases would be attributable to traffic related air pollution.

"However, we knew our model was underestimating the traffic related fraction of air pollution. When we adjusted our results using actual measurements of [air pollutants](#) we saw that up to 24% of the annual cases could be attributable to traffic related air pollution," said study co-author, Professor Mark Nieuwenhuijsen, Director of the Urban Planning, Environment and Health Initiative at ISGlobal, a centre supported by The "la Caixa" Foundation.

Study lead author Dr. Haneen Khreis carried out this research while at the Institute for Transport Studies at Leeds. She said: "Overall rates of childhood asthma cases in Bradford are higher than the national average as were emergency hospital admissions for asthmatic children under 16 years of age. Traffic-related air pollution is a real concern to the community.

"Our team's previous research has shown that children exposed to high levels of traffic-related air pollution have a higher risk of developing asthma. Quantifying the number of childhood asthma cases that are directly attributable to traffic-related air pollution has not been done in the past and as we show now, a significant portion of cases is largely preventable."

She added: "Our work demonstrates that while popular initiatives such as stopping vehicles from idling outside schools or providing walking routes away from roads are important, proposed solutions to mitigate [traffic pollution](#) shouldn't be restricted to localised areas.

"New policies aimed at reducing the effects of traffic-related air pollution need to target each link in the full chain of events—from traffic volume and type, to exhaust and non-exhaust emissions, to dispersion to exposure."

The models used in the study allowed the team to chart how much air pollution is present in the city, and how much of that can be traced back to road traffic. By examining estimates of nitrogen oxide concentrations in Bradford they were also able to estimate the levels of nitrogen dioxide. Nitrogen dioxide are air pollutants produced as a result of road traffic. High concentrations of [nitrogen dioxide](#) can cause irritation to the respiratory system and significantly exacerbate existing respiratory problems.

Professor Nieuwenhuijsen said: "There is very little research that explores the impact of different exposure assessments. Cases of childhood asthma have been steadily increasing since the 1950s. Future progress with childhood asthma requires a focus beyond controlling and treating the disease toward [asthma](#) prevention starting with reducing traffic related air pollution."

The team's research is part of ongoing work in Bradford assessing emissions and air quality profile in the region and the associated [childhood](#) health effects and impacts on the community.

Professor John Wright, Director of the Bradford Institute for Health Research and chief investigator of Born in Bradford, said: "This important study adds to the overwhelming evidence that air [pollution](#) is

harming our children. The air in our cities has become a tragedy of the commons whereby a common good is being poisoned by collective neglect.

"The good news is that we can all save lives by driving less and using cleaner fuels."

More information: Full-Chain Health Impact Assessment of Traffic-Related Air Pollution and Childhood Asthma, *Environment International* (2018).

Provided by University of Leeds

Citation: Up to 38 percent of all annual childhood asthma cases in Bradford may be caused by air pollution (2018, March 27) retrieved 25 April 2024 from <https://phys.org/news/2018-03-percent-annual-childhood-asthma-cases.html>

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