

Nearly half of all childhood asthma cases in Barcelona are attributable to air pollution

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As many as 1,230 cases of childhood asthma in Barcelona—48% of the total—could be attributable to air pollution each year. This is the main conclusion of a new study led by the Barcelona Institute for Global Health (ISGlobal). The study also finds that childhood asthma related to air pollution may have a larger effect on the city's less socially deprived children.

Asthma is the most common chronic [childhood](#) disease and has been associated with increased morbidity and mortality. A recent study by ISGlobal, which used the Health Impact Assessment (HIA) methodology, found that 33% of new [childhood asthma](#) cases in Europe were attributable to [air pollution](#).

The new study used the same quantitative approach to estimate the number of childhood asthma cases in the city of Barcelona attributable to three main air pollutants: nitrogen dioxide (NO₂), particulate matter (PM_{2.5}) and black carbon (BC). The study, published in *Environmental Research*, relied on census data for the city of Barcelona. Asthma incidence rates in children between one

and 18 years of age were collected from the Global Burden of Disease database. Exposure levels for the three pollutants were calculated using a land-use regression model (LUR).

To estimate the burden of childhood asthma, the researchers considered two different scenarios. The first scenario was based on the World Health Organisation (WHO) guidelines for maximum air pollution exposure levels. The second scenario reflected the minimum levels of air pollution reported in various scientific studies.

In the first scenario, the researchers found that if the WHO guidelines on annual exposure levels were met, as many as 478 childhood asthma cases attributable to PM_{2.5} (19% of all cases) and 454 cases attributable to NO₂ (18%) could be prevented in Barcelona each year. In the second scenario, if air pollution were reduced to the minimum reported levels, as many as 1,230 childhood asthma cases attributable to NO₂ (48% of all asthma cases), 992 cases attributable to PM_{2.5} (39%) and 789 cases attributable to BC (31%) could be prevented in Barcelona each year.

David Rojas, researcher at ISGlobal and the Colorado State University and coordinator of the study, commented: "This is the first quantitative [health](#) impact assessment to include multiple pollutants—NO₂, PM_{2.5} and BC—and the development of childhood asthma, with an environmental health equity perspective in Barcelona."

The study also described the distribution of air pollution impacts on the development of childhood asthma by socioeconomic status. Using the MEDEA index, which incorporates various indicators related to education and employment status, the researchers classified the population of Barcelona by deprivation level. In general, differences between socioeconomic groups were found for all of the air pollutants studied. David

Rojas, coordinator of the study, commented: "Our analysis found more air pollution and subsequently more childhood [asthma](#) cases among the less disadvantaged groups in the city." He also added "in Barcelona, unlike other cities, the wealthy population tends to live where more traffic and air pollution are."

"Road transport is one of the major air pollution sources," commented Mark Nieuwenhuijsen, director of the Urban Planning, Environment and Health Initiative at ISGlobal. "Barcelona urgently needs interventions to reduce the amount of motor-vehicle traffic, which has a negative impact on the health of the city's children. "Reducing traffic does not only reduce air [pollution](#), but also reduce noise and heat island effects and increases physical activity which are all beneficial to health," he adds.

More information: I. Pierangeli et al, Health equity and burden of childhood asthma related to air pollution in Barcelona, *Environmental Research* (2020). [DOI: 10.1016/j.envres.2019.109067](https://doi.org/10.1016/j.envres.2019.109067)

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