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33% of New Childhood Asthma Cases in Europe Attributable to Air Pollution

A study in 18 European countries suggests that current WHO air quality guidelines for NO₂ do not provide sufficient protection for children

Barcelona, 8 August, 2019-. Up to **11% of new childhood asthma cases could be prevented** each year if European countries **complied with the WHO PM_{2.5} air quality guidelines**. Moreover, **33% of new annual cases** could be prevented in European countries if they were able to **reduce air pollution levels to lowest levels recorded in the literature**. Those are the conclusions of a study led by the Barcelona Institute for Global Health ([ISGlobal](#)), an institution supported by "la Caixa", and published in the *European Respiratory Journal*.

Asthma is the most common chronic disease in children. Emerging evidence suggests that exposure to air pollution [may increase the risk](#) of developing this respiratory disease during childhood. The new study has estimated the burden of childhood asthma in **18 European countries** and more than 63.4 million children and has concluded that a large number of cases may be attributable to air pollution exposure. The attributable percentage of new annual cases varies according to each of the three pollutants studied: **33% for PM_{2.5}, 23% for NO₂ and 15% for black carbon (BC)**.

The study used **census population data** from 18 European countries and obtained **incidence rates of asthma in children from the Global Burden of Disease (GBD)** study database. Exposure to the different pollutants was calculated using a harmonized European statistical model (land use regression) based on multiple measurements in Europe. To estimate the burden of childhood asthma, researchers posed **two different scenarios**: the first one was based on the maximum air pollution levels recommended by the World Health Organisation (WHO) air quality guidelines. The second scenario took as a reference the lowest air pollution levels recorded among 41 previous studies.

The analysis for the **first scenario** revealed that **66,600 childhood asthma cases** (11% of the total incident cases) could be prevented per year if the 18 countries under study complied with the WHO air quality **guideline for PM_{2.5}**. Compliance with the **NO₂ guideline** was estimated to **prevent 2,400 childhood asthma cases** per year (0.4% of the total incident cases).

"The analysis showed that, while meeting the WHO recommendations for PM_{2.5} would imply a significant reduction in the percentage of annual childhood asthma cases, that is not the case with NO₂, where 0.4% of the cases would be prevented. Therefore, our estimations show that **the current NO₂ WHO air quality guideline value seems to provide much less protection than the PM_{2.5} guideline**. We suggest that these values require update and lowering to be better suited in protecting children's health", says **David Rojas-Rueda**, one of the scientists who led this study at the Barcelona Institute for Global Health.

According to the results of the **second scenario**, if the 18 countries were able to meet the **lowest levels of PM_{2.5}** recorded by previous studies, **more than 190,000 annual cases** (or 33% of incident cases) **could be prevented**. The number of new cases that could be avoided per year if the **lowest levels of NO₂ and black carbon** were achieved would be **135,000** (or 23%) and **89,000** (or 15% of all incident cases), respectively.

Overall, these estimates are **in line with two [previous studies](#) conducted in the UK** which found that the percentage of annual incident childhood asthma attributable to NO₂ was

22%. [Another study](#) estimated that 4 million new paediatric asthma cases could be attributable to NO₂ pollution annually, 64% of which occur in urban centres.

Haneen Khreis, lead author of the study and an associated researcher at the Center for Advancing Research in Transportation Emissions, Energy, and Health at the Texas A&M Transportation Institute, believes **this new analysis is “a call for urgent action”**. “Only in the past two years, several analyses on air pollution and onset of childhood asthma have emerged, strengthening the case from different research teams that air pollution is contributing substantially to the burden of paediatric asthma”, Khreis commented. “Largely, these impacts are preventable and there are numerous policy measures which can reduce the ambient levels of, and children’s exposures to, outdoor air pollution. We can and should do something about it”.

The 18 European countries covered in the study are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. Countries from Eastern Europe were not included due to the lack of air pollution exposure data in the region.

Reference

Haneen Khreis, Marta Cirach, Natalie Mueller, Kees de Hoogh, Gerard Hoek, Mark J Nieuwenhuijsen and David Rojas-Rueda. Outdoor Air Pollution and the Burden of Childhood Asthma across Europe. *Eur Respir J* 2019; in press <https://doi.org/10.1183/13993003.02194-2018>

About ISGlobal

The Barcelona Institute for Global Health, ISGlobal, is the fruit of an innovative alliance between “la Caixa” and academic and government institutions to contribute to the efforts undertaken by the international community to address the challenges in global health. ISGlobal is a consolidated hub of excellence in research that has grown out of work first started in the world of health care by the Hospital Clínic and the Parc de Salut MAR and in the academic sphere by the University of Barcelona and Pompeu Fabra University. The pivotal mechanism of its work model is the transfer of knowledge generated by scientific research to practice, a task undertaken by the institute’s Education and Policy and Global Development departments. ISGlobal a member of the CERCA programme of the Generalitat de Catalunya.

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