

Exposure to chemicals before and after birth is associated with a decrease in lung function

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A study co-directed by the Barcelona Institute for Global Health (ISGlobal) and the French Institute for Health and Biomedical Research (INSERM), in collaboration with other European teams, concludes that early life exposure to parabens, phthalates and perfluoroalkyl substances (PFAS) is associated with reduced lung function in children. The study, published in *The Lancet Planetary Health*, involved analysis of data from more than 1,000 mother-child pairs, and is one of the first to apply a comprehensive exposome approach.

People are continuously and simultaneously exposed to a wide range of environmental factors including changing climate, air pollution in urban settings and chemical substances in the home. The totality of these exposures is referred to as the exposome. To date, many studies have addressed the effect of environmental determinants on respiratory health, but most had focused on single exposures or a single family of chemicals.

"This is the first study that applies an exposome approach to identify associations between pre- and

childhood exposure to a range of important environmental factors and impairment of [lung function](#), thereby representing a new paradigm in environmental health research," explains Martine Vrijheid, ISGlobal researcher and co-coordinator of the study.

The new study, performed under the European HELIX project, analysed data from 1,033 mother-child pairs from six European countries: Spain, France, Greece, England, Lithuania and Norway. The researchers measured 85 exposures during pregnancy and 125 during childhood relating to outdoor, indoor, chemical and lifestyle factors. Lung function was measured by spirometry in children at six and 12 years of age.

The results show that prenatal exposure to two types of [perfluoroalkyl substances](#), PFAS, PFOA and PNFA, was associated with decreased lung function. PFAS are used as stain and water repellents and are found in many household products and food packages. They can be absorbed by the body through food or water, for example, and passed to an unborn baby through the placenta.

The study identified nine exposures associated with impaired lung function in children. Five phthalate metabolites including DEHP and DINP, which are used as plasticizers and can be ingested, inhaled or absorbed through the skin, showed the strongest association. An association was also found with ethyl-paraben, a phenol compound used in cosmetics, and with copper, which in the general population is ingested mainly through drinking water and diet. Finally, house crowding and high density of facilities around school were also associated with lower lung function.

"These findings have important implications for

[public health](#)," concludes Martine Vrijheid.

"Preventive measures to reduce exposure to the [chemical substances](#) identified, including stricter regulation and the labelling of consumer products to better inform the public, could prevent lung function impairment in childhood and benefit health in the long-term," she adds.

More information: *The Lancet Planetary Health*,
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