Green space near home during childhood linked to fewer respiratory problems in adulthood

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Children who have access to green spaces close to their homes have fewer respiratory problems, such as asthma and wheezing, in adulthood, according to new research presented today (Wednesday) at the European Respiratory Society International Congress. In contrast, children who are exposed to air pollution are more likely to experience respiratory problems as young adults.

Until now, little has been known about the association between exposure to air pollution as a child and long-term respiratory problems in adulthood. RHINESSA is a large international study that has been investigating lung health in children and adults in seven European countries, and that has information on residential "greenness" and air pollution exposures from birth onwards from several study centres. In a new analysis, Dr. Ingrid Nordeide Kuiper (MD), from the Department of Occupational Medicine at Haukeland University Hospital, Norway, and colleagues analysed greenness data from 5415 participants aged between 18 and 52 years, contributed by RHINESSA centres in Tartu (Estonia), Reykjavik (Iceland), Uppsala, Gothenburg, Umea (Sweden) and Bergen (Norway); they also analysed air pollution data from 4414 participants, contributed from centres in Uppsala, Gothenburg, Umea and Bergen.

They looked at how many people suffered from more than three respiratory symptoms, severe wheeze (in which the person experienced wheezing with breathlessness in the past year but did not have a cold),

and late onset asthma (asthma that started after the age of 10 years). Respiratory symptoms included: chest wheezing or whistling; breathlessness when wheezing; wheezing or whistling without a cold; a tight chest on waking; being woken by an attack of shortness of breath; being woken by a cough; asthma attack; and taking asthma medicine.

The researchers calculated average annual exposure to three air pollutants: two sizes of fine particulate matter (PM2.5 and PM10) and nitrogen dioxide (NO2) from a child's birth until age 18. They also calculated annual average exposure to "greenness" in a 100-metre zone around the home address for the same period; "greenness" is assessed by means of a Normalised Difference Vegetation Index (NDVI), which uses satellite images to quantify the amount of vegetation in an area.

A total of 608 participants (12%) had more than three respiratory symptoms, 384 (7.7%) had severe wheeze and 444 (9.4%) had late onset asthma.

"These are preliminary results," said Dr. Kuiper, "but we found that exposure to greenness during childhood was associated with fewer respiratory symptoms in adulthood, while exposure to air pollutants in childhood was associated with more respiratory symptoms in adulthood and with late onset asthma."

Examples of findings from the different centres that contributed data for the analysis showed that, in Bergen, exposure to PM2.5 and NO2 increased the probability of late onset asthma by 6-22%; exposure to PM10 increased the probability of developing respiratory symptoms by 21% in Uppsala and by 23% in Bergen; exposure to greenness before the age of ten was associated with a 71% lower probability of wheeze in Tartu, and exposure to greenness between the ages of 11 and 18 was associated with a 29% lower probability of respiratory symptoms and a 39% lower probability of wheeze in Tartu.

"We need to analyse these findings further before drawing any definite conclusions. However, it is likely that our findings will substantially expand our knowledge on the long-term effects of air pollution and greenness, enabling physicians, scientists and policy-makers to see the importance of exposure to pollution and access to green spaces, and helping to improve public health," said Dr. Kuiper. "We will be conducting further analyses that include more centres that are taking part in the RHINESSA study, and we also want to expand analyses to look at the effects of exposure to air pollution and greenness across generations."

She concluded: "We believe that our results, seen together with previous results, will be of particular value for city planners and policy-makers; with increasing population density in the years to come it will be vital to include a decrease in air pollution exposures and an increase in access to green spaces in future city plans and societal regulations."

Professor Mina Gaga is President of the European Respiratory Society, and Medical Director and Head of the Respiratory Department of Athens Chest Hospital, Greece, and was not involved in the study. She said: "This is a fascinating study which underlines the importance for children's short- and long-term health of having plenty of green space in residential areas. The ongoing work of the RHINESSA study will, no doubt, produce more interesting and useful results to support these early indications. From a clinical point of view, access to green spaces is something that doctors may want to enquire about when they see patients with respiratory problems. They could, for instance, advise their patients about trying to avoid polluted areas and tell them about how green spaces might be able to counter some of the negative effects of pollution."

More information: Abstract no: OA5185, "Lung health in adulthood after childhood exposure to air pollution and greenness", by I. Kuiper et al; oral presentation in "Effect of environmental exposure on lung

function outcomes" session, 08.30-10.30 hrs CEST, Wednesday 19 September, Room 7.3M.

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