The Forum of International Respiratory Societies (FIRS) warns that short-term exposure to air pollution in early life may influence future lung growth and development

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An article published in Respirology found a modest association between infant exposure to elevated particulate matter ($PM_{2.5}$) during a six-week coal mine fire and reduced respiratory system reactance, measured three years after the fire. [1].

Short-term health impacts associated with exposure to fine PM have been well characterised. There is consistent evidence associating short-term smoke exposure with increased physician visits, emergency department presentations and hospitalisations for respiratory diseases. However, the long-term health risks from relatively short, that is days to weeks in duration, air pollution episodes have not been characterised, especially in children.

The authors studied children who were living near a coal mine in Victoria, Australia, during a mine fire episode lasting 45 days in Feb 2014.

“This research was driven by concern from members of the affected communities that the fire and severe smoke episodes could have increased the risk of health problems in the longer term. There is currently scant evidence about this, one way or the other – we wanted to address this gap,” says article author Professor Fay Johnston, Head of Environmental Health Research Group, Menzies Institute for Medical Research, University of Tasmania. [2].

They selected 105 children under 2 years old, estimating their personal exposure to $PM_{2.5}$ generated by the mine fire, and they measured their lung function 3 years after the fire to identify any long-term adverse effect on their lung development.

“This study is potentially important for public health because it aims to clarify if even short-term exposure to fine PM may cause any long-term impact on the lung growth of children, who might be more vulnerable because of their fast developing lungs,” said Sara De Matteis, MD, MPH, PhD, Adjunct Professor at Humanitas University, Honorary Senior Lecturer at Imperial College London, and member of FIRS Environmental Committee. [3].

Infants and young children are more susceptible to the respiratory impacts of air pollution exposure due to their less developed airways and immune system, and faster breathing rates compared with adults. The first two years of life is a critical window for lung growth.

The study found that infant exposure to coal mine fire emissions could be associated with long-term impairment of lung reactance.

Dr. De Matteis said “The findings of this study are of potential clinical importance in children most severely exposed to PM, or those with underlying lung conditions, such as asthma. We need further larger studies aimed to elucidate the long-term effects of air pollution on children’ lung function to implement focused preventive strategies and so avoid the associated future public burden of respiratory diseases.”

Professor Fay Johnston concludes “All efforts to improve air quality and protect sensitive groups, including the very young, from episodic air pollution will have important public health benefits. However, our results also demonstrated the larger and more serious adverse impacts from exposure to second-hand tobacco smoke and once again confirmed the importance of supporting parents, prospective parents, and other adults who have regular contact with children not to smoke.”

Notes to Editors

[1] The paper can be viewed at: https://onlinelibrary.wiley.com/doi/full/10.1111/resp.13617

[2] Associate Professor Fay Johnston heads the Environmental Health group, in the Public Health and Primary Care and Cardiorespiratory research themes of the Menzies Institute for Medical Research, University of Tasmania. She is a medical graduate with specialist qualifications in public health and general practice and a PhD in environmental epidemiology.

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[3] Dr Sara De Matteis is Occupational and Environmental Health Physician and epidemiologist whose research centers on the effect of the environment and genetics on health, especially with regard to occupational lung diseases ranging from asthma to lung cancer.

About the Forum of International Respiratory Societies (FIRS)

The Forum of International Respiratory Societies (FIRS) is an organisation comprised of the world's leading international respiratory societies working together to improve lung health globally: American College of Chest Physicians (CHEST), American Thoracic Society (ATS), Asian Pacific Society of Respirology (APSR), Asociación Latino Americana De Tórax (ALAT), European Respiratory Society (ERS), International Union Against Tuberculosis and Lung Diseases (The Union), Pan African Thoracic Society (PATS), Global Initiative for Asthma (GINA), and the Global Initiative for Chronic Obstructive Lung Disease (GOLD).

The goal of FIRS is to unify and enhance efforts to improve lung health through the combined work of its more than 70,000 members globally.

For more information about FIRS please contact Lisa Roscoe lisa.roscoe@firsnet.org.

Respirology is a journal of international standing, publishing peer-reviewed articles of scientific excellence in clinical and clinically-relevant experimental respiratory biology and disease. Fields of research include immunology, intensive and critical care, epidemiology, cell and molecular biology, pathology, pharmacology, physiology, paediatric respiratory medicine, clinical trials, interventional pulmonology and thoracic surgery.

Company Contact:

The Forum of International Respiratory Societies (FIRS)

E. lisa.roscoe@firsnet.org
W. https://www.firsnet.org/

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