



**University of Dundee**

## **Children are especially vulnerable to air pollution**

Belch, Jill J. F.; Elder, Andrew; Bartlett, Sarah; Fardon, Tom; Flinn, Kerry; Hughes, Robert C.

*Published in:*  
BMJ

*DOI:*  
[10.1136/bmj.p2675](https://doi.org/10.1136/bmj.p2675)

*Publication date:*  
2023

*Document Version*  
Peer reviewed version

[Link to publication in Discovery Research Portal](#)

### *Citation for published version (APA):*

Belch, J. J. F., Elder, A., Bartlett, S., Fardon, T., Flinn, K., Hughes, R. C., Miller, M. R., Newby, D., Quinn, T., & Slater, M. (2023). Children are especially vulnerable to air pollution: we need data on transport emissions near schools. *BMJ*, 383, Article p2675. <https://doi.org/10.1136/bmj.p2675>

### **General rights**

Copyright and moral rights for the publications made accessible in Discovery Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## **Rapid Response:**

### **Re: Air pollution is the largest environmental risk to public health and children are especially vulnerable**

Dear Editor

The Royal College of Physicians of Edinburgh, Air Pollution Working group, read with interest Dr Kingdon's article entitled 'Air pollution is the largest environmental risk to public health and children are especially vulnerable' [1]. This resonates strongly with our group. Our children are our future, yet we do not know if they are protected against transport emissions when at school.

Children are among the most susceptible to air pollution as their cells rapidly divide (1,2). Brain (3,4), lung (5,6) heart (7), hormone systems and immunity can all be harmed by air pollution, and hospital admissions for children increase on days of high pollution (10). Children spend a higher proportion of time outdoors and are at greater risk of exposure to ambient air pollutants. There is a correlation between areas of high deprivation and poor air quality in children (5) exacerbating preexisting health inequalities.

Schools are often sited near busy roads and traffic junctions. Air quality is worsened by the 'school run' and idling engines (6). It is essential our schoolchildren are protected from air pollution in playgrounds and on roads surrounding the school, with considerable health and other benefits to be gained, including educational attainment.

It is thus imperative to establish these levels, as often the introduction of small changes in traffic movement round schools can effect improvement in air pollution and thus health (8). We were surprised to discover, however, that in Scotland's cities very few schools were near enough to a networked air quality monitor; too few to draw any conclusions about the safety of our school children.

In conclusion, there is overwhelming evidence that air pollution harms the health of children. What is missing in the UK is data on air pollutant levels at near-school areas and whether pollutants are present at levels above those recommended. As mitigation can produce significant health benefits, we recommend, and are campaigning for, the introduction of air quality monitoring round all city schools as a matter of priority.

#### References:

1. Kingdon C. Air pollution is the largest environmental risk to public health and children are especially vulnerable. *BMJ* 2023;381;1037
2. Pediatrics RCoPa. Every breath we take: the lifelong impact of air pollution. 2016.
3. Clifford A, Lang L, Chen R, Anstey KJ, Seaton A. Exposure to air pollution and cognitive functioning across the life course—a systematic literature review. *Environmental research*. 2016;147:383-98.
4. Milojevic A, Dutey-Magni P, Dearden L, Wilkinson P. Lifelong exposure to air pollution and cognitive development in young children: the UK Millennium Cohort Study. *Environmental Research Letters*. 2021;16(5):055023.
5. Gauderman WJ, Urman R, Avol E, Berhane K, McConnell R, Rappaport E, et al. Association of improved air quality with lung development in children. *N Engl J Med*. 2015;372:905-13.
6. Anderson HR, Favarato G, Atkinson RW. Long-term exposure to air pollution and the incidence of asthma: meta-analysis of cohort studies. *Air Quality, Atmosphere & Health*. 2013;6:47-56.
7. Bilenko N, Rossem Lv, Brunekreef B, Beelen R, Eeftens M, Hoek G, et al. Traffic-related air

pollution and noise and children's blood pressure: results from the PIAMA birth cohort study. *European journal of preventive cardiology*. 2015;22(1):4-12.

10. Fitton C.A., Cox, B., Stewart, M., Chalmers, J., Belch, J.J.F. (2023). Respiratory Admissions Linked to Air Pollution in a Medium Sized City of the UK: A Case-crossover Study. *Aerosol Air Qual. Res.* 23, 230062. <https://doi.org/10.4209/aaqr.230062>.

8. Cameron V, Oduyemi K, Cook T, Rirsche C. Simple traffic measures significantly reduce the exposure of primary school children to NO<sub>2</sub>. *Environmental Health Scotland*. 2019;31(2):29-34.  
Competing interests: No competing interests

3<sup>rd</sup> November 2023

Jill JF Belch<sup>1</sup> and Andrew Elder<sup>2</sup> on behalf of the Royal College of Physicians of Edinburgh, Air Pollution Working group

<sup>1</sup>Professor of Vascular Medicine, University of Dundee, Ninewells Hospital and Medical School, DD1 9SY

<sup>2</sup>Consultant Physician, NHS Fife, Honorary Professor, University of Edinburgh and President of the Royal College of Physicians, Edinburgh

For online version please add

Dr Sarah Bartlett, SpR Stroke / Geriatric Medicine, Royal Infirmary of Edinburgh, NHS Lothian  
Professor Tom Fardon, Consultant Respiratory Physician, Clinical Lead, Respiratory Specialist Delivery Group, Centre of Sustainable Delivery

Ms Kerry Flinn, Former Investigator and Trainer for Scottish Public Services Ombudsman (SPSO) and member of the RCPE Lay Committee

Dr Robert C Hughes, Clinical Research Fellow and member of Centre for Climate Change and Planetary Health Management Group, London School of Health and Tropical Medicine and adviser to the Clean Air Fund

Dr Mark R. Miller, Reader in Air Pollution and Health, British Heart Foundation Centre for Cardiovascular Science, University of Edinburgh, UK

Prof David Newby, BHF Duke of Edinburgh Chair of Cardiology, Deanery of Clinical Sciences, Centre for Cardiovascular Science, University of Edinburgh

Dr Terry Quinn, Senior Clinical Lecturer at University of Glasgow, and Honorary Consultant Physician in Stroke, NHS Greater Glasgow.

Dr Marion Slater, Consultant Physician, Aberdeen Royal Infirmary, NHS Grampian.