

Chimney stove intervention – ready for scale up? PRO

Andrew Bush

It is becoming increasingly clear that the antenatal and preschool years are critical in determining long-term outcomes. This has been highlighted by a recent report¹ in which adults were recruited before age 40 and then followed for >20 years. Of those who did not attain a normal FEV₁, 26% developed COPD (or premature airflow obstruction as many prefer to call it²). An equally large group with COPD at follow-up had a normal FEV₁ at recruitment, but an accelerated loss of lung function, which could not be related to any adult factors, and was presumably also determined by genetic factors or adverse exposures prior to recruitment. So, if we are to turn back COPD from rising up the list of Death Stars, we need to intervene very early.

The key and most pressing early childhood adverse events which need to be tackled across the world to improve long-term lung health are tobacco exposure, outdoor pollution, indoor pollution (in particular in low-income and middle-income countries) and poverty (which are to some extent interlinked). Obesity is obviously also of general and respiratory importance at least in the short term, but will not be discussed in this editorial. Given that randomised controlled trials of many measures are unlikely, perhaps it is appropriate to ask three questions before implementing public health measures:

- ▶ Is the exposure associated with the adverse event, and is causality biologically plausible?
- ▶ Is reduction of the exposure associated with better outcomes?
- ▶ Is there any conceivable, biologically plausible reason why reducing exposure would have adverse consequences?

The adverse effects of passive tobacco smoke exposure are well known and have been reviewed.³ It is known that preterm birth is associated with long-term adverse respiratory outcomes.^{4 5} Cox *et al*⁶ showed that the introduction of successive pieces of legislation reducing passive smoke exposure reduced the incidence of premature birth in Belgium, implying

long-term respiratory benefit as well as the short-term gains from reduction of asthma attacks.⁷ There are no equivalent data for e-cigarettes, but there is no plausible reason why letting children be exposed to the products of vaping, which include nicotine, could be anything other than a bad thing.

Outdoor pollution has been shown to adversely impact airway development both antenatally⁸ and postnatally.⁹ In Southern California, the introduction of stringent policies to improve air quality has been associated with improved lung function in successive cohorts of school age children.¹⁰ The unifying factor of these two success stories is legislation; the policy of the present UK Government of cosying up to those who are causing problems such as obesity and alcohol abuse and expecting them to reform is as wise as asking King Henry the VIII to be a marriage guidance counsellor. Legislation works, nothing else does, so legislation must be enacted.

In this edition of *Thorax*, indoor pollution, worldwide second only to tobacco as the single most detrimental factor impacting long-term lung health, comes into the spotlight.¹¹ This is a follow-up report of a randomised controlled trial of the use of a stove with a chimney vent versus continuing cooking over an indoor open fire in Guatemala. The study design was complex, with continued use of an open fire for differing time periods in different groups of subjects. The investigators measured personal pollution exposure of the children, and then performed spirometry at follow-up. They were able to analyse nearly 1400 measurements in nearly 500 children over more than a year. The authors are to be congratulated on performing such an important study so far off the beaten track, far from the Maddening Laboratory. They found that more prolonged use of an open fire was associated with a statistically significant reduction in peak flow growth over time, with a trend to reduce FEV₁ growth as well. The authors conclude that further studies are needed to gain greater insights, and it is here that this editorialist parts company with the excellent group, and strikes back. They have clearly answered by second question above, showing that

reduced exposures leads to better outcomes, and there is no conceivable plausible biological advantage to regularly exposing young children to wood smoke. They wisely used a stove that is available locally—now is surely the time, on the basis of these data, to ensure that every home has an outside vented stove.

It could be argued that putting in chimneys merely transfers the load of pollution from inside to outside the house. Of course this is what happens, and it would be much better to use non-polluting fuels, but is this going to happen any time soon? The argument that this is a reason to delay implementing the finding of this study does not appeal. We know from the current study that there is benefit here and now from venting stoves; and there is no evidence of harm, although no one would defend pollution. So let's get that benefit for children now, while together campaigning for cleaner air in the future, as well as for action on other adverse factors—tobacco and nicotine exposure, polluting vehicles and child poverty. The fact we are a long way short of protecting our children is no argument for doing what we can, when we can, while striving for a higher goal. Surely the time is now to do something for these vulnerable children, who are unlikely ever to make up lost ground later on.

Funding AB was supported by the NIHR Respiratory Disease Biomedical Research Unit at the Royal Brompton and Harefield NHS Foundation Trust and Imperial College London.

Competing interests None declared.

Provenance and peer review Commissioned; externally peer reviewed.



CrossMark

To cite Bush A. *Thorax* 2016;**71**:393–394.

Published Online First 10 March 2016



- ▶ <http://dx.doi.org/10.1136/thoraxjnl-2015-207783>
- ▶ <http://dx.doi.org/10.1136/thoraxjnl-2016-208318>

Thorax 2016;**71**:393–394.
doi:10.1136/thoraxjnl-2015-208241

REFERENCES

- 1 Lange P, Celli B, Agustí A, *et al*. Lung-function trajectories leading to chronic obstructive pulmonary disease. *N Engl J Med* 2015;**373**:111–22.
- 2 Postma DS, Brusselle G, Bush A, *et al*. I have taken my umbrella, so of course it does not rain. *Thorax* 2012;**67**:88–9.

Correspondence to Professor Andrew Bush, Department of Paediatric Respiratory Medicine, Royal Brompton Hospital, Sydney Street, London SW3 6NP, UK; a.bush@imperial.ac.uk

- 3 Bush A. Health effects of passive smoking in children. In: Loddenkemper R, Kreuter M, eds. *The tobacco epidemic*. 2nd edn. Vol 42. *Progress in respiratory research*. Basel, Switzerland: Karger, 2015:97–109.
- 4 Gough A, Spence D, Linden M, *et al*. General and respiratory health outcomes in adult survivors of bronchopulmonary dysplasia: a systematic review. *Chest* 2012;141:1554–67.
- 5 El Mazloum D, Moschino L, Bozzetto S, *et al*. Chronic lung disease of prematurity: long-term respiratory outcomes. *Neonatology* 2014;105:352–6.
- 6 Cox B, Martens E, Nemery B, *et al*. Impact of a stepwise introduction of smoke-free legislation on the rate of preterm births: analysis of routinely collected birth data. *BMJ* 2013;346:f441.
- 7 Mackay D, Haw S, Ayres JG, *et al*. Smoke-free legislation and hospitalizations for childhood asthma. *N Engl J Med* 2010;363:1139–45.
- 8 Morales E, Garcia-Esteban R, de la Cruz OA, *et al*. Intrauterine and early postnatal exposure to outdoor air pollution and lung function at preschool age. *Thorax* 2015;70:64–73.
- 9 Rojas-Martinez R, Perez-Padilla R, Olaiz-Fernandez G, *et al*. Lung function growth in children with long-term exposure to air pollutants in Mexico City. *Am J Respir Crit Care Med* 2007;176:377–84.
- 10 Gauderman WJ, Urman R, Avol E, *et al*. Association of improved air quality with lung development in children. *N Engl J Med* 2015;372:905–13.
- 11 Heinzerling AP, Guarnieri MJ, Mann JK, *et al*. Lung function in woodsmoke-exposed Guatemalan children following chimney stove intervention. *Thorax* 2016;71:421–8.