

## LETTER

Response to letter by Farioli *et al*

Dear Sir

We thank the authors<sup>1</sup> for their interest in our paper,<sup>2</sup> in which we compared the malignant mesothelioma (MM) rates among those first exposed as children with those first exposed as adults to blue asbestos at Wittenoom, Western Australia. Our aim for this study was to question whether there was additional risk in people first exposed as children, suggested as a possibility by Peto,<sup>3</sup> and we believe that we have shown clearly that there was not.

While the letter writers are concerned about lack of age adjustment and residual age confounding, it has been widely accepted in the asbestos-MM literature for many years that the incidence of MM depends almost entirely (apart from the level of exposure) on time since first exposure and is largely independent of age.<sup>4</sup> It is certainly not strictly age related as they suggest. However, we ourselves have found that with increased length of follow-up there are age effects on MM incidence.<sup>5</sup> Furthermore, in the analyses for the present paper we did estimate models including fractional polynomial terms for age at first exposure, which showed a marked increase from birth to about age 6 before levelling off to a slighter but steady increase with age at first exposure thereafter, with terms  $\log(\text{age})$  and age cubed, and were a much better fit to the data ( $P=0.0006$ ) (table and figure available on request). Since the aim of our paper was to show whether there was an additional risk of MM for children, we opted for categorising age of first exposure into a binary variable for ease of presentation.

As for presenting table 3<sup>2</sup> age adjusted, we decided against that. However, with the prompting of this letter, we have repeated table 3<sup>2</sup> with direct age standardisation

for the two age groups (to the Segi World population),<sup>6</sup> although in 10-year age groups because of smallish numbers, and found that the overall picture was quite different, with lower rates in children in only three of the five 'time since exposure' groups. Even with age standardisation though, this table could still be misleading, in that it categorises time since first exposed into only five risk groups when we know that the risk is increasing within each group according to time cubed, thus we believe the principal results remain those in table 4.<sup>2</sup>

We omitted presenting the actual interaction term as it made little difference to the exposure effect or the model fit. An original version of table 4 included interactions with both sex and age at first of exposure but again these were left out of the final version for ease of interpretation.

Lastly, the letter writers questioned the quality of the diagnosis of MM in this paper. The Western Australian Mesothelioma Registry is probably the longest running in the world, starting in 1972 and still ongoing. From inception until today it has had expert input from respiratory and occupational physicians, pathologists and epidemiologists and is linked to the State cancer registry. All sources of information are collated in order to make a reliable diagnosis. We are confident that there was little or no misclassification of our outcome.

Alison Reid,<sup>1</sup> Peter Franklin,<sup>2</sup> Geoffrey Berry,<sup>3</sup> Susan Peters,<sup>4</sup> Nita Sodhi-Berry,<sup>2</sup> Fraser Brims,<sup>5,6</sup> Arthur W Musk,<sup>2,6</sup> Nicholas H de Klerk<sup>7</sup>

<sup>1</sup>School of Public Health, Curtin University, Bentley, Western Australia, Australia

<sup>2</sup>School of Population Health, University of Western Australia, Crawley, Western Australia, Australia

<sup>3</sup>School of Public Health, University of Sydney, Sydney, New South Wales, Australia

<sup>4</sup>Institute for risk assessment sciences, Utrecht University, Utrecht, The Netherlands

<sup>5</sup>Curtin Medical School, Curtin University—Perth City Campus, Perth, Western Australia, Australia

<sup>6</sup>Respiratory Medicine, Sir Charles Gairdner Hospital, Nedlands, Western Australia, Australia

<sup>7</sup>Centre for Child Health Research, University of Western Australia, Crawley, Western Australia, Australia

**Correspondence to** Dr Alison Reid, School of Public Health, Curtin University, Bentley WA 6102, Australia; alison.reid@curtin.edu.au

**Contributors** NdK and AR wrote the initial draft of the letter. All other authors reviewed and commented on it.

**Competing interests** None declared.

**Patient consent for publication** Not required.

**Provenance and peer review** Not commissioned; internally peer reviewed.

© Author(s) (or their employer(s)) 2019. No commercial re-use. See rights and permissions. Published by BMJ.



**To cite** Reid A, Franklin P, Berry G, *et al*. *Occup Environ Med* 2019;**76**:356.

Received 31 January 2019

Accepted 6 February 2019

Published Online First 30 March 2019



► <http://dx.doi.org/10.1136/oemed-2018-105637>

*Occup Environ Med* 2019;**76**:356.

doi:10.1136/oemed-2019-105740

## REFERENCES

- 1 Farioli A, Boffetta P, Curti S, *et al*. Response to: 'Are children more vulnerable to mesothelioma than adults? A comparison of mesothelioma risk among children and adults exposed non-occupationally to blue asbestos at Wittenoom' by Reid *et al*. *Occup Environ Med* 2019;**76**:355.
- 2 Reid A, Franklin P, Berry G, *et al*. Are children more vulnerable to mesothelioma than adults? A comparison of mesothelioma risk among children and adults exposed non-occupationally to blue asbestos at Wittenoom. *Occup Environ Med* 2018;**75**:898–903.
- 3 Peto J. Fibre carcinogenesis and environmental hazards. *IARC Sci Publ* 1989:457–70.
- 4 Peto J, Seidman H, Selikoff IJ. Mesothelioma mortality in asbestos workers: implications for models of carcinogenesis and risk assessment. *Br J Cancer* 1982;**45**:124–35.
- 5 de Klerk N, Alfonso H, Olsen N, *et al*. Familial aggregation of malignant mesothelioma in former workers and residents of Wittenoom, Western Australia. *Int J Cancer* 2013;**132**:1423–8.
- 6 Segi M. *Cancer mortality for selected sites in 24 countries (1950-57)*. Sendai, Japan: Department of Public Health, Tohoku University of Medicine, 1960.