

## Letter to the Editor

## Reply: Ionising radiation and occupational cancer in Britain

L Rushton<sup>\*,1</sup> and S Hutchings<sup>1</sup><sup>1</sup>Department of Epidemiology and Biostatistics, School of Public Health and MRC-HPA Centre for Environment and Health, Imperial College London, St Mary's Campus, Norfolk Place, London W2 1PG, UK

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Sir,

We are pleased that Drs Muirhead and Haylock (2012), have found our study on occupational cancer in Britain interesting (volume 107, supplement 1) and have responded in such detail regarding the results for ionising radiation. They are correct in pointing out that IARC have identified a wider range of cancer types to be associated with ionising radiation than the five (bone, leukaemia, liver, lung, thyroid), for which we carried out an estimation of occupational burden. As pointed out in the introductory paper of the supplement (Rushton, 2012), we assessed those agents classified by IARC by the end of 2008 as group 1 and 2A carcinogens. Our estimates do not, therefore, include evaluation of the additional sites identified from the review and update by IARC of all group 1 carcinogens (IARC, 2012). We acknowledge that our estimates are thus an underestimate of the true burden.

Our study, including the reviews of the literature available in the detailed technical reports (available at <http://www.hse.gov.uk/cancer/>) was carried out over a number of years and it has taken some time to publish the large number of papers and reports. We thank Muirhead and Haylock (2012) for drawing our attention to their more recent paper reporting results from the National Register of Radiation Workers; we did of course refer in our technical reports to their earlier papers.

## REFERENCES

- IARC (2012) A Review of Human Carcinogens: Radiation. *IARC Monogr Eval Carcinog Risks Hum* 100D: 1–352. <http://monographs.iarc.fr/ENG/Monographs/vol100D/index.php>
- Muirhead CR, Haylock R (2012) Ionising radiation and occupational cancer in Britain. *Br J Cancer* 107: 1660–1661

In developing our methodology we had to make several pragmatic decisions, including the assumptions for latency and risk exposure period referred to in the letter by Muirhead and Haylock (2012). This was due to the general paucity of information on latency of cancers due to occupational carcinogens. To be consistent across all cancers we used our standard latency of 20 years for leukaemia and ionising radiation. If the UNSCEAR (United Nations Scientific Committee on the Effects of Atomic Radiation) model suggests that this period should be longer then we agree our results will be underestimated (United Nations Scientific Committee on the Effects of Atomic Radiation, 2008). Similarly, if our average annual dose is too low this will add to the underestimation.

We have recently been carrying out some evaluation of the effect on our results of the various sources of bias and uncertainty that have occurred in the study and are in the process of preparing a paper for submission to a scientific journal.

We would encourage others to carry out re-estimation of the burden from occupationally related ionising radiation exposure taking into account additional cancers, higher exposures in the past and more recent data from the Central Index of Dose Information. However, we agree with Muirhead and Haylock (2012) that the resulting figures will remain small and particularly in relation to the results for many of the other occupational carcinogens given in the supplement.

- Rushton L (2012) The Burden of Occupational Cancer in Britain. Introduction. *Br J Cancer* 107: S3–S7
- United Nations Scientific Committee on the Effects of Atomic Radiation (2008) *Effects of ionising radiation: UNSCEAR 2006*. Vol. 1, Report to the General Assembly, Annex A. <http://www.unscear.org/>