EDITORIAL

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Childhood leukaemia near nuclear power plants

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This year marks the 30th anniversary of the broadcast of the Yorkshire Television programme 'Windscale: The Nuclear Laundry,' which triggered a Government enquiry into cancer incidence near the Sellafield nuclear reprocessing plant. The report of this enquiry (Black, 1984) was followed by a plethora of studies into rates of cancer – and particularly childhood leukaemia – near nuclear installations, both in the United Kingdom and in other countries. In its 10th report, the Committee on Medical Aspects of Radiation in the Environment (COMARE) examined the incidence of childhood cancers around British nuclear installations; their analyses demonstrated excesses around Sellafield and near the reprocessing plant at Dounreay, in line with previous reports, but 'found no evidence of excess numbers of cases in any local 25 km area' near British nuclear power plants (COMARE, 2005).

In contrast to this latter finding, the KiKK (*Kinderkrebs in der Umgebung von Kernkraftwerken*) study reported an excess of leukaemias at ages under 5 years within 5 km of nuclear power plants in Germany (Kaatsch *et al*, 2008; Spix *et al*, 2008). Following this, COMARE updated its earlier analysis to look at areas closer to British nuclear power plants and came to similar conclusions to before (COMARE, 2011). However, whereas COMARE looked at the geographical distribution of childhood cancers, the KiKK study employed a case–control design that used information at the individual level, rather than averaged over groups.

It is against this backdrop that Bithell *et al* (2013) have conducted a case–control study of childhood leukaemia and non-Hodgkin lymphoma (NHL) near British nuclear power plants. A key strength of this study is the availability of high quality cancer registration data over more than four decades. As in the earlier COMARE analyses, Bithell *et al* found little evidence of a raised risk. However, comparison with the KiKK study is complicated by differences in the study design. First, unlike the KiKK study, the controls in Bithell *et al*'s study were matched to cases from the same birth register. The resultant partial geographical matching has limited the ability to detect an association between leukaemia risk and proximity of the address at birth to a nuclear power plant; however, it should not have led to bias. Second, the control's address at the time of the case's diagnosis is unknown, meaning that these controls could not be used to analyse the proximity of the address at diagnosis to a nuclear power plant, as in the KiKK study. Consequently, for this analysis, Bithell *et al* have used childhood cancers other than leukaemia and NHL as controls. This approach relies on the assumption that there is no association between the incidence of these other cancers and proximity to a plant; that said, both the KiKK study and the British geographical analyses (COMARE, 2005, 2011) provide some support for this contention.

Based on an analysis that looked for any trend in risk with increasing proximity of the address at diagnosis to a nuclear power plant, Bithell *et al* concluded that their findings are incompatible with those from the KiKK study. However, the trend reported in the KiKK study was influenced greatly by the findings within 5 km of German plants. Taken together with the tendency for British nuclear power plants to be sited further from centres of population than their German counterparts, this means that the KiKK study has greater precision within 5 km than does Bithell *et al*'s study. Within this distance range, it is not entirely clear whether the findings from the two studies are inconsistent, although there are indications that this may be the case. Nevertheless, as Bithell *et al* recognise, proximity *per se* may be a poor surrogate for a true measure of exposure.

It should not be forgotten that other national studies have been conducted recently – both case–control and cohort – that analysed the proximity of residences of childhood leukaemia cases and of other children to nuclear power plants; specifically in Finland (Heinävaara *et al*, 2010), France (Sermage-Faure *et al*, 2012) and Switzerland (Spycher *et al*, 2011). It would be valuable, as suggested by Clavel *et al* (2012), to undertake a pooled analysis of individual-level data from relevant studies. In particular, a systematic review that examines critically the similarities and differences, strengths and limitations of such studies and attempts to reach a consensus on their findings might clarify the situation internationally. Further consideration of explicit measures of radiation exposure, as in the French study (Sermage-Faure *et al*, 2012), would also be welcome. Furthermore, as COMARE recommended in its most recent report (COMARE, 2011), epidemiological and radiological monitoring around nuclear sites should continue.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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