Table 1. Leukaemias in children and young adults aged under 24 in the vicinities of Sellafeld, Dounreay, and La Hague

	Study region			Control region				
Site	***O***	***E***	**SIR**	***O***	***E***	**SIR**	**RR**	***P*-value**
Sellafield	6	0.90	6.67	68	75.93	0.90	7.44	0.0002
Dounreay	8	5.46	1.47	8	8.88	0.90	1.63	0.2317
La Hague	5	2.30	2.17	33	34.63	0.95	2.28	0.0852
Pooled data	19	8.66	2.19	109	119.4	0.91	2.40	0.0010

Abbreviations: *E* = expected; *O* = observed; RR = relative risk; SIR = standardised incidence ratio.

zone: all were between 1 year and 6 years old. A relative risk of RR = 3.4 was found, which was not statistically significant using a two-sided test. However, with the one-sided test, which we use here as we test for an increase, the increase of childhood leukaemia near La Hague is statistically significant ($P = 0.042$).

We have pooled the data for leukaemia in children and young adults aged under 24 in the vicinities of Sellafeld, Dounreay, and La Hague (study areas: the wards Seascale, Thurso/Reay, and Beaumont-Hague). We compared the leukaemia rates in the combined study areas with the rates in the combined respective control areas and found a significantly increased relative risk of 2.40 ($P = 0.0010$). The results are shown in Table 1.

In 2012, we analysed the pooled data of leukaemia cases near nuclear power stations in Germany, Great Britain, Switzerland, and France, and found a 37% increased risk in young children living near them (Koerblein and Fairlie, 2012). Since radiation exposures near nuclear reprocessing plants are likely to be greater than those near nuclear power stations, higher leukaemia risks would also be expected. The result in Table 1 is in line with this expectation.

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Response to: Comment on 'Updated investigations of cancer excesses in individuals born or resident in the vicinity of Sellafield and Dounreay'

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Sir,

We thank Drs Fairlie and Korblein for their comments on our paper that reported a lack of recent excesses of childhood or young adult cancer in individuals born or resident in the vicinity of Sellafield or Dounreay (Bunch *et al*, 2014). They stress that the analyses presented were based on small numbers; we have already acknowledged that this was a limitation of our study. However, although there was a statistically significant excess of leukaemia in Seascale ward over the whole study period, this was entirely attributable to an excess in the earliest time period. Four cases were diagnosed during 1963–1983, with only one case diagnosed during 1984–1990 and another during 1991–2006. In contrast to Drs Fairlie and Korblein, we would argue that it is misleading to consider the whole time period (a duration of 44 years) without recourse to subdivision. This would imply that any putative environmental agent related to aetiology was temporally invariant during this prolonged time span. Furthermore, Drs Fairlie and Korblein state that 'radiation exposures near nuclear reprocessing plants are likely to be greater than those near nuclear power stations', but do not provide any evidence for this assertion. Indeed we would dispute their implicit inference that any excesses in leukaemia risk during the earlier time periods are necessarily linked to potential exposures from the nuclear facilities. As we have stated in our paper, there are a number of alternative hypotheses. The most plausible, especially for childhood leukaemia, proposes that increased risk is linked with an infectious aetiology, especially in situations of unusual population mixing, such as those that occurred in the localities around the nuclear facilities (Kinlen, 1988, 1995, 2012). While potential exposure to radiation has not changed over the years, the scale and nature of population mixing has substantively altered. This would be consistent with the observed pattern of excess in the earlier period that was not present in more recent times. We suggest that future research should further consider non-radiation putative risk factors such as changes in population mixing.

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