



Infant leukaemia near nuclear power stations

An important, recent study has put forward a new hypothesis to explain why children living near nuclear power stations are more likely to suffer from leukaemia than the general population. **Dr Ian Fairlie** examines its content and concludes that the government should reconsider its support for nuclear power generation.

Many recent studies are providing incontestable evidence of increased childhood leukaemia near nuclear power plants (NPPs). In fact, no other area of toxicology (e.g. looking into the risks of asbestos or lead) has as many studies showing such a clear association. Over 40 epidemiology studies worldwide show increased leukaemia rates among children living near NPPs. Yet the government and the nuclear industry continue to refute these findings and resist their implications. This response can be compared to the denials of an association between lung cancer and smoking in the 1960s, or in the more recent past between man-made CO₂ emissions and global warming.

It is undeniable that there is a clear and strong pattern of increased child leukaemia rates near NPPs around the world. This now needs to be explained.

Contentious issue for decades

Childhood leukaemia rates near NPPs have been a contentious issue for decades. It was a huge issue in the mid-1980s resulting in many government commissions and committees, international conferences, government reports, two long court cases, dozens of TV programmes and over a hundred scientific articles. The debate was reignited in 1990 by the publication of the Gardner report (1990) which found a very large increase (7 fold) in child leukaemia rates near the infamous Sellafield nuclear facility in Cumbria.¹

In early 2009, the debate was again rekindled by the KiKK study.² This very large study had been commissioned by the German government and – much to its surprise – it found a 60% increase in total cancers and 120% increase in leukaemia among children under five years old living within five kilometres of all German NPPs.

As a result, the French, Swiss and British governments hurriedly set up studies near their own NPPs. All found leukaemia increases. When all their respective data were added together in a meta-analysis, the

result was a 37% increase in leukaemia near all the reactors in these four countries.³ This result was highly statistically significant.

However, few scientists agree on what causes the cancers. Many people are worried about radioactive discharges from NPPs; however any theory involving radiation has a major difficulty. It has to account for the large (~1,000 fold) discrepancy between official dose estimates from NPP emissions and the clearly-observed cancers.

Mainly for this reason, the nuclear industry, advisory bodies and the government argue that it cannot be due to radiation from nuclear facilities. Sadly, few independent scientists have the expertise to question this and to suggest how the cancers might have arisen. But a new study has put forward a detailed explanation for the cancers.⁴

New explanation

The new article is written for scientists who are experts in the field. Therefore, unless the reader has knowledge of radiation biology, statistics and epidemiology, it is not easy to grasp. But it constructs a plausible explanation for increased childhood leukaemia by piecing together pieces of information like a scientific jigsaw puzzle.

The report explains the link as follows:

- 1 The cancer increases are due to radiation exposures received by people downwind from breathing in the radioactive gases and water vapour emitted by NPPs or ingesting food or water which has been contaminated by these radioactive gases/water vapours.
- 2 Huge spikes in NPP emissions occur at nuclear reactors during refuelling. These result in significantly increased doses to populations close to NPPs compared with doses evenly spread over a year.⁵
- 3 The observed cancers are initially triggered not in children, but in the embryos and foetuses of pregnant women.

- 4 Radiation risks in embryos and foetuses are much greater than currently estimated.
- 5 The blood-forming cells in pre-natal bone marrow are even more radiosensitive, meaning tiny doses can significantly increase the probability of adverse effects.
- 6 Resulting babies are born pre-leukemic (which is rarely spotted) and develop into visible full-blown leukaemia in the first few years of life.

The full article discusses these steps in much more detail, and explains the discrepancy between low official doses and the large observed risks.

Conclusion

This new study has several important implications. Women of

child-bearing age should be informed of the possible risks of living near NPPs. NPP operators should be instructed to inform local communities of the dates and times when reactors are to be opened and to only open their reactors after midnight (when most people are indoors), and when winds are blowing out to sea.

In light of the dangerous repercussions of producing nuclear energy, the government should reconsider its plans to construct more nuclear reactors.

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- ¹ Gardner MJ, Snee MP; Hall AJ; Powell CA; Downes S; Terrell JD (1990). 'Results of case-control study of leukaemia and lymphoma among young people near Sellafield nuclear plant in West Cumbria'. (British Medical Journal)
 - ² Kaatsch P, Spix C, Schulze-Rath R, Schmiedel S, Blettner M. (2008). 'Leukaemia in young children living in the vicinity of German nuclear power plants' (International Journal of Cancer)
 - ³ Körblein A and Fairlie I (2012). 'French Geocap study confirms increased leukemia risks in young children near nuclear power plants' (International Journal of Cancer).
 - ⁴ Fairlie (2013). 'A hypothesis to explain childhood cancers near nuclear power plants' (Journal of Environmental Radioactivity 133)
 - ⁵ Fairlie (2012) 'Radioactive Spikes at Nuclear Power Stations', (Blog at <http://www.ianfairlie.org/uncategorized/radioactive-spikes-at-nuclear-power-stations/>)

