

Nuclear power and childhood leukaemia

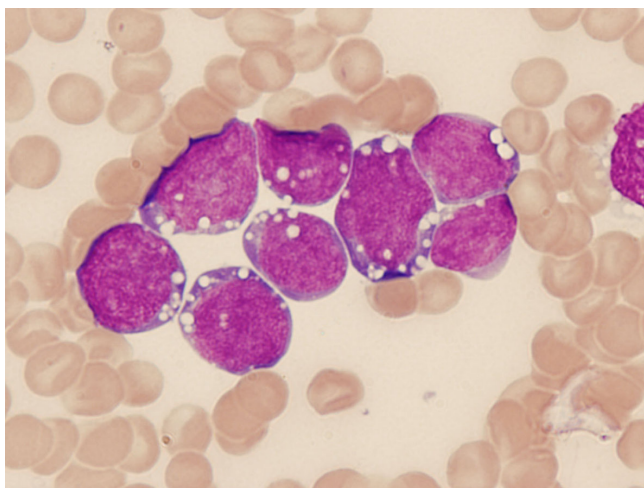
Nuclear power is being suggested by some as a “green” alternative to burning fossil fuels. But are we really considering the full long-term health and safety ramifications of nuclear power stations? One major health concern is whether living near nuclear power stations increases the risk of childhood leukaemia.

Childhood leukaemia

Childhood leukaemia is a cancer of the white blood cells, which causes death unless treated. Many children with leukaemia can be cured with chemotherapy or bone marrow transplantation. However there are significant risks and long-term effects associated with both treatments.

Although what causes leukaemia is poorly understood, environmental exposure to radiation is a well-known risk factor.

Whether the generally low amount of additional radiation exposure received by children living near nuclear power stations increases their risk of childhood leukaemia has been controversial. This fact sheet reviews and summarises new scientific evidence on this topic.



Acute lymphoblastic leukaemic blood smear

New evidence

New studies reviewed overleaf have established beyond reasonable doubt that routine operation of nuclear power plants, even in technologically advanced countries, increases the risk of leukaemia for children living nearby.



A history of inconclusive results and controversy

The first reports of a possible association between living near nuclear power stations and an increased risk of childhood leukaemia came from a study describing a cluster of cases near the Sellafield nuclear site in England 1984. Other clusters were described near Aldermaston (England) and Dounreay in Scotland.

Since then, there have been many studies published in peer-reviewed scientific journals addressing the question of whether the data from these studies are applicable to nuclear reactors in general. However, findings from different studies have been inconclusive and the issue remained controversial. Whilst some studies found an association, others did not and the majority of studies were too small, or the increases in risk statistically insufficient, to draw definitive conclusions.

Reports by the UK Government’s Committee on the Medical Aspects of Radiation in the Environment (COMARE) dismissed radiation exposure as a cause of the leukaemia clusters because the levels of radiation involved were considered too low to explain an increase in leukaemia.



New evidence links nuclear power and childhood leukaemia

US meta-analysis

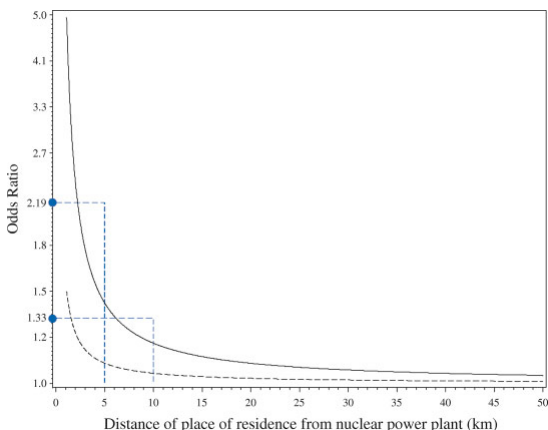
In contrast to previous studies, a more recent meta-analysis (a study analysing all available data of specified quality) undertaken by researchers at the Medical University of North Carolina systematically analysed the evidence accumulated in the past 20 years. The study was funded by the US Dept. of Energy.

The researchers found a small but definite increase in leukaemia cases and deaths in children living near nuclear facilities. The risk was greater in younger children and with closeness to a nuclear facility.

The analysis included 17 research reports covering 136 nuclear sites in the UK, Canada, France, United States, Germany, Japan and Spain. Countries with generally lower environmental and health protection standards — such as China, Russia and developing countries — could not be included because of inadequate health information. This makes the findings a likely best case scenario.

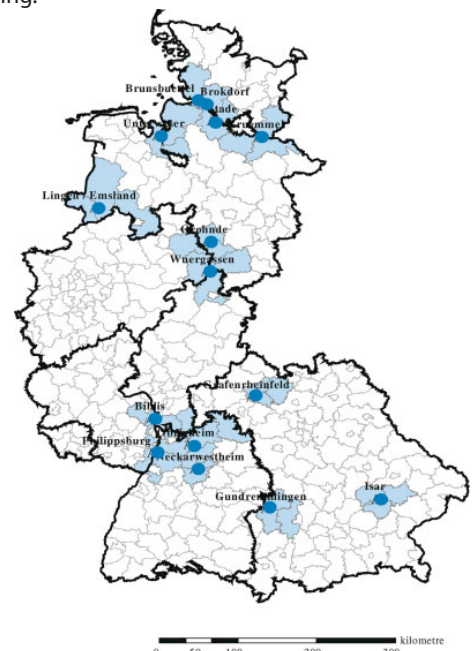
New German evidence

Most striking, however, is convincing new evidence from a large University Mainz study of childhood cancer over 24 years (1980–2003) in proximity to all 16 German nuclear power stations.



Left: Estimated dose response curve for leukaemias (upper curve) based on conditional logistic regression model (593 cases, 1,766 matched controls; distance axis cut off at 50 km). Lower curve: estimated lower on-sided 95% confidence band. Dotted lines: categorical results for inner 5- and 10-km zone. This graph is Figure 2 in Kaatsch, Spix et al (referenced below).

Right: Selected nuclear power plants and study areas in Germany. Each nuclear power plant is identified by name; Lingen/ Emsland are two reactors 2 km apart.



Conclusions

Although results from these new studies cannot provide conclusive proof that it is the ionising radiation produced by nuclear power stations which increases the risk of leukaemia for children living nearby, this does not alter the strength of the association. It has now been established beyond reasonable doubt that routine operation of nuclear power plants, even in technologically advanced countries, increases the risk of leukaemia for children living nearby.

These studies raise important questions regarding the wisdom of embracing nuclear power considering — among many other dangers — the health and safety risks involved.

References:

- Baker PJ, Hoel D. Meta-analysis of standardized incidence and mortality rates of childhood leukaemia in proximity to nuclear facilities. *Eur J Cancer Care* 2007;16:355-63.
- Kaatsch P, Spix C, Schulze-Rath R, Schmiedel S, Blettner M. Leukaemia in young children living in the vicinity of German nuclear power plants. *Int J Cancer* 2008;1220:721-6.
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