New report suggests link between power lines and risk of childhood leukemia

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For decades controversy has persisted about the health effects of electromagnetic fields (EMFs) generated by the transmission of electricity through power lines. Now an independent advisory group to Britain's National Radiation Protection Board (NRPB) has released a wide-ranging review of relevant scientific research. The group's chairman, Sir Richard Doll, was the first scientist to link cigarette smoking with lung cancer more than 30 years ago,

The NRPB's findings were inconclusive as to whether EMFs caused cancer. Nevertheless, the study found that since no alternative explanation existed for the apparent twofold increase in leukemia among children exposed to a magnetic field of more than 4 milligauss (mG), this was suggestive of a link. “Unless, however, further research indicates that the finding is due to chance or some currently unrecognised artifact, the possibility remains that intense and prolonged exposures to magnetic fields can increase the risk of leukemia in children,” it declared.

Doll's team made an assessment of a number of large, well-conducted studies, carried out over the preceding eight years, which provided better evidence than had previously been available. The review included studies detailing the sources and measurements of electromagnetic fields; biological studies on cells relevant to cancer induction; animal and volunteer studies relevant to cancer induction; and epidemiological studies on domestic and occupational exposure to electromagnetic fields. It was the epidemiological evidence that proved to be the most significant.

Epidemiology examines disease in human populations by identifying associations between the occurrence of a particular disease and a specific environmental factor, such as EMFs. This method cannot directly prove causality, because another—unknown—factor could also be involved. Nevertheless, if the risk of developing a disease in the presence of the factor reaches five times the normal rate, then the scientific community will generally accept this as sufficient proof of causality.

More accurate methods of assessing and measuring individual exposure have recently become widely available, and these were utilised by many of the studies reviewed by the NRPB. One study of 3,000 children in the US, Europe and New Zealand suggested that high voltage electricity pylons could double the risk of childhood leukemia. While not conclusive proof of causality, it raises legitimate concerns. After years of denial, the NRPB's findings are the first by a government body to admit the possibility that EMFs and cancer are linked.

As important as this admission is, British consumer groups are already raising questions about Doll's failure to review research conducted by a University of Bristol team, published late last year in the *International Journal of Radiation Biology*.

Led by Professor Denis Henshaw and Dr Peter Fews, the study indicated that power lines produce electrically charged particles called corona ions. According to Henshaw, these ions attach themselves to airborne pollutants such as exhaust fumes, giving them an electrical charge and increasing the likelihood that they will be deposited in the lungs when inhaled.

The team, which was financed by the Foundation for Children with Leukemia, the Department of Health and the Medical Research Council in Britain, placed a number of metal spheres in fields near Bristol and recorded the amount of airborne particles deposited on them. It found a three-fold risk of the pollutants being deposited on the skin for those people living or working

near electricity pylons . Henshaw concluded that power cables were responsible for trebling the amount of cancer-carrying pollutants in the air and that the electromagnetic field surrounding the cables was to blame for the alleged link between power lines and childhood leukemia.

While the British Electricity Association (BEA) denounced Henshaw's work, it was more enthusiastic about Doll's findings. Pointing to the fact that the NRPB could not prove causation, the BEA was quick to pronounce EMFs safe. “Scientists across the world are increasingly coming to the view that there is no major public health risk from exposure to EMFs,” its press release declared.

Aside from being false, this assertion reveals profound contempt for public health, especially the health of young children—the most vulnerable layer of the population. More than 23,000 homes in the UK are located near power lines, and many people have been calling for a mandatory 50-metre (160 foot) buffer zone on each side of the lines. Some British parents have even engaged lawyers over the issue. No doubt the costs involved in relocating thousands of people, let alone compensation payouts, figure prominently in the BEA's response.

Until recently, any possibility of adverse health effects arising from EMFs was dismissed by governments and the scientific community alike, without any studies being undertaken. When studies were finally conducted they showed that some sort of correlation could exist. Two US studies in particular fuelled concerns, generating further investigations. The first, conducted in 1979 by Nancy Wertheimer, found a higher incidence of cancer in children living near high current power lines. The second, carried out in 1987, also linked childhood cancer and proximity to power lines.

In 1999, the United States Institute of Environmental Health Sciences (NIEHS) released its findings from six years of scientific research, costing $60 million. It concluded that, while the scientific evidence was weak, epidemiological studies demonstrated a fairly consistent pattern of a small but increased risk of childhood leukemia with exposure to EMFs, with slightly less risk of adult lymphocytic leukemia. As a result, US legislation now prevents new homes being built near power lines. Consumer groups have taken legal action against power companies and utilities have been forced to move power lines or install shielding.

All the evidence points to the necessity for further research. The Doll report recommends experimental studies into biophysical responses at the cellular and genetic level to assess possible carcinogenic changes. It also calls for epidemiological studies to be conducted in Denmark and Sweden, where exposure to EMFs is far greater than in Britain. One of the shortcomings of investigations so far is that they lack cases exposed to higher EMF levels.

Nevertheless, the research that has been done does demonstrate that exposure to 4 milligaus (mG) or more increases the risk of cancer. In light of this, current government regulations are far from adequate. In the US and Canada, the lower voltage of the national grid creates more intense electromagnetic fields, with potential exposures well over 4 mG. In Australia, existing guidelines allow residents to be exposed to 1,000 mG and industrial workers 5,000 mG. According to Lyn McLean of the Electromagnetic Radiation Alliance of Australia, the guidelines are based on the assumption that radiation only causes health problems when it heats bodies by one degree or more. The NRPB study establishes, however, that other mechanisms may well be at work.