Electromagnetic field and Childhood Cancer

Date: The notion that electric power can cause cancer started in 1979 with a single epidemiological study conducted by Nancy Wertheimer (University of Colorado epidemiologist) and Ed Leeper (electrical engineer). The paper reported an association between wire configuration codes, a measure of residential electromagnetic field (EMF) exposure, and cancer, in this case childhood leukemia.¹

Forecast of the impending disaster: Wertheimer and Leeper claimed that children living near power lines in Denver neighborhood experienced a two or three fold increase in deaths from leukemia. A November 24 (2009) search indicates that Wertheimer & Leeper (1979) had 1,048 citations.

Forecasting method: The evidence presented in Wertheimer & Leeper (1979) could not establish a causal relationship between cancer and EMF. The forecast was based on mere statistical associations in a hypothetical, case-control study with a small sample size, in which subjects were divided into two groups (one with exposure to EMF and one without) and the results were compared.

Actions called for: In 1996, the Federal Communication Commission (FCC) adopted an exposure limit in terms of electric and magnetic field strength and power density for transmitters operating at frequencies from 300 kHz to 100 GHz. The FCC also adopted limits that apply to certain portable transmitting devices such as hand-held cellular telephones.² According to a World Health Organization (WHO) fact sheet, these regulations, along with other measures taken in response to public concerns over EMF, are costing the United States economy alone some $1 billion annually.³ In addition, the US government recommended "passive regulatory action," described as continued information and education of the public and encouraging power utilities to voluntarily reduce exposure to people where possible. International guidelines have been made on exposure limits for all EMF as well, developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

Endorsement of and challenges to the forecast: Many renowned scientists, such as Nobel Prize winner Dr. Robert O. Becker and Swedish scientist Dr. Lennard Tomenius, backed Wertheimer & Leeper’s claim, suggesting that there is an adverse biological effects of EMF on human health. The forecast has been heavily endorsed by the media. Concern over EMF exploded after Paul Brodeur, a staff writer at The New Yorker magazine, wrote a series of articles supporting the association in June 1989. His articles had a catalytic effect on scientists, reporters, and concerned people throughout the world.⁴ The issue gained even more publicity in 1990 when alarming reports appeared in New York Times, the Wall Street Journal, and Business Week. ABC's Ted Koppel and CBS's Dan Rather both aired special segments supporting the claims about EMFs.

Outcomes of the conflict: Wertheimer and Leeper did not actually measure magnetic fields from power lines. Instead, they classified the homes according to their wiring code. The wiring code was then used as a surrogate for the power line magnetic field, which was unmeasured and unknown. This is a flaw in the study. Later studies actually measured the magnetic fields from power lines and found no consistent relationship between measured magnetic field and incidence of cancer.⁵

According to the 1996 WHO International EMF Project, there have been 25,000 articles published over the last 30 years about this topic, and there is still no evidence of the existence of any health consequences from exposure to weak EMF. The report concluded that there is no scientific link between EMF and the collection of symptoms reported by the public, such as headaches, anxiety, suicide, and depression. In response to the study conducted by Wertheimer and Leeper, WHO stated that even if EMF does have effect on cancer, it would be very small.⁶ In 1997, the National Cancer Institute produced the largest epidemiological study to date, which found no association between childhood leukemia and wiring codes or measured magnetic fields.⁷
Finally, National Institute of Environmental Health Sciences (NIEHS) also concluded from a 5-year research that there is inadequate evidence to link EMF to various health effects, such as birth control.

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