Electric Power Lines and Cancer

Nancy Wertheimer and Ed Leeper (1979).
Electrical wiring configurations and childhood cancer.
American Journal of Epidemiology, 109, 273–284.

Found an association between (some forms of) childhood cancer and living close to electric power lines.

Case-control study, multiple testing was done without correction, and electric and magnetic field levels were estimated rather than measured.

A typical paper in a respected refereed journal. Multiple later studies seemed to confirm their findings.

Electric Power Lines and Cancer (cont.)

Paul Brodeur (1989-1990).
Annals of Radiation. The Hazards of electromagnetic fields: I, Power lines, II, Something is happening, III, Video-display terminals. Calamity on Meadow Street.
New Yorker, June 12, 19, and 26, 1989 and July 9, 1990.

Paul Brodeur (1989).
Currents of Death.
New York: Simon and Schuster.

Paul Brodeur (1993).
The Great Power-Line Cover-Up: How the Utilities and the Government Are Trying to Hide the Cancer Hazard Posed by Electromagnetic Fields.
New York: Little-Brown.

Electric Power Lines and Cancer (cont.)

Committee on the Possible Effects of Electromagnetic Fields on Biologic Systems, National Research Council (1997).
Possible Health Effects of Exposure to Residential Electric and Magnetic Fields
Washington: National Academies Press.
(379 pages)

Electric Power Lines and Cancer (cont.)

NRC report found the link between electric and magnetic fields and cancer or other biologic effects had not been established. It highlighted three issues.

- No plausible physical mechanism.
- No reproducible evidence from studies in animals, bacteria, and tissue cultures.
- Most of the epidemiological studies did not directly measure magnetic field strength in the home and the few that did had null results.

NRC report mentions that some scientists argue that "proper adjustment has not been made for multiple comparisons" in the epidemiological studies.

Electric Power Lines and Cancer (cont.)

Martha S. Linet, Elizabeth E. Hatch, Ruth A. Kleinerman, Leslie L. Robison, William T. Kaune, Dana R. Friedman, Richard K. Severson, Carol M. Haines, Charleen T. Hartsock, Shelley Niwa, Sholom Wacholder, and Robert E. Tarone (1997).
Residential exposure to magnetic fields and acute lymphoblastic leukemia in children.
The New England Journal of Medicine, 337, 1–7.
(research article)

Edward W. Campion (1997).
Power lines, cancer, and fear.
The New England Journal of Medicine, 337, 44–46.
(editorial)

Electric Power Lines and Cancer (cont.)

The NEJM research article did one test for association with one cancer (acute lymphoblastic leukemia, ALL). Magnetic field strength was measured by "blinded" workers (who did not know whether the resident of the house was a case or control). No association was found. Not even close to statistical significance.

> The odds ratio for ALL was 1.24 (95 percent confidence interval, 0.86 to 1.79) at exposures of 0.200 μT or greater as compared with less than 0.065 μT.

The NEJM editorial repeats the points made by the NRC report, including that the epidemiological studies did "huge numbers of comparisons with selective emphasis on those that were positive."

Electric Power Lines and Cancer (cont.)

Another large, well designed, well executed study also showed no effect.

UK Childhood Cancer Study Investigators (1999).
Exposure to power-frequency magnetic fields and the risk of childhood cancer.
Lancet, 354, 1925–1931.

Electric Power Lines and Cancer (cont.)

All published studies that did multiple testing without correction found a link between electric power lines and cancer (not always the same form of cancer).

All of the studies that obeyed the "only one test" dogma had negative results.