

# Letters to the Editor

## Cancer Mortality and Electric Transmission Equipment

From DOMINIK PFLUGER AND CHRISTOPH MINDER

Sir—We would like to comment on the paper by Schreiber *et al.*<sup>1</sup> on cancer mortality and electric transmission equipment mostly because of the serious limitations of the investigation.

Most studies of cancer and exposure to electromagnetic fields have been of the case-control type (see e.g. ref. 2). The reason for this is that the relative risks of exposed to non-exposed ranges from 1 to 2, at least in the frequently observed range of exposures. In cohort studies this would necessitate the observation of a very large number of person-years of follow-up, unless the exposure is substantial. Thus, lack of power may be a serious problem of cohort studies and needs to be assessed before the study is conducted.

Power calculations 'post-festum' are shown in Table 1 for the key outcomes of leukaemia, brain cancer and the sum of those two, both for men and women separately and together.

The expected numbers quoted in Table 1 are derived from the data in the paper. For the determination of

power, they were rounded up. As one can see, the power of this study is low in all cases, and never exceeds 41% for any single cause of death. It is doubtful whether the study would have been conducted had such a calculation been performed beforehand. Table 1 also shows that the study really cannot provide any information on the serious question of cancer and exposure to electromagnetic fields.

The study has other shortcomings. A possible advantage of the cohort approach, namely more accurate exposure assessment, was not realized in this study.

There are several possible biases which were insufficiently addressed in the paper. The general population may not be suitable as a reference, as the comparison may be biased by differences in socio-economic status, lifestyle and other exposures: transmission lines usually do not pass through the most affluent regions. The effect of indoor exposure was neglected so that one can expect major misclassifications in the actual exposures associated with the two groups distinguished in the study.

TABLE 1 Power (%) of the Schreiber study to detect relative risks of 1.5 and 2.0 based on person-years of follow-up and expected numbers of the study (ref. 3, p. 274)

Sex	Cause of death	Expected no. of cases among exposed	Relative risk	
			1.5	2.0
Men	leukaemia	2.27	17	39
	brain cancer	1.54	8	21
	both combined	3.81	15	41
Women	leukaemia	1.75	8	21
	brain cancer	1.14	8	21
	both combined	2.89	17	39
Both sexes	leukaemia	4.02	15	41
	brain cancer	2.68	17	39
	both combined	6.70	26	64

NB Combining both sexes and both causes of death is putting heavy restrictions on the risk model considered.

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### REFERENCES

- <sup>1</sup> Schreiber G H, Swaen G M H, Meijers J M M, Slangen J J M, Sturmans F. Cancer mortality and residence near electricity transmission equipment: A retrospective cohort study. *Int J Epidemiol* 1993; 22: 9-15.
- <sup>2</sup> Coleman M, Beral V. A review of epidemiological studies of the health effects of living near or working with electricity generation and transmission equipment. *Int J Epidemiol* 1988; 17: 1-13.
- <sup>3</sup> Breslow N E, Day N E. *Statistical Methods in Cancer Research. Volume II. The design and analysis of cohort studies.* IARC Scientific Publication No. 82, 1987.

## Author's Response

From G M H SWAEN

Sir—Indeed most studies of cancer and exposure to extreme low frequency (ELF) electromagnetic fields have

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