

LEUKAEMIA MORTALITY IN ELECTRICAL WORKERS IN ENGLAND AND WALES

SIR,—Two reports^{1,2} from the United States have suggested an association between electrical occupations and mortality from leukaemia, the greatest increased risk being from acute leukaemia, particularly acute myeloid leukaemia (AML).¹ Two independent analyses on England and Wales mortality data have been used to examine this hypothesis.

1970–72 data collected for a report on occupational mortality³ were reanalysed. To avoid numerator/denominator biases the analysis was confined to proportional mortality ratios (PMRs) based on all deaths in males aged 15–74. Table 1 shows PMRs for all leukaemia and for lymphoid and myeloid leukaemia (all and acute) for all electrical occupations. The distribution of mortality of these occupations taken together is not significantly different from expected. There are consistently raised PMRs, however, for the last four occupations in the table, particularly for AML. Proportional mortality analyses are often considered suspect but PMRs may be of value if interpreted carefully,^{5,6} especially if the ratios are very different from 100.⁶

In the second study deaths entries for 1973 were utilised for a case-control study. Cases were the 537 deaths in England and Wales in males aged 15 and above where the underlying cause of death was AML. 1074 controls from death in males aged 15 and above were

1. Milham S. Mortality from leukemia in workers exposed to electrical and magnetic fields. *N Engl J Med* 1982; 307: 249.
2. Wright W, Peter JW, Mick TM. Leukaemia in workers exposed to electrical and magnetic fields. *Lancet* 1982; ii: 1160–61.
3. Office of Population Censuses and Surveys. Registrar General's decennial supplement on occupational mortality 1970–72. London: HMSO, 1978.
4. Office of Population Censuses and Surveys. Classification of occupations 1970. London: HMSO, 1970.
5. Kupper LL, McMichael AJ, Symons MJ, Most BM. On the utility of proportional mortality analysis. *J Chron Dis* 1978; 31: 15–22.
6. Wong O, Decouffe P. Methodological issues involving the standardised mortality ratio and proportionate mortality ratio in occupational studies. *J Occ Med* 1982; 24: 299–304.

TABLE 1—LEUKAEMIA MORTALITY IN ELECTRICAL OCCUPATIONS: ENGLAND AND WALES 1970–1972 (MALES AGED 15–74)

Occupations	PMR* (and no. of cases)				
	All leukaemia 204–207†	lymphoid leukaemia		Myeloid leukaemia	
		All (204)	Acute (204)	All (205)	Acute (205)
024: radio and radar mechanics	61 (7)	69 (1)	..	72 (2)	109 (2)
025: installers and repairmen telephoner	75 (10)	93 (4)	128 (2)	85 (6)	44 (2)
026: linesmen, cable joiners	64 (7)	63 (1)	..	84 (2)	134 (2)
027: electricians	93 (34)	134 (16)	167 (3)	73 (14)	63 (8)
028: electrical and electronic fitters	79 (4)	125 (2)	..	..	..
029: assemblers (electrical equipment)	127 (2)	..	..	235 (2)	..
030: electrical engineers (so described)	125 (15)	73 (7)	79 (1)	179 (11)	231 (9)
128: telegraph radio operator	249 (6)	132 (1)	..	308 (4)	241 (2)
197: electrical engineers (professional)	102 (7)	..	..	197 (7)	213 (2)
198: electronic engineers (professional)	151 (5)	..	..	262 (5)	305 (4)
Total	98 (85)	100 (29)	104 (11)	107 (49)	104 (31)

* Based on proportionate mortality of all England and Wales males aged 15–74 in 1970–72. † ICD-9, 8th revision.

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THE LANCET, JANUARY 29, 1983

Occupational/Industrial group	RR	95% confidence limits	No. of cases
All electrical occupations and persons of any occupation engaged in an electrical or telecommunications industry	2.3	1.4–3.7	36
All electrical occupations	2.1	1.3–3.6	30
Electricians and electrician's mates	1.6	0.6–4.2	7
Electrical and electronic engineers	1.8	0.7–4.8	7
Post Office and telephone engineers	3.0	0.9–9.7	6
Other telecommunications engineers.	4.0	0.8–17.0	4
Power station, substation, and all electricity board occupations*	2.0	0.7–6.0	

* Some of the individuals in these groups are also classified in three occupation groups above.

randomly selected from all causes of death except leukaemia to match cases within five year age groups. Table 2 shows consistently increased relative risks for the electrical occupations, the highest risk being for telecommunications engineers. The data for one year (1973) used in this case-control study produced about as many deaths from AML to men in electrical occupations as there were in the three years (1970–72) used in the proportional mortality analysis. This is primarily because direct examination of the death entries allowed use of a more appropriate occupation classification. For example, the 1970 classification used³ classified electrician's mates and electrical welders with other occupational groups not identifiable as electrical occupations—which were thus omitted from the 1970–72 analysis. An error in the index of this classification probably resulted in some Post Office engineers being misclassified. Finally, the PMR analysis was limited to men under age 15.

These two analyses reinforce the U.S. findings.^{1,2} Two hypotheses to explain the leukaemia excess were suggested in the earlier reports—exposure to electromagnetic fields (non-ionising radiation) and exposure to chemicals and substances in electrical components or assembly. Unfortunately, there is little consistency between the studies in the degree of risk for different electrical occupations, but the numbers are small and different occupation classifications were used. Telephone linesmen and engineers show risks amongst the highest in three of the studies, but only the 1970–72 proportional mortality study suggests that all electrical occupations combined have not an increased risk of leukaemia. It has been suggested that non-ionising radiation has a short carcinogenic latency period.⁷ Electrical occupations may be exposed to varying degrees of such radiation, and mobility between occupations may make data for specific occupations difficult to interpret.

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MICHAEL E. McDOWALL

BACTERIOLOGICAL DIAGNOSIS OF PERTUSSIS

SIR,—Dr Barrie (Oct. 9, p. 830) and Dr Dianese (Nov. 27, p. 1224) recommend active treatment early in pertussis, but if this policy is adopted it ought to be based, if possible, on a firm diagnosis not suspicion.

Precise diagnosis is nearly always possible early in the disease by culture of a pernasal swab. The result can be available in 3–4 days, which is not too long to wait before starting antibiotics and other potentially harmful drugs. Without this confirmation early treatment will mean much inappropriate prescribing by family doctors.

7. Wertheimer N, Leeper E. Adult cancer related to electrical wires near the home. *Int J Epidemiol* 1982; 11: 345–55.

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