Table 1. Incidence in postcode sectors with average radon levels ≥ 100 Bq m^{-3} compared with postcode sectors with average radon level < 100 Bq m^{-3} (aged less than 15 years, living in Devon and Cornwall)

	Incidence in postcode sectors with average radon level ≥100 Bq m^{-3} (with 95% CI)	Incidence in postcode sectors with average radon level <100 Bq m^{-3} (with 95% CI)	*P* value
Neuroblastoma (1976–1985)	12.2 (6.1–21.9)	3.6 (1.3–7.8)	0.02
Neuroblastoma (1986–1995)	8.9 (3.8–17.5)	8.3 (4.5–13.9)	0.9
Neuroblastoma (1976–1995)	10.6 (6.4–16.5)	5.9 3.6–9.2)	0.08
AML (1976–1985)	6.7 (2.4–14.5)	2.4 (0.7–6.1)	0.11
AML (1986–1995)	11.1 (5.3–20.4)	4.8 2.0–9.4)	0.08
AML (1976–1995)	8.9 (5.1–14.4)	3.6 (1.8–6.2)	0.02

Incidences are per million child years. The P value for the difference between the two incidences is shown (two-tail). AML, acute myeloid leukaemia. CI, confidence interval.

In the subsequent decade, 1986–1995, the incidence of neuroblastoma was similar in the ≥ 100 Bq m^{-3} and <100 Bq m^{-3} radon postcode sectors. Thus, the finding of a significant difference in the decade 1976–1985 is likely to be due to chance.

The higher incidence for AML in the high radon postcode sectors in the period 1976–1985 persisted into the next decade. For the combined period of 20 years, 1976–1995, the incidence of AML in these sectors was significantly increased compared with that in the low radon sectors. A previous study has suggested a correlation between radon exposure and AML [4].

We await the results of the national case–control study described in the editorial that may further elucidate whether exposure to radon has a causal role in any childhood cancer. For those living in Devon and Cornwall, this is particularly important. It should be remembered that in these two counties even in the 'low' radon postcode sectors the average radon levels in homes was 57 Bq m^{-3} which is considerably above the national average of 21 Bq m^{-3}.

1. Parker L, Craft AW. Radon and childhood cancers. *Eur J Cancer* 1996, **32A**, 201–204.
2. Thorne R, Foreman NK, Mott MG. Radon in Devon and Cornwall and paediatric malignancies. *Eur J Cancer* 1996, **32A**, 282–285.
3. Henshaw DL, Eatough JP, Richardson RB. Radon as a causative factor in the induction of myeloid leukaemia and other cancers. *Lancet* 1990, **335**, 1008–1012.
4. Lucie P. Radon exposure and leukaemia. *Lancet* 1989, **ii**, 99–100.

European Journal of Cancer Vol. 32A, No. 13, pp. 2372–2373, 1996

Printed in Great Britain
0959-8049/96 $15.00 + 0.00

PII: S0959-8049(96)00303-6

Very High Male Lung Cancer Incidence in Areas with Tobacco Industries

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IN THE 1970s, in the south-east of The Netherlands, the male lung cancer incidence rate was among the highest in Europe, whereas that for females was among the lowest [1]. However, the rates for men have been decreasing since 1983; those for women are still increasing. In a previous report (*Eur J Cancer* 1995, **31A**, 949–952), it was shown that the changes in lung cancer incidence reflect changes in smoking behaviour, considered to be the major risk factor [2], which occurred 20–25 years ago [3]. The traditional presence of tobacco-processing industries in the south-east of The Netherlands, concentrated mainly in a few rural communities (Valkenswaard, Bladel, Eersel and Tegelen), very likely influenced smoking behaviour. Between 1900

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Received 9 May 1996; accepted 10 Jun. 1996.

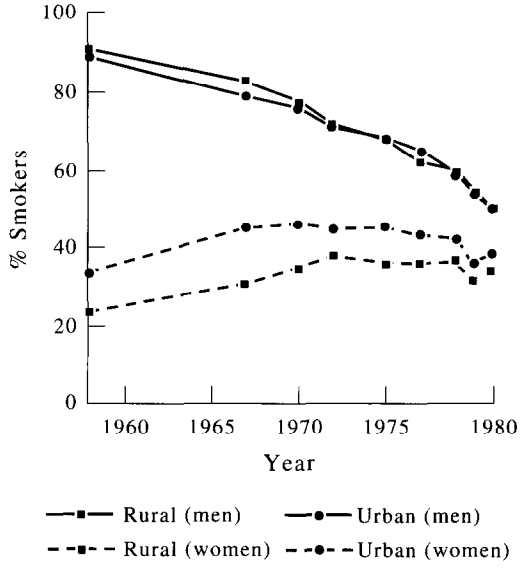

Figure 1. Trends in geographical distribution of smoking behaviour, according to sex

and 1935, approximately 20% of the inhabitants of Valkenswaard (just south of Eindhoven) were employed in the tobacco-processing industries and had an ample supply of tobacco. Since the south-eastern part of The Netherlands was mainly Catholic, smoking was acceptable for men, but not for women (until the 1960s), especially in rural areas. In 1991, the proportion of male smokers in Valkenswaard was still 50% higher than in other rural municipalities. According to Dutch national surveys, performed since 1958 [4], the percentage of male smokers in urban and rural areas in the south-east Netherlands was approximately the same between 1958 and 1981; however, the percentage of female smokers was much higher in urban than in rural areas (Fig. 1).

Using data from The Eindhoven Cancer Registry, we calculated incidence rates for lung cancer in municipalities with tobacco-processing industries and, because of the different smoking behaviour, in urban and rural municipalities [5].

In municipalities with tobacco-processing industries, lung cancer incidence for men was clearly higher than in other municipalities (Fig. 2a). In contrast, lung cancer incidence among women was much higher in urban than in rural areas, and the presence of tobacco industries did not make any notable difference (Fig. 2b).

We are not aware of any other explanation for these divergent male and female rates than their past smoking behaviour. This study shows that the presence of tobacco-processing industries in the south-east of the Netherlands very likely has increased the percentage of male smokers and the amount smoked per day among employees and their acquaintances, which subsequently has given rise to a very high lung cancer incidence rate after a lag time of 20–25 years. In short, the tobacco industry may be good for jobs, but bad for health in its environment.

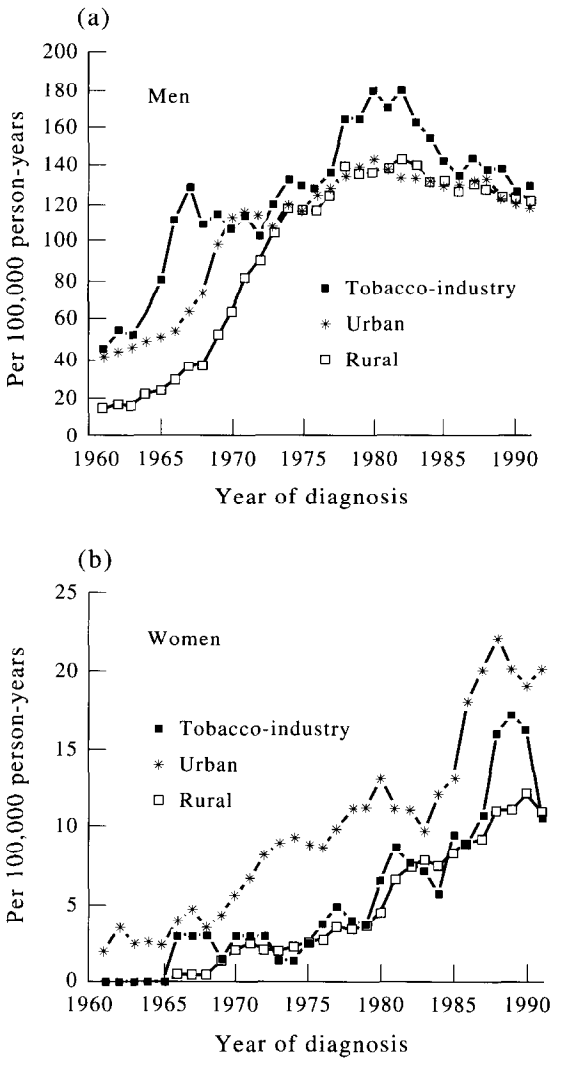

Figure 2. (a) Trends in geographical distribution of male lung cancer incidence (World Standardised Rate). (b) Trends in geographical distribution of female lung cancer incidence (World Standardised Rate)

1. Parkin DM, Muir CS, Whelan SL, Gao YT, Ferlay J, Powell J, eds. *Cancer Incidence in Five continents.* Lyon, IARC Scientific Publications No. 120, 1992, Vol. VI, 865–870.
2. Doll R, Peto R, Wheatly K, Gray R, Sutherland I. Mortality in relation to smoking: 40 years' observations on male British doctors. *Br Med J* 1994, **309**, 901–911.
3. Janssen-Heijnen MLG, Nab HW, van Reek J, van der Heijden LH, Schipper R, Coebergh JWW. Striking changes in smoking behaviour and lung cancer incidence by histological type in the south-east Netherlands, 1960–1991. *Eur J Cancer* 1995, **31A**, 949–952.
4. van Reek J. Smoking behaviour in the Netherlands; a striking decrease between 1958–1982. *Hygie* 1985, **4**, 19–23.
5. Heijnen MLG, Coebergh JWW, Nab HW, van Reek J, van der Heijden LH. Lung cancer incidence and tobacco use in south-east Netherlands since 1960: trends and geographical distribution (in Dutch). *Tijdschr Soc Gezondheidsz* 1994, 72, 194–197.