MONOGRAPHS ON GALLIUM ARSENIDE AND INDIUM PHOSPHIDE

INTRODUCTION TO THE MONOGRAPHS ON GALLIUM ARSENIDE AND INDIUM PHOSPHIDE

Studies of Cancer in Humans

Two compounds evaluated in this volume of the *IARC Monographs*, gallium arsenide and indium phosphide, are predominantly used in the semiconductor industry. However, only parts of the workforce in this industry are exposed to these compounds, and there is also potential for exposure to several other carcinogens in this industry. As none of the studies of cancer in the semiconductor industry were informative with regard to gallium arsenide or indium phosphide, these studies are reported in this introduction.

Two analyses of a small cohort of workers at a semiconductor manufacturing facility in the West Midlands in England have been published (Sorahan *et al*., 1985, 1992). These were prompted by the observation (reported by Sorahan *et al*., 1985) of several instances of skin cancer among the workers. A cohort of 1807 (1526 women) workers first employed in or before 1970, initially followed up until 1982 (Sorahan *et al*., 1985) and further until 1989 for mortality and 1988 for cancer incidence, was compiled (Sorahan *et al.*, 1992). The overall SMR for all causes was 0.72 (107 observed; 95% CI, 0.59–0.87); the standardized registration ratio (SRR) for all cancer registration was 0.96 [93 observed; 95% CI, 0.77–1.18]. The SRR for cancer of the respiratory system was 0.97 [11 observed; 95% CI, 0.48–1.74], that for melanoma was 2.00, [three observed; 95% CI, 0.41–5.84] and that for non-melanoma skin cancer was 1.52 [13 observed; 95% CI, 0.81–2.59] (Table 1).

McElvenny *et al.* (2003) analysed a cohort of 4388 current and former employees (2126 men, 2262 women) at a semiconductor manufacturing facility in Scotland who were first employed at the facility between 1970 (date of start of the operations) and 30 April 1999. Employees were followed up until the end of 2000 for mortality and 1998 for cancer registration analyses. Death and cancer registration rates in the employees were compared with those for Scotland as a whole, with and without adjustment for socio-economic status (using the distribution of the Carstairs deprivation index among current employees). The mean length of follow-up was only 12.5 years. The results, adjusted for socioeconomic status, are presented in Table 1. The study found an excess of lung cancer among women but not men. Small excesses were observed for stomach cancer in women

Table 1. Cohort studies of cancer in the semiconductor industry

Reference, facilities	Cohort characteristics	Cancer site	No. of cases	Relative risk (95% CI)	Comments
Sorahan *et al.* (1992) 1 factory	1526 female and 181 male workers first employed in or before 1970, follow-up for mortality to 1989 and for cancer incidence to 1988	All cause mortality	107	0.72 [0.59–0.87][a]	
		Registration, all cancer	93	0.96 [0.77–1.18][a]	
		Respiratory cancer	11	0.97 [0.48–1.74][a]	
		Melanoma	3	2.00 [0.42–5.92][a]	
		Non-melanoma skin cancer	13	1.52 [0.81–2.59][a]	
McElvenny *et al.* (2003) 1 factory	4388 employees (2126 men, 2262 women) first employed between 1970 and 1999, follow-up for mortality to 2000 and cancer incidence to 1998	All cause mortality			Adjusted for socioeconomic status
		Men	27	0.40 (0.27–0.59)	
		Women	44	0.75 (0.54–1.01)	
		All cancer mortality			
		Men	6	0.47 (0.17–1.02)	
		Women	23	1.10 (0.69–1.64)	
		All cancer registration			
		Men	25	0.99 (0.64–1.47)	
		Women	54	1.11 (0.83–1.45)	
		Lung cancer			
		Men	2	0.56 (0.07–2.02)	
		Women	11	2.73 (1.36–4.88)	
		Melanoma		1.86 (0.23–6.71)	
		Men	2	0.88 (0.11–3.19)	
		Women	2		
		Non-melanoma skin cancer			
		Men	4	1.04 (0.28–2.65)	
		Women	6	1.25 (0.46–2.72)	
		Stomach			
		Men	0		
		Women	3	4.38 (0.90–12.81)	

[a] 95% CI calculated by Working Group

and brain cancer in men (three deaths; unadjusted SMR, 4.01; 95% CI, 0.83–11.72). The SRR for lung cancer in women for up to 10 years since first employment was 3.90 (five registrations; 95% CI, 1.27–9.11), which was higher than that for 10 or more years since first employment (six registrations; SRR, 2.18; 95% CI, 0.80–4.75). [No data on smoking habits were available; however, these results are adjusted for socioeconomic status, which is highly correlated with smoking habits.]

References

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