

Table 2.6 Cohort studies of workers in the rubber industry and other cancers

Reference, location, name of study	Cohort description	Exposure assessment	Organ site (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)*	Adjustment factors	Comments
Chen et al. (1997), PR China	7808 workers (5010 men, 2798 women) employed >1 year in 3 factories, through 1972	Work history and payroll data from company records	Pancreas	<i>Women</i> Tire building	3	SIR 3.7 ($p<0.05$)	Results stratified by smoker/non-smoker	Local reference. Cancer incidence data obtained from company records and confirmed through hospital of diagnosis
Li and Yu (2000); Li and Yu (2002a); Li and Yu (2002c), PR China	Nested case-control study; 1598 workers (934 men, 664 women) employed >1 year in a rubber manufacturing plant from 1973-1997; 4 controls per case, matched by sex and age (± 3 years)	Work history from company records and questionnaire; jobs coded in 5 categories	Pancreas	<i>Job category</i> Tire curing	6	OR 9.3 (1.0-86.1)		Reference category is no exposed
Szeszenia-Dabrowska <i>et al</i> (1991), Szeszenia-Dabrowska <i>et al</i> (1995), Szymczak <i>et al.</i> (2003), Poland	11342 workers (5472 men, 5870 women) employed >1 year during 1945-85 in a rubber footwear plant; mortality follow up until 1997	Occupational history from company records	Gallbladder Cervix	<i>Women</i>	32 36	SMR 2.2 (1.5-3.1) 1.4 (1.0-2.0)		National reference

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Wingren (2006), Norrköping, Sweden	5745 workers (5558 men, 187 women) employed >1 month in a tire manufacturing plant during 1938-1981; 1958-2001; vital status 85%; cause of death 99%	Occupational title groups based on titles/work tasks and chemicals handled	All cancers	Overall	264	SMR 1.1 (1.0-1.2)	10-year lagging	National reference, no SMR reported for specific cancers
Wilczyńska et al. (2001), de Vocht et al. (2009), Poland	17636 workers (11582 men, 6054 women) employed >3 months during 1950-95 in a rubber tire plant; mortality follow-up 1950-2001; vital status 97%; cause of death 88%	JEM for exposure to aromatic amines, inhalable aerosols and rubber fumes from a database of exposure data for the European rubber industry	Liver and intrahepatic bile ducts (155)	<i>Quartiles</i> Inhalable aerosol I II III IV	10	RR 1.0 1.3 (0.1-23.9) 2.4 (0.2-30.0) 4.0 (0.4-42.6)	5-year lagging, gender-specific analyses	Aromatic amine exposure associated with increased risk of prostate cancer in men and digestive and breast cancers in women
Heineman et al. (1995), Shanghai, China	276 incident brain tumor cases diagnosed among women ≥30 years old; cancer incidence follow-up 1980-84	Employment information (industry and occupation) obtained at time of diagnosis for 98% cases	Brain	Employed in rubber Employed in rubber except tires	5 4	SIR 5.0 (1.6-11.6) 4.4 (1.2-11.3)		Local reference

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Zeegers <i>et al.</i> (2004), The Netherlands	Case-cohort study from a cohort of 58279 men aged 55-69 years old; 903 cases (diagnosed 1986-1993), 727 sub-cohort men without cancer	Mailed, self-administered questionnaire on risk factors and confounders; job titles were coded and clustered in professional groups	Prostate	Ever a rubber worker	5	IRR (99% CI) 4.2 (0.2-80.5)	Age; fruit, vegetable, dairy, meat, and alcohol consumption; cigarette smoking; family history of prostate cancer; education; physical activity	
Pronk <i>et al.</i> (2009) Shanghai, China, Shanghai Women's Health Study	71067 non-smoking women aged 40-70 years during 1996-2000; mortality and incidence follow-up through 2005	Occupational histories obtained by interview, occupation and industry titles matched to IARC lists of known and suspected carcinogens	Lung and bronchus	Overall Various occupations in rubber manufacture	7	RR 1.7 (0.8-3.7)	Second hand smoke, education level, family history of lung cancer	

HRR-hazard rate ratio, IRR-incidence rate ratio, IH-industrial hygiene, JEM-job-exposure matrix, OR-odds ratio, RR-relative risk, SIR-standardized incidence ratio, SMR-standardized mortality ratio