Table 2.3. Cohort studies of vinyl chloride monomer and polyvinyl chloride production workers and brain cancer

Reference, location, name of study	Cohort description	Exposure assessment	Organ site (ICD code)	Exposure categories	No. of cases/ deaths	Relative risk (95% CI)*	Adjustment for potential confounders	Comments
Mundt *et al*. (2000) USA	10109 male workers employed in 37 plants ≥ 1 year in jobs that entailed exposure to VCM in 1942–72; mortality follow–up, 1942–95; vital status, 96.8%; cause of death, 99%	JEM	Brain and CNS (ICD-9 191–192)			**SMR**		Reference rates: state rates and USA population *p* value for likelihood ratio test for equality of survivor functions, controlling for time at risk
				Job exposed to VC	36	1.4 (1.0–2.0)		
				Age at first exposure (years)		**Hazard ratio**	Age at first exposure, duration of exposure, year of first exposure	
				< 25	11	1.0		
				25–34	12	0.9 (0.4–2.0)		
				≥ 35	13	2.6 (1.2–5.9)		
						p = 0.02		
				Duration of exposure (years)				
				<5	11	1.0		
				5–9	11	2.0 (0.9–4.7)		
				10–19	5	0.7 (0.2–2.0)		
				≥ 20	9	1.9 (0.8–5.0)		
						p = 0.09		

DRAFT

Table 2.3. Cohort studies of vinyl chloride monomer and polyvinyl chloride production workers and brain cancer

Reference, location, name of study	Cohort description	Exposure assessment	Organ site (ICD code)	Exposure categories	No. of cases/ deaths	Relative risk (95% CI)*	Adjustment for potential confounders	Comments
Ward *et al*. (2000, 2001) Italy, Norway, Sweden, UK	12 700 male workers employed in 19 VCM/PVC plants ≥ 1 year in 1950–85; mortality follow-up, 1955–97; incidence follow-up, 1955–96	Calendar period JEM for 13/19 factories grouped in 22 broad categories; factory-pecific JEM with validated exposure estimates (ppm)	Brain and CNS (ICD-9 191–192)	Employed in VC industry	24	**SMR** 0.93 (0.60–1.39)		Reference mortality and incidence rates: national
				(full cohort)	19	**SIR** 0.91 (0.55–1.42)	Age, calendar period	
				VCM production only	0	**SMR** 0.00 (0.00–5.64)		
				PVC production only	5	0.96 (0.31–2.25)		
				VCM and PVC production	16	0.93 (0.53–1.51)	Age, calendar period	
				PVC processing	18	1.10 (0.23–3.22)		
				Latency (years)		**Relative risk**		
				< 16	9	1.00		Internal comparison, poisson regression analysis
				16–21	4	0.71 (0.19–2.68)		
				22–26	3	0.71 (0.16–3.29)		
				27–34	6	1.37 (0.33–5.63)		
				≥ 35	2	0.77 (0.11–5.47)		
						Test for linear trend, *p*= 0.82		

DRAFT

Table 2.3. Cohort studies of vinyl chloride monomer and polyvinyl chloride production workers and brain cancer

Reference, location, name of study	Cohort description	Exposure assessment	Organ site (ICD code)	Exposure categories	No. of cases/ deaths	Relative risk (95% CI)*	Adjustment for potential confounders	Comments
Ward *et al*. (2000, 2001) (contd)				*Duration (years)*				
				1–2	5	1.00		
				3–6	6	1.34 (0.41–4.40)		
				7–11	4	0.95 (0.25–3.57)		
				12–18	4	0.96 (0.25–3.69)		
				≥ 19 years	5	1.59 (0.43–5.91)		
						Test for linear trend, $p = 0.72$		
				Cumulative exposure (ppm–years)				
				0–34	3	1.00		
				35–99	3	1.37 (0.28–6.82)		
				100–535	10	3.45 (0.94–12.6)		
				536–2811	2	0.75 (0.12–4.50)		
				≥ 2812	3	1.58 (0.31–8.04)		
						Test for linear trend, $p = 0.778$		
				Autoclave worker				
				Never	17	1.00		
				Ever	5	1.08 (0.40–2.92)		
				Unknown	2	1.27 (0.29–5.49)		
Weber *et al*. (1981) Germany	7021 male VCM/PVC production workers from beginning of operation to 1974; mortality follow-up, from beginning of operation to 1974; vital status, > 90%; cause of death, 7–13%	JEM	Brain and CNS (ICD-8 191)			**SMR**		Reference rates: national
				VCM/PVC production and processing	2	1.62 (NR)		

DRAFT

Table 2.3. Cohort studies of vinyl chloride monomer and polyvinyl chloride production workers and brain cancer

Reference, location, name of study	Cohort description	Exposure assessment	Organ site (ICD code)	Exposure categories	No. of cases/ deaths	Relative risk (95% CI)*	Adjustment for potential confounders	Comments
Smulevich *et al*. (1988) former Soviet Union	3232 VCM/PVC production workers (2195 men, 1037 women) employed for ≥ 1 month in VCM-exposed jobs; mortality follow-up, 1939–77	Exposure data in 1953–66 from JEM	Brain and CNS (ICD-9 191–192)	Estimated area exposure: low, medium and high	4	**SMR** 1.54 (0.41–3.94)		City (Gorki) mean death rates in 1959, 1969 and 1975
Wong *et al*. (2002) Taiwan, China	3293 male workers in 6 PVC polymerization plants exposed to VCM ≥ 1 year in 1950–92; mortality follow-up, 1985–97; vital status 99%	JEM	Brain and CNS (ICD-9 191–192)		2	**SMR** [2.86 (0.57–9.16)]		Reference rates, national; cohort assembled from records of the Labour Insurance Bureau

CNS, central nervous system; JEM, job exposure matrix; VCM, vinyl chloride monomer; PCV, polyvinyl chloride

DRAFT