Table 2.9 Cohort studies of workers exposed to mineral oils 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 for potential confounders	Comments
Decouflé et al. (1977) USA	5189 white males employed 1938-1967, worked at metal machining jobs for >1 year; follow-up from 1938-1967	Duration of employment	Digestive Respiratory Other cancers	>30 years >30 years >30 years	18 11 8	1.4 1.2 0.8	Age, calendar time	No positive trends by duration of employment
Decouflé (1978) USA	2485 metal machining plant workers employed 1938-1967 in 1+ years blue collar job	Work in jobs with cutting oil mist exposure	Pancreas Respiratory system	5+ years in oil mist exposure jobs	8 38	[1.1] [1.1]	Age, calendar year	Observed vs. expected presented
Järvholm et al. (1981) Sweden	788 men in the metal industry followed for cancer incidence by linkage to the Swedish cancer registry	Job classification 242 men c1assified as turners and 551 as grinders	Other digestive (150, 152-158) Lung (162)	5+ years exposure to oil mist	16 3	[1.4] [0.6]		Observed vs. expected presented
Järvholm et al. (1985) Sweden	682 bearing ring industry workers followed 1977-1983	Lathe operators	Lung, other cancers	5+ years exposure to oil mist Lung Prostate	 5 6	 [0.4] (0.1-0.9) [0.3] (0.1-0.7)		Observed vs. expected presented
Rønneberg et al. (1988) Norway	529 men exposed to mineral oils in Norwegian cable manufacturing company	Work process characterization	All cancers Lung cancer	<1 year work 1+ years work <1 year work 1+ years work	24 34 8 14	1.3 (0.8-1.9) 0.8 (0.6-1.2) 2.3 (1.0-4.5) 1.9 (1.1-3.3)	Age, calendar time	Not readily explained by smoking; evidence pertains to non-severely refined low and high viscosity oils

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Eisen et al. (1992) USA	33619 male automotive workers employed 3+ years prior to end of 1984; mortality follow-up through 1984	Air measurements, modeling of plant-department-job specific levels by experts	Pancreas, larynx, lung cancer	Ever exposed to straight oils	Pancreas: 34 Larynx: 23 Lung:: 251	0.8 (0.5-1.1) 2.0 (1.3-3.0) 1.0 (0.9-1.2)	Plant, sex, race, age, year at risk, length of follow-up	
				Ever exposed to soluble oils	Pancreas: 61 Larynx: 30 Lung: 478	0.8 (0.6-1.0) 1.4 (1.0-2.0) 1.1 (1.0-1.2)		
				High exposure to straight oils	Larynx: 28	2.2 (1.3-4.0)		
				High exposure to soluble oils	Larynx: 29	1.2 (1.5-2.7)		
Acquavella et al. (1993) USA	3630 metal components manufacturing workers followed from 1950-1987	Exposure inferred by industrial hygienists based on work location	Pancreas, lung cancer	Metal dusts, cutting oils, and fluids	Pancreas: 2 Lung: 31	0.7 (0.1-2.6) 1.8 (1.2-2.6)	Age, calendar time, sex	
Schroeder et al. (1997) USA	33619 male automotive workers employed 3+ years prior to end of 1984; mortality follow-up through 1984	Air measurements, modeling of plant-department-job specific levels by experts	Lung cancer	High exposure to straight oils	88	1.0 (0.7-1.3)	Age, gender, years since hire	
				High exposure to soluble oils	152	0.7 (0.5-1.0)		

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Bardin et al. (1997) USA	21999 male automotive workers employed 3+ years and alive on 1 January 1941; mortality follow-up 1985-2004	Air measurements, modeling of plant-department-job specific levels by experts	Pancreatic cancer	Straight metalworking fluids >2.1 mg/m^3 yrs	18	0.9 (0.5-1.6)	Matched on race, sex, plant, date of birth, adjusted for year since hire	
				Soluble metalworking fluids >51 mg/m^3 yrs	22	1.1 (0.5-2.7)		
Kazerouni et al. (2000) USA	23698 men employed at automotive plant between 1938 and 1967, followed to 1980	Work in jobs with cutting oil mist exposure	Pancreas, larynx, lung	Heavy exposure to oil mist	Pancreas: 29	1.0 (0.7-1.4)	Age, race, calendar year	
					Larynx: 5	0.6 (0.2-1.4)		
					Lung: 195	1.2 (1.1-1.4)		
Eisen et al. (2001) USA	46399 male automotive workers employed 3+ years prior to end of 1984; mortality follow-up through 1994	Air measurements, modeling of plant-department-job specific levels by experts	Pancreas, larynx, lung	High exposure to straight oils	Pancreas: 26 Larynx: 11 Lung:: 191	0.9 (0.5-1.4) 1.9 (0.9-4.0) 1.0 (0.8-1.2)	Plant, sex, race, age, year at risk, length of follow-up	
				High exposure to soluble oils	Pancreas: 42 Larynx: 13 Lung: 204	1.2 (0.8-2.2) 1.8 (0.8-4.3) 0.8 (0.7-1.1)		
Yassi et al. (2003) Canada	2222 men employed in transformer manufacturing	Work process characteristics	Digestive cancers	Mortality Incidence	n/a n/a	1.3 (0.9-1.9) 1.4 (1.1-1.9)	Age, sex, calendar year	Exposure inferred only from work process, not identified further
			Pancreatic cancer	Mortality Incidence	n/a n/a	3.6 (1.9-6.1) 2.7 (1.3-4.9)		

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Zeka et al. (2004) USA	31100 hourly auto workers alive on 1 January 1985 who worked at three automobile plants in Michigan cases identified from the Michigan cancer registry January 1985 through January 1 2000	Air measurements, modeling of plant-department-job specific levels by experts	Larynx (C32.0-32.9)	Soluble fluids Straight chain fluids Synthetic fluids	78 total	1.0 (0.9-1.0) 1.1 (1.0-1.1) 1.0 (0.8-1.4)	Age	Case cohort analysis. Subcohort comprised 3110 male cohort members, randomly sampled Some evidence for association between laryngeal cancer and straight chain fluids in 10-20 year lag window (RR = 1.4, 95% CI = 1.0-2.1)
			Oesophagus (C15.0-15.9)	Soluble fluids Straight chain fluids Synthetic fluids	37 total	0.9 (0.8-1.0) 0.9 (0.8-1.2) 1.0 (0.6-1.6)		
Zhao et al. (2005) California, USA	Cohort of 6,107 male aerospace workers hired before 1980 in the aerospace division who worked 2+ years followed for cancer mortality band 5049 workers followed for cancer incidence	Detailed industrial hygiene review to construct job-exposure matrix	Lung : Mortality	Low Medium High	115 47 32	1.0 2.0 (1.2-3.3) 2.0 (1.0-3.9)		Presented data on both mortality and incidence. Stronger for lung incidence, absent risk for lymphoma & leukemia incidence (with smaller numbers)
			NHL & leukaemia mortality	Low Medium High	41 12 7	1.0 1.2 (0.6-2.4) 2.9 (2.0-7.0)		