

Table 2.15 Case-control studies on other cancers and welding/welding fumes (web only)

Reference, location, enrolment/follow-up period	Population size, description, exposure assessment method	Organ site	Exposure category or level	Exposed cases/deaths	Risk estimate (95% CI)	Covariates controlled	Comments
Magnani et al. (1987) United Kingdom, 3 English counties 1959–1963; 1965–1979	Cases: 99; The cases were men aged 18–54 and resident in the study area who died from one of the five cancers under investigation oesophagus, pancreas, cutaneous melanoma, kidney, and brain Controls: 361; Each case was assigned two controls who had died in the same year from other causes and who were matched to the case for sex, county of residence, and as closely as possible for age at death. Exposure assessment method: Expert judgement	Malignant melanoma: skin	Welding fumes	NR	0.8 (0.4–1.7)	None	
Siemiatycki (1991) Canada, Montreal 1979–1985	Cases: 251; male residents of the Montreal metropolitan area with histologically confirmed incident stomach cancer, age 35–70 Controls: 2397; study subjects with other cancers Exposure assessment method: Expert judgement	Stomach/gastric cancer	Welders and flame cutters (any)	5	0.7 (0.3–1.6)	Age, family income, cigarette index, birthplace	Strengths: expert assessment Limitations: cancer controls
		Arc welding fumes (any)	27	0.9 (0.6–1.3)			
		Arc welding fumes (substantial)	11	1.2 (0.7–2.1)			
		Gas welding fumes (any)	26	0.9 (0.6–1.3)			
			Gas welding fumes (substantial)	9	0.8 (0.5–1.5)		

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Siemiatycki (1991) Canada, Montreal 1979–1985	Cases: 497 colon + 257 rectum; male residents of the Montreal metropolitan area with histologically confirmed incident colon cancer (<i>n</i> = 497) and rectal cancer (<i>n</i> = 257), age 35– 70 Controls: 2056; study subjects with other cancers Exposure assessment method: Expert judgement	Colon	Welders and flame cutters (any)	6	0.5 (0.3–1.1)	Age, family income, cigarette index, ethnic origin, beer index	Strengths: expert assessment Limitations: cancer controls
			Arc welding fumes (any)	53	1 (0.8–1.3)		
			Arc welding fumes (substantial)	14	0.8 (0.5–1.3)		
			Gas welding fumes (any)	50	1 (0.7–1.3)		
			Gas welding fumes (substantial)	20	1.1 (0.7–1.6)		
		Rectum	Welders and flame cutters (any)	8	1 (0.5–2)	Age, family income, cigarette index, ethnic origin, beer index	
			Arc welding fumes (any)	31	0.9 (0.7–1.3)		
			Arc welding fumes (substantial)	7	0.7 (0.4–1.4)		
			Gas welding fumes (any)	29	0.9 (0.6–1.3)		
			Gas welding fumes (substantial)	9	0.7 (0.4–1.2)		

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Siemiatycki (1991) Canada, Montreal	Cases: 449; Male residents of the Montreal metropolitan area with histologically confirmed incident prostate cancer, age 25–70 Controls: 1550; study subjects with other cancers Exposure assessment method: Expert judgement	Prostate	Welders and flame cutters (any)	13	1.1 (0.6–1.8)	Age, family income, cigarette index, ethnic origin, BMI, type or respondent	Strengths: expert assessment Limitations: cancer controls
			Welders and flame cutters (substantial)	9	1.9 (0.9–4)		
			Arc welding fumes (any)	60	1.2 (0.9–1.5)		
			Arc welding fumes (substantial)	23	1.7 (1–2.6)		
			Gas welding fumes (any)	58	1.2 (0.9–1.5)		
			Gas welding fumes (substantial)	23	1.4 (0.9–2.1)		
Siemiatycki (1991) Canada, Montreal 1979–1985	Cases: 103; Male residents of the Montreal metropolitan area with histologically confirmed incident melanoma, age 35–70 Controls: 2525; study subjects with other cancers Exposure assessment method: Expert judgement	Malignant melanoma: skin	Welders and flame cutters (any)	1	0.6 (0.1–3.1)	Age, family income, cigarette index, ethnic origin	Strengths: expert assessment Limitations: cancer controls

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Kauppinen et al. (1992) Finland 1971–1981	Cases: 344; primary liver cancer Controls: 861; two groups hospital-based and population-based, frequency-matched for age and sex with the case group Exposure assessment method: Expert judgement	Liver/hepatocellular carcinoma	Welding fumes (all)	6	1.38 (0.52–3.64)	Alcohol consumption	
			Welding fumes (moderate)	1	-		
			Welding fume (heavy)	5	13.4 (2.02–88.1)		
Keller & Howe (1993) USA, Illinois 1986–1989	Cases: 1341; newly diagnosed male stomach cancer cases reported in Illinois by Illinois hospitals. Controls: 4331; random sample of approximately 10% of all other cancers Exposure assessment method: Questionnaire; job title recorded at cancer registration	Stomach/gastric cancer	Men: Welder	NR	2.11 (1.09–4.09)	Age, history of tobacco use	This study reports on multiple cancer sites Limitations: only welders within the construction industry are selected in the exposed group. It is unclear how many welders (outside of the construction industry) are categorized as unexposed

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Keller & Howe (1993) USA, Illinois 1986–1989	Cases: 4814; newly diagnosed male colon cancer cases reported in Illinois by Illinois hospitals. Controls: 4087; random sample of approximately 10% of all other cancers Exposure assessment method: Questionnaire; job title recorded at cancer registration	Colon	Men: Welder	NR	0.54 (0.29–1)	Age, history of tobacco use	This study reports on multiple cancer sites Limitations: only welders within the construction industry are selected in the exposed group. It is unclear how many welders (outside of the construction industry) are categorized as unexposed
Keller & Howe (1993) USA, Illinois 1986–1989	Cases: 7800; newly diagnosed male prostate cancer cases reported in Illinois by Illinois hospitals. Controls: 3638; random sample of approximately 10% of all other cancers Exposure assessment method: Questionnaire; job title recorded at cancer registration	Prostate	Men: Welder	NR	1 (0.61–1.64)	Age, history of tobacco use	This study reports on multiple cancer sites Limitations: only welders within the construction industry are selected in the exposed group. It is unclear how many welders (outside of the construction industry) are categorized as unexposed

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van der Gulden et al. (1995) the Netherlands 1988–1990	Cases: 345; histologically confirmed prostate cancer, from cancer registry Controls: 1346; men diagnosed with benign prostate hyperplasia were selected from the National Computerized Archive of Pathology Exposure assessment method: Questionnaire; mailed questionnaire on work history with additional questions for farmers, metal workers, repairmen, mechanics	Prostate	Men: Welder (longest held occupation)	4	1.51 (0.48–4.78)	Age	
			Welding fumes (sometimes or frequently)	64	0.91 (0.67–1.24)		
			Welding fumes (frequently)	22	1.19 (0.73–1.95)		
Kaerlev et al. (2000) Denmark, Sweden, France, Germany, Italy, Spain 1995–1997	Cases: 79; incident cases aged 35–69 years with small bowel adenocarcinoma. Controls: 2649; 579 colon cancer controls (only Spain) and 2070 population controls (all other countries) Exposure assessment method: Questionnaire	Small intestine: small bowel adenocarcinoma	Welders and flame cutters	6	2.6 (1–6.4)	Sex, country, year of birth	
			Welders and flame cutters (1–5 years)	1	2.8 (0.3–23.8)		
			Welders and flame cutters (> 5 years)	3	4.6 (1.3–16.6)		
			Trend-test <i>P</i> value: 0.01				

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Engel et al. (2002) USA, New Jersey 1993–1995	Cases: 542; 283 esophageal adenocarcinomas, 259 gastric cardia adenocarcinomas Controls: 689; population-based controls obtained through random digit dialling, for those under 65 years of age and from Health Care Financing Administration records for those 65 years of age or older. Exposure assessment method: Questionnaire	Stomach/gastric cancer: Gastric cardia adenocarcinoma	Welders, solderers (ever)	10	2 (0.8–5.2)	Age, sex, race, study centre, respondent type, smoking, BMI	
			Welders, solderers (1–9 years)	9	3 (1.1–8.5)		
		Welders, solderers (> 9 years)	1	-	Age, sex, race, study centre, respondent type, smoking, BMI		
		Welders, solderers	7	0.8 (0.3–2.3)			
Stomach/gastric cancer: Gastric noncardia adenocarcinoma	Testis	Welding	20	2.84 (1.51–5.35)	Age, duration of exposure		
		Welding	20	1.49 (0.53–4.15)	Age, environmental exposures, occupational exposures, reproductive health history, duration of exposure		
Walschaerts et al. (2007) France (5 cities) 2002–2005	Cases: 229; men diagnosed with a testicular germ-cell tumour age 20–45 at diagnosis Controls: 800; partners from pregnant women recruited from the same hospitals with no history of testicular germ-cell tumour Exposure assessment method: Questionnaire	Testis	Welding	20	2.84 (1.51–5.35)	Age, duration of exposure	
		Testis	Welding	20	1.49 (0.53–4.15)	Age, environmental exposures, occupational exposures, reproductive health history, duration of exposure	

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Fang et al. (2011) Canada, British Columbia 1983–1987	Cases: 1155; male cancer patients aged 20 years and older ascertained by the population-based British Columbia Cancer Registry Controls: 7552; other cancers (excluding lung, rectum, unknown primary site), matched on age and year of diagnosis Exposure assessment method: Questionnaire	Colon	Welding and flame cutting (ever)	36	0.99 (0.69–1.42)	None	Strengths: large size Limitations: the study uses cancer controls
			Welding and flame cutting (usual)	7	0.49 (0.22–1.09)		

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Sauvé et al. (2016) Canada, Montreal 2005–2009	Cases: 1937; incident prostate cancer cases age ≤ 75 years Controls: 1994; population controls from electoral roll, frequency matched to cases by age Exposure assessment method: Questionnaire	Prostate	Welder and flame cutting (ever)	50	0.97 (0.62–1.5)	Age, first-degree family history of prostate cancer, ancestry, screening for prostate cancer, annual household income, highest level of education attained, level of physical activity, alcohol intake, body mass index	
			Welder and flame cutting (< 10 yr)	23	1.05 (0.55–2.02)		
			Welder and flame cutting (10+ yr)	27	0.91 (0.51–1.62)		
			Arc welder (ever)	23	0.98 (0.52–1.85)		
			Arc welder (< 10 yr)	15	1.15 (0.51–2.59)		
			Arc welder (10+ yr)	8	0.75 (0.26–2.11)		
			Gas welder (ever)	3	0.46 (0.11–1.89)		
			Gas welder (< 10 yr)	1	0.56 (0.05–6.14)		
			Gas welder (10+ yr)	2	0.41 (0.07–2.35)		

BMI, body mass index; CI, confidence interval; NR, not reported; yr, year

References

- Engel LS, Vaughan TL, Gammon MD, Chow WH, Risch HA, Dubrow R, et al. (2002). Occupation and risk of esophageal and gastric cardia adenocarcinoma. *Am J Ind Med.* 42(1):11–22. <http://dx.doi.org/10.1002/ajim.10077> PMID:12111686
- Fang R, Le N, Band P (2011). Identification of occupational cancer risks in British Columbia, Canada: a population-based case-control study of 1,155 cases of colon cancer. *Int J Environ Res Public Health.* 8(10):3821–43. <http://dx.doi.org/10.3390/ijerph8103821> PMID:22073015
- Kaerlev L, Teglbjaerg PS, Sabroe S, Kolstad HA, Ahrens W, Eriksson M, et al. (2000). Occupation and small bowel adenocarcinoma: a European case-control study. *Occup Environ Med.* 57(11):760–6. <http://dx.doi.org/10.1136/oem.57.11.760> PMID:11024200
- Kauppinen T, Riala R, Seitsamo J, Hernberg S (1992). Primary liver cancer and occupational exposure. *Scand J Work Environ Health.* 18(1):18–25. <http://dx.doi.org/10.5271/sjweh.1616> PMID:1313183
- Keller JE, Howe HL (1993). Cancer in Illinois construction workers: a study. *Am J Ind Med.* 24(2):223–30. <http://dx.doi.org/10.1002/ajim.4700240208> PMID:8213848
- Magnani C, Coggon D, Osmond C, Acheson ED (1987). Occupation and five cancers: a case-control study using death certificates. *Br J Ind Med.* 44(11):769–76. PMID:3689708
- Sauvé JF, Lavoué J, Parent ME (2016). Occupation, industry, and the risk of prostate cancer: a case-control study in Montréal, Canada. *Environ Health.* 15(1):100. <http://dx.doi.org/10.1186/s12940-016-0185-1> PMID:27769264
- Siemiatycki J (1991). Risk factor for cancer in the workplace. Boca Raton (Florida): CRC Press.
- van der Gulden JW, Kolk JJ, Verbeek AL (1995). Work environment and prostate cancer risk. *Prostate.* 27(5):250–7. <http://dx.doi.org/10.1002/pros.2990270504> PMID:7479392
- Walschaerts M, Muller A, Auger J, Bujan L, Guérin JF, Le Lannou D, et al. (2007). Environmental, occupational and familial risks for testicular cancer: a hospital-based case-control study. *Int J Androl.* 30(4):222–9. <http://dx.doi.org/10.1111/j.1365-2605.2007.00805.x> PMID:17708752