

Table 2.6. Case-control studies of paternal exposures to paints and childhood leukemia in the offspring

Reference, study location, period, study design	Characteristics of cases and controls	Exposure Assessment	Organ Site	Exposure categories	No.of exposed cases	RR (95% CI)	Adjustment for potential confounders	Comments
Buckley <i>et al.</i> (1989) USA and Canada, 1980–1984	204 cases aged <18 years from the CCSG cooperative clinical trial group 262 population controls selected by RDD, matched by date of birth and race	Parental lifetime work history obtained through interviews with each parent	ANLL	Father painters	7	7.0 (p=0.02)	Unclear	
Shu <i>et al.</i> (1999) USA, 1989–1993	1842 cases from CCG hospitals; aged <15 years 1987 population controls selected by RDD, individually matched by age, race, telephone area code and exchange	Detailed lifetime parental occupational history from telephone interview: all jobs held 6 months (father since age 18; mother for two years prior to pregnancy); assessment of specific exposures by an industrial hygienist	ALL	Paternal occupational exposure <i>Spray paints (time period)</i> Anytime Preconception During pregnancy Postnatal <i>Other paints (time period)</i> Anytime Preconception During pregnancy Postnatal	364 272 157 208 315 226 117 163	0.9 (0.7–1.1) 1.0 (0.8–1.3) 1.0 (0.8–1.3) 1.0 (0.8–1.2) 0.9 (0.7–1.1) 0.9 (0.7–1.1) 1.0 (0.7–1.3) 0.9 (0.7–1.2)	Paternal education, race, family income, age and sex of index child	

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Schuz <i>et al.</i> (2000) Germany, LSP Study 1992–1996; NIP and WGP 1993–1997	1138 cases from the German Childhood Cancer Registry; age <15 years. 2962 population controls from population registration files; matched on gender, year of birth and community (NIP study)	Self-reported parental occupational chemical exposures	ALL	Paints or lacquers			Age, gender, year of birth, urbanization, and socioeconomic status	Pooled analysis of three case–control studies
				<i>Fathers</i>				
				Any time	157	1.1 (0.9–1.4)		
				Preconception	147	1.1 (0.9–1.4)		
McKinney et al (2003) United Kingdom 1991-1996	1737 leukemia cases (1461 ALL); age ≤14 years 2 controls per case randomly selected from population registries; individually matched by sex, age, geographical area	Complete occupational history from in-person interview	Leukemia ALL	Paternal occupational exposure to paint			age, sex, region of residence	
				Leukemia				
				ALL	25	1.22 (0.76-1.85)		
				ALL	21	1.22 (0.73-1.91)		

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Fabia and Thuy (1974) Canada. 1965-1970	218 children who died from leukemia or lymphoma before age 5. 772 children whose birth registration immediately preceded or followed that of each case in the official files.	Occupation of fathers was obtained from the children's birth certificates. Occupations were grouped by an industrial hygienist, whereof one group comprised "painters, dyers and cleaners exposed to solvents"	Leukemia, Lymphoma	Father worked as painter, dyer or cleaner at time of child birth	5	OR [1.62] [(0.44-5.13)]	None	Study of malignancies in children overall
Hakulinen et al. (1976) Finland 1959-1968	339 incident cases of leukemia or lymphomas in children <15 years from the Finnish Cancer Registry. 339 controls matched for age, season of birth, and domicile.	Occupation of fathers was obtained from the country-wide antenatal care system. Occupations were grouped into 3 groups, similar to Fabia and Thuy (1974)	Leukemia, Lymphoma	Father worked as motor-vehicle mechanics, machinists, miners (group 1), or painters, dyers, and printers (group 2) at the child's conception	1	Age of child <5 RR 0.33 (0.01-4.2) Age of child <15 RR 0.50 (0.11-1.9)		This study is included in Hemminki (1981)

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Kwa and Fine (1980) USA 1947-1957, 1963-1967	430 leukemia or lymphomas deaths in children <15 years were identified with help from National Center for Health Statistics. Controls were children (1372) whose birth registration preceded and followed that of the case subject	Occupation of fathers was obtained from the children's birth certificates. Occupations were grouped into 3 groups, similar to Fabia and Thuy (1974)	Leukemia, Lymphoma (ICD 200, 202, 204)	Farther worked as painter, dyer or cleaner at time of child birth	7	Age of child <15 [OR 0.93] [(0.34-2.24)]	None	
Hemminki et al. (1981) Finland 1959-1968 1969-1975	319 incident cases of leukemia in children <15 years from the Finnish Cancer Registry In 1959-1968 one control child, born next after, was selected. In 1969-75 two controls, one born before and one after the case were selected in the same maternity welfare district.	Occupation of fathers was obtained from the country-wide antenatal care system.	Leukemia	Father worked as painter during the pregnancy	12 7	all data OR 1.50 data in 1969-1975 OR 2.67	Individual matching	Non significant results

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Sanders et al. (1981) United Kingdom 1959-1963, 1970-1972	2771 children <15 years died from leukemia during the two periods. 618 of those children had fathers who worked in “hydrocarbon-related jobs.” The control population consisted of all children dying from other causes in England and Wales during respective period.	Father’s occupation is routinely recorded on the child’s death certificate “Hydrocarbon-related” occupations comprised miners, workers in engineering and allied trades, some textile workers, printing press operators, painters and decorators, dry cleaners, and drivers.	Leukemia	“Hydrocarbon-related job” at the time of death of the child		1959-1963 data PMR 0.95 [(0.86-1.06)] 1970-1972 data PMR 0.92 [(0.79-1.07)]	None	Proportional mortality ratio analysis among children who died before age 15 in England and Wales

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Gold et al. (1982) 1969-1974 USA	43 children were diagnosed with leukemia before 20 years of age. One control group consisted of children without known malignancy matched to cases by sex, date of birth and race identified from Maryland state Health Department. A second control group consisted of children with other malignancies than leukemia or brain tumors, and was matched to cases on sex, date of diagnosis, age at diagnosis, and race.	Mothers were interviewed about parental occupations etc. "Hydrocarbon-related, broad definition" occupations comprised factory workers, machinists, drivers, mechanics, station attendants, miners, lumberman, painters, dyers, and cleaners.	Leukemia	Father worked as painter during the pregnancy	1	Healthy controls [OR 0.32 (0.01-4.19)]		
				Father worked as painter between birth and diagnosis	1	Healthy controls [OR 0.49 (0.01-9.79)]		
				Father worked in hydrocarbon-related job during the pregnancy	5	Healthy controls [OR 0.81 (0.18-3.51)]		
					6	Cancer controls [OR 3.32 (0.54-35.19)]		
				Father worked in hydrocarbon-related job between birth and diagnosis	9	Healthy controls [OR 1.36 (0.40-4.80)]		
	8	Cancer controls [OR 1.74 (0.45-7.38)]						

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Van Steensel-Moll et al. (1985) The Netherlands 1973-1980	519 children with acute lymphocytic leukemia were selected from a complete nationwide register of cases of childhood leukemia. Controls were matched to cases for year of birth, sex, and place of residence at time of diagnosis	Information about possible exposures were collected by a postal questionnaire	Acute lymphocytic leukemia	Father exposed to chemicals (paint, petroleum, and other chemicals) during pregnancy	140	1.2 (0.8-1.7)	Age, sex	
				Father's worked as painter, dyer, or cleaner	8	at time of pregnancy 1.6 (0.5-5.0)	Age, sex	
					8	one year before diagnosis 1.3 (0.4-4.0)		
Lowengart et al. (1987) USA 1980-1984	123 cases of acute leukemia in children ≤10 years, with complete data, were included in the analysis Controls were selected among friends of the case or random-digit dialing, and matched to cases on age, sex, race, and Hispanic origin for whites	Parents were interviewed over the telephone by trained interviewers Occupations and industries were coded using the 1970 US Census Classification System	Acute leukemia	Father has got significant exposure to spray paint	18	One year before pregnancy OR 1.4 P-value 0.19		No statistically significant association between occupations entailing hydrocarbon exposure and childhood leukemia
					18	During pregnancy OR 2.2 P-value 0.03		
					24	After birth OR 2.0 (0.96-4.39)		
				Frequency of fathers' occupational exposure to spray paint		<50 times/year OR 1.8 > 50 times/year OR 2.5 P-value for trend (one-sided) 0.01		
		Home exposure to Paint, lacquer ≥ 1/wk, during pregnancy		OR 1.0 P-value 0.50				

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