Table 2.5 Case-control studies of maternal exposure to painting and childhood leukemia

Reference, study location, period, study design	Characteristics of the cases and controls	Exposure Assessment	Organ Site	Exposure categories	No.of exposed cases	RR (95% CI)	Adjustment for potential confounders	Comments
Van Steensel-Moll *et al* (1985) The Netherlands 1973-1982	519 acute leukemia cases from national cancer registry; < 15 years old 507 controls from census lists; matched by region, date of birth, sex	Mailed questionnaire	Acute leukemia	Paint, petroleum products, other chemicals during pregnancy	25	2.4 (1.2-4.6)	Social class, birth order, age, sex, region	histological subtype not specified; estimated ~83% ALL cases; the category for paint exposure was combined with petroleum products and other chemicals
Lowengart *et al* (1987) USA 1980-1985	123 acute leukemia cases ≤ 10 years old enrolled from population-based cancer registry 123 age-, sex-, race-, and Hispanic ethnicity-matched controls selected from friends or by RDD	telephone interview using a structured questionnaire	Acute leukemia	Paint, lacquer exposure during pregnancy ≥ once/week	27 4	1.8 (p=0.03) 1.3 (p=0.30)	age, sex, race, Hispanic ethnicity	histological subtype not specified
Buckley *et al*. (1989) 100 institutions in the 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	Paint & pigment exposure *Duration (days)* 1 to 1000 >1000 p for trend *Period of use* Before pregnancy During pregnancy After pregnancy Use of spray paints (prolonged exposure)	 15 15 NG NG NG NG	 1.5 (0.6–3.3) 2.2 (0.9–5.4) 0.05 2.3 (p<0.05) 1.5 0.9 3.0 (p<0.03)	Date of birth, race	

Table 2.5 Case-control studies of maternal exposure to painting and childhood leukemia

Reference, study location, period, study design	Characteristics of the cases and controls	Exposure Assessment	Organ Site	Exposure categories	No.of exposed cases	RR (95% CI)	Adjustment for potential confounders	Comments
Shu *et al*. (1999) 100 institutions in 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 hygenist	ALL	Occupational exposure *Spray paints (time period)* Anytime Preconception During pregnancy Postnatal *Other paints (time period)* Anytime Preconception During pregnancy Postnatal	 53 27 27 38 87 44 37 51	 1.0 (0.7–1.5) 1.3 (0.7–2.3) 1.4 (0.8–2.6) 1.2 (0.7–1.9) 1.3 (0.9–1.7) 1.9 (1.2–3.1) 2.0 (1.2–3.5) 1.3 (0.9–2.0)	Maternal education, race, family income, age, area code	Evaluation of maternal exposures to paints and thinners by duration found a slightly larger OR for the shorter duration category.
Schuz *et al*. (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 Any time Preconception During pregnancy Postnatal	 54 45 32 18	 1.8 (1.2–2.6) 1.6 (1.1–2.4) 2.0 (1.2–3.3) 1.0 (0.6–1.8)	Age, gender, year of birth, urbanization, and socioeconomic status	Pooled analysis of three case–control studies

Table 2.5 Case-control studies of maternal exposure to painting and childhood leukemia

Reference, study location, period, study design	Characteristics of the cases and controls	Exposure Assessment	Organ Site	Exposure categories	No.of exposed cases	RR (95% CI)	Adjustment for potential confounders	Comments
Freedman *et al*. (2001) USA 1989–1993	640 cases from CCG hospitals; age <15 years. 640 population controls selected by RDD; individually matched by age, race, first 8 digits of telephone number	Household exposures of mothers During the interview mothers provided information on household activities that could result in chemical exposure, including painting.	ALL	Mother painted Ever Painted Other people painted Number of rooms painted 1–2 3–4 ≥ 4 p for trend Rooms painted after birth: >4 rooms painted >5 times painted	160 289 128 161 62 64 NG NG	1.1 (0.9–1.5) 1.2 (0.9–1.5) 1.3 (0.9–1.7) 1.0 (0.8–1.3) 1.4 (0.9–2.1) 1.7 (1.1–2.7) 0.01 1.6 (1.2–2.2) 1.8 (1.1–2.8)	Age, income, sex, maternal education, painting during other periods	
Shu *et al* (2004) USA, Canada 1989 -1993	837 cases identified from CCG institutions; < 15 years old;	Telephone interview using structured questionnaires	ALL +K-ras mutation	Paints or thinners Any time Before pregnancy During pregnancy After pregnancy	 4 2 2 3	 1.3 (0.4-3.9) 1.0 (0.2-4.6) 1.0 (0.2-4.4) 1.4 (0.4-4.9)	maternal race, education, age, family income, age, sex	Case-case comparison to examine whether reported parental occupational exposure to hydrocarbons was related to ras gene mutations
			N-ras mutation	Any time Before pregnancy During pregnancy After pregnancy	7 6 6 6	1.0 (0.4-2.2) 1.6 (0.6-4.1) 1.5 (0.6-3.6) 1.1 (0.4-2.7)		

Table 2.5 Case-control studies of maternal exposure to painting and childhood leukemia

Reference, study location, period, study design	Characteristics of the cases and controls	Exposure Assessment	Organ Site	Exposure categories	No.of exposed cases	RR (95% CI)	Adjustment for potential confounders	Comments
Alderton *et al* (2006) USA, Canada 1997 - 2002	158 children (≤ 19 years) with Down's syndrome and acute leukemia (97 ALL, 61 AML) 173 age-matched control children with Down's syndrome but without leukemia	Interview using a structured, computer-assisted telephone questionnaire	ALL	Exposure to paints, stains, lacquers			age, sex, mother's educational level	There is information available for child's exposure to paints, stains, lacquers
				None	97	1.0 (ref)		
				Any	75	1.10 (0.65-1.86)		
				Low	40	1.26 (0.68-2.34)		
				High	35	0.92 (0.46-1.84)		
				p for trend		0.99		
			AML	None	34	1.0 (ref)		
				Any	27	1.23 (0.64-1.37)		
				Low	14	1.10 (0.49-2.44)		
				High	13	1.41 (0.61-3.23)		
				p for trend		0.44		
Scélo *et al* (2009) USA, 1995 - 2005	650 cases (550 ALL, 100 AML) enrolled from hospitals; < 15 years old 862 individually matched controls by age, sex, race, Hispanic status (737 for ALL, 125 for AML); selected from birth certificates	In home interview using structured questionnaire		Paints, stains or lacquers (in home)			income, solvent exposure	
			ALL	ALL	252	1.19 (0.89-1.58)		
			AML	age of diagnosis (yrs)				
				0-1.9	24	2.49 (0.92-6.78)		
				2.0-5.9	155	1.20 (0.83-1.75)		
				6.0-14.9	73	1.06 (0.61-1.84)		
				AML	37	1.37 (0.61-3.11)		

ALL, Acute Lymphocytic Leukemia; ANLL, Acute Nonlymphocytic Leukemia; CCG, Children's Cancer Group; CCSG, Children's Cancer Study Group; JEM, job exposure matrix; NG, not given; POG, Pediatric Oncology Group; RDD, random digit dialing; SES, socioeconomic status