

SUPPLEMENTAL MATERIAL

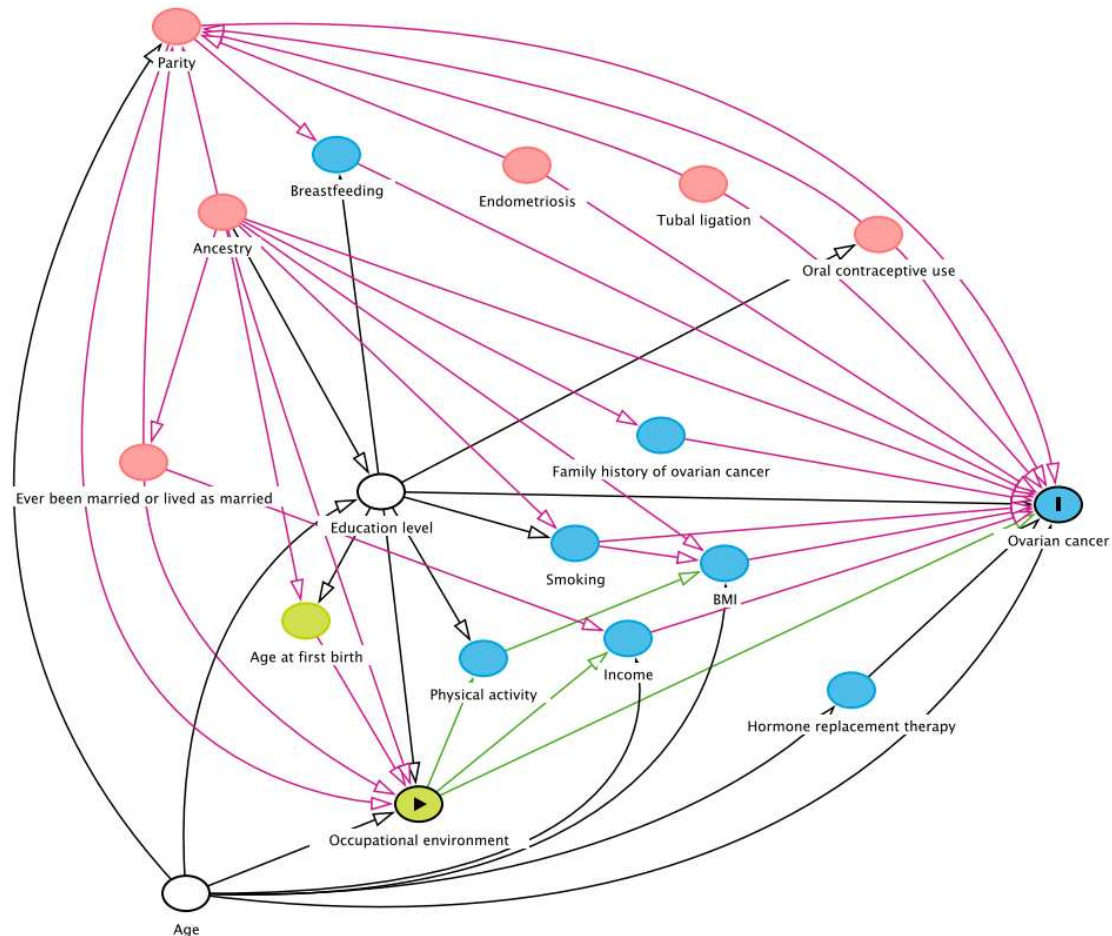


Figure 1. Directed acyclic graph for the association between the occupational environment, including employment in an occupation or industry and specific occupational exposures, and ovarian cancer. The minimally sufficient confounder set identified to estimate the total effect of the occupational environment on ovarian cancer included age, education level, ancestry, parity, and ever been married or lived as married.

Table 1. Linkage procedures with CANJEM

Step	ISCO resolution	No. time periods	Time periods	Linkage rate ^a
1	5-digits	4	1930-1949, 1950-1969, 1970-1984, 1985-2005	82.9%
2	5-digits	2	1930-1969, 1970-2005	7.3%
3	5-digits	1	1930-2005	2.8%
4	3-digits	4	1930-1949, 1950-1969, 1970-1984, 1985-2005	4.0%
5	3-digits	2	1930-1969, 1970-2005	1.5%
6	3-digits	1	1930-2005	0.7%

^aRefers to the number of jobs linked divided by the total number of jobs in the study population for the specific step. For example, in Step 1, 82.9% of all jobs were linked to CANJEM using 5-digits ISCO and 4 time periods.

As CANJEM contains exposure level information between 1930 to 2005, either the entirety of information was considered as one time period (1930-2005) or the information was subdivided into two time periods (1930-1969, 1970-2005) or four time periods (1930-1949, 1950-1969, 1970-1984, 1985-2005). Given that the PROVAQ study finished recruiting participants in 2016, exposure level information from the nearest time period (i.e., 4 time periods: 1985-2005, 2 time periods: 1970-2005) were utilized for jobs that took place after 2005. Jobs were first linked at 5-digit ISCO codes with four time periods, and if unsuccessful, these jobs would then be sequentially linked with two and then one time periods, followed by 3-digit ISCO codes with four, two, and one time periods. This method enabled the linkage of jobs at higher resolutions (i.e., 5-digit ISCO) and narrower time periods (i.e., four time periods) to produce more precise exposure level estimates, while achieving high linkage rates as jobs were also able to link at lower resolutions and wider time periods (Pasquet R. Methodological considerations of the Canadian job-exposure matrix and the evaluation of the risk of brain cancer in relation to occupational exposure to metallic compounds. [Doctoral thesis]. Montreal, Canada: Université de Montréal; 2018). In the PROVAQ study, 99.3% of all jobs were successfully linked to CANJEM.

Table 2. Multivariable ORs (95% CIs) for the association between employment in an industry and ovarian cancer risk, according to employment duration (<10 years, ≥10 years)

NAICS code	Industry	Employment duration < 10 years			Employment duration ≥ 10 years		
		Ca	Co	OR ^{a,b} (95% CI)	Ca	Co	OR ^{a,b} (95% CI)
11	Agriculture, Forestry, Fishing and Hunting	3	4	0.96 (0.21-4.42)	0	4	-
21	Mining, Quarrying, and Oil and Gas Extraction	1	0	-	0	0	-
22	Utilities	0	4	-	0	4	-
23	Construction	6	7	1.59 (0.52-4.83)	3	2	2.79 (0.52-4.83)
31-33	Manufacturing	51	96	0.97 (0.66-1.41)	60	78	1.30 (0.89-1.91)
41	Wholesale Trade	14	24	1.02 (0.52-2.02)	7	11	1.19 (0.45-3.14)
44-45	Retail Trade	94	144	1.27 (0.94-1.72)	50	56	1.59 (1.05-2.39)
48-49	Transportation and Warehousing	29	24	2.14 (1.21-3.76)	4	21	0.30 (0.10-0.90)
51	Information and Cultural Industries	31	54	0.98 (0.61-1.57)	19	42	0.78 (0.44-1.38)
52	Finance and Insurance	42	63	1.22 (0.80-1.86)	24	63	0.66 (0.40-1.08)
53	Real Estate and Rental and Leasing	20	29	1.36 (0.75-2.46)	5	15	0.67 (0.24-1.89)
54	Professional, Scientific and Technical Services	38	79	0.95 (0.62-1.44)	46	83	1.10 (0.74-1.62)
55	Management of Companies and Enterprises	1	0	-	0	0	-
56	Administrative and Support, Waste Management and Remediation Services	29	52	1.01 (0.63-1.63)	11	12	1.38 (0.59-3.22)
61	Educational Services	69	125	1.11 (0.80-1.55)	54	120	1.07 (0.73-1.57)
62	Health Care and Social Assistance	59	143	0.72 (0.51-1.01)	72	162	0.77 (0.56-1.06)
71	Arts, Entertainment and Recreation	26	44	1.17 (0.70-1.96)	11	20	0.87 (0.41-1.87)
72	Accommodation and Food Services	59	93	1.05 (0.73-1.51)	16	36	0.67 (0.36-1.25)
81	Other Services (Except Public Administration)	87	145	1.10 (0.81-1.48)	46	72	1.18 (0.79-1.77)
91	Public Administration	18	59	0.55 (0.32-0.95)	30	40	1.25 (0.75-2.06)

^aAdjusted for age, education level, ancestry, parity, and ever been married or lived as married.

^bReference group includes participants who had never been employed in a given industry.

Table 3. Multivariable ORs (95% CIs) for the association between ever exposure, duration of exposure, and cumulative exposure to 29 agents and ovarian cancer risk, using participants classified as never or uncertainly exposed as the reference group

Agent ^a	Never or uncertainly exposed ^b			Ever exposed ^c			Duration of exposure						Cumulative exposure					
	Ca	Co	OR ^d (95% CI)	Ca	Co	OR ^d (95% CI)	< 8 years			≥ 8 years			Low			High		
							Ca	Co	OR ^d (95% CI)	Ca	Co	OR ^d (95% CI)	Ca	Co	OR ^d (95% CI)	Ca	Co	OR ^d (95% CI)
Cosmetic talc	475	879	1.0 (ref)	15	16	1.7 (0.8-3.6)	11	12	1.7 (0.8-4.0)	4	4	1.7 (0.4-6.8)	8	11	1.4 (0.5-3.5)	7	5	2.5 (0.8-8.0)
Calcium carbonate	435	765	1.0 (ref)	55	130	1.0 (0.7-1.4)	20	42	1.0 (0.6-1.7)	35	88	1.0 (0.6-1.5)	43	91	1.0 (0.7-1.6)	12	39	0.8 (0.4-1.5)
Ammonia	467	867	1.0 (ref)	23	28	1.4 (0.8-2.5)	9	18	0.8 (0.4-1.8)	14	10	2.5 (1.1-5.9)	10	19	0.9 (0.4-1.9)	13	9	2.6 (1.1-6.2)
Hydrogen peroxide	472	876	1.0 (ref)	18	19	1.7 (0.8-3.2)	5	11	0.8 (0.3-2.3)	13	8	2.9 (1.2-7.2)	8	13	1.1 (0.5-2.7)	10	6	2.8 (1.0-7.9)
Hair dust	471	874	1.0 (ref)	19	21	1.6 (0.8-3.1)	5	12	0.7 (0.3-2.1)	14	9	2.8 (1.2-6.7)	8	14	1.1 (0.4-2.6)	11	7	2.7 (1.0-7.1)
Synthetic fibres	456	849	1.0 (ref)	34	46	1.4 (0.9-2.4)	11	19	1.2 (0.5-2.6)	23	27	1.6 (0.9-3.0)	15	32	1.0 (0.5-1.9)	19	14	2.5 (1.2-5.3)
Polyester fibres	466	861	1.0 (ref)	24	34	1.4 (0.8-2.4)	7	16	1.0 (0.4-2.4)	17	18	1.7 (0.8-3.5)	14	23	1.3 (0.6-2.6)	10	11	1.5 (0.6-3.6)
Fabric dust	448	843	1.0 (ref)	42	52	1.5 (1.0-2.5)	15	23	1.3 (0.6-2.5)	27	29	1.8 (1.0-3.2)	25	36	1.4 (0.8-2.4)	17	16	1.9 (0.9-4.0)
Cotton dust	451	844	1.0 (ref)	39	51	1.5 (0.9-2.4)	14	22	1.2 (0.6-2.5)	25	29	1.6 (0.9-3.0)	21	35	1.2 (0.7-2.2)	18	16	2.0 (0.9-4.1)
Wool fibres	479	877	1.0 (ref)	11	18	1.1 (0.5-2.5)	3	10	0.6 (0.2-2.3)	8	8	1.8 (0.6-4.8)	8	12	1.4 (0.5-3.4)	3	6	0.8 (0.2-3.2)
Organic dyes and pigments	479	877	1.0 (ref)	11	18	1.0 (0.5-2.2)	3	12	0.4 (0.1-1.3)	8	6	2.5 (0.8-7.4)	5	12	0.7 (0.2-1.9)	6	6	1.8 (0.6-5.8)
Cellulose	456	847	1.0 (ref)	34	48	1.2 (0.8-1.9)	17	30	0.9 (0.5-1.7)	17	18	1.7 (0.9-3.4)	17	33	0.9 (0.5-1.7)	17	15	1.9 (0.9-3.8)
Aliphatic aldehydes	426	798	1.0 (ref)	64	97	1.2 (0.8-1.7)	26	52	0.9 (0.6-1.5)	38	45	1.5 (0.9-2.5)	48	67	1.3 (0.9-2.0)	16	30	0.9 (0.5-1.8)
Formaldehyde	441	818	1.0 (ref)	49	77	1.2 (0.8-1.8)	16	41	0.7 (0.4-1.3)	33	36	1.7 (1.0-2.9)	33	53	1.2 (0.7-1.8)	16	24	1.2 (0.6-2.4)
Propellant gases	471	874	1.0 (ref)	19	21	1.6 (0.8-3.1)	5	12	0.7 (0.3-2.1)	14	9	2.8 (1.2-6.7)	7	14	0.9 (0.4-2.3)	12	7	3.0 (1.1-7.7)
Organic solvents	445	822	1.0 (ref)	45	73	1.1 (0.7-1.6)	17	39	0.7 (0.4-1.3)	28	34	1.4 (0.8-2.4)	31	51	1.1 (0.7-1.7)	14	22	1.0 (0.5-2.1)
Aliphatic alcohols	453	820	1.0 (ref)	37	75	0.9 (0.6-1.4)	16	36	0.8 (0.4-1.4)	21	39	1.1 (0.6-1.8)	20	52	0.7 (0.4-1.2)	17	23	1.5 (0.8-2.8)
Ethanol	471	874	1.0 (ref)	19	21	1.6 (0.8-3.1)	5	12	0.7 (0.3-2.1)	14	9	2.8 (1.2-6.7)	7	14	0.9 (0.4-2.3)	12	7	2.9 (1.1-7.7)
Isopropanol	457	840	1.0 (ref)	33	55	1.1 (0.7-1.8)	14	31	0.9 (0.4-1.6)	19	24	1.5 (0.8-2.8)	15	38	0.7 (0.4-1.4)	18	17	2.0 (1.0-4.1)
Fluorocarbons	471	874	1.0 (ref)	19	21	1.6 (0.8-3.1)	5	12	0.7 (0.3-2.1)	14	9	2.8 (1.2-6.7)	7	14	0.9 (0.4-2.3)	12	7	2.9 (1.1-7.7)
Alkanes (C5-C17)	476	879	1.0 (ref)	14	16	1.4 (0.7-2.9)	10	11	1.4 (0.6-3.5)	4	5	1.3 (0.3-4.9)	9	11	1.4 (0.6-3.5)	5	5	1.3 (0.4-4.8)
MAHs ^e	475	884	1.0 (ref)	15	11	2.1 (1.0-4.8)	9	9	1.5 (0.6-3.9)	6	2	5.2 (1.0-26.5)	10	7	2.2 (0.8-5.9)	5	4	2.1 (0.5-7.9)
PAHs from any source ^e	468	873	1.0 (ref)	22	22	1.6 (0.8-2.9)	18	14	2.2 (1.0-4.5)	4	8	0.7 (0.2-2.2)	16	15	1.8 (0.9-3.7)	6	7	1.2 (0.4-3.6)
PAHs from petroleum ^e	474	881	1.0 (ref)	16	14	1.8 (0.9-3.9)	14	9	2.6 (1.1-6.1)	2	5	0.6 (0.1-3.3)	10	9	1.9 (0.8-4.8)	6	5	1.8 (0.5-6.0)
Engine emissions	455	838	1.0 (ref)	35	57	1.2 (0.7-1.8)	25	29	1.7 (1.0-2.9)	10	28	0.7 (0.3-1.4)	27	39	1.3 (0.8-2.2)	8	18	0.8 (0.3-1.9)
Cooking fumes	415	770	1.0 (ref)	75	125	1.0 (0.7-1.4)	44	69	1.1 (0.7-1.6)	31	56	0.9 (0.6-1.4)	59	87	1.1 (0.8-1.6)	16	38	0.7 (0.4-1.2)
Cleaning agents	327	599	1.0 (ref)	163	296	0.9 (0.7-1.2)	64	113	1.0 (0.7-1.3)	99	183	0.9 (0.7-1.3)	107	207	0.9 (0.7-1.2)	56	89	1.0 (0.7-1.5)
Biocides	390	677	1.0 (ref)	100	218	0.8 (0.6-1.0)	30	76	0.6 (0.4-1.0)	70	142	0.9 (0.6-1.2)	58	152	0.6 (0.5-0.9)	42	66	1.1 (0.7-1.7)
Bleaches	481	879	1.0 (ref)	9	16	1.0 (0.4-2.3)	2	10	0.3 (0.1-1.6)	7	6	2.2 (0.7-6.7)	2	11	0.3 (0.1-1.5)	7	5	2.5 (0.8-8.1)

^aAgents selected for analysis had at least 15 ever exposed cases and/or 15 ever exposed controls.^bParticipants classified as never exposed to an agent have exclusively worked jobs with a probability of exposure of 0% to the agent and participants classified as uncertainly exposed to an agent have exclusively worked jobs with either a probability of exposure >0- <50% to the agent at any duration or a probability of exposure ≥50% for less than two cumulative years.^cParticipants classified as ever exposed to an agent have ever worked a job with a probability of exposure of ≥50% to the agent for at least two cumulative years.^dAdjusted for age, education level, ancestry, parity, and ever been married or lived as married.^eAbbreviations: Mononuclear aromatic hydrocarbons (MAHs), Polycyclic aromatic hydrocarbons (PAHs).

Table 4. Heat map displaying pairwise Spearman's correlation coefficients (ρ) for the 29 agents^a

	Calcium carbonate	Ammonia	Hydrogen peroxide	Hair dust	Synthetic fibres	Polyester fibres	Fabric dust	Cotton dust	Wool fibres	Organic dyes and pigments	Cellulose	Aliphatic aldehydes	Formaldehyde	Propellant gases	Organic solvents	Aliphatic alcohols	Ethanol	Isopropanol	Fluorocarbons	Alkanes (C5-C17)	MAHs ^b	PAHs from any source ^b	PAHs from petroleum ^b	Engine emissions	Cooking fumes	Cleaning agents	Biocides	Bleaches	
Cosmetic talc	0.0	0.8	0.8	0.6	0.1	0.0	0.1	0.1	0.1	-0.1	0.2	0.3	0.9	0.2	0.8	1.0	0.9	0.6	0.0	0.0	0.0	-0.1	0.0	0.1	0.4	0.6	0.3		
Calcium carbonate		-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.4	-0.3	-0.1	0.1	0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.3	0.0	0.0	-0.2	-0.1	
Ammonia			0.9	0.9	0.2	0.1	0.3	0.2	0.0	0.9	0.1	0.6	0.7	1.0	0.7	0.7	0.9	0.8	0.9	0.3	0.5	1.0	0.7	0.3	0.5	0.6	0.5	1.0	
Hydrogen peroxide				1.0	0.0	0.0	0.0	0.0	0.0	0.9	-0.1	0.3	0.4	1.0	0.3	0.7	1.0	0.8	1.0	-0.1	0.0	0.2	0.0	0.0	0.0	0.3	0.4	1.0	
Hair dust					0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.3	0.4	1.0	0.3	0.6	1.0	0.7	1.0	0.0	0.0	0.2	0.0	0.0	0.0	0.3	0.2	0.9	
Synthetic fibres						1.0	1.0	1.0	1.0	0.1	0.3	0.8	0.9	0.2	0.4	0.0	0.0	0.0	0.0	0.7	0.6	0.6	0.6	0.1	0.2	0.3	0.0	-0.1	
Polyester fibres							1.0	1.0	1.0	0.0	0.1	0.7	0.8	0.2	0.2	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.5	0.2	0.1	0.1	-0.1	0.0	
Fabric dust								1.0	1.0	0.1	0.3	0.8	0.9	0.2	0.6	0.2	0.0	0.2	0.0	0.6	0.6	0.7	0.7	0.1	0.3	0.5	0.3	0.0	
Cotton dust									1.0	0.1	0.3	0.8	0.9	0.1	0.5	0.2	0.0	0.2	0.0	0.7	0.7	0.7	0.8	0.1	0.3	0.5	0.3	0.0	
Wool fibres										0.0	0.0	0.6	0.7	0.1	0.1	0.1	0.0	0.0	0.0	0.3	0.2	0.3	0.4	0.2	0.1	0.2	0.0	0.0	
Organic dyes and pigments											0.3	0.5	0.7	1.0	0.8	0.6	0.9	0.6	0.9	0.7	0.8	0.7	0.9	0.1	0.0	0.3	0.2	1.0	
Cellulose												0.3	0.3	0.0	0.5	0.1	0.0	0.0	0.0	0.7	0.7	0.7	0.8	0.4	0.2	0.0	0.1	0.0	
Aliphatic aldehydes													1.0	0.8	0.8	0.6	0.4	0.6	0.3	0.4	0.4	0.9	0.6	0.6	0.5	0.6	0.6	0.4	
Formaldehyde															0.9	0.7	0.7	0.4	0.5	0.4	0.8	0.6	0.3	0.5	0.7	0.7	0.5		
Propellant gases																0.6	0.8	1.0	0.9	1.0	0.0	0.0	0.5	0.2	0.1	0.6	0.7	1.0	
Organic solvents																	0.8	1.0	0.9	1.0	0.0	0.0	0.8	0.6	0.2	0.4	0.6	0.7	0.4
Aliphatic alcohols																		0.7	1.0	0.6	0.1	0.1	0.3	0.2	0.1	0.3	0.9	0.9	0.6
Ethanol																			0.7	1.0	0.0	0.0	0.3	0.1	0.1	0.0	0.3	0.3	1.0
Isopropanol																				0.7	0.0	0.0	0.4	0.2	0.2	0.4	0.9	1.0	0.7
Fluorocarbons																					0.0	0.0	0.2	0.1	0.1	0.0	0.3	0.2	0.9
Alkanes (C5-C17)																						1.0	0.9	0.8	0.6	0.1	0.1	0.0	0.0
MAHs ^b																							0.9	0.8	0.2	0.1	0.2	0.1	0.0
PAHs from any source ^b																								1.0	0.9	0.8	0.5	0.2	0.0
PAHs from petroleum ^b																									0.9	0.5	0.3	0.1	0.0
Engine emissions																										0.3	0.2	0.2	0.0
Cooking fumes																											0.7	0.4	0.0
Cleaning agents																												0.8	0.4
Biocides																													0.3

^aPairwise Spearman's correlation coefficients were calculated for cumulative exposure to agents and for all study participants.

^bAbbreviations: Mononuclear aromatic hydrocarbons (MAHs), Polycyclic aromatic hydrocarbons (PAHs).

