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Occupational exposure to organic dusts and risk of developing RA

Supplementary tables

Supplementary Table 1. Table of characteristics (n=142,276).

	Men		Women	
	Cases (n=3,929)	Controls (n=40,300)	Cases (n=8,675)	Controls (n=89,372)
Age (median)	61	61	57	57
Exposed to wood dust (%)	396 (10)	3474 (9)	78 (1)	643 (1)
Exposed to animal dust (%)	209 (5)	1676 (4)	208 (2)	1697 (2)
Exposed to paper dust (%)	241 (6)	2571 (6)	377 (4)	3485 (4)
Exposed to textile dust (%)	60 (2)	471 (1)	317 (4)	2769 (3)
Exposed to flour dust (%)	46 (1)	366 (1)	32 (0)	369 (0)
Education (%)				
9 years or less	1,415 (36)	12,437 (31)	2,165 (25)	20,360 (23)
10-12 years	1,736 (44)	17,492 (43)	3,994 (46)	39,562 (44)
>12 years	778 (20)	10,371 (26)	2,516 (29)	29,450 (33)
Smoking				
Ever smoking (%)	2,737 (70)	25,007 (62)	5,359 (62)	46,303 (52)
Pack-years (median)	20	17	15	11
Alcohol consumption				
Non-drinkers (%)	278 (7)	2,674 (7)	748 (9)	7,080 (8)
Low consumption (%)	1,401 (36)	11,455 (28)	5,085 (59)	47,693 (53)
Moderate consumption (%)	1,020 (26)	10,852 (27)	1,740 (20)	19,912 (22)
High consumption (%)	1,230 (31)	15,319 (38)	1,101 (13)	14,686 (16)

Supplementary Table 2. Risk of developing RA among workers ever exposed to different types of organic dusts compared to never exposed workers (n=142,276).

	All RA cases				Seropositive RA cases		Seronegative RA cases	
	Ever exposed cases/controls	Never exposed cases/controls	OR (95 % CI)*	OR (95 % CI)†	OR (95 % CI)*	OR (95 % CI)†	OR (95 % CI)*	OR (95 % CI)†
Men								
Wood dust	396/3474	3487/36333	1.2 (1.1-1.3)	1.0 (0.8-1.1)	1.2 (1.0-1.3)	0.9 (0.8-1.1)	1.2 (1.0-1.5)	1.1 (0.9-1.3)
Animal dust	209/1676	3638/37857	1.3 (1.1-1.5)	1.3 (1.1-1.5)	1.3 (1.1-1.6)	1.4 (1.1-1.7)	1.2 (0.9-1.5)	1.2 (0.9-1.5)
Paper dust	241/2571	3484/35841	1.0 (0.8-1.1)	1.0 (0.8-1.1)	1.0 (0.9-1.2)	1.0 (0.8-1.2)	0.9 (0.7-1.1)	0.9 (0.7-1.1)
Textile dust	60/471	3835/39442	1.3 (1.0-1.7)	1.1 (0.8-1.5)	1.4 (1.0-1.9)	1.1 (0.8-1.6)	1.1 (0.7-1.8)	1.1 (0.7-1.8)
Flour dust	46/366	3883/39934	1.3 (0.9-1.8)	1.2 (0.9-1.6)	1.2 (0.8-1.8)	1.1 (0.7-1.6)	1.5 (0.9-2.4)	1.4 (0.9-2.3)
Women								
Wood dust	78/643	8511/87497	1.2 (1.0-1.6)	1.2 (0.9-1.5)	1.3 (1.0-1.7)	1.2 (0.9-1.6)	1.1 (0.7-1.7)	1.1 (0.7-1.7)
Animal dust	208/1697	8438/87260	1.2 (1.1-1.4)	1.3 (1.1-1.5)	1.2 (1.0-1.4)	1.2 (1.0-1.4)	1.4 (1.1-1.8)	1.4 (1.1-1.8)
Paper dust	377/3485	8202/84930	1.1 (1.0-1.2)	1.0 (0.9-1.2)	1.1 (1.0-1.3)	1.0 (0.9-1.2)	1.1 (0.9-1.3)	1.1 (0.9-1.3)
Textile dust	317/2769	8273/85371	1.2 (1.0-1.3)	1.1 (1.0-1.3)	1.2 (1.0-1.4)	1.1 (1.0-1.3)	1.1 (0.9-1.4)	1.1 (0.9-1.4)
Flour dust	32/369	8643/89003	0.9 (0.6-1.3)	0.9 (0.6-1.4)	0.9 (0.6-1.3)	0.9 (0.6-1.5)	0.9 (0.5-1.8)	0.9 (0.5-1.8)
Men and women‡								
Wood dust	474/4117	11998/123830	1.2 (1.1-1.3)	1.0 (0.9-1.1)	1.2 (1.1-1.3)	1.0 (0.9-1.1)	1.2 (1.0-1.4)	1.1 (0.9-1.3)
Animal dust	417/3373	12076/125117	1.3 (1.1-1.4)	1.3 (1.1-1.4)	1.2 (1.1-1.4)	1.3 (1.1-1.5)	1.3 (1.1-1.6)	1.3 (1.1-1.5)
Paper dust	618/6056	11686/120771	1.1 (1.0-1.1)	1.0 (0.9-1.1)	1.1 (1.0-1.2)	1.0 (0.9-1.1)	1.0 (0.9-1.2)	1.0 (0.8-1.1)
Textile dust	377/3240	12108/124813	1.2 (1.1-1.3)	1.1 (1.0-1.3)	1.2 (1.1-1.4)	1.1 (1.0-1.3)	1.1 (0.9-1.4)	1.1 (0.9-1.3)
Flour dust	78/735	12526/128937	1.1 (0.9-1.4)	1.0 (0.8-1.3)	1.0 (0.8-1.4)	1.0 (0.7-1.3)	1.2 (0.8-1.8)	1.2 (0.8-1.8)

* Adjusted for county, age and index year.

† Additionally adjusted for pack-years of smoking, alcohol consumption and silica dust.

‡ Additionally adjusted for sex.

CI, confidence interval; OR, odds ratio; RA, rheumatoid arthritis.

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Supplementary Table 3. Risk of developing rheumatoid arthritis (RA) among workers exposed to organic dust in different number of censuses compared to never exposed workers (n=142,276).

	All RA cases			Seropositive RA	Seronegative RA
	cases/controls	Mean average intensity (mg/m ³)	Median years since last occupation classified as exposed	OR (95 % CI)*	OR (95 % CI)*
Wood dust					
Unexposed	11998/123830	0.00	.	1.0	1.0
1-2 censuses	304/2885	0.84	23	1.0 (0.8-1.1)	0.9 (0.8-1.1)
3-4 censuses	137/950	0.73	16	1.2 (1.0-1.4)	1.1 (0.9-1.4)
5-7 censuses	33/282	0.76	8	1.0 (0.7-1.5)	1.2 (0.7-1.8)
P for trend				0.5014	0.6855
Animal dust					
Unexposed	12076/125117	0.00	.	1.0	1.0
1-2 censuses	247/2055	0.04	23	1.2 (1.0-1.4)	1.1 (0.9-1.4)
3-4 censuses	113/913	0.03	18	1.4 (1.1-1.7)	1.3 (1.0-1.7)
5-7 censuses	57/405	0.03	12	1.7 (1.2-2.4)	1.9 (1.3-2.9)
P for trend				0.0001	0.0001
Paper dust					
Unexposed	11686/120771	0.00	.	1.0	1.0
1-2 censuses	502/4941	0.10	21	1.0 (0.9-1.1)	1.0 (0.9-1.1)
3-4 censuses	96/893	0.12	15	1.1 (0.9-1.4)	1.1 (0.9-1.5)
5-7 censuses	20/222	0.09	8	1.0 (0.6-1.6)	1.0 (0.6-1.9)
P for trend				0.6599	0.4420
Textile dust					
Unexposed	12108/124813	0.00	.	1.0	1.0
1-2 censuses	314/2746	0.14	32	1.1 (1.0-1.2)	1.1 (0.9-1.3)

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3-4 censuses	55/428	0.13	21	1.4 (1.0-1.9)	1.5 (1.0-2.1)	1.3 (0.8-2.1)
5-7 censuses	8/66	0.13	15	1.1 (0.5-2.7)	1.2 (0.4-3.6)	-
P for trend				0.0175	0.0181	0.4889
Flour dust						
Unexposed	12526/128937	0.00	.	1.0	1.0	1.0
1-2 censuses	62/618	1.13	26	1.0 (0.7-1.3)	0.9 (0.6-1.3)	1.1 (0.7-1.8)
3-4 censuses	12/82	1.21	18	1.5 (0.8-2.9)	1.6 (0.7-3.6)	-
5-7 censuses	4/35	1.21	14	-	-	-
P for trend				0.2387	0.6212	-

* Adjusted for county, age, sex, index year, pack-years of smoking, alcohol consumption and silica dust.

CI, confidence interval; OR, odds ratio; RA, rheumatoid arthritis.

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Supplementary Table 4. Risk of developing RA among workers exposed to organic dust from highest average intensity compared to never exposed workers (n=142 276).

Percentiles	All RA cases				Seropositive RA	Seronegative RA
	cases/controls	Mean highest intensity (mg/m ³)	Median years since last occupation classified as exposed	OR (95 % CI)*	OR (95 % CI)*	OR (95 % CI)*
Wood dust						
Unexposed	11993/123777	0.00	.	1.0	1.0	1.0
≤50	275/2079	0.44	25	1.1 (1.0-1.3)	1.0 (0.9-1.2)	1.3 (1.0-1.6)
>50-≤75	121/1195	1.24	11	1.0 (0.8-1.2)	1.0 (0.8-1.2)	1.0 (0.7-1.3)
> 75	83/896	1.78	21	0.9 (0.7-1.1)	0.9 (0.7-1.2)	0.8 (0.6-1.2)
P for trend				0.5281	0.5482	0.7564
Animal dust						
Unexposed	12072/125059	0.00	.	1.0	1.0	1.0
≤50	175/1456	0.01	22	1.2 (1.0-1.4)	1.1 (0.9-1.4)	1.3 (1.0-1.7)
>50-≤75	137/1133	0.02	24	1.3 (1.1-1.5)	1.2 (1.0-1.6)	1.4 (1.0-1.8)
> 75	109/842	0.19	13	1.4 (1.1-1.7)	1.5 (1.2-1.9)	1.1 (0.8-1.6)
P for trend				0.0463	0.0326	0.7034
Paper dust						
Unexposed	11672/120666	0.00	.	1.0	1.0	1.0
≤50	311/3182	0.05	20	1.0 (0.8-1.1)	0.9 (0.8-1.1)	1.0 (0.8-1.2)
>50-≤75	153/1502	0.09	15	1.1 (0.9-1.3)	1.0 (0.8-1.2)	1.2 (0.9-1.6)
> 75	168/1477	0.28	23	1.1 (0.9-1.3)	1.2 (1.0-1.5)	0.9 (0.6-1.2)
P for trend				0.7371	0.5335	0.6644
Textile dust						
Unexposed	12103/124781	0.00	.	1.0	1.0	1.0
≤50	273/2286	0.11	30	1.2 (1.0-1.3)	1.1 (1.0-1.3)	1.2 (0.9-1.5)

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>50-≤75	22/241	0.20	39	0.9 (0.5-1.3)	0.9 (0.5-1.5)	0.8 (0.3-1.7)
> 75	87/745	0.25	30	1.1 (0.9-1.5)	1.2 (0.9-1.6)	1.1 (0.7-1.6)
P for trend				0.1378	0.1186	0.7309
Flour dust						
Unexposed	12525/128922	0.00	.	1.0	1.0	1.0
≤50	79/750	1.17	24	1.0 (0.8-1.3)	1.0 (0.7-1.3)	1.2 (0.8-1.7)
>50-≤75	0/0	-	-	-	-	-
> 75	0/0	-	-	-	-	-
P for trend				-	-	-

* Adjusted for county, age, sex, index year, pack-years of smoking, alcohol consumption and silica dust.

CI, confidence interval; OR, odds ratio; RA, rheumatoid arthritis.

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Supplementary Table 5. The two most common occupations (with at least 50 % probability of exposure) per exposure and census (n=142,276).

		Men		Women	
		Freq	%	Freq	%
Wood dust					
1960	Bench carpenters and cabinet makers	271	35	Wood work n.e.c	11 42
	Construction carpenters and joiners	242	32	Bench carpenters and cabinet makers	8 31
1970	Construction carpenters and joiners	776	52	Bench carpenters and cabinet makers	44 51
	Bench carpenters and cabinet makers	390	26	Wood work n e c	17 20
1975	Construction carpenters and joiners	858	51	Bench carpenters and cabinet makers	84 54
	Bench carpenters and cabinet makers	447	27	Wood work n e c	31 20
1980	Construction carpenters and joiners	958	55	Bench carpenters and cabinet makers	146 64
	Bench carpenters and cabinet makers	485	28	Frame and circular sawyers and planers	23 10
1990	Construction carpenters	849	58	Wood workers n.e.c.	70 26
	Woodworking machine operators	182	12	Woodworking machine operators	57 21
2001	Woodworking machine operators	337	55	Woodworking machine operators	167 94
	Cabinet makers and joiners	219	36	Cabinet makers and joiners	6 3
2010	Cabinet makers and joiners	405	64	Woodworking machine operators	49 51
	Woodworking machine operators	129	20	Cabinet makers and joiners	22 23
Animal dust					
1960	Working proprietors, agricultural, horticultural and forestry enterprises	253	84	Livestock workers	34 59
	Livestock workers	30	10	Working proprietors, agricultural, horticultural and forestry enterprises	18 31
1970	Working proprietors, agricultural, horticultural and forestry enterprises	502	88	Livestock workers	94 60
	Livestock workers	43	8	Working proprietors, agricultural, horticultural and forestry enterprises	36 23
1975	Working proprietors, agricultural, horticultural and forestry enterprises	665	65	Agricultural workers	549 66
	Agricultural workers	320	31	Working proprietors, agricultural, horticultural and forestry enterprises	226 27
1980	Working proprietors, agricultural, horticultural and forestry enterprises	945	79	Working proprietors, agricultural, horticultural and forestry enterprises	895 76
	Agricultural and livestock workers	207	17	Agricultural and livestock workers	207 17
1990	Working proprietors in agriculture and forestry	803	93	Working proprietors in agriculture and forestry	602 82
	Livestock, dairy and poultry farm workers	32	4	Livestock, dairy and poultry farm workers	90 12
2001	Livestock, dairy and poultry farm workers	241	70	Livestock, dairy and poultry farm workers	68 57

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	Working proprietors in agriculture and forestry	85	25	Working proprietors in agriculture and forestry	23 19
2010	Livestock, dairy and poultry farm workers	196	75	Livestock, dairy and poultry farm workers	112 67
	Working proprietors in agriculture and forestry	52	20	Veterinarians	27 16
Paper dust					
1960	Typographers, lithographers	276	46	Packers	141 43
	Sorting clerks and postmen	149	25	Bookbinders	89 27
1970	Typographers, lithographers	335	45	Typographers, lithographers	269 43
	Sorting clerks and postmen	195	26	Bookbinders	100 16
1975	Typographers, lithographers	367	40	Packers	390 44
	Sorting clerks and postmen	259	28	Sorting clerks and postmen	179 20
1980	Typographers, lithographers	349	37	Packers	324 34
	Sorting clerks and postmen	277	29	Sorting clerks and postmen	251 26
1990	Mail sorting clerks and postmen	299	35	Packers	457 38
	Printing pressmen	209	24	Mail sorting clerks and postmen	441 37
2001	Packers	459	59	Packers	718 67
	Mail sorting clerks and postmen	251	32	Mail sorting clerks and postmen	338 31
2010	Packers	143	35	Packers	222 43
	Mail sorting clerks and postmen	142	34	Mail sorting clerks and postmen	197 38
Textile dust					
1960	Spinners, weavers, knitters and dyers	51	32	Seamstresses, ready-made clothing	555 56
	Upholsterers	47	29	Spinners, weavers, knitters and dyers	177 18
1970	Upholsterers	67	35	Seamstresses, ready-made clothing	459 49
	Spinners, weavers, knitters and dyers	55	29	Spinners, weavers, knitters and dyers	148 16
1975	Upholsterers	79	39	Tailors and dressmakers	500 50
	Spinners, weavers, knitters and dyers	46	23	Spinners, weavers, knitters and dyers	172 17
1980	Upholsterers	69	43	Tailors and dressmakers	344 50
	Spinners, weavers, knitters and dyers	38	23	Spinners, weavers, knitters and dyers	147 21
1990	Upholsterers	41	33	Dressmakers and sewers	439 55
	Lauderers and dry-cleaners	32	26	Lauderers and dry-cleaners	154 19
2001	Upholsterers	7	54	Lauderers and dry-cleaners	39 51
	Weaving and knitting machine setters	2	15	Tailors	12 16
2010	Textile workers n.e.c.	11	31	Lauderers and dry-cleaners	47 39

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	Launderers and dry-cleaners	8	23	Tailors	17 14
Flour dust					
1960	Bakers and pastry cooks	178	96	Bakers and pastry cooks	58 100
	Grain mill and oil press workers	8	4	-	- -
1970	Bakers and pastry cooks	131	95	Bakers and pastry cooks	76 97
	Grain mill and oil press workers	7	5	Grain mill and oil press workers	2 3
1975	Bakers and pastry cooks	120	94	Bakers and pastry cooks	73 97
	Grain mill and oil press workers	8	6	Grain mill and oil press workers	2 3
1980	Bakers and pastry cooks	109	88	Bakers and pastry cooks	96 93
	Grain mill and oil press workers	15	12	Grain mill and oil press workers	7 7
1990	Bakers and pastry cooks	116	90	Bakers and pastry cooks	126 98
	Grain mill and oil press workers	13	10	Grain mill and oil press workers	3 2
2001	Bakers and pastry cooks	36	97	Bakers and pastry cooks	27 100
	Grain mill and oil press workers	1	3	-	- -
2010	Bakers and pastry cooks	45	96	Bakers and pastry cooks	80 99
	Grain mill and oil press workers	2	4	Grain mill and oil press workers	1 1

Abbreviations: NEC, Not Elsewhere Classified