Supplementary table 1: Characteristics of participants those who returned vs. those who did not return the take-home questionnaire at enrollment in the Agricultural Health Study (n=20,409), Iowa and North Carolina

Characteristics	Returned take home	
	No (n=29478)	Yes (n=22916)
Age (years)		
≤45	16070 (54.5)	9657 (42.1)
>45-55	6600 (22.4)	5244 (22.9)
>55-65	4549 (15.4)	5059 (22.1)
>65	2259 (7.7)	2956 (12.9)
Sex		
Female	803 (2.7)	556 (2.4)
Male	28675 (97.3)	22360 (97.6)
Race		
Other	1090 (3.7)	428 (1.9)
White	27853 (94.5)	21986 (95.9)
Missing	535 (1.8)	502 (2.2)
State		
Iowa	17066 (57.9)	14810 (64.6)
North Carolina	12412 (42.1)	8106 (35.4)
Marital status		
Never married	3153 (10.7)	2365 (10.3)
Married/Living as married	24472 (83.0)	19220 (83.9)
Divorced/Widowed	1715 (5.8)	1209 (5.3)
Missing	138 (0.5)	122 (0.5)
Education		
≤ High school	16638 (56.4)	12647 (55.2)
1-3 year beyond high school	6946 (23.6)	5173 (22.6)
≥ College graduate	4588 (15.6)	4001 (17.5)
Something else	69 (0.2)	48 (0.2)
Missing	1237 (4.2)	1047 (4.6)
Smoking status		
Never	14961 (50.8)	11974 (52.3)
Former	8422 (28.6)	7568 (33)
Current	5265 (17.9)	2922 (12.8)
Missing	830 (2.8)	452 (2.0)
Alcohol intake (past 12 months)		
No	8976 (30.4)	7869 (34.3)
Yes	18152 (61.6)	13813 (60.3)
Missing	2350 (8.0)	1234 (5.4)
Overall pesticide lifetime days		
0-64	8740 (29.6)	6535 (28.5)
>64-225	8664 (29.4)	7181 (31.3)
>225-458	5856 (19.9)	4660 (20.3)
>458	5568 (18.9)	4514 (19.7)
Missing	650 (2.2)	26 (0.1)

Supplementary table 2: Ever-use of pesticide at enrollment in relation to self-reported olfactory impairment reported in the third follow-up in the Agricultural Health Study, excluding head injury

	Those who returned the take home and those responded to the head injury question (n=10,162) [a]	
Pesticides	OI (n=1048), n(%)	OR (95% CI)
Insecticide	1022 (97.5)	1.39 (0.92, 2.10)
Organochlorine	721 (69.1)	1.21 (1.04, 1.41)
Aldrin	282 (29.4)	1.01 (0.83, 1.24)
Chlordane	376 (38.1)	1.27 (1.09, 1.49)
Dieldrin	121 (12.6)	1.20 (0.94, 1.53)
DDT	362 (36.9)	1.13 (0.95, 1.35)
Heptachlor	251 (26.1)	1.10 (0.90, 1.35)
Toxaphene	201 (20.5)	1.24 (1.04, 1.48)
Lindane	268 (27.1)	1.19 (1.02, 1.39)
Carbamate	808 (77.2)	1.37 (1.17, 1.61)
Aldicarb	74 (7.6)	0.80 (0.60, 1.06)
Carbaryl	615 (62.9)	1.15 (0.98, 1.34)
Carbofuran	347 (35.0)	1.17 (1.01, 1.35)
Organophosphate	997 (95.2)	1.54 (1.14, 2.08)
Chlorpyrifos	498 (47.9)	1.25 (1.10, 1.43)
Coumaphos	113 (11.6)	1.13 (0.91, 1.39)
Diazinon	373 (38.1)	1.11 (0.95, 1.29)
Dichlorvos	159 (16.0)	1.19 (0.98, 1.43)
Fonofos	256 (25.6)	1.03 (0.88, 1.21)
Malathion	817 (80.1)	1.34 (1.13, 1.58)
Parathion	180 (18.4)	1.16 (0.97, 1.39)
Phorate	386 (39.1)	1.02 (0.88, 1.18)
Terbufos	434 (43.3)	1.08 (0.94, 1.24)
Trichlorfon	7 (0.7)	1.22 (0.55, 2.73)
Permethrin (crops)	150 (15.2)	1.27 (1.05, 1.54)
Permethrin (animals)	169 (16.9)	1.30 (1.08, 1.57)
Fumigant	283 (27.0)	1.19 (1.01, 1.39)
CCl_4/CS_2	96 (9.8)	1.36 (1.07, 1.73)
Aluminum phosphide	59 (6.0)	1.18 (0.89, 1.57)
Ethylene dibromide	33 (3.3)	0.91 (0.62, 1.32)
Methyl bromide	124 (12.5)	0.88 (0.68, 1.14)
Fungicide	389 (37.2)	1.12 (0.97, 1.31)
Benomyl	93 (9.7)	1.30 (0.97, 1.76)
Captan	130 (13.1)	1.17 (0.95, 1.42)
Chlorothalonil	59 (6)	0.94 (0.68, 1.30)
Maneb	87 (8.9)	0.85 (0.64, 1.14)
Metalaxyl	216 (21.8)	1.18 (0.98, 1.43)
Ziram	17 (1.7)	1.23 (0.73, 2.07)
Herbicide	1033 (98.6)	1.07 (0.62, 1.86)
Alachlor	615 (61.6)	1.15 (1.00, 1.32)
Butylate	372 (38.0)	1.05 (0.91, 1.23)
Chlorimuron ethyl	370 (37.6)	1.05 (0.91, 1.21)
Dicamba	592 (59.4)	1.12 (0.95, 1.31)
EPTC	226 (22.9)	1.05 (0.89, 1.24)
Glyphosate	857 (82.2)	1.33 (1.12, 1.58)
Imazethapyr	457 (47.1)	0.96 (0.82, 1.13)

Metolachlor	502 (50.0)	1.04 (0.90, 1.19)
Paraquat	230 (23.4)	1.10 (0.92, 1.30)
Pendimethalin	442 (44.7)	1.08 (0.94, 1.24)
Petroleum distillates	543 (55.1)	1.21 (1.05, 1.39)
Trifluralin	557 (58.9)	1.04 (0.88, 1.22)
2,4-D	868 (83.4)	1.16 (0.97, 1.40)
2,4,5-T	305 (31.2)	1.25 (1.05, 1.48)
2,4,5-TP	105 (10.7)	0.72 (0.57, 0.92)
Atrazine	808 (77.8)	1.17 (0.99, 1.39)
Cyanazine	495 (49.5)	1.14 (0.98, 1.31)
Metribuzin	510 (53.3)	1.03 (0.88, 1.22)

Abbreviation: 2,4-D, 2,4-Dichlorophenoxyacetic acid; 2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid; 2,4,5-T,P, 2-(2,4,5-trichlorophenoxy) propionic acid; CI, Confidence Intervals; CCl_4/CS_2, Carbon tetrachloride/Carbon disulfide 80/20 mix; DDT, Dichlorodiphenyltrichloroethane; EPTC, S-Ethyl dipropylthiocarbamate; OI, Olfactory Impairment; OR, Odds Ratio

Odds ratios are adjusted for age, sex, state of residence, education, smoking status, ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint), and correlated pesticides (correlated ever-use of pesticides with Spearman correlation ≥ 0.40)

[c]Restricted to participants who returned the take-home questionnaire and those who responded to the question on a history of head injury; those with a history of head injury were excluded

Supplementary table 3: Ever-use of pesticide at enrollment in relation to self-reported olfactory impairment reported in the third follow-up in the Agricultural Health Study, excluding those who reported PD in any survey (n=20,184)

Pesticides	No OI n (%)	OI n (%)	OR (95% CI)
Insecticide	17161 (94.1)	1873 (96.2)	1.42 (1.11, 1.82)
Organochlorine	9642 (54.4)	1246 (65.4)	1.29 (1.15, 1.44)
Aldrin	3226 (19.4)	467 (26.5)	1.01 (0.87, 1.18)
Chlordane	4464 (26.4)	605 (33.3)	1.08 (0.96, 1.22)
Dieldrin	1150 (6.9)	199 (11.3)	1.23 (1.02, 1.48)
DDT	3918 (23.3)	612 (34.0)	1.28 (1.13, 1.47)
Heptachlor	2795 (16.7)	411 (23.2)	1.07 (0.92, 1.25)
Toxaphene	2400 (14.2)	346 (19.2)	1.23 (1.08, 1.40)
Lindane	3639 (21.5)	490 (26.9)	1.20 (1.07, 1.34)
Carbamate	12163 (67.9)	1448 (75.5)	1.40 (1.25, 1.57)
Aldicarb	1686 (10.1)	164 (9.2)	0.93 (0.77, 1.13)
Carbaryl	9554 (56.4)	1138 (62.6)	1.24 (1.10, 1.39)
Carbofuran	4941 (29.0)	629 (34.3)	1.16 (1.05, 1.29)
Organophosphate	16413 (90.0)	1823 (93.7)	1.51 (1.24, 1.84)
Chlorpyrifos	7840 (43.3)	910 (47.0)	1.16 (1.05, 1.27)
Coumaphos	1621 (9.7)	205 (11.4)	1.14 (0.98, 1.33)
Diazinon	5615 (33.2)	671 (36.9)	1.04 (0.93, 1.17)
Dichlorvos	2102 (12.4)	291 (15.9)	1.24 (1.08, 1.43)
Fonofos	4033 (23.5)	467 (25.3)	1.00 (0.89, 1.13)
Malathion	12669 (72.8)	1488 (79.1)	1.31 (1.16, 1.48)
Parathion	2541 (15.1)	342 (18.9)	1.22 (1.07, 1.39)
Phorate	5972 (35.2)	691 (38.0)	1.00 (0.90, 1.11)
Terbufos	7070 (41.2)	806 (43.6)	1.06 (0.96, 1.17)
Trichlorfon	103 (0.6)	16 (0.9)	1.40 (0.82, 2.38)
Permethrin (crops)	2321 (13.7)	289 (15.9)	1.23 (1.08, 1.41)
Permethrin (animals)	2618 (15.3)	330 (18.0)	1.25 (1.10, 1.43)
Fumigant	4173 (22.9)	504 (25.9)	1.16 (1.03, 1.31)
CCl_4/CS_2	947 (5.6)	160 (8.9)	1.30 (1.09, 1.56)
Aluminum phosphide	910 (5.4)	106 (5.9)	1.06 (0.86, 1.31)
Ethylene dibromide	618 (3.7)	64 (3.5)	0.89 (0.68, 1.17)
Methyl bromide	2386 (14.0)	245 (13.5)	0.97 (0.81, 1.17)
Fungicide	6486 (35.6)	732 (37.7)	1.17 (1.05, 1.30)
Benomyl	1506 (9.1)	170 (9.6)	1.03 (0.83, 1.29)
Captan	2074 (12.2)	276 (15.1)	1.24 (1.08, 1.43)
Chlorothalonil	1148 (6.8)	137 (7.5)	1.23 (0.99, 1.54)
Maneb	1516 (8.9)	177 (9.8)	1.10 (0.89, 1.35)
Metalaxyl	3733 (21.9)	414 (22.8)	1.16 (1.01, 1.33)
Ziram	252 (1.5)	28 (1.6)	1.04 (0.70, 1.55)
Herbicide	17812 (97.7)	1915 (98.4)	1.26 (0.86, 1.84)
Alachlor	9593 (55.8)	1083 (58.9)	1.05 (0.95, 1.16)
Butylate	5746 (34.1)	680 (37.7)	1.04 (0.93, 1.17)
Chlorimuron ethyl	6451 (37.9)	690 (38.1)	1.00 (0.90, 1.10)
Dicamba	9460 (55.2)	1083 (59.1)	1.11 (0.99, 1.24)
EPTC	3648 (21.5)	430 (23.6)	1.07 (0.95, 1.21)
Glyphosate	14004 (77.2)	1585 (81.8)	1.36 (1.20, 1.54)
Imazethapyr	7860 (46.9)	852 (47.6)	0.94 (0.84, 1.06)
Metolachlor	8304 (48.3)	928 (50.1)	1.04 (0.94, 1.15)
Paraquat	3884 (22.8)	456 (25.1)	1.16 (1.03, 1.32)

Pendimethalin	7626 (44.7)	838 (46.0)	1.05 (0.95, 1.15)
Petroleum distillates	8441 (49.9)	1011 (55.7)	1.18 (1.06, 1.30)
Trifluralin	9047 (55.4)	1047 (60.0)	1.09 (0.96, 1.23)
2,4-D	14095 (78.0)	1589 (82.1)	1.14 (1.00, 1.30)
2,4,5-T	3707 (22.1)	520 (28.9)	1.21 (1.06, 1.38)
2,4,5-T,P	1658 (9.9)	209 (11.6)	0.89 (0.75, 1.07)
Atrazine	13327 (73.4)	1484 (76.9)	1.10 (0.97, 1.24)
Cyanazine	7714 (45.0)	887 (48.2)	1.05 (0.94, 1.17)
Metribuzin	8049 (49.0)	948 (53.8)	1.06 (0.94, 1.20)

Abbreviation: 2,4-D, 2,4-Dichlorophenoxyacetic acid; 2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid; 2,4,5-T,P, 2-(2,4,5-trichlorophenoxy) propionic acid; CI, Confidence Intervals; CCl_4/CS_2, Carbon tetrachloride/Carbon disulfide 80/20 mix; DDT, Dichlorodiphenyltrichloroethane; EPTC, S-Ethyl dipropylthiocarbamate; OI, Olfactory Impairment; OR, Odds Ratio

Odds ratios are adjusted for age, sex, state of residence, education, smoking status, ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint), and correlated pesticides (correlated ever-use of pesticides with Spearman correlation ≥ 0.40)

Supplementary table 4: Intensity-weighted lifetime days of use at enrollment in relation to self-reported olfactory impairment in the Agricultural Health Study, excluding those who reported PD in any survey (n=20,184)

Pesticide	Exposure[a]	No OI (n (%))	OI (n (%))	OR (95% CI)	p-trend
Organochlorine					
Aldrin[b]	Never	8036 (83.9)	793 (75.8)	Ref	0.07
	>0–315	563 (5.9)	88 (8.4)	1.12 (0.87, 1.45)	
	>315–952	486 (5.1)	69 (6.6)	1.00 (0.75, 1.34)	
	>952	496 (5.2)	96 (9.2)	1.29 (0.99, 1.68)	
Chlordane[b]	Never	8030 (82)	806 (73.8)	Ref	0.10
	>0–231	577 (5.9)	97 (8.9)	1.41 (1.11, 1.78)	
	>231–637	606 (6.2)	95 (8.7)	1.27 (1.00, 1.61)	
	>637	583 (6.0)	94 (8.6)	1.23 (0.96, 1.56)	
Dieldrin[b]	Never	9316 (96.7)	1002 (94.7)	Ref	0.85
	>0–210	112 (1.2)	17 (1.6)	0.92 (0.55, 1.57)	
	>210–653	93 (1.0)	23 (2.2)	1.47 (0.91, 2.36)	
	>653	109 (1.1)	16 (1.5)	0.87 (0.51, 1.50)	
DDT[b]	Never	7838 (81.4)	743 (69.9)	Ref	0.01
	>0–328	598 (6.2)	107 (10.1)	1.38 (1.09, 1.75)	
	>328–1583	611 (6.3)	99 (9.3)	1.26 (0.98, 1.61)	
	>1583	587 (6.1)	114 (10.7)	1.46 (1.15, 1.85)	
Heptachlor[b]	Never	8490 (88.1)	872 (82.4)	Ref	0.15
	>0–289	394 (4.1)	55 (5.2)	1.01 (0.74, 1.37)	
	>289–893	382 (4.0)	65 (6.1)	1.20 (0.90, 1.61)	
	>893	368 (3.8)	66 (6.2)	1.22 (0.91, 1.64)	
Toxaphene[b]	Never	9247 (90.1)	977 (85.6)	Ref	0.19
	>0–298	340 (3.3)	51 (4.5)	1.24 (0.91, 1.68)	
	>298–1050	335 (3.3)	65 (5.7)	1.57 (1.19, 2.08)	
	>1050	342 (3.3)	48 (4.2)	1.15 (0.84, 1.58)	
Lindane[b]	Never	8730 (85.6)	890 (78.2)	Ref	<.0001
	>0–315	509 (5.0)	81 (7.1)	1.40 (1.09, 1.79)	
	>315–1176	493 (4.8)	77 (6.8)	1.41 (1.09, 1.82)	
	>1176	469 (4.6)	90 (7.9)	1.69 (1.32, 2.15)	
Carbamate					
Aldicarb[b]	Never	9122 (93.2)	1022 (93.9)	Ref	0.14
	>0–613	213 (2.2)	25 (2.3)	1.11 (0.72, 1.71)	
	>613–2408	221 (2.3)	25 (2.3)	1.07 (0.69, 1.68)	
	>2408	227 (2.3)	16 (1.5)	0.66 (0.39, 1.14)	
Carbaryl[b]	Never	5688 (58.9)	560 (52.1)	Ref	0.60
	>0–341	1340 (13.9)	172 (16.0)	1.19 (0.99, 1.43)	
	>341–2015	1345 (13.9)	191 (17.8)	1.37 (1.13, 1.65)	
	>2015	1292 (13.4)	151 (14.1)	1.17 (0.93, 1.47)	
Carbofuran	Never	12078 (71.5)	1203 (66.1)	Ref	0.31
	>0–350	1591 (9.4)	225 (12.4)	1.28 (1.09, 1.49)	
	>350–1260	1615 (9.6)	200 (11.0)	1.14 (0.97, 1.33)	
	>1260	1607 (9.5)	192 (10.5)	1.10 (0.93, 1.30)	
Organophosphate					
Chlorpyrifos	Never	9399 (54.9)	959 (51.7)	Ref	0.51
	>0–435	2520 (14.7)	326 (17.6)	1.27 (1.11, 1.46)	
	>435–1715	2646 (15.5)	290 (15.6)	1.08 (0.94, 1.24)	
	>1715	2554 (14.9)	280 (15.1)	1.07 (0.93, 1.24)	
Coumaphos	Never	15153 (90.6)	1595 (89.1)	Ref	0.89

	>0–394	535 (3.2)	70 (3.9)	1.17 (0.90, 1.51)	
	>394–1369	507 (3.0)	70 (3.9)	1.25 (0.97, 1.62)	
	>1369	531 (3.2)	55 (3.1)	0.94 (0.71, 1.25)	
Diazinon[b]	Never	7848 (79.4)	807 (72.7)	Ref	0.004
	>0–515	693 (7.0)	110 (9.9)	1.44 (1.16, 1.80)	
	>515–3923	675 (6.8)	93 (8.4)	1.23 (0.97, 1.56)	
	>3923	664 (6.7)	100 (9.0)	1.42 (1.12, 1.80)	
Dichlorvos	Never	14885 (87.9)	1533 (84.3)	Ref	0.04
	>0–315	688 (4.1)	89 (4.9)	1.18 (0.94, 1.49)	
	>315–1143	688 (4.1)	103 (5.7)	1.34 (1.08, 1.67)	
	>1143	677 (4.0)	93 (5.1)	1.24 (0.99, 1.55)	
Fonofos	Never	13085 (76.8)	1375 (75.0)	Ref	0.61
	>0–429	1282 (7.5)	177 (9.7)	1.24 (1.04, 1.47)	
	>429–1550	1364 (8.0)	133 (7.3)	0.85 (0.70, 1.03)	
	>1550	1303 (7.6)	148 (8.1)	0.96 (0.80, 1.15)	
Malathion[b]	Never	3541 (34.8)	315 (27.8)	Ref	0.001
	>0–360	2207 (21.7)	262 (23.1)	1.28 (1.07, 1.52)	
	>360–1344	2273 (22.3)	262 (23.1)	1.21 (1.01, 1.45)	
	>1344	2157 (21.2)	296 (26.1)	1.40 (1.18, 1.67)	
Parathion[b]	Never	9491 (93.1)	1022 (90.4)	Ref	0.07
	>0–315	232 (2.3)	38 (3.4)	1.41 (0.99, 2.01)	
	>315–1700	238 (2.3)	37 (3.3)	1.39 (0.97, 2.00)	
	>1700	236 (2.3)	34 (3.0)	1.31 (0.90, 1.90)	
Phorate[b]	Never	6643 (67.8)	693 (63.8)	Ref	0.81
	>0–315	1078 (11.0)	140 (12.9)	1.11 (0.91, 1.36)	
	>315–1117	1028 (10.5)	134 (12.3)	1.15 (0.94, 1.41)	
	>1117	1053 (10.7)	120 (11.0)	0.95 (0.77, 1.17)	
Terbufos	Never	10080 (59.3)	1041 (56.8)	Ref	0.04
	>0–621	2293 (13.5)	261 (14.2)	1.07 (0.93, 1.25)	
	>621–2279	2371 (13.9)	251 (13.7)	0.99 (0.85, 1.15)	
	>2279	2264 (13.3)	281 (15.3)	1.15 (0.99, 1.32)	
Permethrin					
Permethrin (crops)	Never	14601 (86.7)	1523 (84.7)	Ref	0.0006
	>0–245	742 (4.4)	90 (5.0)	1.16 (0.93, 1.46)	
	>245–963	778 (4.6)	82 (4.6)	1.06 (0.84, 1.35)	
	>963	725 (4.3)	104 (5.8)	1.47 (1.18, 1.82)	
Permethrin (animals)	Never	14491 (84.9)	1507 (82.3)	Ref	0.36
	>0–350	838 (4.9)	121 (6.6)	1.44 (1.18, 1.77)	
	>350–1382	880 (5.2)	108 (5.9)	1.22 (0.98, 1.50)	
	>1382	861 (5.0)	96 (5.2)	1.11 (0.89, 1.38)	
Fumigant					
CCl_4/CS_2[b]	Never	9891 (96.3)	1067 (93.3)	Ref	0.04
	>0–63	126 (1.2)	25 (2.2)	1.48 (0.96, 2.30)	
	>63–331	135 (1.3)	25 (2.2)	1.28 (0.83, 1.99)	
	>331	124 (1.2)	27 (2.4)	1.53 (0.99, 2.35)	
Aluminum phosphide[b]	Never	9904 (96.3)	1101 (95.7)	Ref	0.91
	>0–56	124 (1.2)	18 (1.6)	1.27 (0.77, 2.10)	
	>56–248	127 (1.2)	18 (1.6)	1.25 (0.76, 2.07)	
	>248	128 (1.2)	13 (1.1)	0.92 (0.51, 1.64)	
Ethylene dibromide[b]	Never	9877 (96)	1101 (95.5)	Ref	0.41
	>0–196	137 (1.3)	16 (1.4)	1.09 (0.64, 1.85)	

	>196–919	136 (1.3)	18 (1.6)	1.26 (0.76, 2.09)	
	>919	135 (1.3)	18 (1.6)	1.21 (0.72, 2.02)	
Methyl bromide	Never	14670 (86.6)	1574 (86.8)	Ref	0.71
	>0–294	738 (4.4)	74 (4.1)	0.97 (0.75, 1.27)	
	>294–1260	775 (4.6)	86 (4.7)	1.06 (0.82, 1.38)	
	>1260	765 (4.5)	79 (4.4)	0.95 (0.72, 1.25)	
Fungicide					
Benomyl[b]	Never	8866 (93.5)	967 (92.2)	Ref	0.13
	>0–343	198 (2.1)	34 (3.2)	1.68 (1.13, 2.49)	
	>343–1773	220 (2.3)	19 (1.8)	0.89 (0.53, 1.49)	
	>1773	194 (2.0)	29 (2.8)	1.51 (0.96, 2.37)	
Captan	Never	14849 (89.3)	1547 (86.7)	Ref	0.07
	>0–9	664 (4.0)	85 (4.8)	1.23 (0.97, 1.55)	
	>9–161	527 (3.2)	74 (4.1)	1.31 (1.02, 1.69)	
	>161	579 (3.5)	79 (4.4)	1.28 (1.00, 1.64)	
Chlorothalonil	Never	15833 (93.6)	1680 (93.2)	Ref	0.94
	>0–539	344 (2.0)	45 (2.5)	1.28 (0.92, 1.78)	
	>539–3080	358 (2.1)	42 (2.3)	1.20 (0.85, 1.71)	
	>3080	372 (2.2)	35 (1.9)	1.00 (0.68, 1.47)	
Maneb/Mancozeb[b]	Never	9078 (93.1)	1012 (93.2)	Ref	0.79
	>0–425	232 (2.4)	22 (2.0)	0.85 (0.54, 1.35)	
	>425–2688	230 (2.4)	25 (2.3)	0.93 (0.59, 1.46)	
	>2688	215 (2.2)	27 (2.5)	1.05 (0.68, 1.62)	
Metalaxyl[b]	Never	8370 (82.7)	926 (82.1)	Ref	0.07
	>0–239	576 (5.7)	66 (5.9)	1.03 (0.79, 1.35)	
	>239–1323	596 (5.9)	63 (5.6)	1.10 (0.82, 1.49)	
	>1323	576 (5.7)	73 (6.5)	1.35 (0.99, 1.84)	
Herbicide					
Alachlor	Never	7592 (44.9)	755 (41.4)	Ref	0.06
	>0–788	3114 (18.4)	332 (18.2)	1.00 (0.87, 1.15)	
	>788–2958	3140 (18.6)	371 (20.4)	1.11 (0.97, 1.27)	
	>2958	3056 (18.1)	364 (20)	1.11 (0.97, 1.27)	
Butylate[b]	Never	6940 (71.1)	726 (66.9)	Ref	0.02
	>0–455	943 (9.7)	119 (11)	1.12 (0.90, 1.38)	
	>455–1512	969 (9.9)	111 (10.2)	1.00 (0.80, 1.25)	
	>1512	908 (9.3)	130 (12.0)	1.26 (1.02, 1.55)	
Chlorimuron ethyl[b]	Never	6976 (68.0)	768 (67.0)	Ref	0.31
	>0–236	1124 (11.0)	133 (11.6)	1.11 (0.91, 1.35)	
	>236–662	1071 (10.4)	122 (10.6)	1.04 (0.84, 1.27)	
	>662	1084 (10.6)	124 (10.8)	1.09 (0.88, 1.33)	
Dicamba	Never	7653 (45.2)	750 (41.3)	Ref	0.72
	>0–551	3064 (18.1)	357 (19.6)	1.15 (1.00, 1.33)	
	>551–2170	3151 (18.6)	373 (20.5)	1.14 (0.99, 1.32)	
	>2170	3050 (18.0)	337 (18.5)	1.07 (0.92, 1.24)	
EPTC	Never	13280 (78.8)	1391 (76.9)	Ref	0.14
	>0–315	1209 (7.2)	129 (7.1)	0.97 (0.80, 1.18)	
	>315–1176	1216 (7.2)	152 (8.4)	1.14 (0.95, 1.36)	
	>1176	1143 (6.8)	137 (7.6)	1.09 (0.90, 1.31)	
Glyphosate	Never	4144 (23.1)	352 (18.3)	Ref	0.001
	>0–672	4559 (25.4)	541 (28.1)	1.42 (1.23, 1.64)	
	>672–2610	4724 (26.3)	491 (25.5)	1.24 (1.07, 1.44)	

	>2610	4548 (25.3)	539 (28.0)	1.45 (1.25, 1.68)	
Imazethapyr	Never	8889 (53.5)	936 (52.7)	Ref	0.89
	>0–338	2540 (15.3)	290 (16.3)	0.99 (0.85, 1.16)	
	>338–992	2664 (16)	274 (15.4)	0.90 (0.77, 1.05)	
	>992	2507 (15.1)	277 (15.6)	0.97 (0.83, 1.14)	
Metolachlor	Never	8866 (52.2)	922 (50.2)	Ref	0.13
	>0–720	2701 (15.9)	351 (19.1)	1.23 (1.07, 1.40)	
	>720–2604	2744 (16.2)	302 (16.4)	1.02 (0.89, 1.18)	
	>2604	2678 (15.8)	261 (14.2)	0.91 (0.78, 1.05)	
Paraquat[b]	Never	8765 (85.4)	949 (83.0)	Ref	0.03
	>0–275	500 (4.9)	64 (5.6)	1.18 (0.90, 1.56)	
	>275–1080	505 (4.9)	68 (5.9)	1.31 (1.00, 1.73)	
	>1080	492 (4.8)	63 (5.5)	1.33 (0.99, 1.79)	
Pendimethalin[b]	Never	6478 (63.2)	697 (60.7)	Ref	0.33
	>0–315	1276 (12.4)	146 (12.7)	1.03 (0.85, 1.25)	
	>315–1176	1242 (12.1)	170 (14.8)	1.30 (1.09, 1.56)	
	>1176	1259 (12.3)	135 (11.8)	1.04 (0.86, 1.27)	
Petroleum distillates[b]	Never	8018 (78.7)	844 (73.6)	Ref	0.01
	>0–502	731 (7.2)	96 (8.4)	1.22 (0.97, 1.53)	
	>502–2438	726 (7.1)	107 (9.3)	1.39 (1.12, 1.73)	
	>2438	708 (7.0)	99 (8.6)	1.29 (1.03, 1.62)	
Trifluralin	Never	7267 (45.1)	697 (40.4)	Ref	0.05
	>0–1020	2948 (18.3)	312 (18.1)	1.04 (0.89, 1.21)	
	>1020–3875	3019 (18.7)	360 (20.8)	1.14 (0.98, 1.32)	
	>3875	2878 (17.9)	358 (20.7)	1.15 (0.98, 1.34)	
2,4-D	Never	3981 (22.3)	346 (18.1)	Ref	0.01
	>0–1302	4620 (25.9)	489 (25.6)	1.14 (0.98, 1.33)	
	>1302–5208	4836 (27.1)	512 (26.8)	1.08 (0.93, 1.26)	
	>5208	4431 (24.8)	563 (29.5)	1.21 (1.04, 1.41)	
2,4,5-T[b]	Never	7960 (82.2)	772 (71.7)	Ref	0.01
	>0–280	562 (5.8)	105 (9.8)	1.64 (1.30, 2.06)	
	>280–971	583 (6.0)	108 (10.0)	1.66 (1.32, 2.09)	
	>971	573 (5.9)	91 (8.5)	1.40 (1.10, 1.80)	
2,4,5-TP[b]	Never	9239 (95.3)	998 (92.5)	Ref	0.22
	>0–315	158 (1.6)	25 (2.3)	1.20 (0.77, 1.86)	
	>315–1250	148 (1.5)	32 (3.0)	1.61 (1.08, 2.41)	
	>1250	148 (1.5)	24 (2.2)	1.19 (0.76, 1.86)	
Atrazine	Never	4831 (26.8)	447 (23.3)	Ref	0.26
	>0–1054	4369 (24.3)	484 (25.2)	1.14 (0.99, 1.31)	
	>1054–4340	4497 (25.0)	491 (25.6)	1.08 (0.93, 1.25)	
	>4340	4299 (23.9)	495 (25.8)	1.10 (0.96, 1.28)	
Cyanazine	Never	9433 (55.5)	952 (52.0)	Ref	0.15
	>0–539	2496 (14.7)	299 (16.3)	1.11 (0.96, 1.28)	
	>539–2200	2581 (15.2)	283 (15.4)	1.00 (0.86, 1.16)	
	>2200	2475 (14.6)	298 (16.3)	1.10 (0.95, 1.27)	
Metribuzin[b]	Never	5525 (58.3)	560 (53.3)	Ref	0.01
	>0–315	1317 (13.9)	145 (13.8)	0.99 (0.80, 1.22)	
	>315–1000	1353 (14.3)	162 (15.4)	1.08 (0.89, 1.33)	
	>1000	1277 (13.5)	183 (17.4)	1.26 (1.04, 1.54)	

Abbreviation: 2,4-D, 2,4-Dichlorophenoxyacetic acid; 2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid; 2,4,5-T,P, 2-(2,4,5-trichlorophenoxy) propionic acid; CI, Confidence Intervals; CCl_4/CS_2, Carbon tetrachloride/Carbon disulfide 80/20

mix; DDT, Dichlorodiphenyltrichloroethane; EPTC, S-Ethyl dipropylthiocarbamate; OI, Olfactory Impairment; OR, Odds Ratio

Odds ratios are adjusted for age, sex, state of residence, education, smoking status, ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint), and correlated pesticides (correlated ever-use of pesticides with Spearman correlation ≥ 0.40)

[a]Exposure categories: Never-use and categorized into tertiles among users

[b]Frequency and duration of pesticide was asked only in the take-home questionnaire

Supplementary table 5: Lifetime days (unweighted) of use at enrollment in relation to self-reported olfactory impairment in the Agricultural Health Study

Pesticides	Days	No OI, n (%)	OI, n (%)	OR (95% CI)	P
Aldrin	Never use	8080 (83.9)	849 (75.7)	Ref	0.17
	Tertile 1	752 (7.8)	122 (10.9)	1.06 (0.84, 1.32)	
	Tertile 2	460 (4.8)	78 (7.0)	1.06 (0.80, 1.40)	
	Tertile 3	344 (3.6)	72 (6.4)	1.24 (0.92, 1.67)	
Chlordane	Never use	8080 (82.0)	857 (73.1)	Ref	0.003
	Tertile 1	480 (4.9)	83 (7.1)	1.43 (1.11, 1.84)	
	Tertile 2	726 (7.4)	119 (10.2)	1.23 (0.99, 1.52)	
	Tertile 3	568 (5.8)	113 (9.6)	1.40 (1.12, 1.75)	
Dieldrin	Never use	9363 (96.7)	1074 (94.5)		0.96
	Tertile 1	80 (0.8)	13 (1.1)	0.91 (0.50, 1.67)	
	Tertile 2	133 (1.4)	32 (2.8)	1.26 (0.84, 1.90)	
	Tertile 3	106 (1.1)	17 (1.5)	0.89 (0.52, 1.50)	
DDT	Never use	7873 (81.2)	794 (69.4)	Ref	0.04
	Tertile 1	848 (8.8)	159 (13.9)	1.33 (1.08, 1.63)	
	Tertile 2	380 (3.9)	72 (6.3)	1.31 (0.99, 1.74)	
	Tertile 3	589 (6.1)	119 (10.4)	1.34 (1.06, 1.69)	
Heptachlor	Never use	8535 (88.1)	938 (82.4)	Ref	0.10
	Tertile 1	590 (6.1)	96 (8.4)	1.06 (0.83, 1.36)	
	Tertile 2	325 (3.4)	50 (4.4)	0.96 (0.70, 1.33)	
	Tertile 3	241 (2.5)	54 (4.7)	1.37 (0.99, 1.89)	
Toxaphene	Never use	9303 (90.1)	1050 (85.7)	Ref	0.05
	Tertile 1	538 (5.2)	88 (7.2)	1.25 (0.99, 1.59)	
	Tertile 2	234 (2.3)	43 (3.5)	1.35 (0.96, 1.89)	
	Tertile 3	251 (2.4)	44 (3.6)	1.32 (0.95, 1.85)	
Lindane	Never use	8777 (85.5)	957 (78.4)	Ref	<.0001
	Tertile 1	696 (6.8)	118 (9.7)	1.38 (1.12, 1.71)	
	Tertile 2	330 (3.2)	46 (3.8)	1.14 (0.83, 1.58)	
	Tertile 3	460 (4.5)	99 (8.1)	1.78 (1.41, 2.25)	
Aldicarb	Never use	9177 (93.3)	1099 (94.3)	Ref	0.02
	Tertile 1	217 (2.2)	23 (2.0)	0.94 (0.60, 1.48)	
	Tertile 2	267 (2.7)	35 (3.0)	1.21 (0.82, 1.78)	
	Tertile 3	179 (1.8)	9 (0.8)	0.43 (0.21, 0.86)	
Carbaryl	Never use	5720 (58.8)	605 (52.4)	Ref	0.33
	Tertile 1	1731 (17.8)	253 (21.9)	1.26 (1.07, 1.48)	
	Tertile 2	998 (10.3)	130 (11.3)	1.13 (0.91, 1.41)	
	Tertile 3	1272 (13.1)	167 (14.5)	1.18 (0.95, 1.48)	
Carbofuran	Never use	12143 (71.4)	1278 (65.9)	Ref	0.07
	Tertile 1	1976 (11.6)	272 (14.0)	1.18 (1.02, 1.35)	
	Tertile 2	1279 (7.5)	182 (9.4)	1.21 (1.02, 1.43)	
	Tertile 3	1600 (9.4)	206 (10.6)	1.12 (0.95, 1.31)	
Chlorpyrifos	Never use	10324 (57.1)	1094 (53.6)	Ref	0.06
	Tertile 1	2614 (14.4)	338 (16.6)	1.22 (1.07, 1.39)	
	Tertile 2	2678 (14.8)	303 (14.8)	1.05 (0.92, 1.21)	
	Tertile 3	2475 (13.7)	307 (15.0)	1.17 (1.02, 1.34)	
Coumaphos	Never use	15237 (90.6)	1694 (88.8)	Ref	0.67
	Tertile 1	671 (4.0)	100 (5.2)	1.25 (1.00, 1.55)	
	Tertile 2	447 (2.7)	65 (3.4)	1.24 (0.95, 1.62)	
	Tertile 3	468 (2.8)	48 (2.5)	0.88 (0.65, 1.19)	

Diazinon	Never use	7891 (79.4)	866 (72.9)	Ref	0.00
	Tertile 1	1026 (10.3)	153 (12.9)	1.29 (1.07, 1.56)	
	Tertile 2	445 (4.5)	77 (6.5)	1.39 (1.07, 1.80)	
	Tertile 3	574 (5.8)	92 (7.7)	1.45 (1.14, 1.86)	
DDVP	Never use	14963 (87.8)	1631 (84.3)	Ref	0.03
	Tertile 1	816 (4.8)	108 (5.6)	1.12 (0.91, 1.39)	
	Tertile 2	679 (4.0)	106 (5.5)	1.32 (1.06, 1.63)	
	Tertile 3	581 (3.4)	89 (4.6)	1.28 (1.01, 1.61)	
Fonofos	Never use	13161 (76.8)	1462 (75.0)	Ref	0.37
	Tertile 1	1638 (9.6)	208 (10.7)	1.06 (0.90, 1.24)	
	Tertile 2	1137 (6.6)	139 (7.1)	0.99 (0.82, 1.20)	
	Tertile 3	1200 (7.0)	141 (7.2)	0.92 (0.76, 1.11)	
Malathion	Never use	3562 (34.8)	345 (28.3)	Ref	0.01
	Tertile 1	2732 (26.7)	331 (27.2)	1.18 (1.01, 1.39)	
	Tertile 2	2165 (21.1)	284 (23.3)	1.25 (1.05, 1.48)	
	Tertile 3	1784 (17.4)	258 (21.2)	1.34 (1.12, 1.60)	
Parathion	Never use	9549 (93.1)	1099 (90.5)	Ref	0.49
	Tertile 1	309 (3.0)	59 (4.9)	1.53 (1.14, 2.05)	
	Tertile 2	173 (1.7)	27 (2.2)	1.32 (0.86, 2.00)	
	Tertile 3	227 (2.2)	29 (2.4)	1.09 (0.73, 1.62)	
Phorate	Never use	6682 (67.8)	741 (63.6)	Ref	0.90
	Tertile 1	1334 (13.5)	180 (15.4)	1.08 (0.90, 1.29)	
	Tertile 2	869 (8.8)	126 (10.8)	1.16 (0.94, 1.43)	
	Tertile 3	974 (9.9)	119 (10.2)	0.95 (0.77, 1.17)	
Terbufos	Never use	10144 (59.3)	1100 (56.4)	Ref	0.09
	Tertile 1	2519 (14.7)	295 (15.1)	1.04 (0.91, 1.2)	
	Tertile 2	2418 (14.1)	290 (14.9)	1.07 (0.93, 1.23)	
	Tertile 3	2034 (11.9)	265 (13.6)	1.14 (0.98, 1.32)	
Permethrin (crops)	Never use	14691 (86.7)	1626 (84.9)	Ref	0.02
	Tertile 1	1199 (7.1)	153 (8.0)	1.17 (0.98, 1.39)	
	Tertile 2	410 (2.4)	52 (2.7)	1.24 (0.92, 1.67)	
	Tertile 3	642 (3.8)	84 (4.4)	1.3 (1.02, 1.65)	
Permethrin (animals)	Never use	14569 (84.8)	1611 (82.7)	Ref	0.28
	Tertile 1	1078 (6.3)	157 (8.1)	1.35 (1.13, 1.62)	
	Tertile 2	685 (4.0)	79 (4.1)	1.08 (0.85, 1.38)	
	Tertile 3	844 (4.9)	101 (5.2)	1.13 (0.91, 1.40)	
CCl_4/CS_2	Never use	9947 (96.2)	1146 (93.2)	Ref	0.13
	Tertile 1	188 (1.8)	39 (3.2)	1.40 (0.98, 2.00)	
	Tertile 2	97 (0.9)	21 (1.7)	1.36 (0.84, 2.21)	
	Tertile 3	111 (1.1)	23 (1.9)	1.34 (0.84, 2.12)	
Aluminum Phosphide	Never use	9963 (96.2)	1181 (95.8)	Ref	0.81
	Tertile 1	211 (2.0)	32 (2.6)	1.22 (0.83, 1.78)	
	Tertile 2	108 (1.0)	11 (0.9)	0.88 (0.47, 1.65)	
	Tertile 3	70 (0.7)	9 (0.7)	1.10 (0.54, 2.22)	
Ethylene Dibromide	Never use	9937 (96.0)	1182 (95.6)	Ref	0.90
	Tertile 1	151 (1.5)	18 (1.5)	1.06 (0.64, 1.75)	
	Tertile 2	156 (1.5)	28 (2.3)	1.55 (1.01, 2.36)	
	Tertile 3	104 (1.0)	9 (0.7)	0.76 (0.38, 1.52)	
Methyl Bromide	Never use	14752 (86.5)	1673 (86.9)	Ref	0.17
	Tertile 1	895 (5.2)	89 (4.6)	0.95 (0.74, 1.21)	
	Tertile 2	676 (4.0)	66 (3.4)	0.87 (0.65, 1.17)	

	Tertile 3	732 (4.3)	98 (5.1)	1.18 (0.92, 1.53)	
Benomyl	Never use	8920 (93.5)	1041 (92.3)	Ref	0.20
	Tertile 1	302 (3.2)	42 (3.7)	1.32 (0.93, 1.89)	
	Tertile 2	116 (1.2)	16 (1.4)	1.34 (0.76, 2.35)	
	Tertile 3	199 (2.1)	29 (2.6)	1.41 (0.90, 2.23)	
Captan	Never use	14939 (89.3)	1649 (86.8)	Ref	0.04
	Tertile 1	1080 (6.5)	150 (7.9)	1.24 (1.03, 1.48)	
	Tertile 2	137 (0.8)	17 (0.9)	1.08 (0.65, 1.79)	
	Tertile 3	566 (3.4)	83 (4.4)	1.31 (1.03, 1.67)	
Chlorothalonil	Never use	15927 (93.6)	1791 (93.4)	Ref	0.92
	Tertile 1	365 (2.1)	50 (2.6)	1.27 (0.93, 1.74)	
	Tertile 2	339 (2.0)	39 (2.0)	1.13 (0.79, 1.63)	
	Tertile 3	378 (2.2)	38 (2.0)	1.03 (0.71, 1.49)	
Maneb/Mancozeb	Never use	9138 (93.1)	1089 (93.2)	Ref	0.89
	Tertile 1	310 (3.2)	27 (2.3)	0.73 (0.48, 1.11)	
	Tertile 2	191 (1.9)	33 (2.8)	1.41 (0.94, 2.12)	
	Tertile 3	179 (1.8)	20 (1.7)	0.89 (0.54, 1.45)	
Metalaxyl	Never use	8441 (82.8)	996 (82.1)	Ref	0.05
	Tertile 1	630 (6.2)	79 (6.5)	1.08 (0.84, 1.39)	
	Tertile 2	683 (6.7)	79 (6.5)	1.12 (0.85, 1.47)	
	Tertile 3	442 (4.3)	59 (4.9)	1.40 (1.01, 1.94)	
Alachlor	Never use	7642 (44.9)	795 (41.0)	Ref	0.01
	Tertile 1	4219 (24.8)	484 (25.0)	1.02 (0.91, 1.16)	
	Tertile 2	2097 (12.3)	249 (12.8)	1.05 (0.90, 1.23)	
	Tertile 3	3051 (17.9)	411 (21.2)	1.18 (1.04, 1.35)	
Butylate	Never use	6975 (71.1)	790 (67.8)	Ref	0.10
	Tertile 1	982 (10.0)	132 (11.3)	1.08 (0.88, 1.33)	
	Tertile 2	1085 (11.1)	125 (10.7)	0.94 (0.77, 1.16)	
	Tertile 3	773 (7.9)	119 (10.2)	1.22 (0.98, 1.51)	
Chlorimuron Ethyl	Never use	7021 (68.0)	828 (67.3)	Ref	0.43
	Tertile 1	2147 (20.8)	265 (21.5)	1.07 (0.92, 1.24)	
	Tertile 2	117 (1.1)	11 (0.9)	0.73 (0.39, 1.36)	
	Tertile 3	1033 (10.0)	126 (10.2)	1.10 (0.90, 1.35)	
Dicamba	Never use	7708 (45.2)	794 (41.0)	Ref	0.43
	Tertile 1	3972 (23.3)	501 (25.9)	1.16 (1.02, 1.33)	
	Tertile 2	2796 (16.4)	322 (16.6)	1.07 (0.92, 1.24)	
	Tertile 3	2560 (15.0)	318 (16.4)	1.13 (0.97, 1.31)	
EPTC	Never use	13365 (78.9)	1488 (77.3)	Ref	0.13
	Tertile 1	1662 (9.8)	191 (9.9)	0.97 (0.82, 1.14)	
	Tertile 2	822 (4.9)	97 (5.0)	1.01 (0.81, 1.26)	
	Tertile 3	1096 (6.5)	148 (7.7)	1.15 (0.96, 1.38)	
Glyphosate	Never use	4166 (23.0)	381 (18.6)	Ref	0.00
	Tertile 1	5728 (31.6)	680 (33.2)	1.31 (1.15, 1.50)	
	Tertile 2	4176 (23.1)	472 (23.1)	1.28 (1.11, 1.48)	
	Tertile 3	4031 (22.3)	513 (25.1)	1.44 (1.24, 1.66)	
Imazethapyr	Never use	8947 (53.6)	1001 (52.9)	Ref	0.27
	Tertile 1	3400 (20.4)	416 (22.0)	1.00 (0.87, 1.14)	
	Tertile 2	2510 (15.0)	268 (14.2)	0.88 (0.75, 1.03)	
	Tertile 3	1841 (11.0)	207 (10.9)	0.94 (0.79, 1.12)	
Metolachlor	Never use	8929 (52.2)	989 (50.6)	Ref	0.20
	Tertile 1	2730 (16.0)	376 (19.3)	1.20 (1.06, 1.37)	

	Tertile 2	2908 (17.0)	305 (15.6)	0.92 (0.80, 1.05)	
	Tertile 3	2530 (14.8)	283 (14.5)	0.96 (0.84, 1.11)	
Paraquat	Never use	8817 (85.4)	1022 (83.2)	Ref	0.05
	Tertile 1	838 (8.1)	121 (9.9)	1.25 (1.02, 1.54)	
	Tertile 2	274 (2.7)	29 (2.4)	0.99 (0.66, 1.48)	
	Tertile 3	394 (3.8)	56 (4.6)	1.39 (1.01, 1.90)	
Pendimethalin	Never use	6521 (63.2)	755 (61.3)	Ref	0.62
	Tertile 1	1698 (16.5)	229 (18.6)	1.13 (0.97, 1.33)	
	Tertile 2	967 (9.4)	122 (9.9)	1.14 (0.93, 1.40)	
	Tertile 3	1132 (11.0)	126 (10.2)	1.02 (0.83, 1.25)	
Petroleum	Never use	8058 (78.7)	911 (74.1)	Ref	0.04
	Tertile 1	732 (7.1)	102 (8.3)	1.21 (0.97, 1.51)	
	Tertile 2	812 (7.9)	120 (9.8)	1.30 (1.06, 1.60)	
	Tertile 3	642 (6.3)	96 (7.8)	1.27 (1.01, 1.60)	
Trifluralin	Never use	7301 (45.0)	742 (40.5)	Ref	0.16
	Tertile 1	3029 (18.7)	343 (18.7)	1.05 (0.90, 1.21)	
	Tertile 2	3540 (21.8)	440 (24.0)	1.09 (0.95, 1.27)	
	Tertile 3	2339 (14.4)	309 (16.8)	1.14 (0.97, 1.34)	
2,4-D	Never use	4004 (22.3)	364 (17.9)	Ref	0.19
	Tertile 1	5538 (30.8)	606 (29.8)	1.12 (0.97, 1.29)	
	Tertile 2	4234 (23.5)	503 (24.8)	1.14 (0.98, 1.33)	
	Tertile 3	4217 (23.4)	558 (27.5)	1.16 (1.00, 1.35)	
2,4,5 T	Never use	7999 (82.2)	828 (71.6)	Ref	0.05
	Tertile 1	980 (10.1)	194 (16.8)	1.62 (1.35, 1.94)	
	Tertile 2	320 (3.3)	63 (5.4)	1.60 (1.20, 2.15)	
	Tertile 3	435 (4.5)	71 (6.1)	1.32 (1.01, 1.74)	
2,4,5 T P	Never use	9291 (95.3)	1071 (92.5)	Ref	0.24
	Tertile 1	229 (2.3)	43 (3.7)	1.34 (0.94, 1.89)	
	Tertile 2	88 (0.9)	19 (1.6)	1.48 (0.89, 2.48)	
	Tertile 3	138 (1.4)	25 (2.2)	1.24 (0.79, 1.93)	
Atrazine	Never use	4863 (26.8)	473 (23.2)	Ref	0.24
	Tertile 1	4413 (24.4)	503 (24.7)	1.12 (0.97, 1.28)	
	Tertile 2	4930 (27.2)	567 (27.8)	1.05 (0.92, 1.21)	
	Tertile 3	3913 (21.6)	495 (24.3)	1.13 (0.98, 1.31)	
Cyanazine	Never use	9498 (55.6)	1008 (51.7)	Ref	0.37
	Tertile 1	3076 (18.0)	381 (19.5)	1.07 (0.94, 1.22)	
	Tertile 2	2434 (14.2)	297 (15.2)	1.06 (0.92, 1.23)	
	Tertile 3	2090 (12.2)	263 (13.5)	1.08 (0.93, 1.26)	
Metribuzin	Never use	5550 (58.3)	605 (53.6)	Ref	0.10
	Tertile 1	1916 (20.1)	248 (22.0)	1.08 (0.91, 1.29)	
	Tertile 2	1052 (11.0)	131 (11.6)	1.05 (0.85, 1.31)	
	Tertile 3	1003 (10.5)	144 (12.8)	1.21 (0.98, 1.50)	

Abbreviation: 2,4-D, 2,4-Dichlorophenoxyacetic acid; 2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid; CI, Confidence Intervals; EPTC, S-Ethyl dipropylthiocarbamate; OI, Olfactory Impairment; OR, Odds Ratio

Odds ratios are adjusted for age, sex, state of residence, education, smoking status, ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint), and correlated pesticides (correlated ever-use of pesticides with Spearman correlation ≥ 0.40)

[a]Exposure categories: Never use and categorized into tertiles among users

Supplementary table 6: Average days per year of use at enrollment in relation to self-reported olfactory impairment in the Agricultural Health Study

Pesticide	Days	No OI	OR (95% CI)	P
Aldrin	0 d	849 (75.7)	Ref	0.32
	<5 d	141 (12.6)	1.09 (0.87, 1.35)	
	5-9 d	94 (8.4)	1.07 (0.83, 1.38)	
	> 10 d	38 (3.4)	1.21 (0.83, 1.78)	
Chlordane	0 d	857 (73.0)	Ref	0.01
	<5 d	246 (21)	1.37 (1.16, 1.61)	
	5-9 d	49 (4.2)	1.14 (0.82, 1.56)	
	> 10 d	22 (1.9)	1.62 (1.00, 2.62)	
DDT	0 d	794 (69.3)	Ref	0.01
	<5 d	191 (16.7)	1.33 (1.10, 1.62)	
	5-9 d	76 (6.6)	1.16 (0.89, 1.53)	
	10-19 d	42 (3.7)	1.28 (0.90, 1.83)	
	20–39 d	27 (2.4)	2.09 (1.34, 3.27)	
	>40 d	15 (1.3)	1.35 (0.76, 2.41)	
Heptachlor	0 d	938 (82.3)	Ref	0.16
	<5 d	113 (9.9)	1.13 (0.90, 1.42)	
	5-9 d	57 (5.0)	0.92 (0.68, 1.25)	
	> 10 d	32 (2.8)	1.54 (1.02, 2.32)	
Toxaphene	0 d	1050 (85.6)	Ref	0.01
	<5 d	109 (8.9)	1.34 (1.08, 1.67)	
	5-9 d	37 (3.0)	1.04 (0.73, 1.49)	
	10-19 d	16 (1.3)	1.19 (0.69, 2.05)	
	>20 d	14 (1.1)	2.31 (1.26, 4.25)	
Lindane	0 d	957 (78.4)	Ref	<.0001
	<5 d	163 (13.3)	1.40 (1.17, 1.68)	
	5-9 d	56 (4.6)	1.33 (0.99, 1.78)	
	10-19 d	27 (2.2)	1.55 (1.02, 2.36)	
	>20 d	18 (1.5)	3.07 (1.76, 5.35)	
Aldicarb	0 d	1099 (94.3)	Ref	0.10
	<5 d	31 (2.7)	1.02 (0.68, 1.51)	
	5-9 d	25 (2.1)	1.12 (0.72, 1.74)	
	>10 d	11 (0.9)	0.51 (0.27, 0.96)	
Carbaryl	0 d	605 (52.3)	Ref	0.06
	<5 d	345 (29.8)	1.24 (1.07, 1.44)	
	5-9 d	112 (9.7)	1.08 (0.85, 1.36)	
	10-19 d	62 (5.4)	1.30 (0.96, 1.77)	
	>20 d	32 (2.8)	1.43 (0.95, 2.15)	
Carbofuran	0 d	1278 (65.9)	Ref	0.03
	<5 d	314 (16.2)	1.14 (0.99, 1.30)	
	5-9 d	216 (11.1)	1.22 (1.04, 1.43)	
	10-19 d	102 (5.3)	1.11 (0.89, 1.38)	
	>20 d	29 (1.5)	1.26 (0.84, 1.87)	
Chlorpyrifos	0 d	1094 (53.5)	Ref	0.27
	<5 d	469 (23.0)	1.19 (1.06, 1.33)	
	5-9 d	294 (14.4)	1.14 (0.99, 1.31)	
	10-19 d	141 (6.9)	1.03 (0.86, 1.24)	
	>20 d	45 (2.2)	1.15 (0.84, 1.58)	
Coumaphos	0 d	1694 (88.8)	Ref	0.97

	<5 d	147 (7.7)	1.23 (1.02, 1.47)	
	5-9 d	42 (2.2)	1.12 (0.81, 1.55)	
	10-19 d	10 (0.5)	0.59 (0.31, 1.13)	
	>20 d	14 (0.7)	1.06 (0.6, 1.86)	
Diazinon	0 d	866 (72.9)	Ref	0.0008
	<5 d	193 (16.2)	1.29 (1.09, 1.54)	
	5-9 d	83 (7.0)	1.39 (1.08, 1.79)	
	10-19 d	32 (2.7)	1.54 (1.04, 2.28)	
	>20 d	14 (1.2)	1.64 (0.91, 2.96)	
Dicholrvos	0 d	1631 (84.3)	Ref	0.03
	<5 d	119 (6.2)	1.12 (0.92, 1.38)	
	5-9 d	61 (3.2)	1.33 (1.00, 1.76)	
	10-19 d	43 (2.2)	1.28 (0.92, 1.77)	
	20–39 d	27 (1.4)	1.13 (0.75, 1.70)	
	40–59 d	22 (1.1)	1.56 (0.98, 2.47)	
	>60 d	31 (1.6)	1.29 (0.88, 1.90)	
Fonofos	0 d	1462 (75.0)	Ref	0.71
	<5 d	228 (11.7)	1.09 (0.94, 1.27)	
	5-9 d	148 (7.6)	0.87 (0.72, 1.04)	
	10-19 d	94 (4.8)	1.01 (0.81, 1.27)	
	>2 0	18 (0.9)	1.03 (0.63, 1.70)	
Malathion	0 d	345 (28.3)	Ref	0.01
	<5 d	586 (48)	1.21 (1.05, 1.40)	
	5-9 d	178 (14.6)	1.28 (1.05, 1.56)	
	10-19 d	74 (6.1)	1.34 (1.02, 1.76)	
	20–39 d	23 (1.9)	1.29 (0.82, 2.03)	
	>40 d	15 (1.2)	1.76 (0.99, 3.13)	
Parathion	0 d	1099 (90.5)	Ref	0.34
	<5 d	66 (5.4)	1.41 (1.07, 1.87)	
	5-9 d	27 (2.2)	1.39 (0.91, 2.12)	
	10-19 d	12 (1.0)	1.07 (0.58, 1.97)	
	>20 d	10 (0.8)	1.09 (0.56, 2.14)	
Phorate	0 d	741 (63.5)	Ref	0.47
	<5 d	222 (19.0)	1.11 (0.94, 1.32)	
	5-9 d	149 (12.8)	1.07 (0.88, 1.30)	
	>10 d	55 (4.7)	0.85 (0.64, 1.15)	
Terbufos	0 d	1100 (56.3)	Ref	0.08
	<5 d	337 (17.3)	1.06 (0.93, 1.21)	
	5-9 d	280 (14.3)	1.04 (0.90, 1.20)	
	10-19 d	188 (9.6)	1.17 (0.99, 1.38)	
	>20 d	48 (2.5)	1.15 (0.85, 1.57)	
Permethrin (crops)	0 d	1626 (84.8)	Ref	0.01
	<5 d	168 (8.8)	1.15 (0.97, 1.36)	
	5-9 d	60 (3.1)	1.32 (1.00, 1.74)	
	10-19 d	37 (1.9)	1.28 (0.90, 1.82)	
	>20 d	26 (1.4)	1.46 (0.96, 2.22)	
Permethrin (poultry)	0 d	1611 (82.7)	Ref	0.28
	<5 d	196 (10.1)	1.24 (1.05, 1.46)	
	5-9 d	70 (3.6)	1.17 (0.91, 1.52)	
	10-19 d	43 (2.2)	1.27 (0.92, 1.76)	
	20–39 d	14 (0.7)	1.01 (0.58, 1.77)	

	>40 d	15 (0.8)	1.10 (0.64, 1.89)	
CCl_4/CS_2	0 d	1146 (93.1)	Ref	0.02
	1 d	35 (2.8)	1.4 (0.96, 2.04)	
	>2 d	50 (4.1)	1.38 (1.00, 1.9)	
Aluminum Phosphide	0 d	1181 (95.8)	Ref	0.55
	1 d	29 (2.4)	1.10 (0.74, 1.63)	
	>2 d	23 (1.9)	1.12 (0.72, 1.74)	
Ethylene Dibromide	0 d	1182 (95.6)	Ref	0.35
	1 d	24 (1.9)	1.13 (0.73, 1.75)	
	>2 d	31 (2.5)	1.19 (0.80, 1.77)	
Methyl Bromide	0 d	1673 (86.8)	Ref	0.87
	1 d	118 (6.1)	1.03 (0.83, 1.30)	
	2-5 d	107 (5.6)	0.98 (0.77, 1.24)	
	6-10 d	14 (0.7)	0.74 (0.42, 1.30)	
	>11 d	15 (0.8)	1.15 (0.66, 2.00)	
Benomyl	0 d	1041 (92.3)	Ref	0.27
	1 d	22 (2.0)	1.6 (1.00, 2.56)	
	2-5 d	24 (2.1)	0.98 (0.62, 1.57)	
	5-9 d	25 (2.2)	1.78 (1.1, 2.87)	
	>10 d	16 (1.4)	1.13 (0.64, 2.00)	
Captan	0 d	1649 (86.2)	Ref	0.01
	1 d	169 (8.8)	1.23 (1.04, 1.46)	
	2-5 d	32 (1.7)	1.14 (0.78, 1.66)	
	6-10 d	34 (1.8)	1.49 (1.03, 2.17)	
	11-20 d	18 (0.9)	1.38 (0.83, 2.28)	
	>20 d	12 (0.6)	1.63 (0.87, 3.05)	
Chlorothalonil	0 d	1791 (93.3)	Ref	0.21
	1 d	21 (1.1)	1.17 (0.73, 1.86)	
	2-5 d	41 (2.1)	1.17 (0.83, 1.66)	
	6-10 d	29 (1.5)	0.96 (0.64, 1.45)	
	>11 d	38 (2.0)	1.31 (0.91, 1.90)	
Maneb/Mancozeb	0 d	1089 (93.1)	Ref	0.99
	1 d	13 (1.1)	0.97 (0.54, 1.74)	
	2-5 d	23 (2.0)	0.72 (0.45, 1.14)	
	5-9 d	26 (2.2)	1.37 (0.87, 2.16)	
	>10 d	19 (1.6)	0.92 (0.55, 1.52)	
Metalaxyl	0 d	996 (81.9)	Ref	0.02
	1 d	64 (5.3)	1.12 (0.85, 1.47)	
	2-5 d	96 (7.9)	1.09 (0.85, 1.40)	
	5-9 d	34 (2.8)	1.13 (0.76, 1.66)	
	>10 d	26 (2.1)	1.74 (1.11, 2.73)	
Alachlor	0 d	795 (41.0)	Ref	0.61
	<5 d	458 (23.6)	1.11 (0.98, 1.25)	
	5-9 d	368 (19.0)	1.00 (0.87, 1.14)	
	10-19 d	251 (12.9)	1.23 (1.06, 1.44)	
	20–39 d	55 (2.8)	0.89 (0.67, 1.19)	
	>40 d	12 (0.6)	1.01 (0.55, 1.85)	
Butylate	0 d	790 (67.8)	Ref	0.19
	<5 d	148 (12.7)	1.03 (0.85, 1.25)	
	5-9 d	145 (12.4)	1.00 (0.82, 1.22)	

	10-19 d	71 (6.1)	1.37 (1.05, 1.80)	
	>20 d	12 (1.0)	0.97 (0.53, 1.79)	
Chlorimuron Ethyl	0 d	828 (67.3)	Ref	0.31
	<5 d	275 (22.3)	1.05 (0.90, 1.21)	
	5-9 d	94 (7.6)	1.07 (0.85, 1.35)	
	>10 d	34 (2.8)	1.16 (0.80, 1.68)	
Dicamba	0 d	794 (41.0)	Ref	0.47
	<5 d	656 (33.8)	1.18 (1.04, 1.33)	
	5-9 d	324 (16.7)	1.04 (0.90, 1.21)	
	10-19 d	123 (6.3)	1.06 (0.86, 1.31)	
	>20 d	41 (2.1)	1.27 (0.90, 1.78)	
EPTC	0 d	1488 (77.2)	Ref	0.35
	<5 d	215 (11.2)	0.96 (0.83, 1.13)	
	5-9 d	145 (7.5)	1.17 (0.97, 1.41)	
	10-19 d	59 (3.1)	1.04 (0.79, 1.38)	
	>20 d	20 (1.0)	1.08 (0.67, 1.72)	
Glyphosate	0 d	381 (18.6)	Ref	0.003
	<5 d	756 (36.9)	1.29 (1.13, 1.47)	
	5-9 d	457 (22.3)	1.28 (1.11, 1.48)	
	10-19 d	330 (16.1)	1.54 (1.31, 1.81)	
	20–39 d	100 (4.9)	1.43 (1.13, 1.82)	
	40–59 d	13 (0.6)	1.18 (0.66, 2.11)	
	>60 d	11 (0.5)	1.67 (0.87, 3.19)	
Imazethapyr	0 d	1001 (52.9)	Ref	0.61
	<5 d	456 (24.1)	0.99 (0.86, 1.13)	
	5-9 d	292 (15.4)	0.86 (0.74, 1.00)	
	10-19 d	119 (6.3)	1.05 (0.85, 1.3)	
	>20 d	26 (1.4)	0.94 (0.62, 1.42)	
Metolachlor	0 d	989 (50.6)	Ref	0.21
	<5 d	424 (21.7)	1.19 (1.05, 1.35)	
	5-9 d	319 (16.3)	0.94 (0.82, 1.08)	
	10-19 d	168 (8.6)	0.89 (0.75, 1.06)	
	>20 d	55 (2.8)	1.01 (0.75, 1.35)	
Paraquat	0 d	1022 (83.2)	Ref	0.002
	<5 d	135 (11.0)	1.19 (0.97, 1.45)	
	5-9 d	34 (2.8)	1.02 (0.70, 1.48)	
	10-19 d	23 (1.9)	1.72 (1.08, 2.75)	
	>20 d	14 (1.1)	2.06 (1.13, 3.75)	
Pendimethalin	0 d	755 (61.3)	Ref	0.18
	<5 d	251 (20.4)	1.07 (0.92, 1.25)	
	5-9 d	156 (12.7)	1.13 (0.94, 1.37)	
	10-19 d	54 (4.4)	1.13 (0.84, 1.53)	
	>20 d	16 (1.3)	1.16 (0.68, 1.98)	
Petroleum	0 d	911 (74.1)	Ref	0.04
	<5 d	160 (13.0)	1.28 (1.07, 1.54)	
	5-9 d	81 (6.6)	1.15 (0.90, 1.47)	
	10-19 d	41 (3.3)	1.35 (0.96, 1.89)	
	20–39 d	16 (1.3)	1.24 (0.73, 2.11)	
	>40 d	20 (1.6)	1.36 (0.84, 2.20)	
Trifluralin	0 d	742 (40.4)	Ref	0.15
	<5 d	412 (22.4)	1.05 (0.91, 1.21)	

	5-9 d	422 (23.0)	1.11 (0.96, 1.29)	
	10-19 d	198 (10.8)	1.06 (0.88, 1.27)	
	>20 d	63 (3.4)	1.24 (0.93, 1.65)	
2,4-D	0 d	364 (17.9)	Ref	0.67
	<5 d	717 (35.2)	1.17 (1.02, 1.34)	
	5-9 d	487 (23.9)	1.05 (0.91, 1.23)	
	10-19 d	325 (16.0)	1.21 (1.02, 1.43)	
	20–39 d	112 (5.5)	1.12 (0.89, 1.41)	
	40–59 d	21 (1.0)	1.16 (0.72, 1.86)	
	>60 d	10 (0.5)	1.00 (0.51, 1.95)	
2,4,5 T	0 d	828 (71.6)	Ref	0.0002
	<5 d	238 (20.6)	1.56 (1.32, 1.85)	
	5-9 d	60 (5.2)	1.45 (1.08, 1.94)	
	>10 d	30 (2.6)	1.58 (1.05, 2.38)	
2,4,5 T P	0 d	1071 (92.5)	Ref	0.06
	<5 d	57 (4.9)	1.37 (1.01, 1.86)	
	5-9 d	15 (1.3)	0.98 (0.56, 1.72)	
	>10 d	15 (1.3)	1.70 (0.95, 3.03)	
Atrazine	0 d	473 (23.2)	Ref	0.95
	<5 d	630 (30.9)	1.08 (0.95, 1.23)	
	5-9 d	546 (26.8)	1.13 (0.98, 1.30)	
	10-19 d	289 (14.2)	1.09 (0.92, 1.28)	
	20–39 d	87 (4.3)	1.11 (0.87, 1.43)	
	>40 d	14 (0.7)	0.76 (0.44, 1.33)	
Cyanazine	0 d	1008 (51.7)	Ref	0.53
	<5 d	452 (23.2)	1.09 (0.96, 1.24)	
	5-9 d	303 (15.5)	1.05 (0.91, 1.21)	
	10-19 d	138 (7.1)	1.04 (0.85, 1.26)	
	>20 d	49 (2.5)	1.11 (0.82, 1.52)	
Metribuzin	0 d	605 (53.6)	Ref	0.10
	<5 d	305 (27.0)	1.08 (0.92, 1.27)	
	5-9 d	160 (14.2)	1.07 (0.87, 1.31)	
	10-19 d	48 (4.3)	1.37 (0.99, 1.91)	
	>20 d	10 (0.9)	1.28 (0.65, 2.55)	

Abbreviation: 2,4-D, 2,4-Dichlorophenoxyacetic acid; 2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid; CI, Confidence Intervals; EPTC, S-Ethyl dipropylthiocarbamate; OI, Olfactory Impairment; OR, Odds Ratio

Odds ratios are adjusted for age, sex, state of residence, education, smoking status, ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint), and correlated pesticides (correlated ever-use of pesticides with Spearman correlation ≥ 0.40)

[a]Exposure categories: Never-use (0d) and use categorized by average days per year of use

Supplementary table 7: Intensity-weighted lifetime days of use through the first follow-up in relation to self-reported olfactory impairment with onset reported ≤ 10 years before the third follow-up in the Agricultural Health Study (n=19,563)

Pesticide	Exposure[a]	OR (95% CI)	P-trend
Lindane	Never	Ref	0.001
	>0–328	1.24 (0.91, 1.70)	
	>328–1188	1.50 (1.12, 2.02)	
	>1188	1.56 (1.17, 2.09)	
Aldicarb	Never	Ref	0.70
	>0–630	1.09 (0.66, 1.80)	
	>630–2426	1.19 (0.71, 1.98)	
	>2426	0.88 (0.50, 1.54)	
Carbaryl	Never	Ref	0.55
	>0–395	1.18 (0.94, 1.48)	
	>395–2048	1.28 (1.01, 1.61)	
	>2048	1.18 (0.90, 1.55)	
Carbofuran	Never	Ref	0.87
	>0–347	1.27 (1.05, 1.54)	
	>347–1241	1.26 (1.04, 1.51)	
	>1241	1.01 (0.82, 1.24)	
Chlorpyrifos	Never	Ref	0.74
	>0–465	1.21 (1.03, 1.43)	
	>465–1776	1.13 (0.95, 1.34)	
	>1776	1.06 (0.89, 1.27)	
Coumaphos	Never	Ref	0.43
	>0–394	1.04 (0.75, 1.46)	
	>394–1382	1.27 (0.94, 1.73)	
	>1382	0.82 (0.56, 1.18)	
Diazinon	Never	Ref	
	>0–324	1.43 (1.10, 1.86)	0.11
	>324–1147	1.13 (0.85, 1.50)	
	>1147	1.29 (0.97, 1.71)	
Dichlorvos	Never	Ref	0.13
	>0–543	1.41 (1.09, 1.83)	
	>543–3923	1.11 (0.84, 1.48)	
	>3923	1.28 (0.96, 1.69)	
Fonofos	Never	Ref	0.09
	>0–438	1.01 (0.75, 1.37)	
	>438–1550	1.31 (1.00, 1.72)	
	>1550	1.26 (0.96, 1.66)	
Malathion	Never	Ref	0.52
	>0–384	1.18 (0.95, 1.47)	
	>384–1286	0.90 (0.71, 1.13)	
	>1286	0.95 (0.76, 1.19)	
Parathion	Never	Ref	0.01
	>0–327	1.46 (1.17, 1.83)	
	>327–1622	1.36 (1.09, 1.70)	
	>1622	1.54 (1.25, 1.91)	
Phorate	Never	Ref	0.20
	>0–315	1.05 (0.81, 1.34)	
	>315–1134	1.28 (1.01, 1.62)	

	>1134	0.82 (0.62, 1.07)	
Terbufos	Never	Ref	0.05
	>0–637	1.08 (0.90, 1.30)	
	>637–2300	0.98 (0.81, 1.18)	
	>2300	1.20 (1.01, 1.43)	
Permethrin (crops)	Never	Ref	0.00
	>0–267	1.06 (0.80, 1.41)	
	>267–1004	0.97 (0.72, 1.32)	
	>1004	1.47 (1.14, 1.89)	
Permethrin (animals)	Never	Ref	0.06
	>0–385	1.31 (1.02, 1.69)	
	>385–1478	1.39 (1.09, 1.78)	
	>1478	1.26 (0.98, 1.63)	
Aluminum Phosphide	Never	Ref	0.52
	>0–64	1.52 (0.86, 2.66)	
	>64–257	1.51 (0.85, 2.70)	
	>257	0.67 (0.29, 1.55)	
Ethylene Dibromide	Never	Ref	0.18
	>0–196	0.77 (0.36, 1.68)	
	>196–930	1.30 (0.70, 2.39)	
	>930	1.42 (0.80, 2.54)	
Methyl Bromide	Never	Ref	0.31
	>0–294	0.99 (0.72, 1.36)	
	>294–1260	1.07 (0.79, 1.46)	
	>1260	0.84 (0.60, 1.18)	
Benomyl	Never	Ref	0.06
	>0–350	1.69 (1.04, 2.75)	
	>350–1792	1.07 (0.59, 1.94)	
	>1792	1.76 (1.05, 2.97)	
Captan	Never	Ref	0.11
	>0–10	1.20 (0.90, 1.62)	
	>10–466	1.28 (0.96, 1.69)	
	>466	1.28 (0.97, 1.71)	
Chlorothalonil	Never	Ref	0.44
	>0–588	1.25 (0.83, 1.88)	
	>588–3276	1.22 (0.81, 1.83)	
	>3276	1.19 (0.78, 1.83)	
Maneb/Mancozeb	Never	Ref	0.59
	>0–432	0.89 (0.50, 1.56)	
	>432–2688	1.24 (0.75, 2.03)	
	>2688	1.14 (0.68, 1.91)	
Metalaxyl	Never	Ref	0.60
	>0–255	1.15 (0.84, 1.57)	
	>255–1323	1.02 (0.72, 1.46)	
	>1323	1.13 (0.77, 1.64)	
Alachlor	Never	Ref	0.18
	>0–784	0.99 (0.83, 1.17)	
	>784–2955	1.08 (0.91, 1.27)	
	>2955	1.11 (0.94, 1.31)	
Butylate	Never	Ref	0.32
	>0–455	1.08 (0.83, 1.41)	

	>455–1512	0.86 (0.64, 1.15)	
	>1512	1.17 (0.90, 1.53)	
Chlorimuron Ethyl	Never	Ref	0.62
	>0–248	1.07 (0.83, 1.38)	
	>248–735	1.03 (0.80, 1.33)	
	>735	1.07 (0.83, 1.37)	
Dicamba	Never	Ref	0.59
	>0–680	1.15 (0.96, 1.39)	
	>680–2352	1.24 (1.03, 1.50)	
	>2352	1.12 (0.93, 1.36)	
EPTC	Never	Ref	0.54
	>0–315	0.97 (0.76, 1.24)	
	>315–1176	1.14 (0.91, 1.43)	
	>1176	1.06 (0.83, 1.34)	
Glyphosate	Never	Ref	0.03
	>0–983	1.33 (1.06, 1.67)	
	>983–3402	1.35 (1.09, 1.68)	
	>3402	1.45 (1.16, 1.81)	
Imazethapyr	Never	Ref	0.66
	>0–400	0.98 (0.81, 1.19)	
	>400–1176	0.92 (0.76, 1.12)	
	>1176	0.96 (0.78, 1.17)	
Metolachlor	Never	Ref	0.25
	>0–765	1.23 (1.04, 1.45)	
	>765–2688	1.07 (0.90, 1.28)	
	>2688	0.95 (0.79, 1.14)	
Paraquat	Never	Ref	0.10
	>0–289	1.21 (0.88, 1.68)	
	>289–1171	1.21 (0.86, 1.69)	
	>1171	1.35 (0.95, 1.92)	
Pendimethalin	Never	Ref	0.40
	>0–354	0.98 (0.78, 1.22)	
	>354–1176	1.17 (0.95, 1.45)	
	>1176	1.08 (0.86, 1.35)	
Petroleum distillates	Never	Ref	0.05
	>0–490	1.17 (0.88, 1.56)	
	>490–2320	1.32 (1.00, 1.73)	
	>2320	1.31 (1.00, 1.73)	
Trifluralin	Never	Ref	0.24
	>0–1050	0.93 (0.77, 1.13)	
	>1050–3906	1.08 (0.89, 1.31)	
	>3906	1.09 (0.90, 1.33)	
2,4-D	Never	Ref	0.11
	>0–1511	1.20 (0.98, 1.46)	
	>1511–5428	1.12 (0.92, 1.37)	
	>5428	1.25 (1.02, 1.53)	
2,4,5-T	Never	Ref	0.19
	>0–289	1.76 (1.35, 2.31)	
	>289–971	1.56 (1.16, 2.09)	
	>971	1.30 (0.95, 1.76)	
Atrazine	Never	Ref	0.51

	>0–1232	1.06 (0.88, 1.28)	
	>1232–4550	1.05 (0.87, 1.26)	
	>4550	1.09 (0.90, 1.30)	
Cyanazine	Never	Ref	0.64
	>0–540	1.18 (0.99, 1.42)	
	>540–2222	1.14 (0.95, 1.36)	
	>2222	1.09 (0.91, 1.31)	
Metribuzin	Never	Ref	0.50
	>0–333	1.10 (0.86, 1.40)	
	>333–1040	1.01 (0.78, 1.31)	
	>1040	1.11 (0.86, 1.43)	

Abbreviation: 2,4-D, 2,4-Dichlorophenoxyacetic acid; 2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid; CI, Confidence Intervals; EPTC, S-Ethyl dipropylthiocarbamate; OI, Olfactory Impairment; OR, Odds Ratio

Odds ratios are adjusted for age, sex, state of residence, education, smoking status, ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint), and correlated pesticides (correlated ever-use of pesticides with Spearman correlation ≥ 0.40)

[a]Exposure categories: Never use and categorized into tertiles among users

Supplementary table 8: Ever-use of pesticide at enrollment in relation to self-reported olfactory impairment reported in the third follow-up in the Agricultural Health Study using inverse probability of censoring weights[a]

Pesticides	OR (95% CI)
Insecticide	
Organochlorine	
Aldrin	1.04 (0.88, 1.22)
Chlordane	1.09 (0.97, 1.23)
Dieldrin	1.22 (1.01, 1.49)
DDT	1.30 (1.14, 1.49)
Heptachlor	1.08 (0.91, 1.27)
Toxaphene	1.22 (1.07, 1.40)
Lindane	1.20 (1.07, 1.35)
Carbamate	
Aldicarb	1.01 (0.82, 1.25)
Carbaryl	1.25 (1.12, 1.41)
Carbofuran	1.13 (1.01, 1.26)
Organophosphate	
Chlorpyrifos	1.13 (1.02, 1.25)
Coumaphos	1.07 (0.92, 1.26)
Diazinon	1.09 (0.97, 1.22)
Dichlorvos	1.22 (1.06, 1.40)
Fonofos	0.98 (0.87, 1.10)
Malathion	1.32 (1.17, 1.50)
Parathion	1.22 (1.07, 1.40)
Phorate	1.00 (0.89, 1.11)
Terbufos	1.07 (0.96, 1.19)
Permethrin (crops)	1.28 (1.10, 1.47)
Permethrin (animals)	1.2 (1.05, 1.38)
Fumigant	
CCl_4/CS_2	1.37 (1.13, 1.65)
Aluminum phosphide	1.07 (0.87, 1.32)
Ethylene dibromide	0.81 (0.62, 1.07)
Methyl bromide	0.97 (0.80, 1.18)
Fungicide	
Benomyl	0.90 (0.71, 1.16)
Captan	1.25 (1.08, 1.44)
Chlorothalonil	1.39 (1.09, 1.77)
Maneb	1.16 (0.93, 1.45)
Metalaxyl	1.14 (0.99, 1.32)
Herbicide	
Alachlor	1.04 (0.93, 1.15)
Butylate	1.05 (0.93, 1.18)
Chlorimuron ethyl	0.99 (0.89, 1.10)
Dicamba	1.11 (0.99, 1.25)
EPTC	1.07 (0.94, 1.20)
Glyphosate	1.34 (1.18, 1.53)
Imazethapyr	0.93 (0.82, 1.04)
Metolachlor	1.01 (0.91, 1.11)
Paraquat	1.12 (0.98, 1.28)
Pendimethalin	1.03 (0.93, 1.14)
Petroleum distillates	1.14 (1.03, 1.27)

Trifluralin	1.09 (0.96, 1.23)
2,4-D	1.11 (0.97, 1.28)
2,4,5-T	1.25 (1.09, 1.43)
2,4,5-TP	0.85 (0.71, 1.03)
Atrazine	1.09 (0.96, 1.24)
Cyanazine	1.02 (0.91, 1.13)
Metribuzin	1.03 (0.91, 1.16)

Abbreviation: 2,4-D, 2,4-Dichlorophenoxyacetic acid; 2,4,5-T, 2,4,5-Trichlorophenoxyacetic acid; 2,4,5-T,P, 2-(2,4,5-trichlorophenoxy) propionic acid; CI, Confidence Intervals; CCl_4/CS_2, Carbon tetrachloride/Carbon disulfide 80/20 mix; DDT, Dichlorodiphenyltrichloroethane; EPTC, S-Ethyl dipropylthiocarbamate; OI, Olfactory Impairment; OR, Odds Ratio

Odds ratios are adjusted for age, sex, state of residence, education, smoking status, ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint), and correlated pesticides (correlated ever-use of pesticides with Spearman correlation ≥ 0.40)

[a]Numerator of stabilized weights estimated as a marginal probability of overall participation in the third follow-up and denominator estimated as a probability of overall participation conditional on specific pesticide (that considered as exposure), age, sex, state of residence, education, smoking status, and ever performed following tasks at least once each year (repair engines, replace asbestos brake linings, handle stored grain, work in swine confinement areas, weld and paint)