

Supplementary Table 1: Sensitivity analyses for the association between occupational exposures and incidence of CB, chronic cough and chronic phlegm.
N=8794 participants followed-up at ECRHS II and III (n=13185 observations)

(a) Sensitivity analysis 1: no adjustment for degree of airway obstruction

	Chronic Bronchitis			Chronic cough only			Chronic phlegm only		
	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)
Biological dust	159/9496 (1.7%)	68/3689 (1.8%)	1.03 (0.78 – 1.36)	480/9496 (5.1%)	188/3689 (5.1%)	0.95 (0.81 – 1.12)	385/9496 (4.1%)	179/3689 (4.9%)	1.15 (0.97 – 1.37)
Mineral Dust	164/10359 (1.6%)	63/2826 (2.2%)	1.36 (1.01 – 1.85)	504/10359 (4.9%)	164/2826 (5.8%)	1.12 (0.93 – 1.34)	374/10359 (3.6%)	190/2826 (6.7%)	1.72 (1.44 – 2.06)
Gases & fumes	131/8164 (1.6%)	96/5021 (1.9%)	1.16 (0.89 – 1.50)	409/8164 (5.0%)	259/5021 (5.2%)	0.98 (0.84 – 1.14)	299/8164 (3.7%)	265/5021 (5.3%)	1.35 (1.15 – 1.58)
Vapors, Gases, Dusts & Fumes	123/7525 (1.6%)	104/5660 (1.8%)	1.10 (0.85 – 1.43)	379/7525 (5.0%)	289/5660 (5.1%)	0.98 (0.84 – 1.14)	270/7525 (3.6%)	294/5660 (5.2%)	1.37 (1.17 – 1.61)
Herbicides	223/12974 (1.7%)	4/211 (1.9%)	1.11 (0.41 – 3.02)	655/12974 (5.0%)	13/211 (6.2%)	1.21 (0.71 – 2.07)	551/12974 (4.2%)	13/211 (6.2%)	1.34 (0.78 – 2.29)
Insecticides	222/12852 (1.7%)	5/333 (1.5%)	0.84 (0.35 – 2.03)	650/12852 (5.1%)	18/333 (5.4%)	1.04 (0.66 – 1.64)	546/12852 (4.2%)	18/333 (5.4%)	1.15 (0.73 – 1.83)
Fungicides	222/12823 (1.7%)	5/362 (1.4%)	0.78 (0.32 – 1.92)	649/12823 (5.1%)	19/362 (5.2%)	1.02 (0.65 – 1.60)	544/12823 (4.2%)	20/362 (5.5%)	1.19 (0.77 – 1.85)
All pesticides	220/12716 (1.7%)	7/469 (1.5%)	0.87 (0.41 – 1.84)	644/12716 (5.1%)	24/469 (5.1%)	1.00 (0.67 – 1.50)	541/12716 (4.3%)	23/469 (4.9%)	1.05 (0.70 – 1.59)
Aromatic solvents	195/11419 (1.7%)	32/1766 (1.8%)	1.09 (0.75 – 1.60)	571/11419 (5.0%)	97/1766 (5.5%)	1.11 (0.90 – 1.38)	467/11419 (4.1%)	97/1766 (5.5%)	1.27 (1.02 – 1.57)
Chlorinated solvents	198/11769 (1.7%)	29/1416 (2.0%)	1.25 (0.85 – 1.85)	586/11769 (5.0%)	82/1416 (5.8%)	1.17 (0.93 – 1.47)	482/11769 (4.1%)	82/1416 (5.8%)	1.32 (1.05 – 1.67)
Other solvents	175/9976 (1.8%)	52/3209 (1.6%)	0.95 (0.70 – 1.29)	518/9976 (5.2%)	150/3209 (4.7%)	0.92 (0.77 – 1.10)	418/9976 (4.2%)	146/3209 (4.5%)	1.09 (0.91 – 1.31)
Metals	194/11878 (1.6%)	33/1307 (2.5%)	1.71 (1.16 – 2.51)	588/11878 (5.0%)	80/1307 (6.1%)	1.29 (1.02 – 1.64)	483/11878 (4.1%)	81/1307 (6.2%)	1.44 (1.14 – 1.82)

Pooled results from analysis on 50 multiply imputed datasets. Adjusted for age, sex, lifetime smoking pack-years, current smoking, socioeconomic status (SES), current asthma and severity of airflow limitation.

(b) Sensitivity analysis 2: incident asthma cases excluded

	Chronic Bronchitis			Chronic cough only			Chronic phlegm only		
	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)
Biological dust	109/8518 (1.3%)	41/3266 (1.3%)	1.03 (0.78 – 1.36)	358/8518 (4.2%)	130/3266 (4.0%)	0.95 (0.81 – 1.12)	286/8518 (3.4%)	130/3266 (4.0%)	1.15 (0.97 – 1.37)
Mineral Dust	105/9267 (1.1%)	45/2517 (1.8%)	1.35 (0.99 – 1.84)	362/9267 (3.9%)	126/2517 (5.0%)	1.11 (0.92 – 1.33)	271/9267 (2.9%)	145/2517 (5.8%)	1.72 (1.43 – 2.06)
Gases & fumes	84/7302 (1.2%)	66/4482 (1.5%)	1.12 (0.86 – 1.46)	295/7302 (4.0%)	193/4482 (4.3%)	0.96 (0.82 – 1.12)	215/7302 (2.9%)	201/4482 (4.5%)	1.32 (1.12 – 1.55)
Vapors, Gases, Dusts & Fumes	80/6722 (1.2%)	70/5062 (1.4%)	1.07 (0.82 – 1.39)	274/6722 (4.1%)	214/5062 (4.2%)	0.96 (0.82 – 1.12)	192/6722 (2.9%)	224/5062 (4.4%)	1.34 (1.14 – 1.58)
Herbicides	148/11597 (1.3%)	2/187 (1.1%)	1.05 (0.38 – 2.90)	479/11597 (4.1%)	9/187 (4.8%)	1.19 (0.70 – 2.05)	405/11597 (3.5%)	11/187 (5.9%)	1.29 (0.76 – 2.20)
Insecticides	148/11483 (1.3%)	2/301 (0.7%)	0.80 (0.33 – 1.97)	475/11483 (4.1%)	13/301 (4.3%)	1.02 (0.64 – 1.61)	402/11483 (3.5%)	14/301 (4.7%)	1.11 (0.70 – 1.76)
Fungicides	147/11465 (1.3%)	3/319 (0.9%)	0.79 (0.32 – 1.96)	474/11465 (4.1%)	14/319 (4.4%)	1.03 (0.66 – 1.62)	400/11465 (3.5%)	16/319 (5.0%)	1.19 (0.77 – 1.84)
All pesticides	146/11363 (1.3%)	4/421 (1.0%)	0.83 (0.39 – 1.79)	470/11363 (4.1%)	18/421 (4.3%)	0.99 (0.66 – 1.47)	398/11363 (3.5%)	18/421 (4.3%)	1.02 (0.67 – 1.54)
Aromatic solvents	124/10210 (1.2%)	26/1574 (1.7%)	1.08 (0.74 – 1.58)	413/10210 (4.0%)	75/1574 (4.8%)	1.11 (0.89 – 1.38)	341/10210 (3.3%)	75/1574 (4.8%)	1.26 (1.01 – 1.56)
Chlorinated solvents	128/10520 (1.2%)	22/1264 (1.7%)	1.23 (0.84 – 1.82)	425/10520 (4.0%)	63/1264 (5.0%)	1.16 (0.92 – 1.46)	355/10520 (3.4%)	61/1264 (4.8%)	1.32 (1.04 – 1.66)
Other solvents	115/8932 (1.3%)	35/2852 (1.2%)	0.95 (0.70 – 1.29)	381/8932 (4.3%)	107/2852 (3.8%)	0.92 (0.77 – 1.10)	308/8932 (3.4%)	108/2852 (3.8%)	1.09 (0.91 – 1.31)
Metals	123/10608 (1.2%)	27/1176 (2.3%)	1.68 (1.15 – 2.47)	426/10608 (4.0%)	62/1176 (5.3%)	1.28 (1.01 – 1.63)	352/10608 (3.3%)	64/1176 (5.4%)	1.43 (1.13 – 1.80)

Pooled results from analysis on 50 multiply imputed datasets. Adjusted for age, sex, lifetime smoking pack-years, current smoking, socioeconomic status (SES), current asthma and severity of airflow limitation.

(c) Sensitivity analysis 3: incident asthma cases excluded, and no adjustment for degree of airway obstruction

	Chronic Bronchitis			Chronic cough only			Chronic phlegm only		
	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)
Biological dust	109/8518 (1.3%)	41/3266 (1.3%)	1.05 (0.80 – 1.39)	358/8518 (4.2%)	130/3266 (4.0%)	0.97 (0.82 – 1.14)	286/8518 (3.4%)	130/3266 (4.0%)	1.17 (0.98 – 1.39)
Mineral Dust	105/9267 (1.1%)	45/2517 (1.8%)	1.37 (1.01 – 1.86)	362/9267 (3.9%)	126/2517 (5.0%)	1.12 (0.93 – 1.35)	271/9267 (2.9%)	145/2517 (5.8%)	1.73 (1.44 – 2.08)
Gases & fumes	84/7302 (1.2%)	66/4482 (1.5%)	1.14 (0.88 – 1.49)	295/7302 (4.0%)	193/4482 (4.3%)	0.97 (0.83 – 1.14)	215/7302 (2.9%)	201/4482 (4.5%)	1.34 (1.13 – 1.57)
Vapors, Gases, Dusts & Fumes	80/6722 (1.2%)	70/5062 (1.4%)	1.09 (0.84 – 1.41)	274/6722 (4.1%)	214/5062 (4.2%)	0.97 (0.83 – 1.13)	192/6722 (2.9%)	224/5062 (4.4%)	1.36 (1.15 – 1.59)
Herbicides	148/11597 (1.3%)	2/187 (1.1%)	1.11 (0.40 – 3.02)	479/11597 (4.1%)	9/187 (4.8%)	1.22 (0.71 – 2.09)	405/11597 (3.5%)	11/187 (5.9%)	1.34 (0.79 – 2.28)
Insecticides	148/11483 (1.3%)	2/301 (0.7%)	0.83 (0.34 – 2.02)	475/11483 (4.1%)	13/301 (4.3%)	1.03 (0.65 – 1.64)	402/11483 (3.5%)	14/301 (4.7%)	1.14 (0.72 – 1.80)
Fungicides	147/11465 (1.3%)	3/319 (0.9%)	0.81 (0.33 – 1.98)	474/11465 (4.1%)	14/319 (4.4%)	1.04 (0.66 – 1.62)	400/11465 (3.5%)	16/319 (5.0%)	1.21 (0.78 – 1.87)
All pesticides	146/11363 (1.3%)	4/421 (1.0%)	0.85 (0.40 – 1.82)	470/11363 (4.1%)	18/421 (4.3%)	1.00 (0.67 – 1.49)	398/11363 (3.5%)	18/421 (4.3%)	1.04 (0.69 – 1.57)
Aromatic solvents	124/10210 (1.2%)	26/1574 (1.7%)	1.10 (0.75 – 1.60)	413/10210 (4.0%)	75/1574 (4.8%)	1.12 (0.90 – 1.39)	341/10210 (3.3%)	75/1574 (4.8%)	1.27 (1.02 – 1.57)
Chlorinated solvents	128/10520 (1.2%)	22/1264 (1.7%)	1.26 (0.85 – 1.86)	425/10520 (4.0%)	63/1264 (5.0%)	1.17 (0.93 – 1.48)	355/10520 (3.4%)	61/1264 (4.8%)	1.33 (1.05 – 1.67)
Other solvents	115/8932 (1.3%)	35/2852 (1.2%)	0.95 (0.70 – 1.29)	381/8932 (4.3%)	107/2852 (3.8%)	0.92 (0.77 – 1.10)	308/8932 (3.4%)	108/2852 (3.8%)	1.09 (0.91 – 1.31)
Metals	123/10608 (1.2%)	27/1176 (2.3%)	1.70 (1.15 – 2.49)	426/10608 (4.0%)	62/1176 (5.3%)	1.29 (1.02 – 1.64)	352/10608 (3.3%)	64/1176 (5.4%)	1.43 (1.13 – 1.81)

Pooled results from analysis on 50 multiply imputed datasets. Adjusted for age, sex, lifetime smoking pack-years, current smoking, socioeconomic status (SES), current asthma and severity of airflow limitation.

(d) Sensitivity analysis 4: no adjustment for socioeconomic status (SES)

	Chronic Bronchitis			Chronic cough only			Chronic phlegm only		
	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)
Biological dust	159/9496 (1.7%)	68/3689 (1.8%)	0.99 (0.75 – 1.32)	480/9496 (5.1%)	188/3689 (5.1%)	0.94 (0.80 – 1.10)	385/9496 (4.1%)	179/3689 (4.9%)	1.15 (0.96 – 1.36)
Mineral Dust	164/10359 (1.6%)	63/2826 (2.2%)	1.29 (0.95 – 1.75)	504/10359 (4.9%)	164/2826 (5.8%)	1.11 (0.93 – 1.33)	374/10359 (3.6%)	190/2826 (6.7%)	1.69 (1.41 – 2.01)
Gases & fumes	131/8164 (1.6%)	96/5021 (1.9%)	1.11 (0.85 – 1.45)	409/8164 (5.0%)	259/5021 (5.2%)	0.98 (0.84 – 1.14)	299/8164 (3.7%)	265/5021 (5.3%)	1.33 (1.13 – 1.56)
Vapors, Gases, Dusts & Fumes	123/7525 (1.6%)	104/5660 (1.8%)	1.07 (0.82 – 1.38)	379/7525 (5.0%)	289/5660 (5.1%)	0.97 (0.84 – 1.13)	270/7525 (3.6%)	294/5660 (5.2%)	1.36 (1.16 – 1.60)
Herbicides	223/12974 (1.7%)	4/211 (1.9%)	1.06 (0.39 – 2.89)	655/12974 (5.0%)	13/211 (6.2%)	1.21 (0.71 – 2.05)	551/12974 (4.2%)	13/211 (6.2%)	1.31 (0.76 – 2.26)
Insecticides	222/12852 (1.7%)	5/333 (1.5%)	0.82 (0.34 – 1.99)	650/12852 (5.1%)	18/333 (5.4%)	1.04 (0.66 – 1.64)	546/12852 (4.2%)	18/333 (5.4%)	1.14 (0.72 – 1.81)
Fungicides	222/12823 (1.7%)	5/362 (1.4%)	0.77 (0.31 – 1.88)	649/12823 (5.1%)	19/362 (5.2%)	1.03 (0.66 – 1.61)	544/12823 (4.2%)	20/362 (5.5%)	1.19 (0.77 – 1.83)
All pesticides	220/12716 (1.7%)	7/469 (1.5%)	0.84 (0.39 – 1.78)	644/12716 (5.1%)	24/469 (5.1%)	1.01 (0.68 – 1.50)	541/12716 (4.3%)	23/469 (4.9%)	1.04 (0.69 – 1.57)
Aromatic solvents	195/11419 (1.7%)	32/1766 (1.8%)	1.05 (0.71 – 1.55)	571/11419 (5.0%)	97/1766 (5.5%)	1.10 (0.89 – 1.37)	467/11419 (4.1%)	97/1766 (5.5%)	1.26 (1.01 – 1.56)
Chlorinated solvents	198/11769 (1.7%)	29/1416 (2.0%)	1.19 (0.80 – 1.78)	586/11769 (5.0%)	82/1416 (5.8%)	1.15 (0.91 – 1.45)	482/11769 (4.1%)	82/1416 (5.8%)	1.32 (1.05 – 1.66)
Other solvents	175/9976 (1.8%)	52/3209 (1.6%)	0.94 (0.69 – 1.28)	518/9976 (5.2%)	150/3209 (4.7%)	0.91 (0.76 – 1.08)	418/9976 (4.2%)	146/3209 (4.5%)	1.09 (0.91 – 1.31)
Metals	194/11878 (1.6%)	33/1307 (2.5%)	1.67 (1.14 – 2.47)	588/11878 (5.0%)	80/1307 (6.1%)	1.30 (1.03 – 1.64)	483/11878 (4.1%)	81/1307 (6.2%)	1.44 (1.14 – 1.81)

Pooled results from analysis on 50 multiply imputed datasets. Adjusted for age, sex, lifetime smoking pack-years, current smoking, current asthma and severity of airflow limitation.

Supplementary Table 2: Association between occupational exposures and incidence of CB, chronic cough and chronic phlegm, stratified by intensity of exposure (only low exposure / ever high exposure, vs unexposed). N=8794 participants followed-up at ECRHS II and III (n=13185 observations)

	Chronic Bronchitis		Chronic cough only		Chronic phlegm only	
	Only low	Ever high	Only low	Ever high	Only low	Ever high
Biological dust	1.02 (0.77 – 1.37)	0.86 (0.42 – 1.75)	0.98 (0.82 – 1.15)	0.85 (0.57 – 1.27)	1.18 (0.99 – 1.41)	0.94 (0.62 – 1.42)
Mineral Dust	1.36 (0.99 – 1.88)	1.39 (0.88 – 2.20)	1.11 (0.91 – 1.34)	1.08 (0.81 – 1.45)	1.62 (1.33 – 1.96)	1.45 (1.12 – 1.89)
Gases & fumes	1.22 (0.94 – 1.58)	0.91 (0.55 – 1.51)	1.01 (0.86 – 1.18)	0.92 (0.69 – 1.22)	1.23 (1.04 – 1.45)	1.43 (1.11 – 1.84)
Vapors, Gases, Dusts & Fumes	1.10 (0.84 – 1.44)	1.17 (0.80 – 1.71)	0.96 (0.82 – 1.12)	1.02 (0.82 – 1.28)	1.20 (1.02 – 1.41)	1.55 (1.25 – 1.91)
Herbicides	1.63 (0.60 – 4.40)	N/A	1.56 (0.91 – 2.68)	0.84 (0.28 – 2.52)	1.30 (0.67 – 2.51)	1.19 (0.46 – 3.05)
Insecticides	1.29 (0.48 – 3.45)	0.67 (0.17 – 2.68)	0.98 (0.52 – 1.87)	1.15 (0.63 – 2.09)	0.96 (0.49 – 1.89)	1.40 (0.78 – 2.50)
Fungicides	0.86 (0.27 – 2.74)	0.67 (0.17 – 2.70)	0.97 (0.52 – 1.80)	1.13 (0.62 – 2.06)	1.08 (0.58 – 1.99)	1.23 (0.67 – 2.26)
All pesticides	1.23 (0.55 – 2.76)	0.90 (0.29 – 2.79)	1.16 (0.73 – 1.87)	1.10 (0.62 – 1.95)	0.95 (0.56 – 1.63)	1.34 (0.76 – 2.33)
Aromatic solvents	1.10 (0.75 – 1.62)	0.77 (0.19 – 3.02)	1.11 (0.89 – 1.38)	1.13 (0.61 – 2.11)	1.20 (0.96 – 1.50)	1.53 (0.88 – 2.67)
Chlorinated solvents	1.12 (0.70 – 1.77)	2.00 (1.12 – 3.60)	1.19 (0.93 – 1.53)	1.10 (0.72 – 1.70)	1.26 (0.97 – 1.64)	1.55 (1.08 – 2.24)
Other solvents	0.98 (0.72 – 1.34)	0.73 (0.24 – 2.25)	0.92 (0.77 – 1.10)	1.04 (0.61 – 1.77)	1.08 (0.89 – 1.30)	1.54 (0.96 – 2.45)
Metals	1.77 (1.16 – 2.72)	1.58 (0.88 – 2.83)	1.42 (1.10 – 1.84)	0.96 (0.63 – 1.46)	1.41 (1.08 – 1.84)	1.49 (1.06 – 2.11)

Pooled results from analysis on 50 multiply imputed datasets. Adjusted for age, sex, lifetime smoking pack-years, current smoking, socioeconomic status (SES), current asthma and severity of airflow limitation.

Supplementary Table 3: Association between occupational exposures and incidence of CB, chronic cough and chronic phlegm, stratified by sex and smoking status. N=8794 participants followed-up at ECRHS II and III (n=13185 observations)

(a) Stratified by sex

	Chronic Bronchitis		Chronic cough only		Chronic phlegm only	
	Male	Female	Male	Female	Male	Female
Biological dust	0.97 (0.62 – 1.51)	1.03 (0.72 – 1.48)	0.97 (0.75 – 1.24)	0.91 (0.74 – 1.13)	1.09 (0.85 – 1.41)	1.18 (0.93 – 1.50)
Mineral Dust	1.24 (0.82 – 1.86)	1.50 (0.97 – 2.33)	1.06 (0.84 – 1.34)	1.18 (0.90 – 1.55)	1.76 (1.40 – 2.22)	1.64 (1.23 – 2.19)
Gases & fumes	1.21 (0.82 – 1.80)	1.08 (0.75 – 1.54)	1.02 (0.82 – 1.28)	0.92 (0.74 – 1.14)	1.51 (1.20 – 1.91)	1.17 (0.92 – 1.48)
Vapors, Gases, Dusts & Fumes	1.17 (0.79 – 1.74)	1.02 (0.72 – 1.45)	1.03 (0.82 – 1.29)	0.92 (0.75 – 1.13)	1.63 (1.29 – 2.06)	1.14 (0.91 – 1.44)
Herbicides	0.77 (0.19 – 3.20)	1.76 (0.44 – 7.03)	1.36 (0.74 – 2.50)	0.88 (0.29 – 2.63)	1.08 (0.55 – 2.14)	1.90 (0.79 – 4.55)
Insecticides	0.74 (0.24 – 2.31)	1.01 (0.25 – 4.12)	1.01 (0.58 – 1.76)	1.08 (0.49 – 2.39)	0.77 (0.41 – 1.46)	2.10 (1.10 – 4.01)
Fungicides	0.65 (0.20 – 2.07)	1.10 (0.27 – 4.50)	1.04 (0.62 – 1.76)	0.97 (0.41 – 2.31)	0.91 (0.52 – 1.59)	2.03 (1.03 – 4.02)
All pesticides	0.83 (0.34 – 2.04)	0.90 (0.22 – 3.68)	1.02 (0.65 – 1.62)	0.94 (0.43 – 2.09)	0.80 (0.47 – 1.34)	1.84 (0.96 – 3.51)
Aromatic solvents	1.12 (0.70 – 1.77)	0.93 (0.43 – 1.98)	1.14 (0.88 – 1.47)	0.99 (0.64 – 1.51)	1.35 (1.05 – 1.73)	0.99 (0.60 – 1.62)
Chlorinated solvents	1.41 (0.88 – 2.25)	0.79 (0.33 – 1.90)	1.16 (0.88 – 1.53)	1.10 (0.71 – 1.70)	1.36 (1.04 – 1.78)	1.17 (0.72 – 1.89)
Other solvents	1.09 (0.70 – 1.69)	0.82 (0.53 – 1.27)	0.96 (0.75 – 1.24)	0.86 (0.67 – 1.11)	1.27 (1.00 – 1.62)	0.90 (0.67 – 1.19)
Metals	1.74 (1.13 – 2.67)	1.53 (0.57 – 4.12)	1.26 (0.97 – 1.64)	1.44 (0.82 – 2.54)	1.52 (1.18 – 1.96)	0.86 (0.37 – 2.02)

Pooled results from analysis on 50 multiply imputed datasets. Adjusted for age, sex, lifetime smoking pack-years, current smoking, socioeconomic status (SES), current asthma and severity of airflow limitation.

(b) Stratified by smoking status (ever smokers / never smokers)

	Chronic Bronchitis		Chronic cough only		Chronic phlegm only	
	Never smokers	Ever smokers	Never smokers	Ever smokers	Never smokers	Ever smokers
Biological dust	1.23 (0.74 – 2.06)	0.96 (0.69 – 1.33)	1.04 (0.78 – 1.39)	0.91 (0.75 – 1.10)	1.27 (0.95 – 1.71)	1.10 (0.90 – 1.35)
Mineral Dust	1.77 (1.00 – 3.10)	1.26 (0.89 – 1.76)	1.21 (0.87 – 1.69)	1.08 (0.88 – 1.33)	1.82 (1.32 – 2.50)	1.69 (1.37 – 2.07)
Gases & fumes	1.38 (0.86 – 2.22)	1.09 (0.81 – 1.46)	1.09 (0.84 – 1.42)	0.93 (0.78 – 1.11)	1.40 (1.06 – 1.85)	1.32 (1.10 – 1.59)
Vapors, Gases, Dusts & Fumes	1.30 (0.82 – 2.07)	1.04 (0.78 – 1.39)	1.13 (0.88 – 1.45)	0.91 (0.77 – 1.09)	1.50 (1.15 – 1.95)	1.32 (1.10 – 1.58)
Herbicides	2.81 (0.81 – 9.77)	0.46 (0.07 – 3.19)	1.81 (0.81 – 4.01)	0.94 (0.44 – 2.01)	1.92 (0.84 – 4.37)	1.08 (0.52 – 2.22)
Insecticides	2.03 (0.58 – 7.15)	0.48 (0.12 – 1.89)	1.29 (0.57 – 2.91)	0.94 (0.53 – 1.67)	1.45 (0.63 – 3.31)	1.04 (0.59 – 1.83)
Fungicides	1.85 (0.52 – 6.58)	0.46 (0.12 – 1.81)	1.36 (0.64 – 2.86)	0.89 (0.50 – 1.58)	1.23 (0.53 – 2.84)	1.18 (0.70 – 1.97)
All pesticides	1.54 (0.43 – 5.50)	0.67 (0.25 – 1.78)	1.13 (0.53 – 2.40)	0.96 (0.59 – 1.55)	1.07 (0.46 – 2.48)	1.04 (0.65 – 1.68)
Aromatic solvents	1.30 (0.62 – 2.73)	1.04 (0.67 – 1.59)	1.31 (0.89 – 1.92)	1.04 (0.81 – 1.34)	1.11 (0.72 – 1.72)	1.33 (1.04 – 1.69)
Chlorinated solvents	1.58 (0.74 – 3.41)	1.16 (0.75 – 1.82)	1.30 (0.84 – 2.01)	1.12 (0.86 – 1.46)	1.10 (0.67 – 1.80)	1.41 (1.09 – 1.81)
Other solvents	1.09 (0.62 – 1.91)	0.91 (0.63 – 1.29)	1.04 (0.77 – 1.41)	0.87 (0.70 – 1.07)	1.23 (0.90 – 1.68)	1.04 (0.84 – 1.28)
Metals	2.45 (1.23 – 4.91)	1.51 (0.97 – 2.36)	1.43 (0.91 – 2.22)	1.24 (0.95 – 1.64)	1.32 (0.82 – 2.12)	1.48 (1.14 – 1.93)

Pooled results from analysis on 50 multiply imputed datasets. Adjusted for age, sex, lifetime smoking pack-years, current smoking, socioeconomic status (SES), current asthma and severity of airflow limitation.

Supplementary Table 4: Association between occupational exposures and incidence of CB, chronic cough and chronic phlegm: complete case analysis.

N=6186 participants followed-up at ECRHS II and III (n=9046 observations)

	Chronic Bronchitis			Chronic cough only			Chronic phlegm only		
	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)	Unexposed	Exposed	RR (95%CI)
Biological dust	159/9496 (1.7%)	68/3689 (1.8%)	1.01 (0.73 – 1.39)	480/9496 (5.1%)	188/3689 (5.1%)	0.95 (0.79 – 1.15)	385/9496 (4.1%)	179/3689 (4.9%)	1.16 (0.95 – 1.42)
Mineral Dust	164/10359 (1.6%)	63/2826 (2.2%)	1.49 (1.04 – 2.13)	504/10359 (4.9%)	164/2826 (5.8%)	1.13 (0.91 – 1.40)	374/10359 (3.6%)	190/2826 (6.7%)	1.90 (1.54 – 2.35)
Gases & fumes	131/8164 (1.6%)	96/5021 (1.9%)	1.17 (0.86 – 1.59)	409/8164 (5.0%)	259/5021 (5.2%)	1.00 (0.83 – 1.20)	299/8164 (3.7%)	265/5021 (5.3%)	1.39 (1.14 – 1.68)
Vapors, Gases, Dusts & Fumes	123/7525 (1.6%)	104/5660 (1.8%)	1.05 (0.78 – 1.43)	379/7525 (5.0%)	289/5660 (5.1%)	0.99 (0.82 – 1.18)	270/7525 (3.6%)	294/5660 (5.2%)	1.36 (1.12 – 1.64)
Herbicides	223/12974 (1.7%)	4/211 (1.9%)	1.26 (0.39 – 4.05)	655/12974 (5.0%)	13/211 (6.2%)	1.44 (0.79 – 2.61)	551/12974 (4.2%)	13/211 (6.2%)	1.66 (0.93 – 2.96)
Insecticides	222/12852 (1.7%)	5/333 (1.5%)	0.98 (0.37 – 2.61)	650/12852 (5.1%)	18/333 (5.4%)	1.18 (0.71 – 1.97)	546/12852 (4.2%)	18/333 (5.4%)	1.27 (0.76 – 2.12)
Fungicides	222/12823 (1.7%)	5/362 (1.4%)	0.88 (0.32 – 2.40)	649/12823 (5.1%)	19/362 (5.2%)	1.23 (0.75 – 1.99)	544/12823 (4.2%)	20/362 (5.5%)	1.29 (0.79 – 2.11)
All pesticides	220/12716 (1.7%)	7/469 (1.5%)	1.03 (0.46 – 2.34)	644/12716 (5.1%)	24/469 (5.1%)	1.13 (0.73 – 1.77)	541/12716 (4.3%)	23/469 (4.9%)	1.12 (0.70 – 1.78)
Aromatic solvents	195/11419 (1.7%)	32/1766 (1.8%)	1.10 (0.70 – 1.73)	571/11419 (5.0%)	97/1766 (5.5%)	1.06 (0.81 – 1.38)	467/11419 (4.1%)	97/1766 (5.5%)	1.44 (1.13 – 1.85)
Chlorinated solvents	198/11769 (1.7%)	29/1416 (2.0%)	1.23 (0.77 – 1.97)	586/11769 (5.0%)	82/1416 (5.8%)	1.02 (0.76 – 1.35)	482/11769 (4.1%)	82/1416 (5.8%)	1.39 (1.07 – 1.81)
Other solvents	175/9976 (1.8%)	52/3209 (1.6%)	0.88 (0.61 – 1.26)	518/9976 (5.2%)	150/3209 (4.7%)	0.83 (0.67 – 1.03)	418/9976 (4.2%)	146/3209 (4.5%)	1.12 (0.91 – 1.39)
Metals	194/11878 (1.6%)	33/1307 (2.5%)	1.54 (0.97 – 2.46)	588/11878 (5.0%)	80/1307 (6.1%)	1.18 (0.89 – 1.56)	483/11878 (4.1%)	81/1307 (6.2%)	1.41 (1.08 – 1.85)

Adjusted for age, sex, lifetime smoking pack-years, current smoking, socioeconomic status (SES), current asthma and severity of airflow limitation.

Supplementary Table 5: Descriptive characteristics of the participants excluded because of cough of phlegm at baseline (ECRHS I), N=1,033

	ECRHS II	ECRHS III
Number of participants followed up	919	575
Median age at follow-up (y), range	42.5 (27.9 – 56.9)	53.2 (38.6 – 67.1)
% male	51.4	49.6
% with chronic bronchitis (cough with phlegm)	14.0	14.4
% with chronic cough	27.2	28.0
% with chronic phlegm	25.4	21.7
% with current asthma	19.4	21.9
% current smokers	45.6	31.0
% ever smokers	69.5	68.1
Median lifetime smoking pack-years (ever smokers only)	20.2	25.3
% with airflow limitation (FEV1/FVC < LLN)	10.0	17.2
Severity (among those with airflow limitation)		
FEV1 >= 80% predicted	44.0	40.0
50% <= FEV1 < 80% predicted	52.0	50.6
FEV1 < 50% predicted	4.0	9.4
Occupational exposures (% with any exposure since baseline)		
Biological dust	27.7	33.2
Mineral Dust	26.9	30.4
Gases & fumes	43.4	46.6
Vapors, Gases, Dusts & Fumes	46.6	50.3
Herbicides	1.6	1.9
Insecticides	2.3	3.1
Fungicides	2.4	4.3
All pesticides	3.0	5.4
Aromatic solvents	16.0	17.4
Chlorinated solvents	12.9	13.6
Other solvents	23.7	25.9
Metals	12.2	15.5
% missing information		
Lifetime smoking pack-years	9.7	32.2
Current smoking	1.4	18.6
Current asthma	1.6	1.6
Socioeconomic status	0.3	3.8
Lung function	18.5	14.3

Supplementary Table 6: Crude effects of occupational exposures on chronic bronchitis symptoms at each study follow-up (ECRHS II and ECRHS III), N=7,819 at ECRHS II and N=5,366 at ECRHS III

	ECRHS II			ECRHS III		
	Unexposed	Exposed	Crude RR (95%CI)	Unexposed	Exposed	Crude RR (95%CI)
Biological dust	88/5767 (1.5%)	28/2052 (1.4%)	0.89 (0.59 - 1.36)	71/3729 (1.9%)	40/1637 (2.4%)	1.28 (0.87 - 1.88)
Mineral Dust	87/6231 (1.4%)	29/1588 (1.8%)	1.31 (0.86 - 1.98)	77/4128 (1.9%)	34/1238 (2.7%)	1.47 (0.99 - 2.19)
Gases & fumes	71/4970 (1.4%)	45/2849 (1.6%)	1.11 (0.76 - 1.6)	60/3194 (1.9%)	51/2172 (2.3%)	1.25 (0.86 - 1.81)
Vapors, Gases, Dusts & Fumes	69/4605 (1.5%)	47/3214 (1.5%)	0.98 (0.68 - 1.41)	54/2920 (1.8%)	57/2446 (2.3%)	1.26 (0.87 - 1.82)
Herbicides	116/7704 (1.5%)	0/115 (0.0%)	N/A	107/5270 (2.0%)	4/96 (4.2%)	2.05 (0.77 - 5.45)
Insecticides	114/7642 (1.5%)	2/177 (1.1%)	0.76 (0.19 - 3.04)	108/5210 (2.1%)	3/156 (1.9%)	0.93 (0.3 - 2.89)
Fungicides	116/7632 (1.5%)	0/187 (0.0%)	N/A	106/5191 (2.0%)	5/175 (2.9%)	1.4 (0.58 - 3.39)
All pesticides	114/7572 (1.5%)	2/247 (0.8%)	0.54 (0.13 - 2.16)	106/5144 (2.1%)	5/222 (2.3%)	1.09 (0.45 - 2.65)
Aromatic solvents	100/6833 (1.5%)	16/986 (1.6%)	1.11 (0.66 - 1.87)	95/4586 (2.1%)	16/780 (2.1%)	0.99 (0.59 - 1.67)
Chlorinated solvents	102/7039 (1.4%)	14/780 (1.8%)	1.24 (0.71 - 2.15)	96/4730 (2.0%)	15/636 (2.4%)	1.16 (0.68 - 1.99)
Other solvents	93/6044 (1.5%)	23/1775 (1.3%)	0.84 (0.54 - 1.33)	82/3932 (2.1%)	29/1434 (2.0%)	0.97 (0.64 - 1.47)
Metals	99/7098 (1.4%)	17/721 (2.4%)	1.69 (1.02 - 2.81)	95/4780 (2.0%)	16/586 (2.7%)	1.37 (0.81 - 2.32)

Details about the multiple imputation procedure

Multiple imputation was employed to handle covariate missingness only (not outcome missingness due to drop-out). The most frequent covariates affected by missingness were lung function measurements (at both surveys, i.e. ECRHS II and III), plus current smoking status and lifetime smoking pack-years (only at ECRHS III) (see Table 1 in the manuscript). Very few observations had missing values on current asthma and SES.

Multiple imputation with chained equations was performed using the R package “mice”, version 2.30. The procedure was applied on the long-format dataset (n=13324 observations from N=8933 study participants). The imputation method was set to logistic regression for binary variables (current asthma and current smoking), polynomial regression for categorical variables (SES and degree of airflow limitation), and predictive mean matching for continuous variables (lifetime smoking pack-years). All variables used in the main model were used as predictors in the imputation model, including all occupational exposures, outcomes (chronic cough and chronic phlegm separately) and a survey indicator (ECRHS II or III). The passive imputation function of the “mice” package was used to ensure that the imputed value for current smoking would be set to FALSE if the imputed lifetime pack-years were zero.

Fifty imputed datasets were created with 10 Gibbs sampler iterations each; convergence was assessed by visually examining the traceplots, and was deemed very satisfactory. The distribution of imputed values for lifetime pack-years was compared to the observed values using a density plot, and was found to be very similar (see figure below).

