Supplementary Table 1: Comparison of baseline characteristics between participants included in the final sample and participants not followed-up in ECRHS 3.

	Participants followed-up (N=3343)	Participants not followed-up (N=4644)	p-value
Median age (y)	34.5	34.1	0.07 †
% male	49.0	48.5	0.68 ‡
% ever smokers	53.5	56.4	0.012 ‡
Median pack-years (ever smokers only)	9.2	9.5	0.33 †
Median %predicted FEV1/FVC	100.7	100.3	0.19 †
Socioeconomic Status (Years of formal education)			<0.001 ‡
>19 years (%)	58.7	51.4	
16-19 years (%)	33.4	37.8	
16 years (%)	7.9	10.9	

† Continuous variable, compared with Mann-Whitney test.

‡ Categorical variable, compared with Fisher's exact test.

Supplementary Table 2: Associations between occupational exposures on and COPD incidence **after excluding participants with incident asthma**. Separate models for low or high exposure to an agent, compared to unexposed to that agent. N=2,962 ECRHS participants from 24 study centres without COPD and without asthma at baseline or at any follow-up

	Cases in unexposed	Cases in exposed	Relative Risk (95% Credible Interval)	Population Attributable Fraction (%)
Biological dust	38/2016 (1.9%)	31/946 (3.3%)	2.0 (1.2 – 3.1)	22.0%
Mineral Dust	46/2224 (2.1%)	23/738 (3.1%)	1.1 (0.7 – 1.9)	3.7%
Gases & fumes	26/1670 (1.6%)	43/1292 (3.3%)	1.9 (1.2 – 3.0)	28.9%
Vapors, Gases, Dusts & Fumes	26/1522 (1.7%)	43/1440 (3.0%)	1.6 (1.0 – 2.6)	22.4%
Herbicides	64/2895 (2.2%)	5/67 (7.5%)	2.5 (1.0 – 5.2)	4.3%
Insecticides	62/2860 (2.2%)	7/102 (6.9%)	2.6 (1.2 – 5.1)	6.3%
Fungicides	63/2846 (2.2%)	6/116 (5.2%)	1.9 (0.8 – 3.9)	4.0%
All pesticides	62/2817 (2.2%)	7/145 (4.8%)	1.9 (0.8 – 3.9)	4.9%
Aromatic solvents	54/2464 (2.2%)	15/498 (3.0%)	1.1 (0.6 – 2.0)	2.4%
Chlorinated solvents	58/2564 (2.3%)	11/398 (2.8%)	0.9 (0.5 – 1.8)	–
Other solvents	49/2106 (2.3%)	20/856 (2.3%)	0.9 (0.5 – 1.5)	–
Metals	59/2582 (2.3%)	10/380 (2.6%)	0.9 (0.4 – 1.7)	–

Relative Risks adjusted for gender, age, pack-years of smoking, FEV1/FVC ratio at baseline (%predicted), socioeconomic status and early life disadvantage score.

Supplementary Table 3: Associations between occupational exposures and COPD incidence. Separate models for low or high exposure to an agent, **compared to unexposed to all agents under study**. N=3,343 ECRHS participants from 24 study centres without COPD and without asthma at baseline

	Cases	Relative Risk (95% Credible Interval)
Fully unexposed	39/1696 (2.3%)	Ref
Biological dust	41/1079 (3.8%)	1.6 (1.0 – 2.4)
Mineral Dust	31/842 (3.7%)	1.3 (0.8 – 2.2)
Gases & fumes	55/1455 (3.8%)	1.4 (1.0 – 2.1)
Vapors, Gases, Dusts & Fumes	56/1618 (3.5%)	1.3 (0.9 – 2.0)
Herbicides	5/74 (6.8%)	2.2 (0.8 – 4.8)
Insecticides	8/114 (7.0%)	2.5 (1.1 – 4.9)
Fungicides	8/132 (6.1%)	2.2 (1.0 – 4.3)
All pesticides	10/164 (6.1%)	2.4 (1.2 – 4.5)
Aromatic solvents	16/547 (2.9%)	1.0 (0.6 – 1.9)
Chlorinated solvents	13/439 (3.0%)	1.0 (0.5 – 2.0)
Other solvents	25/952 (2.6%)	1.1 (0.7 – 1.7)
Metals	14/421 (3.3%)	1.2 (0.6 – 2.3)

Relative Risks adjusted for gender, age, pack-years of smoking, FEV1/FVC ratio at baseline (%predicted), socioeconomic status and early life disadvantage score.

Supplementary Table 4: Associations between occupational exposures and COPD incidence, **stratified by sex**.

	Men			Women		
	Cases in unexposed	Cases in exposed	Relative Risk (95% Credible Interval)	Cases in unexposed	Cases in exposed	Relative Risk (95% Credible Interval)
Biological dust	31/1146 (2.7%)	20/492 (4.1%)	1.5 (0.9 – 2.5)	24/1118 (2.1%)	21/587 (3.6%)	1.7 (1.0 – 3.0)
Mineral Dust	29/1037 (2.8%)	22/601 (3.7%)	1.0 (0.6 – 1.7)	36/1464 (2.5%)	9/241 (3.7%)	1.5 (0.7 – 2.8)
Gases & fumes	17/791 (2.1%)	34/847 (4.0%)	1.4 (0.8 – 2.6)	24/1097 (2.2%)	21/608 (3.5%)	1.6 (0.9 – 2.8)
Vapors, Gases, Dusts & Fumes	17/714 (2.4%)	34/924 (3.7%)	1.2 (0.7 – 2.2)	23/1011 (2.3%)	22/694 (3.2%)	1.4 (0.8 – 2.5)
Herbicides	48/1586 (3.0%)	3/52 (5.8%)	1.6 (0.4 – 4.1)	43/1683 (2.6%)	2/22 (9.1%)	2.1 (0.4 – 6.8)
Insecticides	45/1557 (2.9%)	6/81 (7.4%)	2.3 (0.9 – 4.6)	43/1672 (2.6%)	2/33 (6.1%)	1.7 (0.3 – 5.8)
Fungicides	45/1535 (2.9%)	6/103 (5.8%)	1.8 (0.7 – 3.7)	43/1676 (2.6%)	2/29 (6.9%)	1.7 (0.3 – 5.8)
All pesticides	43/1512 (2.8%)	8/126 (6.3%)	2.1 (1.0 – 4.1)	43/1667 (2.6%)	2/38 (5.3%)	1.6 (0.3 – 5.5)
Aromatic solvents	37/1200 (3.1%)	14/438 (3.2%)	0.9 (0.5 – 1.6)	43/1596 (2.7%)	2/109 (1.8%)	0.6 (0.1 – 2.1)
Chlorinated solvents	40/1293 (3.1%)	11/345 (3.2%)	0.8 (0.4 – 1.5)	43/1611 (2.7%)	2/94 (2.1%)	0.8 (0.1 – 2.8)
Other solvents	39/1112 (3.5%)	12/526 (2.3%)	0.6 (0.3 – 1.1)	32/1279 (2.5%)	13/426 (3.1%)	1.3 (0.7 – 2.2)
Metals	38/1263 (3.0%)	13/375 (3.5%)	1.0 (0.5 – 1.7)	44/1659 (2.7%)	1/46 (2.2%)	0.6 (0.0 – 3.7)

Relative Risks adjusted for sex, age, pack-years of smoking, FEV1/FVC ratio at baseline (%predicted), socioeconomic status and early life disadvantage score.

Supplementary Table 5: Associations between occupational exposures and COPD incidence, **sensitivity analysis according to extent of covariate adjustment**. Seperate models for ever low or ever high exposure to an agent compared to no exposure to that specific agent. N=3,343 ECRHS participants from 24 study centres without COPD and without asthma at baseline.

	Fully adjusted model	Without adjustment for SES and ELDS	Without adjustment for SES, ELDS and baseline FEV1/FVC
Biological dust	1.6 (1.1 – 2.3)	1.6 (1.1 – 2.3)	1.6 (1.1 – 2.3)
Mineral Dust	1.1 (0.7 – 1.7)	1.1 (0.7 – 1.7)	1.2 (0.7 – 1.8)
Gases & fumes	1.5 (1.0 – 2.2)	1.5 (1.0 – 2.2)	1.6 (1.1 – 2.5)
Vapors, Gases, Dusts & Fumes	1.3 (0.9 – 2.0)	1.3 (0.9 – 2.0)	1.4 (1.0 – 2.1)
Herbicides	2.0 (0.7 – 4.1)	1.9 (0.7 – 4.1)	2.1 (0.8 – 4.5)
Insecticides	2.3 (1.1 – 4.2)	2.3 (1.1 – 4.2)	2.2 (1.0 – 4.3)
Fungicides	1.9 (0.9 – 3.6)	1.8 (0.9 – 3.4)	1.9 (0.9 – 3.7)
All pesticides	2.2 (1.1 – 3.8)	2.1 (1.1 – 3.7)	2.0 (1.0 – 3.7)
Aromatic solvents	0.9 (0.5 – 1.5)	0.9 (0.5 – 1.5)	0.9 (0.5 – 1.6)
Chlorinated solvents	0.8 (0.5 – 1.4)	0.8 (0.5 – 1.4)	0.9 (0.5 – 1.6)
Other solvents	0.8 (0.5 – 1.3)	0.8 (0.5 – 1.3)	0.9 (0.6 – 1.4)
Metals	1.0 (0.5 – 1.6)	1.0 (0.5 – 1.6)	1.0 (0.5 – 1.8)

All models adjusted for sex, age and pack-years of smoking. Full model also adjusted for socioeconomic status (SES), early life disadvantage score (ELDS) and FEV1/FVC ratio at baseline (%predicted).

Supplementary Table 6: Associations between job categories and COPD incidence. Separate models for ever working in each job category, compared to participants consistently working in white-collar occupations. N=3,343 ECRHS participants from 24 study centres without COPD and without asthma at baseline

	Cases	Relative Risk (95% Credible Interval)
Consistently white-collar	42/1841 (1.1%)	Ref
At least once in the following occupation:		
Health care	12/494 (2.4%)	1.0 (0.5 – 1.8)
Cleaning	6/185 (3.2%)	1.3 (0.5 – 2.9)
Transport	11/183 (6.0%)	1.7 (0.9 – 3.2)
Other services	6/172 (3.5%)	1.2 (0.5 – 2.4)
Construction	5/130 (3.8%)	1.5 (0.5 – 3.7)
Painting	2/27 (7.4%)	4.5 (0.7 – 16.1)
Metal industry	7/174 (4.0%)	1.6 (0.7 – 3.5)
Chemical and related	2/47 (4.3%)	1.6 (0.2 – 6.4)
Electrical	3/94 (3.2%)	1.0 (0.2 – 3.0)
Wood, paper and textile	6/111 (5.4%)	2.1 (0.9 – 4.5)
Food processing	4/88 (4.5%)	2.0 (0.7 – 4.6)
Other industry and mining	2/63 (3.2%)	0.9 (0.2 – 2.9)
Agriculture, fishery, forestry	6/95 (6.3%)	2.3 (0.9 – 5.0)

Relative Risks adjusted for sex, age, pack-years of smoking, FEV1/FVC ratio at baseline (%predicted), socioeconomic status and early life disadvantage score.

Supplementary Table 7: Most frequent occupations with exposure to biological dust, gases/fumes and pesticides in the study population, by sex.

(a) With exposure to biological dust

Men

ISCO code	Description	N	Number of COPD cases
3152	Safety, health and quality inspectors	39	1 (2.6%)
7233	Agricultural- or industrial-machinery mechanics and fitters	31	0 (0.0%)
7124	Carpenters and joiners	28	1 (3.6%)
2221	Medical doctors	26	0 (0.0%)
9141	Building caretakers	24	1 (4.2%)

Women

ISCO code	Description	N	Number of COPD cases
2230	Nursing and midwifery professionals	118	6 (5.1%)
9132	Helpers and cleaners in offices, hotels and other establishments	103	4 (3.9%)
5132	Institution-based personal care workers	89	2 (2.2%)
3231	Nursing associate professionals	72	1 (1.4%)
5133	Home-based personal care workers	35	2 (5.7%)

(b) With exposure to gases & fumes

Men

ISCO code	Description	N	Number of COPD cases
8322	Car, taxi and van drivers	46	3 (6.5%)
8324	Heavy truck and lorry drivers	46	1 (2.2%)
3152	Safety, health and quality inspectors	39	1 (2.6%)
7136	Plumbers and pipe fitters	39	1 (2.6%)
7137	Building and related electricians	38	1 (2.6%)

Women

ISCO code	Description	N	Number of COPD cases
2230	Nursing and midwifery professionals	118	6 (5.1%)
9132	Helpers and cleaners in offices, hotels and other establishments	103	4 (3.9%)
5132	Institution-based personal care workers	89	2 (2.2%)
5133	Home-based personal care workers	35	2 (5.7%)
9131	Domestic helpers and cleaners	33	3 (9.1%)

(c) With exposure to pesticides

Men

ISCO code	Description	N	Number of COPD cases
8211	Machine-tool operators	31	2 (6.5%)
9333	Freight handlers	21	2 (9.5%)
6113	Gardeners, horticultural and nursery growers	19	1 (5.3%)
6121	Dairy and livestock producers	12	1 (8.3%)
6112	Tree and shrub crop growers	8	1 (12.5%)

Women

ISCO code	Description	N	Number of COPD cases
6113	Gardeners, horticultural and nursery growers	8	0 (0.0%)
2223	Veterinarians	4	0 (0.0%)
6130	Market-oriented crop and animal producers	4	0 (0.0%)
9211	Farm-hands and labourers	4	1 (25.0%)
6112	Tree and shrub crop growers	3	1 (33.3%)

(d) With exposure to mineral dust

Men

ISCO code	Description	N	Number of COPD cases
8324	Heavy truck and lorry drivers	46	1 (2.2%)
3152	Safety, health and quality inspectors	39	1 (2.6%)
7136	Plumbers and pipe fitters	39	1 (2.6%)
7137	Building and related electricians	38	1 (2.6%)
7231	Motor vehicle mechanics and fitters	31	1 (3.2%)

Women

ISCO code	Description	N	Number of COPD cases
9132	Helpers and cleaners in offices, hotels and other establishments	103	4 (3.9%)
9131	Domestic helpers and cleaners	33	3 (9.1%)
3225	Dental assistants	17	0 (0.0%)
3471	Decorators and commercial designers	16	0 (0.0%)
2452	Sculptors, painters and related artists	12	0 (0.0%)

Supplementary Table 8: Associations between occupational exposures on and COPD incidence, **without excluding participants with current asthma at baseline** (*alternative definition of study population*). Separate models for low or high exposure to an agent, compared to unexposed to that agent. N=3,543 ECRHS participants from 24 study centres without COPD at baseline.

	Cases in unexposed	Cases in exposed	Relative Risk (95% Credible Interval)	Population Attributable Fraction (%)
Biological dust	59/2395 (2.5%)	47/1148 (4.1%)	1.7 (1.2 – 2.4)	18.4%
Mineral Dust	71/2644 (2.7%)	35/899 (3.9%)	1.2 (0.8 – 1.8)	5.2%
Gases & fumes	46/2001 (2.3%)	60/1542 (3.9%)	1.5 (1.1 – 2.2)	19.3%
Vapors, Gases, Dusts & Fumes	44/1827 (2.4%)	62/1716 (3.6%)	1.3 (0.9 – 1.9)	14.6%
Herbicides	101/3468 (2.9%)	5/75 (6.7%)	2.0 (0.7 – 4.1)	2.3%
Insecticides	98/3423 (2.9%)	8/120 (6.7%)	2.2 (1.0 – 4.0)	4.1%
Fungicides	98/3408 (2.9%)	8/135 (5.9%)	1.9 (0.9 – 3.5)	3.5%
All pesticides	96/3372 (2.8%)	10/171 (5.8%)	2.1 (1.1 – 3.7)	4.9%
Aromatic solvents	88/2968 (3.0%)	18/575 (3.1%)	1.0 (0.6 – 1.5)	–
Chlorinated solvents	91/3080 (3.0%)	15/463 (3.2%)	1.0 (0.5 – 1.6)	–
Other solvents	78/2532 (3.1%)	28/1011 (2.8%)	0.9 (0.6 – 1.3)	–
Metals	90/3099 (2.9%)	16/444 (3.6%)	1.1 (0.6 – 1.8)	0.9%

Relative Risks adjusted for gender, age, pack-years of smoking, FEV1/FVC ratio at baseline (%predicted), socioeconomic status, early life disadvantage score and current asthma at baseline..

Supplementary Table 9: Associations between occupational exposures on and COPD incidence, **with COPD defined using pre-bronchodilator spirometry at follow-up** (instead of post-bronchodilator – *alternative definition of outcome*). Separate models for low or high exposure to an agent, compared to unexposed to that agent. N=3,556 ECRHS participants from 24 study centres without COPD and without asthma at baseline or at any follow-up.

	Cases in unexposed	Cases in exposed	Relative Risk (95% Credible Interval)	Population Attributable Fraction (%)
Biological dust	129/2408 (5.4%)	69/1148 (6.0%)	1.1 (0.8 – 1.4)	2.1%
Mineral Dust	146/2659 (5.5%)	52/897 (5.8%)	0.9 (0.7 – 1.2)	–
Gases & fumes	103/2006 (5.1%)	95/1550 (6.1%)	1.0 (0.8 – 1.3)	1.4%
Vapors, Gases, Dusts & Fumes	96/1836 (5.2%)	102/1720 (5.9%)	1.0 (0.8 – 1.3)	–
Herbicides	192/3482 (5.5%)	6/74 (8.1%)	1.2 (0.5 – 2.4)	0.6%
Insecticides	190/3440 (5.5%)	8/116 (6.9%)	1.1 (0.5 – 2.1)	0.5%
Fungicides	187/3420 (5.5%)	11/136 (8.1%)	1.4 (0.7 – 2.3)	1.5%
All pesticides	184/3387 (5.4%)	14/169 (8.3%)	1.5 (0.9 – 2.4)	2.4%
Aromatic solvents	165/2978 (5.5%)	33/578 (5.7%)	0.9 (0.7 – 1.3)	–
Chlorinated solvents	171/3086 (5.5%)	27/470 (5.7%)	0.9 (0.6 – 1.3)	–
Other solvents	151/2548 (5.9%)	47/1008 (4.7%)	0.8 (0.6 – 1.0)	–
Metals	172/3112 (5.5%)	26/444 (5.9%)	0.9 (0.6 – 1.3)	–

Relative Risks adjusted for gender, age, pack-years of smoking, FEV1/FVC ratio at baseline (%predicted), socioeconomic status and early life disadvantage score.

Supplementary Table 10: Associations between occupational exposures on and COPD incidence, **with COPD defined using pre-bronchodilator spirometry at follow-up** (instead of post-bronchodilator) **AND without excluding participants with current asthma at baseline** (*alternative definitions of outcome and study population*). Separate models for low or high exposure to an agent, compared to unexposed to that agent. N=3,776 ECRHS participants from 24 study centres without COPD at baseline.

	Cases in unexposed	Cases in exposed	Relative Risk (95% Credible Interval)	Population Attributable Fraction (%)
Biological dust	139/2552 (5.4%)	79/1224 (6.5%)	1.1 (0.9 – 1.5)	4.7%
Mineral Dust	161/2818 (5.7%)	57/958 (5.9%)	0.9 (0.7 – 1.2)	–
Gases & fumes	116/2132 (5.4%)	102/1644 (6.2%)	1.1 (0.8 – 1.3)	2.3%
Vapors, Gases, Dusts & Fumes	106/1950 (5.4%)	112/1826 (6.1%)	1.0 (0.8 – 1.3)	0.7%
Herbicides	212/3700 (5.7%)	6/76 (7.9%)	1.2 (0.5 – 2.4)	0.5%
Insecticides	210/3653 (5.7%)	8/123 (6.5%)	1.1 (0.5 – 2.0)	0.4%
Fungicides	207/3637 (5.7%)	11/139 (7.9%)	1.4 (0.7 – 2.3)	1.3%
All pesticides	204/3598 (5.7%)	14/178 (7.9%)	1.5 (0.9 – 2.4)	2.1%
Aromatic solvents	184/3166 (5.8%)	34/610 (5.6%)	0.9 (0.7 – 1.3)	–
Chlorinated solvents	190/3279 (5.8%)	28/497 (5.6%)	0.9 (0.6 – 1.3)	–
Other solvents	166/2704 (6.1%)	52/1072 (4.9%)	0.8 (0.6 – 1.0)	–
Metals	191/3307 (5.8%)	27/469 (5.8%)	0.9 (0.6 – 1.3)	–

Relative Risks adjusted for gender, age, pack-years of smoking, FEV1/FVC ratio at baseline (%predicted), socioeconomic status, early life disadvantage score and current asthma at baseline.

Details about the statistical methodology

A log-binomial regression model was used to estimate COPD incidence, as a function of covariates and follow-up time (Equation 1). The model was fitted in a Bayesian framework (using JAGS). Compared to a frequentist setting, this avoids potential convergence issues that often occur with log-binomial models, and also offers easier handling of missing covariate values. All priors for fixed effect coefficients (betas) were set to noninformative Gaussian (with zero mean and large variance).

Equation 1: Basic model equation

$$\log(p_i) = \beta_1 + \beta_2 exposure_i + \beta_3 female_i + \beta_4 age_i + \beta_5 age_i^2 + \beta_6 packYears_i + \beta_7 packYears_i^2 + \\ + \beta_8 basePredLF_i + \beta_9 SES_j^{mid} + \beta_{10} SES_j^{low} + \beta_{11} disadvScore_j + \log(timeFU_i)$$

In 448 cases (23.2%), the participant's status as smoker was known, but the exact amount of smoking pack-years was missing; therefore a truncated Gamma prior was also set on this variable, in order to do fully Bayesian imputation. Smoking pack-years was modelled with a Gamma distribution, whose parameters (shape and rate) were calculated according to the mean and standard deviation of smoking pack-years for the observed cases. This distribution produces a close fit of the observed values, as evident in the following

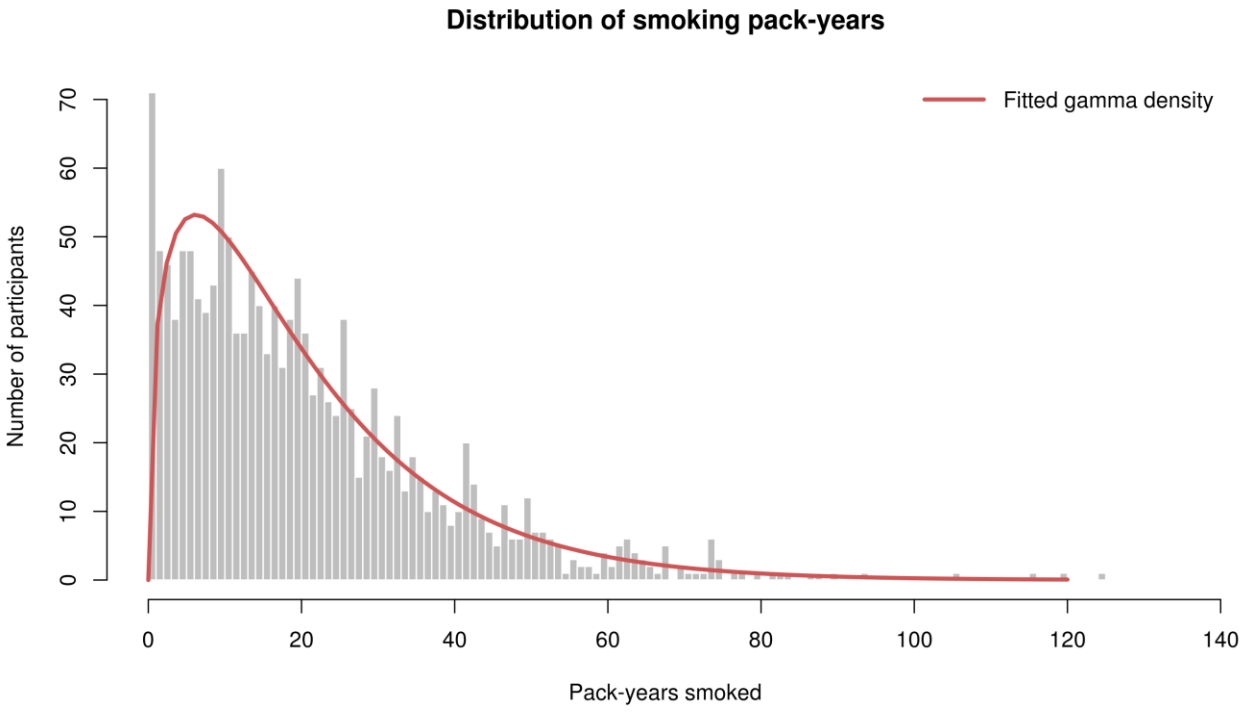


diagram:

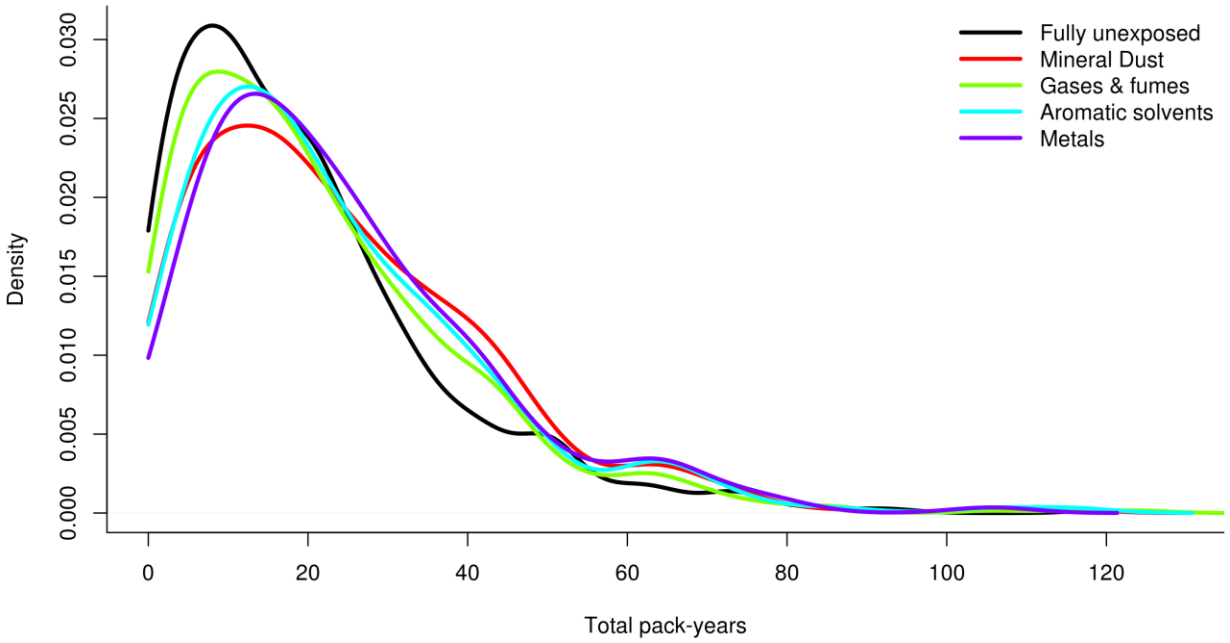
The distribution was further truncated in cases where pack-years were missing, but there was a lower pack-year limit for the participant (known from a previous follow-up, i.e. ECRHS 2); this occured in 311 of 448 cases.

The distribution was further truncated in cases where pack-years were missing, but there was a lower pack-year limit for the participant (known from a previous follow-up, i.e. ECRHS 2); this occured in 311 of 448 cases.

The full JAGS code of the model was as follows:

```
data {
  for (i in 1:N) {
    ones[i] <- 1
  }
}

model {

  # Define model for each observational unit
  for(i in 1:N ) {
    log(p[i]) <- beta[1] + beta[2]*X[i] +
                 beta[3]*female[i] + beta[4]*age[i] + beta[5]*age[i]^2 +
                 beta[6]*packyrs[i] + beta[7]*packyrs[i]^2 +
                 beta[8]*LFIP[i] + beta[9]*SESmid[i] + beta[10]*SESlow[i] +
                 beta[11]*disadv[i] +
                 log(t[i])

    Y[i] ~ dbern(p[i])
  }

  for (i in 1:N) {
    ones[i] ~ dbern(q[i])
    q[i] <- step(1 - p[i])
  }

  # Priors:
  # Fixed intercept and slope
  for (b in 1:11) {
    beta[b] ~ dnorm(0.0,1.0E-5)
  }

  SESmid <- equals(SES, 2)
  SESlow <- equals(SES, 3)

# Imputation sub-model for missing pack-years
  ga <- gmean^2/gsd^2
  gb <- gmean/gsd^2
  for(i in 1:N ) {
    packyrs[i] ~ dgamma(ga, gb)T(pylim[i],)
  }

}
```

The above approach for the Bayesian imputation of missing smoking pack-years implies an ignorable missingness mechanism, as the distribution of pack-years is assumed to not depend on any other observed covariates. We further explored this assumption by examining the distribution of pack-years (for the observed cases) by occupatonal exposure; we compared the distribution for each exposure to the distribution for those fully occupationally unexposed, using the Mann-Whitney test. For four exposures (mineral dust, gases & fumes, aromatic solvents and metals) we found statistically significant differences in the distribution of smoking pack-years compared to those unexposed; however the differences were minor, with the median value up to 5 pack-years higher (for mineral dust), as illustrated in the following kernel density plot:

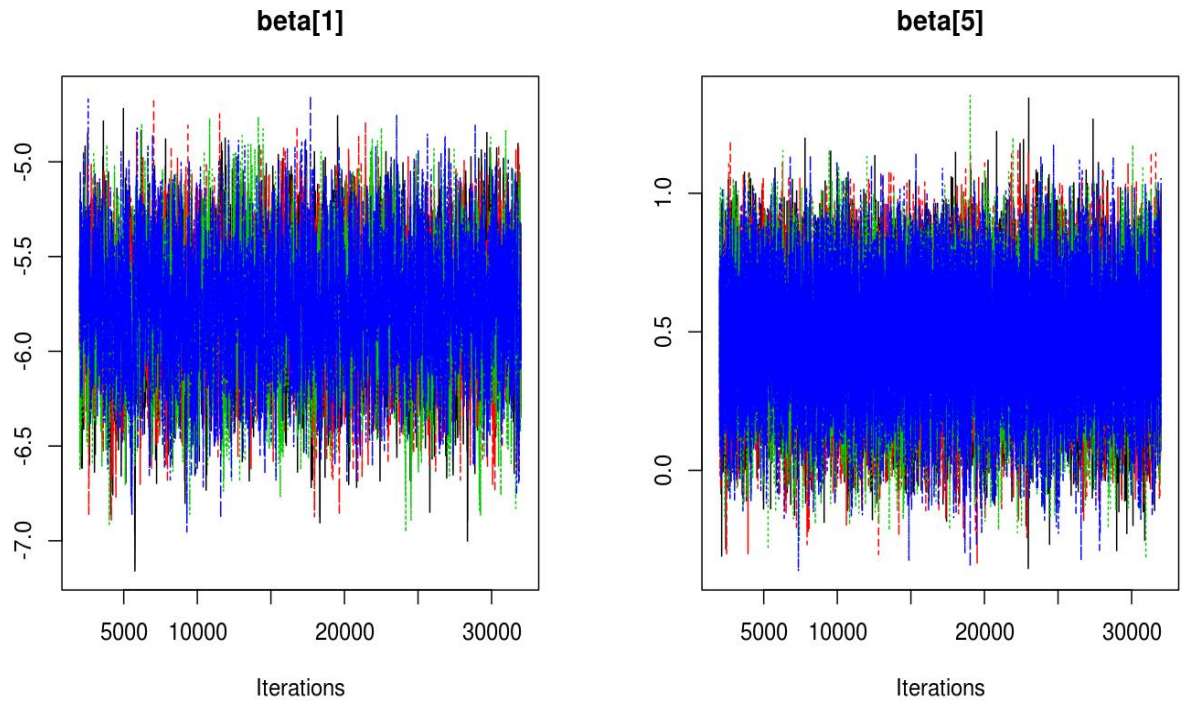


As a result, despite its simplicity, this imputation method is bound to produce reliable and unbiased estimates for our main log-binomial regression model.

As a result, despite its simplicity, this imputation method is bound to produce reliable and unbiased estimates for our main log-binomial regression model.

Bayesian model fitting

The models were fitted using Markov-Chain Monte Carlo (MCMC) using the JAGS software. The number of burn-in iterations (2,000 – discarded from further analysis) and the number of sampling iterations (30,000) were determined empirically based on convergence of the MCMC chains and available computing resources,



with the chains running for as long as was practicable.

Convergence was determined by inspecting the traceplots for all model parameters and calculating the Gelman-Rubin statistic. All the chains were unthinned, as even in the presence of autocorrelation thinning remains inefficient[1].

Convergence was determined by inspecting the traceplots for all model parameters and calculating the Gelman-Rubin statistic. All the chains were unthinned, as even in the presence of autocorrelation thinning remains inefficient[1].

Uncertainty around the point estimate of each parameter was expressed using 95% Credible Intervals (CrI); these intervals provide a range where the parameter lies with 95% probability. The 95% CrIs used were equal-tailed, i.e. ranging from the 2.5% percentile to the 97.5% percentile of the posterior probability distribution of the parameter.

1 Link WA, Eaton MJ. On thinning of chains in MCMC. Methods in Ecology and Evolution 2012; 3: 112–5.

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Calculation of Population Attributable Fractions (PAFs)

Population Attributable Fractions (PAFs) for individual occupational exposures were calculated according to the following formula, found in Rockhill et al:[2] $PAF = pd(\frac{RR-1}{RR})$, where *pd* is the proportion of exposed among the COPD cases, and *RR* is the (adjusted) Relative Risk. Unlike other commonly used formulas, this one produces internally valid estimates when confounding of the exposure-outcome assosiation exists, and uses **adjusted** Relative Risk estimates.

To calculate a combined PAF for multiple exposures, a complete cross-classification of exposures was performed to create non-overlapping categories of exposure; then the following formula was applied, also found in Rockhill et al:[2] $PAF = 1 - \sum \frac{pd_i}{RR_i}$, where pd_i is the proportion of exposed among the COPD cases and RR_i the adjusted Relative Risk for each exposure category *i*. This also produces internally valid estimates when confounding exists, and utilized adjusted Relative Risk estimates.

2 Rockhill B, Newman B, Weinberg C. Use and misuse of population attributable fractions. Am J Public Health 1998; 88: 15–9.