

Supplementary Appendix

Supplement to:

Prevalence and burden of chronic cough in China: a national cross-sectional study

Table E1 Age-specific and age-standardized prevalence of chronic cough in the general adult population stratified by smoking status

| Variables | Never smoker | Ever smoker* | P-value |
|-------------------------------|---------------------|---------------------|----------------|
| Total | 2.5% (2.0-3.0) | 5.9% (4.9-7.0) | <0.0001 |
| Sex | | | |
| Men | 2.3% (1.7-3.0) | 6.0% (5.0-7.3) | <0.0001 |
| Women | 2.5% (2.0-3.2) | 3.1% (2.1-4.7) | 0.4125 |
| P-value for difference | 0.5127 | 0.0035 | |
| Age, years | | | |
| 20-49 | 1.6% (1.1-2.4) | 4.1% (3.0-5.8) | 0.0022 |
| ≥50 | 4.1% (3.6-4.7) | 9.4% (8.2-10.7) | <0.0001 |
| P-value for difference | <0.0001 | <0.0001 | |
| COPD# | | | |
| No | 2.2% (1.8-2.8) | 5.4% (4.5-6.6) | <0.0001 |
| Yes | 4.6% (1.8-10.9) | 6.4% (4.8-8.4) | 0.3193 |
| P-value for difference | 0.2483 | 0.2867 | |
| SAD§ | | | |
| No | 2.0% (1.5-2.7) | 4.7% (3.6-6.2) | 0.0003 |
| Yes | 2.9% (2.3-3.7) | 6.6% (5.1-8.6) | 0.0006 |
| P-value for difference | 0.0396 | 0.1120 | |

Values are represented as percentage (%) (95% confidence interval, CI). Abbreviations: COPD, chronic obstructive pulmonary disease; SAD, small airway dysfunction.

P-value for difference is for the comparison of binary variables. All the calculations of P-value are weighted, taken into account the multistage cluster sampling design and based on χ^2 test.

* Ever-smoker was defined as having smoked equal to or more than 100 cigarettes in the lifetime.

#COPD was defined as the individuals with post-bronchodilator FEV₁/FVC less than 70%.

§SAD was diagnosed on the basis of at least two of the following three indicators of lung function being less than 65% of predicted: maximal mid-expiratory flow, forced expiratory flow (FEF) 50%, and FEF 75% after bronchodilator inhalation.

TABLE E2 The distribution of concomitant symptoms in population with chronic cough stratified by sex, age, COPD or SAD

| Concomitant symptoms | ALL | Sex | | | Age | | | COPD* | | | SAD# | | |
|------------------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | Men | Women | <i>P</i> value | 20-49 yrs | ≥50 yrs | <i>P</i> value | No | Yes | <i>P</i> value | No | Yes | <i>P</i> value |
| Phlegm | 1380 (67.5%) | 919 (75.8%) | 461 (52.8%) | 0.0102 | 413 (58.7%) | 967 (74.6%) | 0.0122 | 984 (63.6%) | 396 (80.8%) | 0.0045 | 617 (58.4%) | 738 (76.9%) | 0.0009 |
| Wheezing | 487 (21.0%) | 272 (18.2%) | 215 (25.9%) | 0.0542 | 100 (13.0%) | 387 (27.3%) | 0.0115 | 263 (14.0%) | 224 (44.4%) | 0.0066 | 140 (12.6%) | 333 (29.5%) | 0.0070 |
| Dyspnea | 547 (24.6%) | 298 (21.1%) | 249 (30.5%) | 0.1471 | 119 (18.0%) | 428 (29.6%) | 0.0432 | 319 (18.5%) | 228 (43.9%) | 0.0006 | 188 (18.2%) | 343 (30.2%) | 0.0081 |
| Nighttime sleep disturbance | 827 (40.8%) | 405 (33.9%) | 422 (53.0%) | 0.0051 | 226 (37.9%) | 601 (43.1%) | 0.3461 | 611 (41.1%) | 216 (40.0%) | 0.8556 | 376 (41.4%) | 433 (38.9%) | 0.6669 |

Values are weighted and shown as number (%). Abbreviations: COPD, chronic obstructive pulmonary disease; SAD, small airway dysfunction.

P-value is weighted, taking into account of the multistage cluster sampling design and based on χ^2 test.

*COPD was defined as post-bronchodilator FEV₁/FVC<70%.

#SAD was diagnosed on the basis of at least two of the following three indicators of lung function being less than 65% of predicted: maximal mid-expiratory flow, forced expiratory flow (FEF) 50%, and FEF 75% after bronchodilator inhalation.

TABLE E3 Multiple adjusted odds ratios of chronic cough in the never-smokers

| Variables | OR (95% CI) | P-value |
|--|--------------------|----------------|
| Men | 0.86 (0.51-1.44) | 0.5416 |
| Age (10 years) | 1.51 (1.34-1.70) | <0.0001 |
| Rural resident | 0.85 (0.56-1.29) | 0.4351 |
| No. of ever smokers living in the home | | |
| 0 | 1.00 (Reference) | - |
| 1 | 1.43 (0.96-2.14) | 0.0771 |
| ≥2 | 1.04 (0.60-1.83) | 0.8774 |
| Biomass use | 1.17 (0.78-1.77) | 0.4289 |
| Annual mean PM_{2.5}, µg/m³ | | |
| <50 | 1.00 (Reference) | - |
| 50-75 | 1.12 (0.68-1.86) | 0.6419 |
| ≥75 | 1.05 (0.61-1.80) | 0.8519 |
| Education level | | |
| Primary school and lower | 1.00 (Reference) | - |
| Middle and high school | 0.70 (0.55-0.90) | 0.0070 |
| College and higher | 1.24 (0.60-2.56) | 0.5329 |
| Occupational exposure | 0.99 (0.71-1.39) | 0.9488 |
| Visible mold spots in the current residence | | |
| Rarely | 1.00 (Reference) | - |
| Sometimes | 0.94 (0.69-1.27) | 0.6581 |
| Often | 1.19 (0.65-2.19) | 0.5575 |
| History of pneumonia or bronchitis during childhood | 2.09 (1.32-3.30) | 0.0033 |
| Parental history of respiratory diseases | 1.15 (0.78-1.72) | 0.4571 |
| Body mass index, kg/m² | | |
| <18.5 | 1.65 (1.02-2.69) | 0.0427 |
| 18.5-24.9 | 1.00 (Reference) | - |
| ≥25 | 1.08 (0.77-1.51) | 0.6411 |
| Allergic rhinitis | 3.85 (2.34-6.34) | <0.0001 |

The variables listed in the table are all included in the model. Abbreviations: OR, odds ratio; 95% CI: 95% confidence interval; PM_{2.5}, particulate matter with a diameter less than 2.5 µm.

The logistic regression analyses were weighted, taking into account of the multistage cluster sampling design.

TABLE E4 The comparison of lung function before bronchodilator inhalation and medication use between people with chronic cough and those without chronic cough

| Variables | No chronic cough (n=49006) | Chronic cough (n=1985) | P-value |
|--------------------------------|-------------------------------|---------------------------|---------|
| Lung function | | | |
| FEV ₁ /FVC, % | 79.7 (0.4) | 73.0 (1.3) | <0.0001 |
| FEV ₁ %pred | 96.9 (0.8) | 89.7 (2.1) | 0.0005 |
| SAD* | 22464 (41.4%) | 1196 (62.6%) | 0.0011 |
| Medication use | | | |
| Inhaled corticosteroid | | | 0.1478 |
| | 242 (1.5%) | 70 (6.2%) | |
| Inhaled bronchodilator | | | 0.1232 |
| | 237 (1.8%) | 88 (7.0%) | |
| Aminophylline | | | 0.1236 |
| | 172 (5.9%) | 98 (10.6%) | |
| Systemic corticosteroid | | | 0.5301 |
| | 112 (4.7%) | 60 (5.8%) | |
| Antibiotics | | | 0.0650 |
| | 478 (20.2%) | 234 (32.6%) | |
| Expectorants | | | 0.0610 |
| | 181 (7.4%) | 117 (28.4%) | |
| Anti-allergic agent | | | 0.2994 |
| | 120 (4.3%) | 39 (13.3%) | |

Values are weighted and shown as number (%) or mean (SE). Abbreviations: FEV₁, forced expiratory volume in one second; FVC, forced vital capacity; SAD, small airway dysfunction.

All the calculations of P-value are weighted, taking into account of the multistage cluster sampling design and based on χ^2 test for categorical variables or Student's t test for continuous variables.

*SAD was diagnosed on the basis of at least two of the following three indicators of lung function being less than 65% of predicted: maximal mid-expiratory flow, forced expiratory flow (FEF) 50%, and FEF 75% before bronchodilator inhalation.

TABLE E5 Clinical characteristics and use of healthcare resources by diagnosis of solely chronic cough

| Variables | Neither chronic cough nor phlegm, dyspnea and wheeze (n=38589) | Solely chronic cough (n=404) | P-value |
|---|--|------------------------------|---------|
| Lung function* | | | |
| FEV ₁ /FVC, % | 82.5 (0.4) | 79.6 (1.2) | 0.0144 |
| FEV ₁ %pred | 100 (0.8) | 104 (4.6) | 0.3513 |
| FEV ₁ /FVC<70% | 2920 (6.5%) | 39 (9.1%) | 0.2747 |
| MMEF%pred | 77.3 (1.1) | 72.5 (2.7) | 0.0920 |
| FEF 50%pred | 89.5 (1.2) | 85.6 (3.4) | 0.2445 |
| FEF 75%pred | 78.3 (1.5) | 73.8 (2.9) | 0.1271 |
| SAD [#] | 11869 (26.4%) | 143 (31.8%) | 0.0847 |
| Positive bronchodilator reversibility [†] | 2192 (5.5%) | 26 (16.9%) | 0.3296 |
| Short form (SF)-12 scores | | | |
| PCS scores | 53.2 (0.2) | 52.2 (0.5) | 0.0689 |
| MCS scores | 54.5 (0.3) | 54.7 (0.8) | 0.8041 |
| Comorbidities | | | |
| Hypertention | 2450 (4.7%) | 54 (10.7%) | 0.1103 |
| Coronary heart disease | 327 (1.2%) | 8 (2.1%) | 0.4544 |
| Diabetes | 799 (1.9%) | 15 (1.7%) | 0.8398 |
| Acute exacerbation of respiratory symptoms in the last 12 months | | | |
| Emergency | 22 (0.1%) | 12 (4.7%) | 0.1328 |
| Hospital admission | 22 (0.0%) | 7 (1.0%) | 0.1337 |

Values are weighted and shown as number (%) or mean (SE). Abbreviations: FEV₁, forced expiratory volume in one second; FVC, forced vital capacity; PCS, physical component summary; MCS, mental component summary; SAD, small airway dysfunction.

All the calculations of P-value are weighted, taking into account the multistage cluster sampling design and based on χ^2 test for categorical variables or Student's t test for continuous variables.

*The parameters were measured at 20 min after inhalation of 400 μ g of salbutamol.

[#]SAD was diagnosed on the basis of at least two of the following three indicators of lung function being less than 65% of predicted: maximal mid-expiratory flow, forced expiratory flow (FEF) 50%, and FEF 75% after bronchodilator inhalation.

[†]A positive bronchodilator reversibility test was defined as an increase in post-bronchodilator forced expiratory volume in 1 s of more than 12% and more than 200 ml from baseline, 20 min after inhalation of 400 μ g of salbutamol.

TABLE E6 Associations of chronic cough with lung function before bronchodilator inhalation

| Parameters | OR or β (95% CI) | <i>P</i> value |
|-----------------------------------|--|-----------------------|
| FEV₁/FVC | -3.44 (-5.24, -1.64) | 0.0008 |
| FEV₁ %pred | -6.24 (-10.04, -2.44) | 0.0029 |
| FEV₁/FVC<70% | 1.64 (1.26, 2.13) | 0.0009 |
| MMEF% pred | -6.07 (-10.09, -2.04) | 0.0053 |
| FEF 50% pred | -8.43 (-13.33, -3.53) | 0.0020 |
| FEF 75% pred | -6.32 (-10.02, -2.62) | 0.0021 |
| SAD* | 1.64 (1.17, 2.28) | 0.0059 |

Abbreviations: FEV₁, forced expiratory volume in one second; FVC, forced vital capacity; MMEF, maximal mid-expiratory flow; FEF 50%, forced expiratory flow at 50% of the FVC; FEF 75%, forced expiratory flow at 50% of the FVC; SAD, small airway dysfunction.

Adjusted for age, sex, urbanization, body mass index, cigarette smoking, biomass, annual mean PM_{2.5}, education, occupational exposure, visible mold spots in the current residence, history of pneumonia or bronchitis during childhood, parental history of respiratory diseases, parental history of respiratory diseases, and allergic rhinitis. The logistic or linear regression analyses are weighted, taking into account of the multistage cluster sampling design.

*SAD was diagnosed on the basis of at least two of the following three indicators of lung function being less than 65% of predicted: MMEF, FEF 50%, and FEF 75% before bronchodilator inhalation.