

Online Data Supplement

“Assessment of chronic bronchitis and risk factors in young adults: Results from BAMSE”

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Text

Definitions of potential confounders and covariates

Self-reported respiratory symptoms at 24 years were assessed as any troublesome breathing, chest tightness or wheezing during the last 12 months.

Self-reported respiratory infections were assessed based on the question “How many times have you had respiratory infections (a cold with rhinitis, coughing, fever) over the last 12 months?” according to the answers: 1) Never; 2) 1-3 times; 3) 4-6 times; 4) More than 6 times and recoded into Never, 1-3 times and More than 3 times.

Self-reported pneumonia was assessed based on the question “Have you contracted pneumonia which was then treated with antibiotics (e.g. penicillin) at any point in the last 12 months?” according to the answers: 1) No; 2) Yes, 1 time and Yes; 3) 2 times or more and recoded to No and Yes.

Smoking status were defined as former smoker, current sometimes smoker and current daily smoker according to the answers to the question related to smoke: 1) No, but I used to smoke; 2) Yes, sometimes and 3) Yes, every day.

Parental asthma was defined as any parent with a doctor’s diagnosis of asthma and asthma medication of mother or father at the time of questionnaire 0.

Maternal smoking during pregnancy was defined as the mother smoked at least one cigarette per day at any point in time during pregnancy.

Parental smoking during childhood was defined as any of the parents smoking ≥ 1 cigarette per day during 0-16 years of age.

Sensitization was assessed to a mix of common airborne allergens with Phadiatop[®] and to a mix of common food allergens with fx5[®] (ImmunoCAP System; ThermoFisher, Uppsala, Sweden) and a positive test was defined as specific IgE ≥ 0.35 kU_A/L).

Premature birth was defined as babies who were delivered before 37 completed weeks of gestation.

Low birth weight was defined as babies with the birth weight lower than 2500 grams.

Statistical analysis

Collinearity among the covariates was evaluated by the variance inflation factor (VIF), and only covariates with a VIF <10 were included in the models. Potential risk factors for chronic bronchitis symptoms were selected based on previous literature and on availability in the BAMSE cohort. The final model only included variables that led to greater than 10 % change in the β coefficient and likelihood ratio test differed significantly ($P < 0.05$).

Tables

Table E1. Respiratory health events and lung function in participants with and without chronic bronchitis (CB) after exclusion of current asthma (at age 24) subjects

	CB (N=108)	No CB (N=2155)	p value
Self-reported respiratory symptoms *, any, n (%)	51 (47.2%)	262 (12.2%)	< 0.001
Emergency department visits, Yes, n (%)	5 (4.7%)	17 (0.8%)	0.003 II
Self-reported respiratory infections, n (%)			< 0.001
Never	6 (5.6%)	319 (14.8%)	
1-3 times	50 (46.3%)	1471 (68.3%)	
More than 3 times	52 (48.1%)	365 (16.9%)	
Self-reported pneumonia, Yes, n (%)	8 (7.5%)	41 (1.9%)	< 0.001
Sensitization to airborne allergens ‡, Yes, n (%)	619 (38.0%)	35 (42.7%)	0.394
Sensitization to food allergens §, Yes, n (%)	11 (13.4%)	87 (5.3%)	0.002
FeNO, ppb, median (IQR)	12 (9, 17)	12 (8, 18)	0.563
% predicted † pre-FEV ₁ , mean (SD)	95.6 (10.6)	97.3 (10.1)	0.163
Pre-FEV ₁ lower than LLN †, Yes, n (%)	7 (9.9%)	63 (4.3%)	0.027
Pre-FEV ₁ z-score †, mean (SD)	-0.37 (0.9)	-0.23 (0.9)	0.164
% predicted † pre-FVC, mean (SD)	100.1 (10.5)	99.4 (10.2)	0.579
Pre-FVC z-score †, mean (SD)	-0.00 (0.9)	-0.06 (0.9)	0.571
Pre-FEV ₁ /FVC, %, mean (SD)	81.5 (6.4)	83.7 (6.0)	0.003
Pre-FEV ₁ /FVC z-score †, mean (SD)	-0.62 (0.9)	-0.30 (0.9)	0.003
Reversibility test			
Change in FEV ₁ , ml, median (IQR)	139 (84, 232)	111 (51, 190)	0.006
Change in FEV ₁ % baseline value, %, median (IQR)	4.0 (2.2, 6.1)	2.9 (1.3, 4.7)	0.004

% predicted † post-FEV ₁ , mean (SD)	99.1 (10.5)	100.3 (9.8)	0.341
Post-FEV ₁ lower than LLN †, Yes, n (%)	4 (6.3%)	25 (1.8%)	0.033 ll
Post-FEV ₁ z-score †, mean (SD)	-0.08 (0.9)	0.03 (0.9)	0.338
% predicted † post-FVC, mean (SD)	99.2 (10.6)	98.9 (10.3)	0.807
Post-FVC z-score †, mean (SD)	-0.08 (0.9)	-0.10 (0.9)	0.817
Post-FEV ₁ /FVC, %, mean (SD)	85.3 (5.5)	86.7 (5.2)	0.026
Post-FEV ₁ /FVC z-score †, mean (SD)	-0.07 (0.8)	0.16 (0.8)	0.031

SD: standard deviation; IQR: interquartile range; FeNO: fractional exhaled nitric oxide; ppb: parts per billion; FEV₁: forced expiratory volume in 1 second; LLN: lower limit of normal; FVC: forced vital capacity.

* Respiratory symptoms were assessed as any troublesome breathing, chest tightness or wheezing during the last 12 months.

† Based on reference equation from the Global Lung Initiative 2012 [1].

‡ Sensitization was assessed to a mix of common airborne allergens with Phadiatop® (ImmunoCAP System; ThermoFisher, Uppsala, Sweden, and a positive test was defined as specific IgE ≥ 0.35 kU_A/L).

§ Sensitization was assessed to a mix of common food allergens with fx5® (ImmunoCAP System; ThermoFisher, Uppsala, Sweden, and a positive test was defined as specific IgE ≥ 0.35 kU_A/L).

ll Based on Fisher's exact test.

Table E2. Logistic regression results of the combination of smoking status and second-hand smoke and chronic bronchitis (CB) *.

	Parental smoking during childhood †		
		No	Yes
Participants' smoking status	None	Reference	aOR=0.82, 95% CI 0.44 to 1.46
	Ever	aOR=1.58, 95% CI 0.98 to 2.50	aOR=3.63, 95% CI 2.33 to 5.64

* Results after adjustment for age, sex, body mass index, early life air pollution, parental education and breast-feeding.

† Parental smoking during childhood was defined as defined as any of the parents smoking ≥ 1 cigarette per day during 0-16 years of age.

Figures

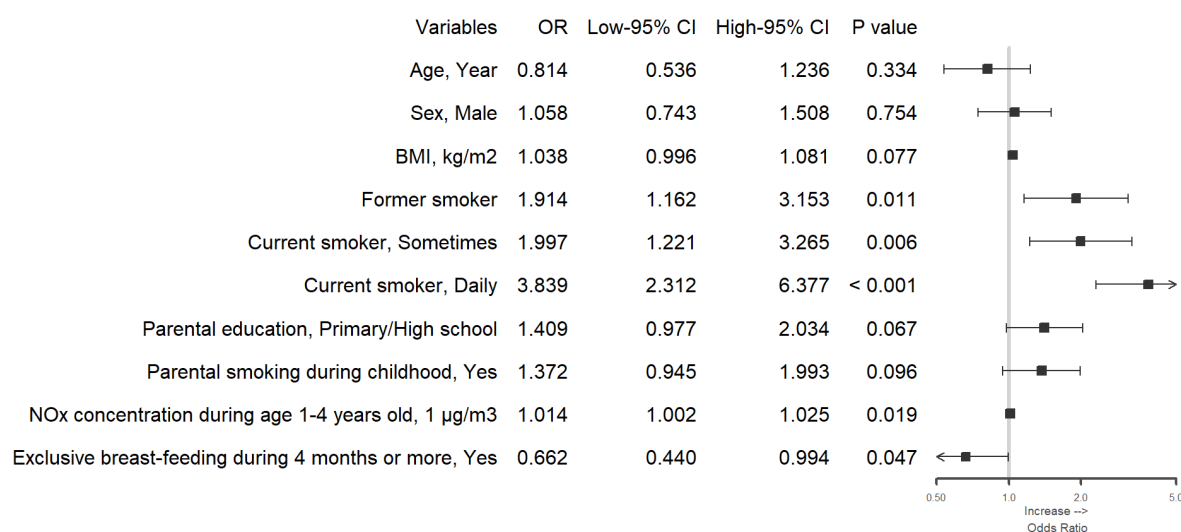


Figure E1. Mutually adjusted logistic regression results for the assessment of chronic bronchitis (CB) in young adults from the BAMSE study (n=2184). The model included age, sex, body mass index (BMI), smoking, parental education, parental smoking during childhood, air pollution during age 1-4 years old (nitrogen oxides, NO_x) and exclusive breast-feeding during 4 months or more as covariates.

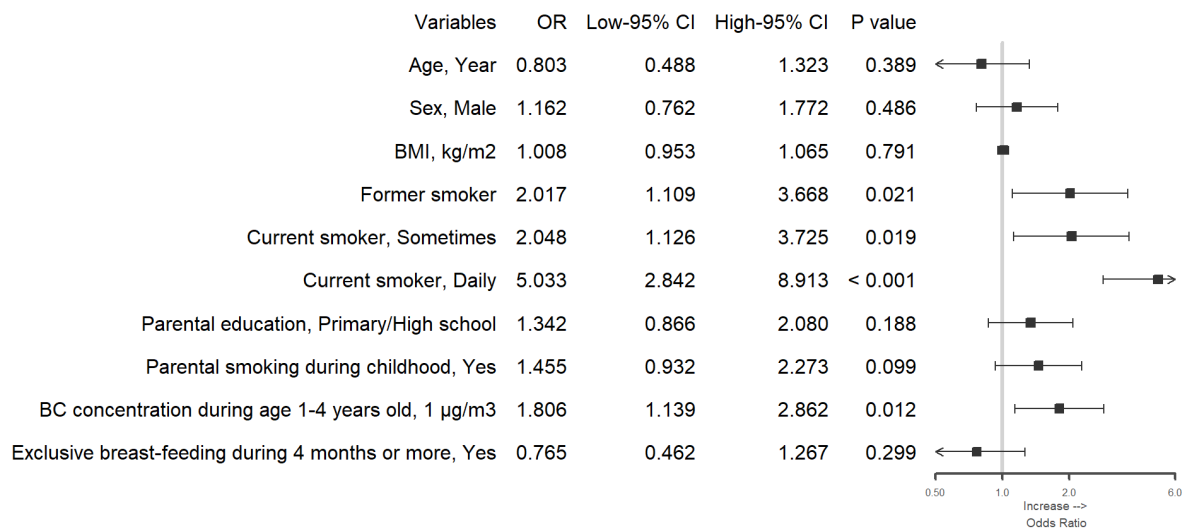


Figure E2. Mutually adjusted logistic regression results for the assessment of chronic bronchitis (CB) in young adults from the BAMSE study excluding current asthma patients (n=1957). The model included age, sex, body mass index (BMI), smoking, parental education, parental smoking during childhood, air pollution during age 1-4 years old (black carbon, BC) and exclusive breast-feeding during 4 months or more as covariates.

Reference

1. Quanjer PH, Stanojevic S, Cole TJ, Baur X, Hall GL, Culver BH, Enright PL, Hankinson JL, Ip MSM, Zheng J, Stocks J. Multi-ethnic reference values for spirometry for the 3-95-yr age range: the global lung function 2012 equations. *Eur Respir J* 2012; 40(6): 1324-1343.