

Supplement to ‘Characterization of occupational endotoxin-related small airway disease with longitudinal paired inspiratory/expiratory CT scans’

e-Table 1. Intraclass correlation coefficient of small airway measures

Small airway measures	2011, N = 30	2016, N = 30
Exp ₋₈₅₆	0.999	0.999
E/I MLA	0.999	0.999
RVC _{-856 to -950}	0.999	0.999
Residual ₋₈₅₆	0.999	0.999

Note: Intraclass correlation coefficient for each small airway measure in 2011 and 2016 are reported. Thirty subjects were randomly selected from 2011 and 2016, respectively. The agreement between the small airway measures of the same subject extracted in two sessions with a two-month interval was evaluated by intraclass correlation coefficients. Exp₋₈₅₆, percent gas trapping; E/I MLA, expiratory to inspiratory ratio of mean lung attenuation; RVC_{-856 to -950}, relative volume change of voxels with attenuation between -856 HU and -950 HU; Residual₋₈₅₆, residuals from the linear regression of Exp₋₈₅₆ on the percent of voxels with attenuation less than -950 HU.

e-Table 2. Unadjusted correlations between quantitative small airways measures and spirometry

	FEV ₁	<i>p</i> -Value	pp FEV ₁	<i>p</i> -Value	FEV ₁ /FVC	<i>p</i> -Value
2011, N = 404						
Exp ₋₈₅₆	0.011	0.831	-0.112	0.024	-0.446	<0.001
E/I MLA	-0.210	<0.001	-0.232	<0.001	-0.354	<0.001
RVC _{-856 to -950}	-0.292	<0.001	-0.240	<0.001	-0.232	<0.001
Residual ₋₈₅₆	-0.149	0.003	-0.189	<0.001	-0.410	<0.001
2016, N = 404						
Exp ₋₈₅₆	-0.072	0.149	-0.126	0.011	-0.486	<0.001
E/I MLA	-0.292	<0.001	-0.233	<0.001	-0.385	<0.001
RVC _{-856 to -950}	-0.324	<0.001	-0.220	<0.001	-0.223	<0.001
Residual ₋₈₅₆	-0.216	<0.001	-0.181	<0.001	-0.413	<0.001

Note: Pearson correlation coefficients were reported. $p < 0.05$ was considered significantly different from zero. Abbreviations: FEV₁, Forced Expiratory Volume in the first 1 second; pp FEV₁, percent predicted FEV₁; FVC, Forced Vital Capacity; Exp₋₈₅₆, percent gas trapping; E/I MLA, expiratory to inspiratory ratio of mean lung attenuation; RVC_{-856 to -950}, relative volume change of voxels with attenuation between -856 HU and -950 HU; Residual₋₈₅₆, residuals from the linear regression of Exp₋₈₅₆ on the percent of voxels with attenuation less than -950 HU.

e-Table 3. Multivariate analysis of the association between quantitative small airway measures and spirometry

	FEV ₁	<i>p</i> -Value	pp FEV ₁	<i>p</i> -Value	FEV ₁ /FVC	<i>p</i> -Value
All, N = 404						
Exp ₋₈₅₆	30.324	0.700	0.014	0.687	-0.107	<0.001
E/I MLA	-189.215	0.222	-0.131	0.064	-0.165	<0.001
RVC _{-856 to -950}	-142.417	0.030	-0.083	0.006	-0.034	0.015
Residual ₋₈₅₆	-51.828	0.522	-0.033	0.369	-0.095	<0.001
Cotton workers, N = 178						
Exp ₋₈₅₆	-2.740	0.983	0.0004	0.994	-0.115	<0.001
E/I MLA	-143.523	0.600	-0.116	0.336	-0.172	0.002
RVC _{-856 to -950}	-114.295	0.301	-0.066	0.180	-0.037	0.096
Residual ₋₈₅₆	-61.572	0.643	-0.034	0.558	-0.103	<0.001

Note: Coefficients and *p*-Values from the linear mixed model with a random intercept were reported. *p* < 0.05 was considered significantly different from zero. Spirometry was the outcome and small airway measures were the explanatory variables in the model. Data from both 2011 and 2016 was used in the model. The linear mixed model was adjusted for age, gender, height, smoking intensity, and survey year. Abbreviations: FEV₁, Forced Expiratory Volume in the first 1 second; pp FEV₁, percent predicted FEV₁; FVC, Forced Vital Capacity; Exp₋₈₅₆, percent gas trapping; E/I MLA, expiratory to inspiratory ratio of mean lung attenuation; RVC_{-856 to -950}, relative volume change of voxels with attenuation between -856 HU and -950 HU; Residual₋₈₅₆, residuals from the linear regression of Exp₋₈₅₆ on the percent of voxels with attenuation less than -950 HU.

e-Table 4. Linear regression for spirometry in 2016 on quantitative small airway measures in 2011

	FEV ₁	<i>p</i> -Value	R ²	pp FEV ₁	<i>p</i> -Value	R ²	FEV ₁ /FVC	<i>p</i> -Value	R ²
All, N = 404									
Exp ₋₈₅₆	-38.793	0.811	0.537	-0.013	0.857	0.083	-0.166	<0.001	0.248
E/I MLA	-826.786	0.009	0.545	-0.468	0.001	0.107	-0.220	<0.001	0.202
RVC _{-856 to -950}	-337.442	0.012	0.544	-0.200	0.001	0.108	-0.020	0.362	0.164
Residual ₋₈₅₆	-296.739	0.096	0.540	-0.157	0.052	0.092	-0.141	<0.001	0.213
Cotton worker, N = 178									
Exp ₋₈₅₆	-176.434	0.502	0.589	-0.114	0.322	0.161	-0.190	<0.001	0.271
E/I MLA	-422.175	0.429	0.589	-0.356	0.126	0.168	-0.200	0.018	0.197
RVC _{-856 to -950}	-213.487	0.319	0.590	-0.168	0.071	0.172	0.008	0.819	0.171
Residual ₋₈₅₆	-244.424	0.397	0.589	-0.172	0.172	0.166	-0.143	0.002	0.217

Note: Coefficients, *p*-Values and R² from the linear regression model were reported. *p* < 0.05 was considered significantly different from zero. Spirometry in 2016 was the outcome and quantitative small airway measures were the explanatory variables. Abbreviations: FEV₁, Forced Expiratory Volume in the first 1 second; pp FEV₁, percent predicted FEV₁; FVC, Forced Vital Capacity; Exp₋₈₅₆, percent gas trapping; E/I MLA, expiratory to inspiratory ratio of mean lung attenuation; RVC_{-856 to -950}, relative volume change of voxels with attenuation between -856 HU and -950 HU; Residual₋₈₅₆, residuals from the linear regression of Exp₋₈₅₆ on the percent of voxels with attenuation less than -950 HU

e-Table 5. Minimum detectable difference (MDD) of spirometry and quantitative small airway measures

	MDD
Spirometry	
FEV ₁ (ml)	59.231
pp FEV ₁ (%)	1.771
FEV ₁ /FVC	0.007
Small airway measures	
Exp ₋₈₅₆	0.013
E/I MLA	0.007
RVC _{-856 to -950}	0.016
Residual ₋₈₅₆	0.012

Note: Minimum detectable difference (MDD) was calculated at the significance level of 0.05 and power of 80%. The total number of the observations 404. Abbreviations: MDD, Minimum detectable difference; FEV₁, Forced Expiratory Volume in the first 1 second; pp FEV₁, percent predicted FEV₁; FVC, Forced Vital Capacity; Exp₋₈₅₆, percent gas trapping; E/I MLA, expiratory to inspiratory ratio of mean lung attenuation; RVC_{-856 to -950}, relative volume change of voxels with attenuation between -856 HU and -950 HU; Residual₋₈₅₆, residuals from the linear regression of Exp₋₈₅₆ on the percent of voxels with attenuation less than -950 HU

e-Table 6. Multivariate analysis of the association between occupation and spirometry

	FEV ₁	<i>p</i> -Value	pp FEV ₁	<i>p</i> -Value	FEV ₁ /FVC	<i>p</i> -Value
Survey Year 2011						
Cotton vs. Silk worker	-44.386	0.266	-2.764	0.117	-0.004	0.510
Survey Year 2016						
Cotton vs. Silk worker	-91.858	0.022	-4.044	0.022	-0.003	0.700
Difference						
Cotton vs. Silk worker	-47.472	0.020	-1.281	0.172	0.002	0.711

Note: Coefficients and *p*-Values from the linear mixed model with a random intercept were reported. *p* < 0.05 was considered significantly different from zero. Spirometry was the outcome and occupation (cotton vs. silk worker) was the explanatory variables in the model. The linear mixed model was adjusted for age, gender, height, smoking intensity, and survey year. Abbreviations: FEV₁, Forced Expiratory Volume in the first 1 second; pp FEV₁, percent predicted FEV₁; FVC, Forced Vital Capacity; Exp₋₈₅₆, percent gas trapping; E/I MLA, expiratory to inspiratory ratio of mean lung attenuation; RVC_{-856 to -950}, relative volume change of voxels with attenuation between -856 HU and -950 HU; Residual₋₈₅₆, residuals from the linear regression of Exp₋₈₅₆ on the percent of voxels with attenuation less than -950 HU.

e-Table 7. Multivariate analysis of the association between occupation and small airway measures

	Exp ₋₈₅₆	<i>p</i> -Value	E/I MLA	<i>p</i> -Value	RVC _{-856 to -950}	<i>p</i> -Value	Residual	<i>p</i> -Value
Survey Year 2011								
Cotton vs. Silk worker	-0.013	0.288	0.001	0.863	0.010	0.496	-0.003	0.815
Survey Year 2016								
Cotton vs. Silk worker	0.000	0.994	0.006	0.307	0.025	0.085	0.010	0.366
Difference								
Cotton vs. Silk worker	0.013	0.270	0.005	0.389	0.015	0.288	0.013	0.278

Note: Coefficients and *p*-Values from the linear mixed model with a random intercept were reported. *p* < 0.05 was considered significantly different from zero. Spirometry was the outcome and occupation (cotton vs. silk worker) was the explanatory variables in the model. The linear mixed model was adjusted for age, gender, height, smoking intensity, and survey year. Abbreviations: FEV₁, Forced Expiratory Volume in the first 1 second; pp FEV₁, percent predicted FEV₁; FVC, Forced Vital Capacity; Exp₋₈₅₆, percent gas trapping; E/I MLA, expiratory to inspiratory ratio of mean lung attenuation; RVC_{-856 to -950}, relative volume change of voxels with attenuation between -856 HU and -950 HU; Residual₋₈₅₆, residuals from the linear regression of Exp₋₈₅₆ on the percent of voxels with attenuation less than -950 HU.