Supplementary Material

Figure 1: Flowchart of participants numbers included in SAGE wave1 China and exclusion reasons

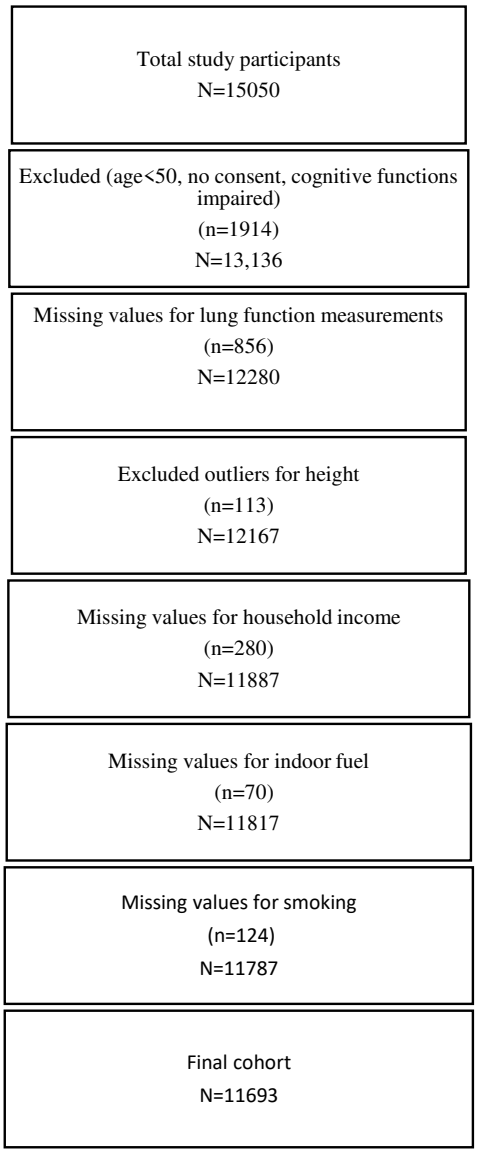

Table S1: Results of 10-fold cross-validation for PM1, PM2.5, PM10 and NO2

Pollutants	Daily model		Annual Averages	
	CV R^2	RMSE	CV R^2	RMSE
PM1	55%	20.5 µg/m^3	75%	8.8 µg/m^3
PM2.5	83%	18.1 µg/m^3	86%	6.9 µg/m^3
PM10	78%	31.5 µg/m^3	81%	14.4 µg/m^3
NO2	64%	12.4 µg/m^3	72%	6.5 µg/m^3

*RMSE: Root mean square error; CV: cross-validation

Table S2 Pollutant descriptive statistics and correlation matrix

Study Region	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)	NO_2 (μg/m^3)
Guangdong	80.32 (2.91)	51.63 (2.67)	24.30 (4.87)
Hubei	108.36 (2.37)	67.64 (2.70)	31.52 (1.58)
Jilin	74.70 (3.56)	42.19 (1.85)	20.20 (4.73)
Shaanxi	91.24 (19.35)	48.84 (10.41)	24.40 (5.90)
Shangdong	135.85 (14.25)	71.28 (11.18)	32.60 (9.85)
Shanghai	100.55 (1.12)	69.68 (.77)	46.31 (1.60)
Yunnan	47.10 (5.14)	27.90 (4.99)	19.19 (3.49)
Zhejiang	83.86 (11.40)	50.96 (7.85)	26.96 (11.94)
Mean (SD)	91.11 (28.95)	54.02 (17.02)	28.97 (11.31)
Median (IQR)	93.79 (31.15)	55.62 (26.14)	24.18 (22.42)

Spearman correlation coefficients (p value)

PM_{10} (μg/m^3)	1	0.9248 (P<0.001)	0.6146(P<0.001)
$PM_{2.5}$ (μg/m^3)		1	0.8182(P<0.001)
NO_2 (μg/m^3)			1

PM10, particulate matter with an aerodynamic diameter less than or equal to 10μm; PM2.5, particulate matter with an aerodynamic diameter less than or equal to 2.5μm and NO2 nitrogen dioxide.

Table S3: Sensitivity analysis of the association between COPD prevalence and moving averages of pollutants

Model Number	**NO_2**	**$PM_{2.5}$**	**PM_{10}**
†Model 1[a]	1.01 (1.42, 1.61)	1.38 (1.29-1.47)	1.21 (1.16-1.31)
†Model2[b]	1.04 (0.98, 1.10)	1.41 (1.38, 1.44)	1.30 (1.21, 1.39)
†Model3[c]	1.03 (1.35, 1.50)	1.29 (1.20, 1.38)	1.18 (1.16, 1.20)
††Model4[d]	1.08 (1.35, 1.50)	1.35 (1.29, 1.41)	1.23 (1.16, 1.30)

[a] Excluding participant (n= 3,692) who had cardiovascular comorbidity

[b] Using one-year average IQR increase

[c] Using five-years average IQR increase

[d] Using three-years moving average IQR increase

† Model includes pollutant, age, sex, tobacco use, tobacco consumption physical activity, education, BMI, alcohol, place of residence, household income, type of indoor fuel use, daily fruit and vegetable consumption.

†† Model includes pollutant, age, sex, tobacco use, tobacco consumption physical activity, education, BMI, alcohol, place of residence, household income, gross domestic product (GDP), percentage of the population living in urban areas, type of indoor fuel use, daily fruit and vegetable consumption.

IQR PM_{10}: 1 year: 29.60 μg/m^3 and 5 year: 28.02 μg/m^3

IQR $PM_{2.5}$: 1 year: 26.79 μg/m^3 and 5 year: 26.69 μg/m^3

IQR NO_2: 1 year: 21.36 μg/m^3 and 5 year: 22.79 μg/m^3

Table S4: Sensitivity analysis of the association between FEV_1 change and moving averages of pollutants

Model Number	NO_2	$PM_{2.5}$	PM_{10}
†Model 1[a]	-63.17 (-84.00, -36.23)	-73.18 (-84.87, -61.49)	-29.74 (-40.30, -19,18)
††Model 2[b]	-56.24 (-76.65, -35.83)	-70.63 (-91.78, -49.48)	-34.44 (-46.09, -22.79)
††Model 3[c]	-62.89 (-77.68, -48.10)	-77.05 (-97.41, -56.69)	-29.95 (-38.94, -20.96)

[a] Excluding participants (n= 3,692) who had cardiovascular comorbidity

[b] Using one-year average IQR increase

[c] Using five-years average IQR increase

† Model includes pollutant, age, sex, tobacco use, physical activity, education, BMI, alcohol, place of residence, household income, type of indoor fuel use, daily fruit and vegetables consumption.

†† Model includes pollutant, age, sex, tobacco use, physical activity, education, BMI, alcohol, place of residence, household income, gross domestic product (GDP), percentage of population living in urban areas, type of indoor fuel use, daily fruit and vegetables consumption.

IQR PM_{10}: 1 year: 29.60 $\mu g/m^3$ and 5 year: 28.02 $\mu g/m^3$

IQR $PM_{2.5}$: 1 year: 26.79 $\mu g/m^3$ and 5 year: 26.69 $\mu g/m^3$

IQR NO_2: 1 year: 21.36 $\mu g/m^3$ and 5 year: 22.79 $\mu g/m^3$