

Supplementary Materials

Table S1. Results of 10-fold cross-validation for PM₁, PM_{2.5}, PM₁₀ and NO₂.

Pollutants	Daily Model		Annual Averages	
	CV R ²	RMSE	CV R ²	RMSE
PM ₁	55%	20.5 µg/m ³	75%	8.8 µg/m ³
PM _{2.5}	83%	18.1 µg/m ³	86%	6.9 µg/m ³
PM ₁₀	78%	31.5 µg/m ³	81%	14.4 µg/m ³
NO ₂	64%	12.4 µg/m ³	72%	6.5 µg/m ³

RMSE: Root mean square error; CV: cross-validation. PM₁₀, particulate matter with an aerodynamic diameter less than or equal to 10 µm; PM_{2.5}, particulate matter with an aerodynamic diameter less than or equal to 2.5 µm; PM₁, particulate matter with an aerodynamic diameter less than or equal to 1 µm and NO₂ nitrogen dioxide.

Table S2. Annual average concentrations and pair wise correlations of air pollutants.

Pollutants	Spearman Correlation Coefficients (p value)			
	PM ₁₀	PM _{2.5}	PM ₁	NO ₂
PM ₁₀ (µg/m ³)	1	0.9248 (P < 0.001)	0.2835 (P < 0.001)	0.6146 (P < 0.001)
PM _{2.5} (µg/m ³)		1	0.5191 (P < 0.001)	0.8182 (P < 0.001)
PM ₁ (µg/m ³)			1	0.7928 (P < 0.001)
NO ₂ (µg/m ³)				1

PM₁₀, particulate matter with an aerodynamic diameter less than or equal to 10 µm; PM_{2.5}, particulate matter with an aerodynamic diameter less than or equal to 2.5 µm; PM₁, particulate matter with an aerodynamic diameter less than or equal to 1 µm and NO₂ nitrogen dioxide.

Table S3. Characteristics of participants with haemoglobin blood samples data and without blood sample (BS) data.

Characteristics	Participants without BS	Participants with BS	Total (N = 12,950)	p-value
	Consent (N = 2756)	Consent (N = 10,611)		
Age (±SD)	63.7 (9.3)	63.0 (9.3)	63.2 (9.4)	0.001
Sex				<0.001
Female (%)	1554 (21.9)	5539 (78.1)	7093	
Male (%)	1202 (19.2)	5072 (80.8)	6274	
Smoking				<0.001
Never smoker (%)	1702 (19.7)	6941 (80.3)	8643	
Ever smoker (%)	712 (16.5)	3610 (83.5)	4322	
Alcohol				0.864
No (%)	1671 (18.7)	7283 (81.3)	8954	
Yes (%)	739 (18.5)	3252 (81.5)	3991	
BMI (±SD)	23.9 (4.0)	24.0 (5.1)	24(5.0)	
Physical Activity				<0.001
Low level (%)	869 (20.8)	3313 (79.2)	4182	
Moderate level (%)	709 (19.5)	2936 (80.5)	3645	
High level (%)	834 (16.2)	4303 (83.8)	5137	
Education				<0.001
No school (%)	1038 (18.5)	4562 (81.5)	5600	
Primary (%)	4311 (16.6)	217 (83.4)	2602	
Middle (%)	651 (24.0)	2057(76.0)	2708	
Higher education (%)	615 (25.8)	1770 (74.2)	2385	
Fruit and Vegetable consumption				0.009
Insufficient intake (%)	1307 (21.6)	4733 (78.4)	6040	
Sufficient intake (%)	1449 (19.8)	5878 (80.2)	7327	

Fuel used at home				<0.001
Clean (%)	1798 (24.4)	5580 (75.6)	7378	
Unclean (%)	946 (16.0)	4969 (84.0)	5915	
Total Household income				<0.001
≤15,000 (%)	1234 (18.5)	5442 (81.5)	6676	
>15,000 (%)	1485 (23.2)	4907 (76.8)	6392	
Location of residence				<0.001
Urban (%)	1061 (15.6)	5739 (84.4)	6800	
Rural (%)	1695 (25.8)	4872(74.2)	6567	

Table S4. Associations between 3-year pollutant moving averages and haemoglobin, by participant characteristics.

Characteristics	PM ₁₀	PM _{2.5}	PM ₁	NO ₂
	β ± SE	β ± SE	β ± SE	β ± SE
Sex				
Male	-0.71 ± 0.09	-0.80 ± 0.12	-0.61 ± 0.09	-1.61 ± 0.10
Female	-0.63 ± 0.08	-0.74 ± 0.11	-0.72 ± 0.08	-1.84 ± 0.10
Interaction p-value	0.29	0.46	0.28	0.90
Age				
Below Median (70 years)	-0.65 ± 0.09	-0.77 ± 0.12	-0.64 ± 0.08	-1.65 ± 0.10
Above Median (70 years)	-0.66 ± 0.09	-0.70 ± 0.11	-0.63 ± 0.09	-1.69 ± 0.10
Interaction p-value	0.32	0.80	0.61	0.360
History of COPD/Emphysema				
Yes	-0.66 ± 0.21	-0.75 ± 0.27	-0.66 ± 0.15	-1.64 ± 0.28
No	-0.64 ± 0.06	-0.72 ± 0.08	-0.62 ± 0.06	-1.68 ± 0.07
Interaction p-value	0.74	0.71	0.96	0.81
Smoker				
Current tobacco use	-0.78 ± 0.10	-0.95 ± 0.14	-0.80 ± 0.10	-1.87 ± 0.12
No current tobacco use	-0.61 ± 0.08	-0.67 ± 0.10	-0.58 ± 0.07	-1.65 ± 0.09
Interaction p-value	0.003	0.05	0.006	0.12
Alcohol				
Ever	-0.74 ± 0.12	-0.79 ± 0.16	-0.69 ± 0.11	-1.69 ± 0.12
Never	-0.60 ± 0.07	-0.71 ± 0.09	-0.61 ± 0.07	-1.66 ± 0.09
Interaction p-value	0.08	0.30	<0.001	0.01
Total household income				
≤15000	-0.92 ± 0.08	-1.21 ± 0.11	-0.85 ± 0.08	-1.96 ± 0.10
>15000	-0.43 ± 0.12	-0.36 ± 0.15	-0.12 ± 0.10	-1.11 ± 0.12
Interaction p-value	0.06	0.99	0.16	0.29
Region				
South	-0.04 ± 0.20	0.25 ± 0.22	0.20 ± 0.10	-1.69 ± 0.98
North	-0.29 ± 0.06	-0.52 ± 0.08	0.19 ± 0.07	-0.30 ± 0.10
Interaction p-value	<0.001	<0.001	<0.001	<0.001

PM₁₀, particulate matter with an aerodynamic diameter less than or equal to 10 µm; PM_{2.5}, particulate matter with an aerodynamic diameter less than or equal to 2.5 µm; PM₁, particulate matter with an aerodynamic diameter less than or equal to 1 µm and NO₂ nitrogen dioxide. COPD: chronic obstructive pulmonary disease.

Table S5. Sensitivity analysis of the association between anaemia prevalence and moving averages of pollutants.

Model Number	NO ₂	PM ₁	PM _{2.5}	PM ₁₀
† Model 1 ^a	1.51 (1.42–1.61)	1.26 (1.17–1.36)	1.24 (1.17–1.32)	1.14 (1.10–1.19)
†† Model 2 ^b	1.40(1.33, 1.48)	1.12 (1.05, 1.19)	1.11 (1.05, 1.16)	1.04 (1.01, 1.07)
†† Model 3 ^c	1.42 (1.35, 1.50)	1.15 (1.09, 1.23)	1.12 (1.06, 1.18)	1.05 (1.02, 1.08)

^a Excluding participants (n = 3692) who had respiratory or cardiovascular comorbidity. ^b using 1-year average IQR increase. ^c using 5 years average IQR increase. † Model includes pollutant, age, sex, tobacco use, physical activity, education, body mass index (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, diabetes history, hypertension history, chronic lung disease history, type of indoor fuel use, daily fruit and vegetables consumption. IQR PM₁₀: 1 year: 29.60 $\mu\text{g}/\text{m}^3$ and 5 year: 28.02 $\mu\text{g}/\text{m}^3$. IQR PM_{2.5}: 1 year: 26.79 $\mu\text{g}/\text{m}^3$ and 5 year: 26.69 $\mu\text{g}/\text{m}^3$. IQR PM₁: 1 year: 23.70 $\mu\text{g}/\text{m}^3$ and 5 year: 22.42 $\mu\text{g}/\text{m}^3$. IQR NO₂: 1 year: 21.36 $\mu\text{g}/\text{m}^3$ and 5 year: 22.79 $\mu\text{g}/\text{m}^3$.

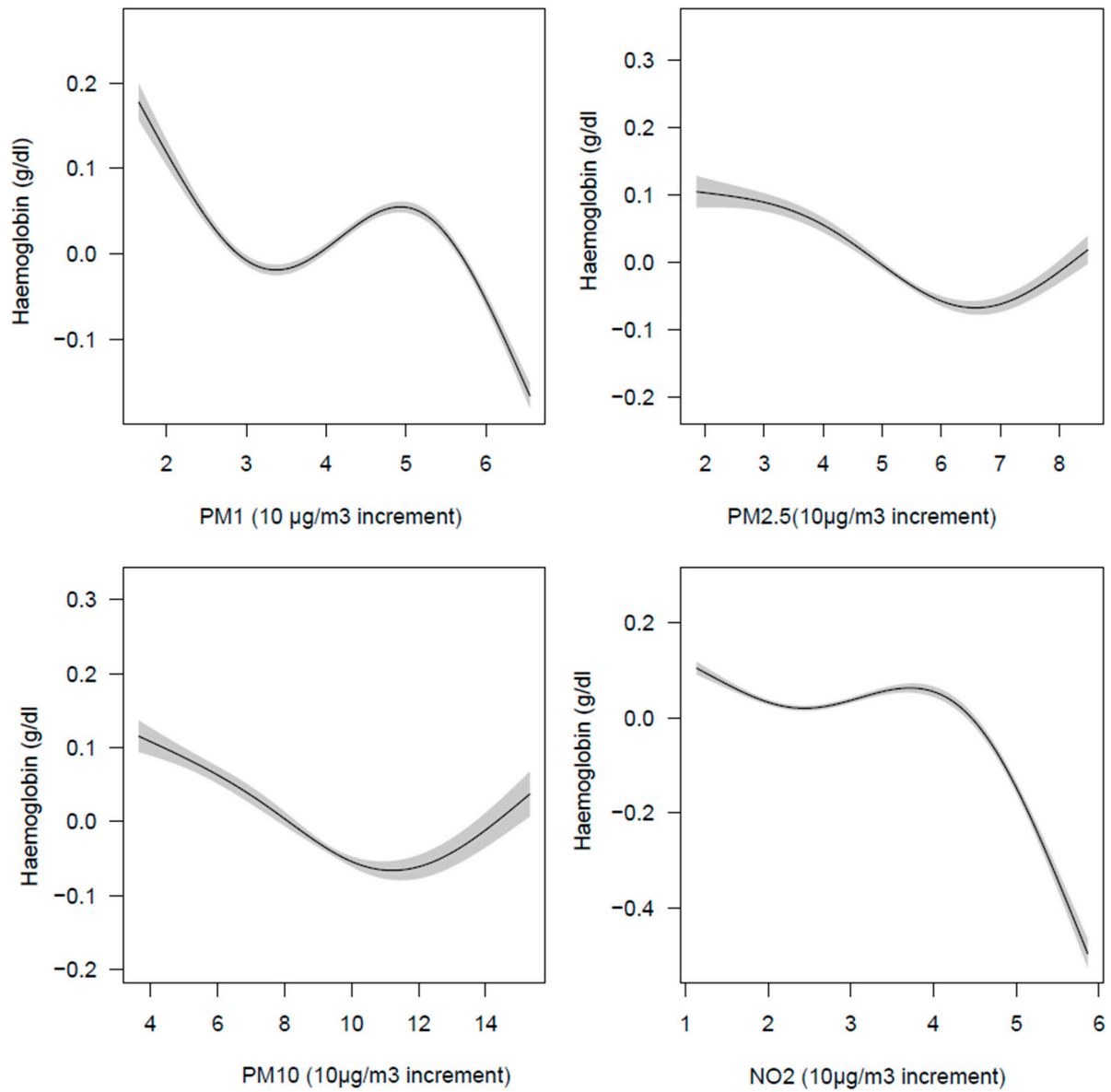


Figure S1. the association between a 10 $\mu\text{g}/\text{m}^3$ increase of particulate matter (PM) and NO₂ and decrements in haemoglobin (g/dL). The shaded region indicates 95% CIs.