Personal and indoor PM$_{2.5}$ exposure from burning solid fuels in vented and unvented stoves in a rural region of China with a high incidence of lung cancer - Supporting Information

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Supplementary Table S1 - Variables considered for inclusion in mixed model creation

Broad Category	Detailed variables
Stove design	**Stove ventilation (ventilated, unventilated, mixed, portable stove or firepit)**
	Stove ventilated, unventilated or mixed ventilation[*]
	Stove ventilated, unventilated mixed or firepit
	Stove either firepit or other design (or mixed)
	Stove design as reported by study participant[£]
Fuel type/source	Major fuel type including smoky coal subtypes and county from which coal sourced (Fuyuan was divided into north/south)
	County from which fuel purchased
	Broad fuel types (smoky coal, smokeless coal, "mixed" coal, wood, plant materials, "mixed" fuels)
	Fuel type including smoky coal subtypes
	Fuel type including individual smoky coal mines
	Fuel type including smoky coal subtypes
	Weight of fuel used[†]
Meteorological conditions	**Season of measurement**
	Average daily temperature
	Average daily high temperature
	Average daily low temperature
	Average daily humidity
	Average daily wind speed
	Average daily maximum wind speed
	Average daily dew point
	Average daily rainfall
Other variables	Room size[†]
	Phase of study during visit
	Number of owned stoves
	Number of doors in main cooking room
	Number of windows in main cooking room
	Presence or absence of a stairway in the main cooking room
	Hours of stove use standardized by number of used stoves
	Hours of stove use per measurement period
	Age of participant
	Month of visit
	Administrative borders[‡]

[*]refers to the use of multiple stoves with different ventilation designs.
[£]categories are high stove, low stove (with or without ventilation), portable stove, firepit and multiple stoves.
[†]divided into quartiles.
[‡]townships/areas as defined by local administrative bodies.
Variables in bold were selected for model construction.

Supplementary Table S2 - Linear mixed effect model indicating variables which contribute to differences between indoor and personal measurements

	Estimate (β)	95%CI	GMR[‡]
Ln(indoor PM$_{2.5}$ measurement), ln-µg/m^3	0.59	0.53,0.66	1.80
Average daily high temperature	-0.01	-0.02,-0.01	0.99
Weight of fuel (in quartiles)			
1	Ref.		1.00
2	0.06	-0.07,0.20	1.06
3	0.18	0.04,0.32	1.20
4	0.15	0.00,0.29	1.16
Unknown	0.20	0.03,0.36	1.22
Variance explained			
Between subjects		73%	
Between villages		100%[*]	
Reference value[†] (ln personal measurement), ln-µg/m^3		2.12	

[‡]Geometric mean ratio = GM(estimate)/GM(reference) = exp(β).
[†]Reference value represents base value of ln-transformed PM$_{2.5}$ in model for reference group [low weight fuel used coinciding with lowest ln-transformed indoor PM$_{2.5}$ (3.17) and temperature measurements (-0.4°C)].
[*]Zero residual between village variance remained in the final model as a result of the high correlation between indoor and personal measurements.

Supplementary Table S3 - Linear mixed effect modelling of ln-transformed indoor PM$_{2.5}$ exposure

	Estimate(β)	95% CI	GMR[‡]
Fuel type			
Smokeless coal	Ref.		1.00
Smoky coal	0.29	0.02,0.56	1.34
"Mixed" coal	0.22	-0.08,0.52	1.24
Wood	0.78	0.38,1.18	2.19
Plant materials	0.55	0.13,0.97	1.73
"Mixed" fuel	0.28	0.01,0.56	1.33
Stove design			
Vented stove	Ref.		1.00
Unvented stove	0.34	0.06,0.61	1.40
Portable stove	0.15	-0.07,0.38	1.17
Firepit	0.54	0.23,0.85	1.72
Mixed ventilation stove	0.20	0.02,0.37	1.21
Unknown ventilation stove	-0.30	-0.69,0.09	0.74
Number of windows in main cooking room			
Zero	Ref.		1.00
One	0.03	-0.22,0.27	1.03
Two	-0.15	-0.43,0.12	0.86
Season			
Autumn	Ref.		1.00
Winter	0.18	0.00,0.35	1.20
Spring	-0.12	-0.28,0.05	0.89
Summer	-0.55	-0.9,-0.2	0.58
Number of hours burning fuel standardized by number of used stoves[§]	0.00	-0.02,0.01	1.00
Variation explained, %			
Between individual subjects		36	
Between villages		63	
Reference value[†], ln-μg/m^3		4.60	

[‡]Geometric mean ratio = GM(estimate)/GM(reference) = exp(β).
[§]Median period 4.3 hrs; IQR 2.2 to 9.6 hrs per stove.
[†]Reference value represents base value of ln-transformed PM$_{2.5}$ in model for reference group (smokeless coal burnt in a vented stove, during autumn in a room with no windows).