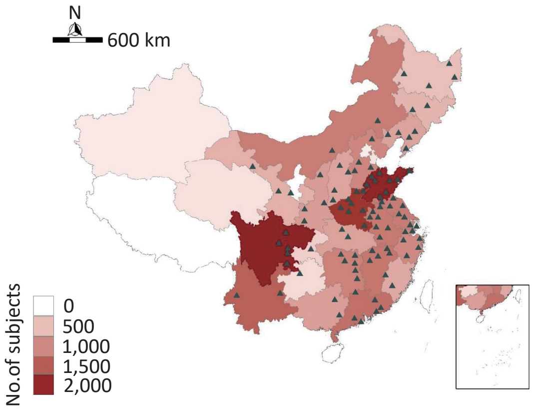

Supplementary Figure S1. Locations of the study sites in the CHARLS project.

Supplementary Table S1. Associations between ambient fine particulate matter (FPM or $PM_{2.5}$) concentrations and blood pressure

Model	PM Conc.[e]	*β* (95% *CI*)[a]	
		Systolic blood pressure	Diastolic blood pressure
Model I[b]	FPM_{1Y}	0.868 (0.576, 1.161)	0.354 (0.169, 0.539)
	FPM_{2Y}	1.289 (0.818, 1.760)	0.675 (0.377, 0.973)
Model II[c]	FPM_{1Y}	1.266 (0.865, 1.667)	0.513 (0.260, 0.766)
	FPM_{2Y}	1.558 (0.966, 2.150)	0.853 (0.479, 1.226)
Model IV[d]	FPM_{1Y}	1.180 (0.777, 1.584)	0.513 (0.258, 0.768)
	FPM_{2Y}	1.460 (0.864, 2.055)	0.835 (0.459, 1.211)

Note. [a]Blood pressure change based on each 10 μg/m^3 change of ambient $PM_{2.5}$ concentration (Conc.); [b]Model I: $BP = \beta \times PM_{2.5} + \beta_{1\text{-}2} \times CF_{1\text{-}2} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}2}$ of potential confounders ($CF_{1\text{-}2}$: city and medication), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [c]Model II: $BP = \beta \times PM_{2.5} + \beta_{1\text{-}4} \times CF_{1\text{-}4} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}4}$ of potential confounders ($CF_{1\text{-}4}$: city, medication, temperature, and age), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [d]Model IV: $BP = \beta \times PM_{2.5} + \beta_{1\text{-}16} \times CF_{1\text{-}16} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with β coefficients of $PM_{2.5}$, $\beta_{1\text{-}16}$ of potential confounders ($CF_{1\text{-}16}$: $CF_{1\text{-}10}$, temperature maintenance of household, heating fuel, living in a multi-story building or not, renting a house, untidiness of the household, and telephone usage), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [e] verage fine particulate matter (FPM) concentration over the past time period before the survey, FPM_{1Y}: average $PM_{2.5}$ concentration in the past one year; FPM_{2Y}: average $PM_{2.5}$ concentration in the past two years.

Supplementary Table S2. Associations between fine particulate matter ($PM_{2.5}$) concentrations in the year before the survey and blood pressure

Group	Systolic blood pressure		Diastolic blood pressure	
	β^*	P-value†	β	P-value†
Age (years)				
40–49	1.208	0.314	0.587	0.716
50–59	1.223		0.563	
60–69	1.220		0.419	
70–79	1.443		0.465	
> 80	0.509		0.308	
Gender				
Female	1.046	0.270	0.512	0.858
Male	0.843		0.487	
Education				
Below elementary	1.314	0.229	0.487	0.762
Above middle	1.196		0.586	
Elementary & middle	1.006		0.503	
Residence				
Rural	1.229	0.753	0.433	0.186
Urban	1.258		0.631	
Marriage				
No	1.067	0.355	0.315	0.088
Yes	1.276		0.540	
Smoking				
No	1.223	0.669	0.506	0.727
Yes	1.280		0.488	
Drinking				
Frequent	1.064	0.274	0.448	0.886
Never	1.297		0.524	
Rare	1.332		0.487	
Medication				
No	1.197	0.292	0.512	1.003
Yes	1.342		0.471	

Note. *Blood pressure change based on each 10 μg/m^3 change of ambient $PM_{2.5}$ concentration; †P-value of the analysis of variance.

Supplementary Table S3. Associations between ambient fine particulate matter (FPM or $PM_{2.5}$) concentrations and blood pressure, excluding participants taking anti-hypertension medicine

Model	PM Conc.[e]	*β* (95% *CI*)[a]	
		Systolic blood pressure	Diastolic blood pressure
Model I[b]	FPM_{1Y}	0.200 (-0.115, 0.514)	0.023 (-0.192, 0.238)
	FPM_{2Y}	0.388 (-0.123, 0.898)	0.204 (-0.145, 0.552)
Model II[c]	FPM_{1Y}	0.943 (0.511, 1.376)	0.379 (0.085, 0.673)
	FPM_{2Y}	1.299 (0.658, 1.941)	0.720 (0.285, 1.156)
Model III[f]	FPM_{1Y}	0.895 (0.463, 1.328)	0.357 (0.063, 0.65)
	FPM_{2Y}	1.226 (0.585, 1.867)	0.680 (0.244, 1.116)
Model IV[d]	FPM_{1Y}	0.819 (0.383, 1.255)	0.353 (0.057, 0.648)
	FPM_{2Y}	1.139 (0.494, 1.785)	0.654 (0.216, 1.092)

Note. [a]Blood pressure change based on each 10 μg/m^3 change of ambient $PM_{2.5}$ concentration (Conc.); [b]Model I: BP = $\beta \times PM_{2.5} + \beta_1 \times CF_1 + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}2}$ of potential confounders (CF_1: city), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [c]Model II: BP = $\beta \times PM_{2.5} + \beta_{1\text{-}3} \times CF_{1\text{-}3} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}4}$ of potential confounders ($CF_{1\text{-}3}$: city, temperature, and age), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [f]Model III: BP = $\beta \times PM_{2.5} + \beta_{1\text{-}9} \times CF_{1\text{-}9} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}10}$ of potential confounders ($CF_{1\text{-}9}$: $CF_{1\text{-}4}$, residence, gender, education, marriage, smoking, and drinking alcohol), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [d]Model IV: BP = $\beta \times PM_{2.5} + \beta_{1\text{-}15} \times CF_{1\text{-}15} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with β coefficients of $PM_{2.5}$, $\beta_{1\text{-}16}$ of potential confounders ($CF_{1\text{-}15}$: $CF_{1\text{-}10}$, temperature maintenance of household, heating fuel, living in a multi-story building or not, renting a house, untidiness of the household, and telephone usage), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [e]Average fine particulate matter (FPM) concentration over the past time period before the survey, FPM_{1Y}: average $PM_{2.5}$ concentration in the past one year; FPM_{2Y}: average $PM_{2.5}$ concentration in the past two years.

Supplementary Table S4. Associations between ambient fine particulate matter (FPM or $PM_{2.5}$) concentrations and blood pressure after deletion of missing data

Model	PM Conc.[e]	β (95% *CI*)[a]	
		Systolic blood pressure	Diastolic blood pressure
Model I[b]	FPM_{1Y}	0.864 (0.553, 1.176)	0.292 (0.096, 0.489)
	FPM_{2Y}	1.234 (0.729, 1.738)	0.529 (0.211, 0.848)
Model II[c]	FPM_{1Y}	1.126 (0.695, 1.556)	0.368 (0.096, 0.639)
	FPM_{2Y}	1.305 (0.667, 1.942)	0.604 (0.203, 1.006)
Model III[f]	FPM1Y	1.101 (0.670, 1.532)	0.355 (0.083, 0.627)
	FPM2Y	1.276 (0.639, 1.913)	0.586 (0.184, 0.988)
Model IV[d]	FPM_{1Y}	1.066 (0.633, 1.499)	0.391 (0.118, 0.664)
	FPM_{2Y}	1.259 (0.619, 1.899)	0.627 (0.224, 1.030)

Note. [a] Blood pressure change based on each 10 μg/m^3 change of ambient $PM_{2.5}$ concentration (Conc.); [b]Model I: BP = $\beta \times PM_{2.5} + \beta_1 \times CF_1 + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}2}$ of potential confounders (CF_1: city), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [c]Model II: BP = $\beta \times PM_{2.5} + \beta_{1\text{-}3} \times CF_{1\text{-}3} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}4}$ of potential confounders ($CF_{1\text{-}3}$: city, temperature, and age), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [f]Model III: BP = $\beta \times PM_{2.5} + \beta_{1\text{-}9} \times CF_{1\text{-}9} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with the β coefficients of $PM_{2.5}$, $\beta_{1\text{-}10}$ of potential confounders ($CF_{1\text{-}9}$: $CF_{1\text{-}4}$, residence, gender, education, marriage, smoking, and drinking alcohol), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [d]Model IV: BP = $\beta \times PM_{2.5} + \beta_{1\text{-}15} \times CF_{1\text{-}15} + \gamma_1(S) + \gamma_2(H)$. This model incorporated fixed terms with β coefficients of $PM_{2.5}$, $\beta_{1\text{-}16}$ of potential confounders ($CF_{1\text{-}15}$: $CF_{1\text{-}10}$, temperature maintenance of household, heating fuel, living in a multi-story building or not, renting a house, untidiness of the household, and telephone usage), as well as a random intercept for each subject $\gamma_1(S)$ and each household $\gamma_2(H)$; [e]Average fine particulate matter (FPM) concentration over the past time period before the survey, FPM_{1Y}: average $PM_{2.5}$ concentration in the past one year; FPM_{2Y}: average $PM_{2.5}$ concentration in the past two years.