# THE LANCET Planetary Health

### Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Sun D, Liu C, Ding Y, et al. Long-term exposure to ambient  $PM_{2.5}$ , active commuting, and farming activity and cardiovascular disease risk in adults in China: a prospective cohort study. *Lancet Planet Health* 2023; **7**: e304–12.

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49	concentration (n=201,140)
50	

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#### 87 eMethods

<ul> <li>\$ Section A: For non-farmers</li> <li>1. In the past 12 months, how active were you at work?</li> <li>Mainly sedentary (e.g. office worker)</li> <li>Standing occupation (e.g. guard, shop assistant)</li> <li>Manual work (e.g. nimer, construction worker)</li> <li>Heavy manual work (e.g. nimer, construction worker)</li> <li>Heavy manual work (e.g. nimer, construction worker)</li> <li>Bey motorbike</li> <li>In the past 12 months, how did you usually get to work?hours</li> <li>In the past 12 months, how did you usually get to work?hours</li> <li>Mainly walk</li> <li>By bicycle</li> <li>By motorbike</li> <li>By bus/ear/ferry/train</li> <li>Mainly stayed at home, or work near home <i>s go to Question 12</i></li> <li>How much time did you spend each day on the journey to and from work?mins</li> <li>Section B: For farmers</li> <li>In the past 12 months, did your farming work change seasonally?</li> <li>No → g to Question 7</li> <li>Yes</li> <li>In the past 12 months did it usually last?months</li> <li>How many hours did you usually work?hours</li> <li>How many hours did you usually work each day?hours</li> <li>How many hours did you usually work at much faster heartbeat?</li> <li></li></ul>	88	Q	uestionnaire on physical activity used in the CKB study at baseline
<ul> <li>1. In the past 12 months, how active were you at work?</li> <li>Mainly sedentary (e.g., office worker)</li> <li>Standing occupation (e.g., guard, shop assistant)</li> <li>Manual work (e.g. plumber, carpenter)</li> <li>Heavy manual work (e.g., miner, construction worker)</li> <li>Retired, housewife/husband, unemployed, or disabled <i>&gt; go to Question 12</i></li> <li>2. In a typical week, about how many hours did you usually work?hours</li> <li>3. In the past 12 months, how did you usually get to work?</li> <li>Mainly walk by bic/car/ferry/train</li> <li>Mainly stayed at home, or work near home <i>&gt; go to Question 12</i></li> <li>4. How much time did you spend each day on the journey to and from work?mins</li> <li>Section B: For farmers</li> <li>5. In the past 12 months, did your farming work change seasonally?</li> <li>No <i>&gt; go to Question 7</i></li> <li>Yes</li> <li>During the farming season in the last 12 months:</li> <li>Manual □ Semi-mechanized □ Fully mechanized</li> <li>How many hours did you usually work ach day?hours</li> <li>How many hours did you usually work ach day?hours</li> <li>Mo <i>&gt; go to Question 11</i></li> <li>How many hours did you usually work an the field?hours</li> <li>8. Apart from the agriculture work, did you ausually work in the field?hours</li> <li>8. Apart from the agriculture work, did you have any other job?hours</li> <li>Na <i>&gt; go to Question 11</i></li> <li>Yes</li> <li>How active were you at work with other job?hours</li> <li>I. In a typical week, about how many hours did you usually work at other job?hours</li> <li>II. In a typical work, about how many hours did you work at other job?hours</li> <li>II. In a typical work, about how many hours did you work at other job?hours</li> <li>II. In a typical work and there and on farmers</li> <li>II. During the past 12 months, how often did you work at other job?hours</li> <li>II. In a typical work and there may yours did you work at other job?hours</li> <li>II. In a typical work and thow many hours did</li></ul>	89	•	Section A: For non-farmers
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<ul> <li>6. During the farming season in the last 12 months:</li> <li>— How many months did it usually last?months</li> <li>— What types of work did it usually involve?</li> <li>— Manual □ Semi-mechanized □ Fully mechanized</li> <li>— How many hours did you usually work each day?hours</li> <li>— Of which, how many hours did you usually work in the field?hours</li> <li>7. In a typical week, how many hours did you usually work in the field?hours</li> <li>8. Apart from the agriculture work, did you have any other job?</li> <li>[ No → go to Question 11</li> <li>[ Yes</li> <li>9. How active were you at work with other job?</li> <li>[ Mainly standing □ Mainly general manual work</li> <li>10. In a typical week, about how many hours did you usually spend on the journey to and from work on foot or by bicycle?mins</li> <li>24</li> <li>Section C: For both farmers and non-farmers</li> <li>12. During the past 12 months, how often did you exercise in your leisure time?</li> <li>[ Never or almost never ] → go to Question 15</li> </ul>	106		□ Yes
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<ul> <li>— Of which, how many hours did you sweat or have a much faster heartbeat?</li> <li>hours</li> <li>7. In a typical week, how many hours did you usually work in the field?hours</li> <li>8. Apart from the agriculture work, did you have any other job?</li> <li>B. No <i>→ go to Question 11</i></li> <li>Yes</li> <li>9. How active were you at work with other job?</li> <li>Mainly sedentary Mainly general manual work</li> <li>Mainly standing Mainly heavy manual work</li> <li>10. In a typical week, about how many hours did you usually spend on the journey to and from work on foot or by bicycle? mins</li> <li>Section C: For both farmers and non-farmers</li> <li>12. During the past 12 months, how often did you exercise in your leisure time?</li> <li>B. Never or almost never</li> <li>B. Section 15</li> </ul>	111		— How many hours did you usually work each day?hours
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<ul> <li>8. Apart from the agriculture work, did you have any other job?</li> <li>No → go to Question 11</li> <li>Yes</li> <li>9. How active were you at work with other job?</li> <li>Mainly sedentary</li></ul>	114	7.	In a typical week, how many hours did you usually work in the field?hours
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<ul> <li>117 □ Yes</li> <li>9. How active were you at work with other job?</li> <li>119 □ Mainly sedentary □ Mainly general manual work</li> <li>120 □ Mainly standing □ Mainly heavy manual work</li> <li>121 10. In a typical week, about how many hours did you work at other job?hours</li> <li>11. In a typical day how much time did you usually spend on the journey to and from work on foot or by bicycle?mins</li> <li>124</li> <li>125 • Section C: For both farmers and non-farmers</li> <li>126 12. During the past 12 months, how often did you exercise in your leisure time?</li> <li>127 □ Never or almost never</li> <li>128 □ 1-3 times/month</li></ul>	116		$\square \text{ No} \rightarrow go \text{ to Question 11}$
<ul> <li>9. How active were you at work with other job?</li> <li>119</li></ul>	117		□ Yes
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$ \begin{array}{c c} 127 & \Box & \text{Never or almost never} \\ 128 & \Box & 1-3 & \text{times/month} \end{array} \\                                   $	126	12	. During the past 12 months, how often did you exercise in your leisure time?
128 $\Box$ 1-3 times/month $\int \rightarrow go \ to \ Question \ 15$ 4	127		□ Never or almost never
4	128		$\Box 1-3 \text{ times/month} \qquad \int \rightarrow go \text{ to Question 15}$
			4

129	$\Box$ 1-2 times/week
130	$\Box$ 3-5 times/week
131	□ Daily or almost every day
132	13. What is your main type of exercise? (tick one box only)
133	□ Taichi/Qigong □ Walking
134	□ Jogging/aerobic exercise □ Swimming
135	$\square$ Ball games (basketball, table tennis, etc.) $\square$ Other (eg. mountain climbing)
136	14. About how many hours per week did you spent on these exercises?
137	15. In a typical week during the past 12 months, how often did you sweat or have a much faster
138	heartbeat because of physical activities/exercise?
139	□ Never or almost never
140	$\Box <1 \text{ time/week} \qquad \int \Rightarrow go \text{ to Question } 17$
141	$\Box$ 1-2 times/week
142	$\Box$ 3-5 times/week
143	□ Daily or almost every day
144	16. About how many hours per week did you do such vigorous activities?hours
145	17. About how many hours per week did you do housework? hour
146	
147	Link to the electronic questionnaires
148	https://www.ckbiobank.org/site/binaries/content/assets/resources/pdf/qs_baseline-final-

149 from10june2004.pdf

150 Physical activity t	ypes, ML	values, co	des and	intensity	categories
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Activity type	Intensity	MET	$\operatorname{Codes}^*$
Heavy manual work	Vigorous	6.5	11477
Manual work	Moderate	4.5	11476
Standing work	Moderate	3.8	Mean of 11610 and 11630
Sedentary work	Low	1.8	Mean of 11580, 11585, and 11590
Manual work in the farming season	Vigorous	6.3	Mean of 11145 and 11146
Semi-mechanized work in the farming season	Moderate	3.4	Mean of 11146 and 11147
Fully mechanized work in the farming season	Low	2.4	Mean of 11147 and 11170
Work outside the farming season	Low	2.0	11147
Walking	Moderate	4.0	17270
Bicycle	Vigorous	6.8	1011
Motorbike	Moderate	3.5	16030
Private or public transportation (such as bus, car, underground, and ferry)	Low	1.7	Mean of 16010, 16015, and 16016
Household activity	Low	2.8	Mean of $05030^{\dagger}$ , $05040^{\dagger}$ , $05035$ , $05055$ , $05070$ , $05090^{\dagger}$ , $05092^{\dagger}$ , $05184$ , $05197$ , and $05200$
Tai-Chi/qigong/leisure walking	Moderate	3.3	Mean of 15670 and 17160
Jogging/aerobic exercise	Vigorous	7.4	Mean of 03015, 12020, and 12150
Ball games	Moderate	5.5	Mean of 15020 <sup>†</sup> , 15030 <sup>†</sup> , 15055, 15080, 15090, 15255, 15605 <sup>†</sup> , 15610 <sup>†</sup> , 15652, 15660, 15675, 15710 <sup>†</sup> , and 15711 <sup>†</sup>
Brisk walking/gymnastics/folk dancing	Moderate	4.2	Mean of 03025, 15300, and 17200
Swimming	Vigorous	7.2	Mean of 18230, 18240, and 18310
Other exercise, e.g. mountain walking, home exercise and rope jumping	Moderate	5.9	Mean of 02010, 02064, 04001, 04100, 15110 <sup>†</sup> , 15120 <sup>†</sup> , 15200, 15240, 15310, 15425 <sup>†</sup> , 15430 <sup>†</sup> , 15537, 15550 <sup>‡</sup> , 15551 <sup>‡</sup> , 15552 <sup>‡</sup> , 15580, 15590, 15730, 15732 <sup>‡</sup> , 15733 <sup>‡</sup> , 15734 <sup>‡</sup> , and 19030

151 MET, metabolic equivalent of task.

152 \*Based on the 2011 Compendium of Physical Activities: a second update of codes and MET values. Ainsworth BE, et al. Medicine and Science in Sports and Exercise,

153 2011;43(8):1575-1581.

<sup>†</sup>Assigned 1/2 weight in calculating the mean MET value because the connecting two items represent one type of activity.

<sup>155</sup> <sup>‡</sup>Assigned 1/3 weight in calculating the mean MET value because the connecting three items represent one type of activity.

### 156 **Reproducibility of active commuting and farming activity**

- 157 After the baseline survey, about 5% of the participants were randomly selected for the first resurvey in
- 158 2008. Reproducibility of the physical activity levels from active commuting and farming activity was
- tested in 3,402 participants who worked outside home at baseline and completed the same
- 160 questionnaire within two years (median interval=1.7 years). The intraclass correlation coefficients for
- 161 physical activity levels from active commuting and farming activity were 0.54 and 0.75, respectively.

#### 162 **Description of covariates**

- 163 Other covariates collected using the baseline questionnaire included demographic characteristics (sex,
- age, educational level, income, and occupation), lifestyle factors (smoking and alcohol drinking status,
- 165 consumption of red meat, fresh vegetables and fruits, and leisure sedentary time), pollution from
- 166 household fuel combustion (solid fuel use for cooking and heating in the past three houses, and
- 167 cookstove ventilation in the baseline house), passive smoking, self-rated health status, personal medical
- 168 history, and family histories of diseases.
- 169 Physical measurements, including height, weight, waist and hip circumferences, and blood pressure,
- 170 were conducted by trained staff using calibrated instruments. Body mass index (BMI) was calculated as
- 171 weight (kilogram) divided by height (meter) squared. Waist-hip ratio (WHR) was calculated as waist
- 172 circumference divided by hip circumference. Prevalent hypertension was defined as having measured
- 173 systolic blood pressure >140mmHg, diastolic blood pressure >90mmHg, self-reported diagnosis of
- 174 hypertension, or taking antihypertensive drugs. Prevalent diabetes was defined as having random blood
- 175 glucose 211.1 mmol/L, fasting glucose 27.0 mmHg, self-reported diagnosis of diabetes, or taking anti-
- 176 diabetic drugs. A family history of heart attack or stroke was defined as at least one of the parents and
- 177 siblings with the corresponding disease.

### 178 Case Adjudication

As of 2018, medical records of 33,515 IHD cases and 38,823 stroke cases were retrieved and reviewed
by cardiovascular specialists. The diagnosis was confirmed for 87.9% of IHD cases and 91.1% of stroke
cases.<sup>1</sup>

### 182 Model adjustment

- 183 The model was adjusted for sex, age (years), education (no formal school, primary school, middle
- 184 school, or high school or above), household income (<10000, 10000-19999, or  $\geq$ 20000 RMB/y),
- 185 occupation (manufacturing workers, managers, professionals, sales or service workers, self-employed,
- 186 or others; only adjusted in analyses for non-farmers), seasonal work pattern of farm (have or not have,
- 187 only adjusted in farmers), smoking status (non-smokers, former smokers who had stopped for reasons
- 188 other than illness, current smokers or former smokers who had stopped because of illness: 1-14, 15-24,
- 189 or  $\geq$ 25 cigarettes or equivalent per day), alcohol consumption (less than weekly, former weekly, weekly
- but not daily, daily drinking <30, 30-59, or  $\ge 60$  g/day of pure alcohol), consumption of fresh
- 191 vegetables, fresh fruits, and red meat (days per week), leisure sedentary time (hours per day), fuel types
- 192 for cooking and heating in baseline house (solid fuels, clean fuels, other fuels, or heating/cooking less
- than once a month), cumulative exposure time to solid fuels in the past three houses (years), cookstove
- 194 ventilation in the baseline house (have or not have), duration of living with a smoker (years), exposure

to secondhand smoke (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status (excellent, good, fair, or
poor), prevalent hypertension and diabetes (yes or no), family histories of heart disease and stroke
(have or not have), and the remaining part after deducting the active commuting or farming activity
from the total physical activity (MET-h/d).

### 200 Model equation

199

We estimated the associations between physical activity and CVD using Cox proportional hazard
 models, stratified by the 5-year age groups and 10 study areas. For each participant, the hazard under
 this model is

204 
$$h(t|x) = h_{0S}(t)exp(X_1\beta_1 + C\beta_C)$$

where  $h_{0S}(t)$  is the baseline hazard for the stratum *S* defined by the 5-year age groups and 10 study areas,  $X_1$  is active commuting or farming activity, *C* are all the covariates, and  $\beta_1$  and  $\beta_c$  are coefficients for them.

208 In the subgroup analyses, we split the study population (farmers or non-farmers) into two subgroups by 209 the median (or upper tertile in the sensitivity analysis) of  $PM_{2.5}$  exposure. We performed the above 210 stratified Cox models in each subgroup. We used likelihood ratio tests to compare the models with and 211 without the interaction terms of the  $PM_{2.5}$  strata and physical activity. The models with and without the 212 interaction term are

213 
$$h(t|x) = h_{0S}(t)exp(X_1\beta_1 + X_2\beta_2 + X_1X_2\beta_3 + C\beta_c)$$

214 
$$h(t|x) = h_{0S}(t)exp(X_1 \beta_1 + X_2 \beta_2 + C \beta_c)$$

where  $X_2$  is the PM<sub>2.5</sub> strata, and  $X_1 X_2$  is the interaction term of the PM<sub>2.5</sub> strata and active commuting or farming activity.

### **Reference**

- 218 1. Turnbull I, Clarke R, Wright N, et al. Diagnostic accuracy of major stroke types in Chinese
- adults: A clinical adjudication study involving 40,000 stroke cases. *Lancet Reg Health West Pac* 2022;
- **21**: 100415.

Urban areas **Rural areas** Qingdao Harbin Suzhou Liuzhou Sichuan Gansu Haikou Henan Zhejiang Hunan Mean±SD 57.1±1.0 51.2±1.7 55.3±1.3  $26.2 \pm 0.4$ 57.4±1.7 45.3±0.9  $51.4 \pm 4.0$  $39.0{\pm}2.0$  $70.8 \pm 1.4$  $53.5 \pm 1.1$ P25 56.2 54.3 26.0 56.1 45.0 48.8 37.8 70.0 52.3 50.2 P50 57.2 55.5 26.3 58.0 45.4 51.9 39.1 70.7 53.5 51.2 P75 57.8 56.6 26.4 58.7 45.8 54.3 40.2 71.4 54.4 52.9

Table S1. Average yearly PM<sub>2.5</sub> concentrations (µg/m<sup>3</sup>) from 2005 to 2017 among ten study areas

SD, standard derivation; P25, 25<sup>th</sup> percentile; P50, 50<sup>th</sup> percentile; P75, 75<sup>th</sup> percentile.



Figure S1. Geographical locations of 10 study areas and estimated average PM<sub>2.5</sub> concentrations in China from 2005 to 2017



Figure S2. Associations of physical activity from active commuting with cerebrovascular disease and ischemic heart disease among non-farmers (n=118,274).

MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with restricted cubic splines. Curves within the 95<sup>th</sup> percentile of active commuting level were shown.

231 The models were adjusted for sex, age (years), education, household income, occupation, smoking status, alcohol consumption, consumption of fresh vegetables, fresh fruits,

and red meat (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time to solid fuels in the past

three houses (years), cookstove ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke (hours/day), BMI (kg/m<sup>2</sup>), WHR,

self-rated health status, prevalent hypertension and diabetes, family histories of heart disease and stroke, and the remaining part after deducting the active commuting from

the total physical activity (MET-h/d).

### Cerebrovascular disease



236

### Ischemic heart disease



237

# Figure S3. Associations of active commuting level categories with cerebrovascular disease and ischemic heart disease among non-farmers stratified according to the median of PM<sub>2.5</sub> concentration (n=118,274).

241 MET, metabolic equivalent of task.

242 The models were adjusted for sex, age (years), education, household income, occupation, smoking

243 status, alcohol consumption, consumption of fresh vegetables, fresh fruits, and red meat (days per

244 week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house,

cumulative exposure time to solid fuels in the past three houses (years), cookstove ventilation in the

baseline house, duration of living with a smoker (years), exposure to secondhand smoke (hours/day),

247 BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family histories of

heart disease and stroke, and the remaining part after deducting the active commuting from the totalphysical activity (MET-h/d).



### Figure S4. Associations of active commute time with cerebrovascular disease and ischemic heart disease among non-farmers stratified according to the median of PM<sub>2.5</sub> concentration (n=118,274).

### 254 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with restricted cubic splines.

255 Curves within the 95<sup>th</sup> percentile of active commuting time in each stratum were shown.

256 The models were adjusted for sex, age (years), education, household income, occupation, smoking status, alcohol consumption, consumption of fresh vegetables, fresh fruits, and red meat

257 (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time to solid fuels in the past three houses (years), cookstove

258 ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and

259 diabetes, family histories of heart disease and stroke, and the remaining part after deducting the active commuting from the total physical activity (MET-h/d).



### Figure S5. Associations of physical activity from active commuting with cerebrovascular disease and ischemic heart disease among non-farmers stratified according to the upper

### 262 tertile of PM<sub>2.5</sub> concentration (n=118,274).

- 263 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with restricted cubic splines.
- 264 Curves within the 95<sup>th</sup> percentile of active commuting level in each stratum were shown.
- 265 The models were adjusted for sex, age (years), education, household income, occupation, smoking status, alcohol consumption, consumption of fresh vegetables, fresh fruits, and red meat
- 266 (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time to solid fuels in the past three houses (years), cookstove
- ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and
- 268 diabetes, family histories of heart disease and stroke, and the remaining part after deducting the active commuting from the total physical activity (MET-h/d).



### Figure S6. Associations of physical activity from active commuting with cerebrovascular disease and ischemic heart disease among farmers (n=204,125).

271 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with 272 restricted cubic splines. Curves within the 95<sup>th</sup> percentile of active commuting level were shown.

273 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of farm, smoking status, alcohol consumption, consumption of fresh

274 vegetables, fresh fruits, and red meat (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time

- to solid fuels in the past three houses (years), cookstove ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke
- 276 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family histories of heart disease and stroke, and the remaining part after
- 277 deducting the active commuting from the total physical activity (MET-h/d).

### Cerebrovascular disease



278

### Ischemic heart disease



279

## Figure S7. Associations of active commuting level categories with cerebrovascular disease and ischemic heart disease among farmers stratified according to the median of PM<sub>2.5</sub> concentration

282 (n=204,125).

283 MET, metabolic equivalent of task.

284 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of

285 farm, smoking status, alcohol consumption, consumption of fresh vegetables, fresh fruits, and red meat

286 (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline

287 house, cumulative exposure time to solid fuels in the past three houses (years), cookstove ventilation in

the baseline house, duration of living with a smoker (years), exposure to secondhand smoke

289 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family

290 histories of heart disease and stroke, and the remaining part after deducting the active commuting from

291 the total physical activity (MET-h/d).



Figure S8. Associations of active commute time with cerebrovascular disease and ischemic heart disease among farmers stratified according to the median of PM<sub>2.5</sub>
 concentration (n=204,125).

296 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with

297 restricted cubic splines. Curves within the 95<sup>th</sup> percentile of active commuting time in each stratum were shown.

298 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of farm, smoking status, alcohol consumption, consumption of fresh

299 vegetables, fresh fruits, and red meat (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time

300 to solid fuels in the past three houses (years), cookstove ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke

301 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family histories of heart disease and stroke, and the remaining part after

302 deducting the active commuting from the total physical activity (MET-h/d).



## Figure S9. Associations of physical activity from active commuting with cerebrovascular disease and ischemic heart disease among farmers stratified according to the upper tertile of PM<sub>2.5</sub> concentration (n=204,125).

306 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with

307 restricted cubic splines. Curves within the 95<sup>th</sup> percentile of active commuting level in each stratum were shown.

308 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of farm, smoking status, alcohol consumption, consumption of fresh

309 vegetables, fresh fruits, and red meat (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time

310 to solid fuels in the past three houses (years), cookstove ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke

311 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family histories of heart disease and stroke, and the remaining part after

312 deducting the active commuting from the total physical activity (MET-h/d).



### 314 Figure S10. Associations of physical activity from farming with cerebrovascular disease and ischemic heart disease among farmers (n=201,140).

315 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with

316 restricted cubic splines. Curves within the 95<sup>th</sup> percentile of farming activity level were shown.

317 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of farm, smoking status, alcohol consumption, consumption of fresh

318 vegetables, fresh fruits, and red meat (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time

319 to solid fuels in the past three houses (years), cookstove ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke

320 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family histories of heart disease and stroke, and the remaining part after

321 deducting the farming activity from the total physical activity (MET-h/d).

322

### Cerebrovascular disease



323

### Ischemic heart disease



324

### Figure S11. Associations of farming activity level categories with cerebrovascular disease and ischemic heart disease among farmers stratified according to the median of PM<sub>2.5</sub> concentration

327 (n=201,140).

328 MET, metabolic equivalent of task.

329 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of

330 farm, smoking status, alcohol consumption, consumption of fresh vegetables, fresh fruits, and red meat

331 (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline

house, cumulative exposure time to solid fuels in the past three houses (years), cookstove ventilation in

the baseline house, duration of living with a smoker (years), exposure to secondhand smoke

334 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family

histories of heart disease and stroke, and the remaining part after deducting the farming activity from

the total physical activity (MET-h/d).



### 339 Figure S12. Associations of farming time with cerebrovascular disease and ischemic heart disease among farmers stratified according to the median of PM<sub>2.5</sub>

### 340 concentration (n=201,140).

341 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with

342 restricted cubic splines. Curves within the 95<sup>th</sup> percentile of farming time in each stratum were shown.

343 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of farm, smoking status, alcohol consumption, consumption of fresh

344 vegetables, fresh fruits, and red meat (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time

345 to solid fuels in the past three houses (years), cookstove ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke

346 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family histories of heart disease and stroke, and the remaining part after

347 deducting the farming activity from the total physical activity (MET-h/d).

348



### Figure S13. Associations of physical activity from farming with cerebrovascular disease and ischemic heart disease among farmers stratified according to the upper tertile of PM<sub>2.5</sub> concentration (n=201,140).

352 MET, metabolic equivalent of task. Solid lines represent hazard ratios and the ribbons represent 95% confidence intervals from Cox proportional hazard models with

353 restricted cubic splines. Curves within the 95<sup>th</sup> percentile of farming activity level in each stratum were shown.

354 The models were adjusted for sex, age (years), education, household income, seasonal work pattern of farm, smoking status, alcohol consumption, consumption of fresh

355 vegetables, fresh fruits, and red meat (days per week), leisure sedentary time (hours per day), fuel types for cooking and heating in baseline house, cumulative exposure time

356 to solid fuels in the past three houses (years), cookstove ventilation in the baseline house, duration of living with a smoker (years), exposure to secondhand smoke

357 (hours/day), BMI (kg/m<sup>2</sup>), WHR, self-rated health status, prevalent hypertension and diabetes, family histories of heart disease and stroke, and the remaining part after

358 deducting the farming activity from the total physical activity (MET-h/d).