

## **Supplementary materials**

### **Long-term exposure to fine particulate matter modifies the association between physical activity and hypertension incidence**

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Supplementary Table 1. Hazard ratios and 95% confidence intervals for hypertension incidence associated with the volume and intensity of physical activity stratified by long-term exposure to PM<sub>2.5</sub> in participants with more than 1-year follow-up.

|  | Quartiles of PA volume (MET-h/day) |                     |                    |                           | <i>P</i> <sub>trend</sub> |
|--|------------------------------------|---------------------|--------------------|---------------------------|---------------------------|
|  | First (≤18.0)                      | Second (>18.0-32.0) | Third (>32.0-54.5) | Fourth (>54.5)            |                           |
| Low PM <sub>2.5</sub> (<59.8 µg/m <sup>3</sup> ) |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                       | 1711/46,949                        | 1447/46,667         | 1482/52,295        | 1468/50,060               |                           |
| Multivariable-adjusted model 1 <sup>a</sup>      | 1.00                               | 0.93(0.86-1.00)     | 0.86(0.79-0.93)    | 0.79(0.73-0.86)           | <0.001                    |
| High PM <sub>2.5</sub> (≥59.8µg/m <sup>3</sup> ) |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                       | 1988/62,376                        | 1446/45,630         | 1119/39,530        | 1106/41,476               |                           |
| Multivariable-adjusted model 1 <sup>a</sup>      | 1.00                               | 1.11(1.03-1.19)     | 1.05(0.97-1.14)    | 1.06(0.98-1.16)           | 0.289                     |
|  | Average PA intensity (MET)         |                     |                    | <i>P</i> <sub>trend</sub> |                           |
|  | Light (1.6-<3.0)                   | Moderate (3.0-<6.0) | Vigorous (≥6.0)    |                           |                           |
| Low PM <sub>2.5</sub> (<59.8 µg/m <sup>3</sup> ) |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                       | 2458/71,947                        | 2230/77,155         | 1343/44,871        |                           |                           |
| Multivariable-adjusted model 2 <sup>b</sup>      | 1.00                               | 0.87(0.80-0.94)     | 0.79(0.70-0.90)    |                           | <0.001                    |
| High PM <sub>2.5</sub> (≥59.8µg/m <sup>3</sup> ) |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                       | 2372/75,198                        | 1947/65,595         | 1214/44,766        |                           |                           |
| Multivariable-adjusted model 2 <sup>b</sup>      | 1.00                               | 1.12(1.03-1.22)     | 1.18(1.04-1.34)    |                           | 0.016                     |

<sup>a</sup> Cox proportional hazard model was stratified by cohort, and adjusted for age, sex, education level, urbanicity, geographic region, smoking status, alcohol drinking, body mass index, systolic blood pressure, diabetes mellitus, total cholesterol, and temperature.

<sup>b</sup> Adjusted for covariates in multivariable-adjusted model 1 and physical activity volume in MET-h/day.

Abbreviations: MET = metabolic equivalent; PA = physical activity; PM<sub>2.5</sub> = fine particulate matter.

Supplementary Table 2. Hazard ratios and 95% confidence intervals for hypertension incidence associated with the volume and intensity of physical activity stratified by PM<sub>2.5</sub> exposure further adjusting for county-level averaged years of education.

|   | Quartiles of PA volume (MET-h/day) |                     |                    |                           | <i>P</i> <sub>trend</sub> |
|---|------------------------------------|---------------------|--------------------|---------------------------|---------------------------|
|   | First (≤18.0)                      | Second (>18.0-32.0) | Third (>32.0-54.5) | Fourth (>54.5)            |                           |
| <b>Low PM<sub>2.5</sub> (&lt;59.8 μg/m<sup>3</sup>)</b> |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                              | 1741/46,967                        | 1477/46,685         | 1522/52,313        | 1535/50,095               |                           |
| Multivariable-adjusted model 1 <sup>a</sup>             | 1.00                               | 0.93(0.87-1.01)     | 0.88(0.81-0.96)    | 0.84(0.77-0.92)           | <0.001                    |
| <b>High PM<sub>2.5</sub> (≥59.8 μg/m<sup>3</sup>)</b>   |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                              | 2049/62,409                        | 1487/45,653         | 1150/39,541        | 1139/41,492               |                           |
| Multivariable-adjusted model 1 <sup>a</sup>             | 1.00                               | 1.08(1.00-1.15)     | 1.01(0.93-1.09)    | 1.01(0.93-1.10)           | 0.903                     |
|   | Average PA intensity (MET)         |                     |                    | <i>P</i> <sub>trend</sub> |                           |
|   | Light (1.6-<3.0)                   | Moderate (3.0-<6.0) | Vigorous (≥6.0)    |                           |                           |
| <b>Low PM<sub>2.5</sub> (&lt;59.8 μg/m<sup>3</sup>)</b> |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                              | 2503/71,973                        | 2291/77,185         | 1403/44,905        |                           |                           |
| Multivariable-adjusted model 2 <sup>b</sup>             | 1.00                               | 0.88(0.81-0.95)     | 0.81(0.72-0.92)    |                           | 0.003                     |
| <b>High PM<sub>2.5</sub> (≥59.8 μg/m<sup>3</sup>)</b>   |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                              | 2450/75,239                        | 1992/65,618         | 1255/44,784        |                           |                           |
| Multivariable-adjusted model 2 <sup>b</sup>             | 1.00                               | 1.09(1.00-1.18)     | 1.17(1.03-1.32)    |                           | 0.017                     |

<sup>a</sup> Cox proportional hazard model was stratified by cohort, adjusted for age, sex, education level, urbanicity, geographic region, county-level averaged years of education, smoking status, alcohol drinking, body mass index, systolic blood pressure, diabetes mellitus, total cholesterol, and temperature.

<sup>b</sup> Adjusted for covariates in multivariable-adjusted model 1 and physical activity volume in MET-h/day.

Abbreviations: MET = metabolic equivalent; PA = physical activity; PM<sub>2.5</sub> = fine particulate matter.

Supplementary Table 3. Hazard ratios and 95% confidence intervals for hypertension incidence associated with the volume and intensity of physical activity stratified by PM<sub>2.5</sub>, with PM<sub>2.5</sub> exposure dichotomized by the 75<sup>th</sup> percentile of exposure range.

|   | Quartiles of PA volume (MET-h/day) |                     |                    |                           | <i>P</i> <sub>trend</sub> |
|---|------------------------------------|---------------------|--------------------|---------------------------|---------------------------|
|   | First (≤18.0)                      | Second (>18.0-32.0) | Third (>32.0-54.5) | Fourth (>54.5)            |                           |
| Low PM <sub>2.5</sub> (<77.7 μg/m <sup>3</sup> )  |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                        | 2711/73,164                        | 2151/66,797         | 1980/65,921        | 1955/60,871               |                           |
| Multivariable-adjusted model 1 <sup>a</sup>       | 1.00                               | 0.94(0.88-0.99)     | 0.81(0.76-0.87)    | 0.77(0.72-0.83)           | <0.001                    |
| High PM <sub>2.5</sub> (≥77.7 μg/m <sup>3</sup> ) |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                        | 1079/36,212                        | 813/25,541          | 692/25,933         | 719/30,716                |                           |
| Multivariable-adjusted model 1 <sup>a</sup>       | 1.00                               | 1.15(1.05-1.26)     | 1.01(0.92-1.12)    | 0.97(0.87-1.07)           | 0.191                     |
|   | Average PA intensity, MET          |                     |                    | <i>P</i> <sub>trend</sub> |                           |
|   | Light (1.6-<3.0)                   | Moderate (3.0-<6.0) | Vigorous (≥6.0)    |                           |                           |
| Low PM <sub>2.5</sub> (<77.7 μg/m <sup>3</sup> )  |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                        | 3764/107,407                       | 3135/101,792        | 1772/5,4621        |                           |                           |
| Multivariable-adjusted model 2 <sup>b</sup>       | 1.00                               | 0.86(0.81-0.93)     | 0.82(0.74-0.92)    |                           | 0.001                     |
| High PM <sub>2.5</sub> (≥77.7 μg/m <sup>3</sup> ) |                                    |                     |                    |                           |                           |
| No. of cases/ person-years                        | 1189/39,805                        | 1148/41,011         | 886/35,068         |                           |                           |
| Multivariable-adjusted model 2 <sup>b</sup>       | 1.00                               | 1.14(1.03-1.26)     | 1.26(1.09-1.46)    |                           | 0.003                     |

<sup>a</sup> Cox proportional hazard model was stratified by cohort, adjusted for age, sex, education level, urbanicity, geographic region, smoking status, alcohol drinking, body mass index, systolic blood pressure, diabetes mellitus, total cholesterol, and temperature.

<sup>b</sup> Adjusted for covariates in multivariable-adjusted model 1 and physical activity volume in MET-h/day.

Abbreviations: MET = metabolic equivalent; PA = physical activity; PM<sub>2.5</sub> = fine particulate matter.

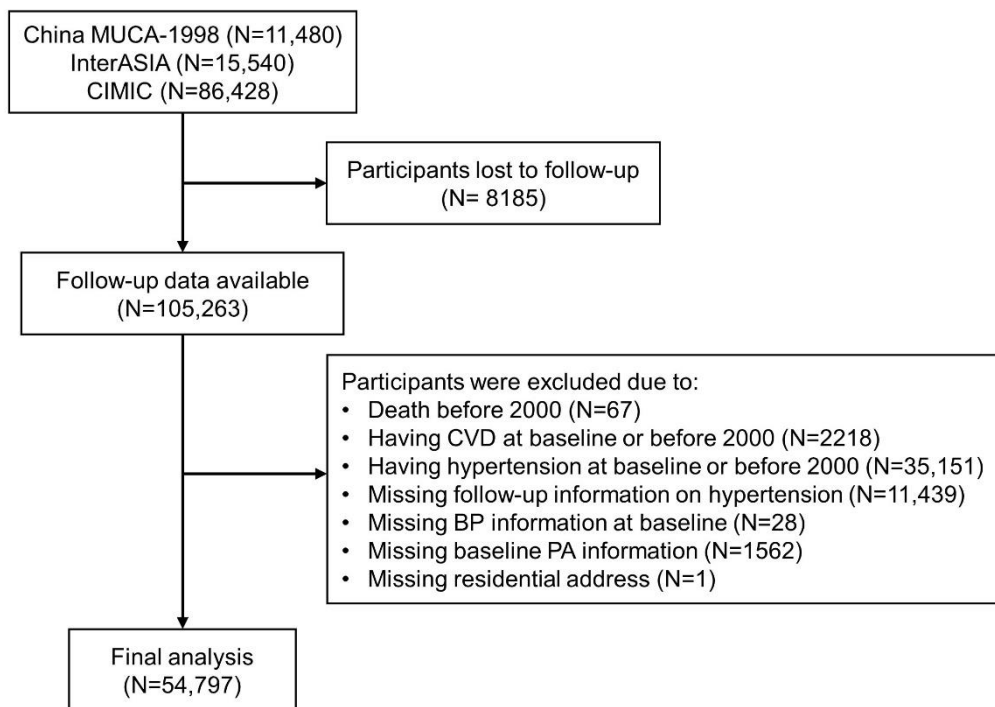


Fig. S1. Flow chart of participant selection.

BP = blood pressure; China MUCA-1998 = China Multi-Center Collaborative Study of Cardiovascular Epidemiology (1998); CIMIC = Community Intervention of Metabolic Syndrome in China & Chinese Family Health Study; CVD = cardiovascular disease; InterASIA = International Collaborative Study of Cardiovascular disease in Asia; PA = physical activity.