

Supplemental Material

Table S1. Interactions for PM10 and physical activity on the risk of cardiovascular disease among 5-year cancer survivors.

| | Moderate-to-vigorous physical activity, times/week | | | | <i>P</i> _{trend} | <i>P</i> _{interaction} |
|------------------------|--|-------------------|-------------------|-------------------|---------------------------|---------------------------------|
| | 0 | 1-2 | 3-4 | ≥5 | | |
| Cardiovascular disease | | | | | | 0.428 |
| Low PM10 | | | | | | |
| Events | 228 | 53 | 54 | 98 | | |
| Person-years | 27,415 | 9,783 | 8,934 | 15,056 | | |
| aHR (95% CI) | 1.00 (reference) | 0.88 (0.65-1.19) | 0.91 (0.67-1.23) | 0.81 (0.64-1.03) | 0.089 | |
| High PM10 | | | | | | |
| Events | 239 | 61 | 55 | 132 | | |
| Person-years | 27,429 | 10,367 | 9,227 | 15,351 | | |
| aHR (95% CI) | 1.00 (reference) | 0.90 (0.67-1.20) | 0.77 (0.58-1.04) | 0.94 (0.76-1.17) | 0.385 | |
| Coronary heart disease | | | | | | 0.858 |
| Low PM10 | | | | | | |
| Events | 99 | 30 | 26 | 55 | | |
| Person-years | 27,415 | 9,783 | 8,934 | 15,056 | | |
| aHR (95% CI) | 1.00 (reference) | 1.14 (0.71-1.84)* | 0.99 (0.60-1.64)* | 1.00 (0.68-1.46)* | 0.979 | |
| High PM10 | | | | | | |
| Events | 100 | 38 | 24 | 70 | | |
| Person-years | 27,429 | 10,367 | 9,227 | 15,351 | | |
| aHR (95% CI) | 1.00 (reference) | 1.33 (0.86-2.06)* | 0.80 (0.48-1.34)* | 1.18 (0.82-1.69)* | 0.561 | |
| Stroke | | | | | | 0.635 |
| Low PM10 | | | | | | |
| Events | 129 | 23 | 28 | 43 | | |
| Person-years | 27,415 | 9,783 | 8,934 | 15,056 | | |
| aHR (95% CI) | 1.00 (reference) | 0.67 (0.40-1.12)* | 0.85 (0.53-1.37)* | 0.66 (0.44-0.98)* | 0.021 | |
| High PM10 | | | | | | |
| Events | 139 | 23 | 31 | 62 | | |
| Person-years | 27,429 | 10,367 | 9,227 | 15,351 | | |
| aHR (95% CI) | 1.00 (reference) | 0.59 (0.35-0.99)* | 0.76 (0.48-1.19)* | 0.77 (0.54-1.09)* | 0.082 | |

Adjusted hazard ratios calculated by Cox proportional hazards regression after adjustments for age, sex, household income, area of residence, smoking, alcohol intake, body mass index, systolic blood pressure, fasting serum glucose, total cholesterol, and Charlson comorbidity index.

* 95% CI calculated after Bonferroni correction ($p < 0.025$ for significance).

PM10 range: low, 35.5-52.1 $\mu\text{g}/\text{m}^3$; high, 52.4-61.9 $\mu\text{g}/\text{m}^3$.

MVPA determined by adding the frequency of moderate PA and vigorous PA per week, each ranging between 0-7 times per week.

Acronyms: MVPA, moderate-to-vigorous physical activity; PM, particulate matter; aHR, adjusted hazard ratio; CI, confidence interval.

Table S2. Hazard ratios for cardiovascular disease according to PM10 and physical activity among 5-year cancer survivors.

| | Low PM10 and MVPA \geq 3 times/week | Low PM10 and MVPA \leq 2 times/week | High PM10 and MVPA \geq 3 times/week | High PM10 and MVPA \leq 2 times/week |
|-----------------------------|--|--|---|---|
| Cardiovascular disease | | | | |
| Events | 152 | 281 | 187 | 300 |
| Person-years | 23,890 | 37,193 | 24,577 | 37,795 |
| aHR (95% CI) | 1.00 (reference) | 1.18 (0.96-1.44) | 1.15 (0.93-1.43) | 1.26 (1.03-1.54) |
| Coronary heart disease | | | | |
| Events | 81 | 129 | 94 | 138 |
| Person-years | 23,890 | 37,193 | 24,577 | 37,795 |
| aHR (95% CI) | 1.00 (reference) | 1.04 (0.72-1.50)* | 1.12 (0.75-1.67)* | 1.15 (0.78-1.69)* |
| Acute myocardial infarction | | | | |
| Events | 16 | 34 | 14 | 22 |
| Person-years | 23,890 | 37,193 | 24,577 | 37,795 |
| aHR (95% CI) | 1.00 (reference) | 1.39 (0.63-3.05)* | 0.81 (0.31-2.13)* | 0.87 (0.35-2.13)* |
| Total stroke | | | | |
| Events | 71 | 152 | 93 | 162 |
| Person-years | 23,890 | 37,193 | 24,577 | 37,795 |
| aHR (95% CI) | 1.00 (reference) | 1.33 (0.91-1.93)* | 1.20 (0.79-1.82)* | 1.38 (0.94-2.02)* |
| Ischemic stroke | | | | |
| Events | 37 | 84 | 49 | 93 |
| Person-years | 23,890 | 37,193 | 24,577 | 37,795 |
| aHR (95% CI) | 1.00 (reference) | 1.42 (0.85-2.37)* | 1.16 (0.65-2.06)* | 1.47 (0.87-2.48)* |
| Hemorrhagic stroke | | | | |
| Events | 12 | 25 | 12 | 16 |
| Person-years | 23,890 | 37,193 | 24,577 | 37,795 |
| aHR (95% CI) | 1.00 (reference) | 1.27 (0.50-3.20)* | 0.85 (0.29-2.52)* | 0.78 (0.28-2.18)* |

Adjusted hazard ratios calculated by Cox proportional hazards regression after adjustments for age, sex, household income, area of residence, smoking, alcohol intake, body mass index, systolic blood pressure, fasting serum glucose, total cholesterol, and Charlson comorbidity index.

* 95% CI calculated after Bonferroni correction ($p < 0.01$ for significance).

PM10 range: low, 35.5-52.1 $\mu\text{g}/\text{m}^3$; high, 52.4-61.9 $\mu\text{g}/\text{m}^3$.

MVPA determined by adding the frequency of moderate PA and vigorous PA per week, each ranging between 0-7 times per week.

Acronyms: PM, particulate matter; MVPA, moderate-to-vigorous physical activity; aHR, adjusted hazard ratio; CI, confidence interval.

Table S3. Hazard ratios for cardiovascular disease according to particulate matter.

| | PM2.5 | | PM10 | |
|------------------------|------------------|-------------------|------------------|-------------------|
| | Low PM | High PM | Low PM | High PM |
| Cardiovascular disease | | | | |
| Events | 413 | 507 | 433 | 487 |
| Person-years | 62,272 | 61,289 | 61,188 | 62,373 |
| aHR (95% CI) | 1.00 (reference) | 1.18 (1.03-1.36) | 1.00 (reference) | 1.10 (0.96-1.26) |
| Coronary heart disease | | | | |
| Events | 195 | 247 | 210 | 232 |
| Person-years | 62,272 | 61,289 | 61,188 | 62,373 |
| aHR (95% CI) | 1.00 (reference) | 1.21 (0.96-1.52)* | 1.00 (reference) | 1.11 (0.88-1.40)* |
| Stroke | | | | |
| Events | 218 | 260 | 223 | 255 |
| Person-years | 62,272 | 61,289 | 61,188 | 62,373 |
| aHR (95% CI) | 1.00 (reference) | 1.16 (0.93-1.45)* | 1.00 (reference) | 1.09 (0.87-1.36)* |

Adjusted hazard ratios calculated by Cox proportional hazards regression after adjustments for age, sex, physical activity, household income, area of residence, smoking, alcohol intake, body mass index, systolic blood pressure, fasting serum glucose, total cholesterol, and Charlson comorbidity index.

* 95% CI calculated after Bonferroni correction ($p < 0.025$ for significance).

PM2.5 range: low, 19.8-25.6 $\mu\text{g}/\text{m}^3$; high, 25.8-33.8 $\mu\text{g}/\text{m}^3$.

PM10 range: low, 35.5-52.1 $\mu\text{g}/\text{m}^3$; high, 52.4-61.9 $\mu\text{g}/\text{m}^3$.

Acronyms: PM, particulate matter; aHR, adjusted hazard ratio; CI, confidence interval.

Table S4. Hazard ratios for cardiovascular disease according to physical activity.

| | Moderate-to-vigorous physical activity, times per week | |
|------------------------|--|-------------------|
| | ≤2 | ≥3 |
| Cardiovascular disease | | |
| Events | 581 | 339 |
| Person-years | 74,988 | 48,567 |
| aHR (95% CI) | 1.00 (reference) | 0.89 (0.77-1.02) |
| Coronary heart disease | | |
| Events | 267 | 175 |
| Person-years | 74,988 | 48,567 |
| aHR (95% CI) | 1.00 (reference) | 0.97 (0.78-1.21)* |
| Stroke | | |
| Events | 314 | 164 |
| Person-years | 74,988 | 48,567 |
| aHR (95% CI) | 1.00 (reference) | 0.82 (0.66-1.02)* |

Adjusted hazard ratios calculated by Cox proportional hazards regression after adjustments for age, sex, household income, area of residence, smoking, alcohol intake, body mass index, systolic blood pressure, fasting serum glucose, total cholesterol, and Charlson comorbidity index.

* 95% CI calculated after Bonferroni correction ($p < 0.025$ for significance).

MVPA determined by adding the frequency of moderate PA and vigorous PA per week, each ranging between 0-7 times per week.

Acronyms: aHR, adjusted hazard ratio; CI, confidence interval.

Table S5. Hazard ratios for cardiovascular disease according to PM2.5 and physical activity among 5-year cancer survivors by cancer type.

| | Low PM2.5 and MVPA≥3 times/week | Low PM2.5 and MVPA≤2 times/week | High PM2.5 and MVPA≥3 times/week | High PM2.5 and MVPA≤2 times/week |
|--|--|--|---|---|
| Smoking-related cancer (N=7,943) | | | | |
| Number of participants | 1,761 | 2,218 | 1,731 | 2,233 |
| Events, N (%) | 129 (7.3) | 149 (6.7) | 126 (7.3) | 120 (5.4) |
| aHR (95% CI) | 1.00 (reference) | 1.17 (0.91-1.51) | 1.17 (0.92-1.50) | 1.18 (0.91-1.54) |
| Obesity-related cancer (N=10,742) | | | | |
| Number of participants | 2,321 | 2,934 | 2,439 | 3,048 |
| Events, N (%) | 124 (5.3) | 113 (3.9) | 107 (4.4) | 80 (2.6) |
| aHR (95% CI) | 1.00 (reference) | 1.43 (1.06-1.91) | 1.40 (1.04-1.88) | 1.71 (1.28-2.23) |
| Gastrointestinal cancer (N=5,636) | | | | |
| Number of participants | 1,249 | 1,589 | 1,243 | 1,555 |
| Events, N (%) | 88 (7.1) | 104 (6.5) | 89 (7.2) | 83 (5.3) |
| aHR (95% CI) | 1.00 (reference) | 1.14 (0.84-1.54) | 1.18 (0.88-1.59) | 1.16 (0.84-1.59) |
| Hepatobiliary cancer (N=613) | | | | |
| Number of participants | 146 | 177 | 122 | 168 |
| Events, N (%) | 13 (8.9) | 10 (5.7) | 9 (7.4) | 5 (3.0) |
| aHR (95% CI) | 1.00 (reference) | 2.26 (0.71-7.19) | 1.37 (0.44-4.25) | 2.74 (0.92-8.12) |
| Lung cancer (N=356) | | | | |
| Number of participants | 83 | 95 | 73 | 106 |
| Events, N (%) | 7 (8.5) | 5 (5.3) | 4 (5.5) | 8 (7.6) |
| aHR (95% CI) | 1.00 (reference) | 0.85 (0.23-3.09) | 0.76 (0.23-2.55) | 1.28 (0.41-4.00) |
| Breast cancer (N=3,062) | | | | |
| Number of participants | 663 | 835 | 682 | 882 |
| Events, N (%) | 38 (5.7) | 26 (3.1) | 25 (3.7) | 12 (1.4) |
| aHR (95% CI) | 1.00 (reference) | 2.22 (1.10-4.46) | 2.37 (1.18-4.76) | 3.52 (1.80-6.89) |
| Thyroid cancer (N=3,703) | | | | |
| Number of participants | 789 | 1,012 | 834 | 1,068 |
| Events, N (%) | 23 (2.9) | 29 (2.9) | 25 (3.0) | 22 (2.1) |
| aHR (95% CI) | 1.00 (reference) | 1.27 (0.71-2.27) | 1.13 (0.63-2.02) | 1.04 (0.56-1.94) |

Smoking related cancer includes cancer from head and neck, esophagus, stomach, colorectum, liver, pancreas, larynx, trachea, bronchus and lung, bladder, kidney, and acute myeloid leukemia.

Obesity related cancer includes cancer from thyroid, esophagus, breast, multiple myeloma, liver, kidney, gallbladder, stomach, pancreas, endometrium, colorectum, and ovary.

Adjusted hazard ratios calculated by Cox proportional hazards regression after adjustments for age, sex, household income, area of residence, smoking, alcohol intake, body mass index, systolic blood pressure, fasting serum glucose, total cholesterol, and Charlson comorbidity index.

PM_{2.5} range: high, 25.8-33.8 $\mu\text{g}/\text{m}^3$; low, 19.8-25.6 $\mu\text{g}/\text{m}^3$.

MVPA determined by adding the frequency of moderate PA and vigorous PA per week, each ranging between 0-7 times per week.

Acronyms: PM, particulate matter; MVPA, moderate-to-vigorous physical activity; aHR, adjusted hazard ratio; CI, confidence interval.