

Table S1. Distribution of demographic data according to tertile of estimation of air pollutants concentration

| Variable | O ₃ (ppb) | | | | CO(ppm) | | | | NO ₂ (ppb) | | | |
|-----------------------------|----------------------|-------------|-------------|---------|-------------|-------------|-------------|---------|-----------------------|-------------|-------------|---------|
| | T1 | T2 | T3 | P-value | T1 | T2 | T3 | P-value | T1 | T2 | T3 | P-value |
| Male | 4427(37.7%) | 4659(39.7%) | 4638(39.5%) | 0.003* | 4701(40.1%) | 4597(39.2%) | 4426(37.7%) | 0.001* | 4701(40.1%) | 4640(39.6%) | 4383(37.3%) | <0.001* |
| Age | 64.25±3.28 | 64.14±3.20 | 64.17±3.18 | 0.028* | 64.19±3.31 | 64.15±3.14 | 64.22±3.20 | 0.195 | 64.32±3.41 | 64.03±3.05 | 64.21±3.17 | <0.001* |
| Education >12 years | 6577(56.1%) | 7142(60.9%) | 6797(57.9%) | <0.001* | 4382(37.4%) | 4644(39.6%) | 5653(48.2%) | <0.001* | 4494(38.3%) | 4522(38.6%) | 5663(48.3%) | <0.001* |
| Married/Cohabitant | 8907(76.1%) | 9073(77.4%) | 9171(78.2%) | <0.001* | 9165(78.2%) | 9045(77.1%) | 8941(76.3%) | 0.002* | 9083(77.5%) | 9161(78.2%) | 8907(76.0%) | <0.001* |
| Monthly income >100,000 | 529(8.3%) | 514(7.7%) | 467(6.9%) | 0.009* | 507(7.5%) | 430(6.7%) | 573(8.6%) | <0.001* | 540(7.2%) | 397(6.9%) | 573(8.7%) | <0.001* |
| NTD | | | | | | | | | | | | |
| BMI | | | | 0.001* | | | | <0.001* | | | | <0.001* |
| <18.5 kg/m ² | 280(2.4%) | 274(2.3%) | 265(2.3%) | | 224(1.9%) | 275(2.3%) | 320(2.7%) | | 225(1.9%) | 277(2.4%) | 317(2.7%) | |
| 18.5≤X<24 kg/m ² | 5638(48.1%) | 5334(45.5%) | 5471(46.7%) | | 5246(44.8%) | 5438(46.4%) | 5759(49.1%) | | 5255(44.8%) | 5444(46.4%) | 5744(49.0%) | |
| 24≤X<27 kg/m ² | 3644(31.1%) | 3721(31.7%) | 3669(31.3%) | | 3757(32.1%) | 3688(31.4%) | 3589(30.6%) | | 3746(32.0%) | 3723(31.8%) | 3565(30.4%) | |
| ≥27 kg/m ² | 2159(18.4%) | 2398(20.4%) | 2322(19.8%) | | 2493(21.3%) | 2326(19.8%) | 2060(17.6%) | | 2498(21.3%) | 2280(19.4%) | 2101(17.9%) | |
| Exercise habits | 5736(48.9%) | 5563(47.4%) | 5611(47.8%) | 0.060 | 5425(46.3%) | 5563(47.4%) | 5922(50.5%) | <0.001* | 5425(46.2%) | 5707(48.7%) | 5778(49.2%) | <0.001* |
| Smoking | 1534(13.9%) | 1638(14.9%) | 1591(14.3%) | 0.102 | 1719(15.6%) | 1562(14.1%) | 1482(13.6%) | <0.001* | 1682(15.2%) | 1615(14.6%) | 1466(13.4%) | <0.001* |
| Alcohol | 1013(8.6%) | 1156(9.9%) | 1080(9.2%) | 0.006* | 1204(10.3%) | 1037(8.8%) | 1008(8.6%) | <0.001* | 1208(10.3%) | 1079(9.2%) | 962(8.2%) | <0.001* |
| Hypertension | 2920(24.9%) | 3005(25.6%) | 3005(25.6%) | 0.347 | 3076(26.2%) | 3004(25.6%) | 2850(24.3%) | 0.002* | 3076(26.2%) | 3031(25.8%) | 2823(24.1%) | <0.001* |
| Stroke | 154(1.3%) | 174(1.5%) | 164(1.4%) | 0.540 | 171(1.5%) | 172(1.5%) | 149(1.3%) | 0.351 | 192(1.6%) | 153(1.3%) | 147(1.3%) | 0.025* |
| Diabetes | 1232(10.5%) | 1351(11.5%) | 1355(11.5%) | 0.016* | 1344(11.5%) | 1345(11.5%) | 1249(10.6%) | 0.073 | 1359(11.6%) | 1354(11.5%) | 1225(10.4%) | 0.007* |
| Depression | 428(3.6%) | 464(4.0%) | 409(3.5%) | 0.154 | 404(3.4%) | 439(3.7%) | 458(3.9%) | 0.170 | 405(3.5%) | 438(3.7%) | 458(3.9%) | 0.181 |

*: P-value<0.05

Table S2 The associations between tertiles of air pollutant concentrations and MCI in multi-pollutant and interaction models.

| Variable | Crude OR | Model 1 [#] | Model 2 ^{##} | Model 3 ^{###} |
|---------------------------|---------------------|----------------------|-----------------------|------------------------|
| PM _{2.5} Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 0.95 (0.88 - 1.03) | 0.92 (0.82 - 1.03) | 0.95 (0.82–1.11) | 0.58 (0.45–0.74)* |
| T3 | 1.19 (1.10 - 1.29)* | 1.23 (1.11 - 1.37)* | 2.00 (1.61–2.50)* | 1.74 (1.27–2.37)* |
| PM ₁₀ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.21 (1.12 - 1.31)* | 1.19 (1.06 - 1.33)* | 1.19 (1.02–1.37)* | 1.33 (1.14–1.56)* |
| T3 | 1.16 (1.07 - 1.26)* | 1.10 (0.98 - 1.23) | 0.66 (0.51–0.85)* | 0.76 (0.58–0.99)* |
| SO ₂ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.18 (1.09 - 1.28)* | 1.25 (1.11 - 1.40)* | 1.42 (1.25–1.61)* | 1.06 (0.87–1.28) |
| T3 | 1.18 (1.09 - 1.28)* | 1.20 (1.07 - 1.34)* | 1.61 (1.36–1.91)* | 1.21 (0.96–1.54) |
| O ₃ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.19 (1.10 - 1.28)* | 1.13 (1.02 - 1.27)* | 0.93 (0.82–1.06) | 0.97 (0.85–1.11) |
| T3 | 0.88 (0.81 - 0.95)* | 0.85 (0.75 - 0.95)* | 0.67 (0.57–0.78)* | 0.67 (0.58–0.79)* |
| CO Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 0.91 (0.84 - 0.98)* | 0.88 (0.79 - 0.98)* | 0.70 (0.60–0.82)* | 0.66 (0.56–0.78)* |
| T3 | 0.86 (0.80 - 0.94)* | 0.93 (0.83 - 1.03) | 0.66 (0.53–0.82)* | 0.66 (0.53–0.82)* |
| NO ₂ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.07 (0.99 - 1.16) | 1.09 (0.97 - 1.22) | 0.97 (0.81–1.16) | 1.07 (0.88–1.29) |
| T3 | 0.95 (0.88 - 1.03) | 1.04 (0.93 - 1.16) | 0.89 (0.70–1.13) | 0.99 (0.77–1.26) |

[#]: **Model 1** adjusted for gender, age, stroke, monthly income, BMI, exercise habits, Married/Cohabitant, Smoking, Alcohol, Hypertension, and Diabetes.

^{##}: **Model 2** adjusted for gender, age, stroke, monthly income, BMI, exercise habits, Married/Cohabitant, Smoking, Alcohol, Hypertension, Diabetes, and co-pollutants.

^{###}: **Model 3** adjusted for gender, age, stroke, monthly income, BMI, exercise habits, Married/Cohabitant, Smoking, Alcohol, Hypertension, Diabetes, co-pollutants, and PM_{2.5} × SO₂ interaction.

*: P-value<0.05

Table S3 Sensitivity analysis of the associations between air pollutants and MCI, additionally adjusted for depression.

| Variable | Crude OR | Model 1 [#] | Model 2 ^{##} | Model 3 ^{###} |
|---------------------------------|---------------------|----------------------|-----------------------|------------------------|
| PM_{2.5} Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 0.95 (0.88 - 1.03) | 0.94 (0.84–1.06) | 0.95 (0.82–1.11) | 0.58 (0.45–0.74)* |
| T3 | 1.19 (1.10 - 1.29)* | 1.30 (1.17–1.45)* | 2.01 (1.61–2.50)* | 1.75 (1.28–2.38)* |
| PM₁₀ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.21 (1.12 - 1.31)* | 1.22 (1.09–1.37)* | 1.18 (1.02–1.37)* | 1.33 (1.14–1.56)* |
| T3 | 1.16 (1.07 - 1.26)* | 1.16 (1.04–1.30)* | 0.66 (0.51–0.85)* | 0.76 (0.58–0.99)* |
| SO₂ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.18 (1.09 - 1.28)* | 1.29 (1.16–1.45)* | 1.42 (1.25–1.61)* | 1.06 (0.87–1.28) |
| T3 | 1.18 (1.09 - 1.28)* | 1.25 (1.11–1.40)* | 1.61 (1.36–1.92)* | 1.21 (0.96–1.54) |
| O₃ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.19 (1.10 - 1.28)* | 1.14 (1.02–1.27)* | 0.93 (0.81–1.06) | 0.97 (0.85–1.10) |
| T3 | 0.88 (0.81 - 0.95)* | 0.85 (0.76–0.95)* | 0.67 (0.57–0.78)* | 0.67 (0.58–0.79)* |
| CO Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 0.91 (0.84 - 0.98)* | 0.91 (0.81–1.01) | 0.70 (0.60–0.82)* | 0.66 (0.56–0.78)* |
| T3 | 0.86 (0.80 - 0.94)* | 0.93 (0.83–1.04) | 0.66 (0.53–0.82)* | 0.66 (0.53–0.82)* |
| NO₂ Tertile | | | | |
| T1 | Ref. | Ref. | Ref. | Ref. |
| T2 | 1.07 (0.99 - 1.16) | 1.12 (1.00–1.25)* | 0.97 (0.81–1.16) | 1.07 (0.88–1.29) |
| T3 | 0.95 (0.88 - 1.03) | 1.04 (0.93–1.16) | 0.89 (0.70–1.13) | 0.99 (0.77–1.26) |

[#]: **Model 1** adjusted for gender, age, stroke, monthly income, BMI, exercise habits, Married/Cohabitant, Smoking, Alcohol, Hypertension, Diabetes and Depression.

^{##}: **Model 2** adjusted for gender, age, stroke, monthly income, BMI, exercise habits, Married/Cohabitant, Smoking, Alcohol, Hypertension, Diabetes, Depression, and co-pollutants.

^{###}: **Model 3** adjusted for gender, age, stroke, monthly income, BMI, exercise habits, Married/Cohabitant, Smoking, Alcohol, Hypertension, Diabetes, Depression, co-pollutants, and PM_{2.5} × SO₂ interaction.

*: P-value<0.05

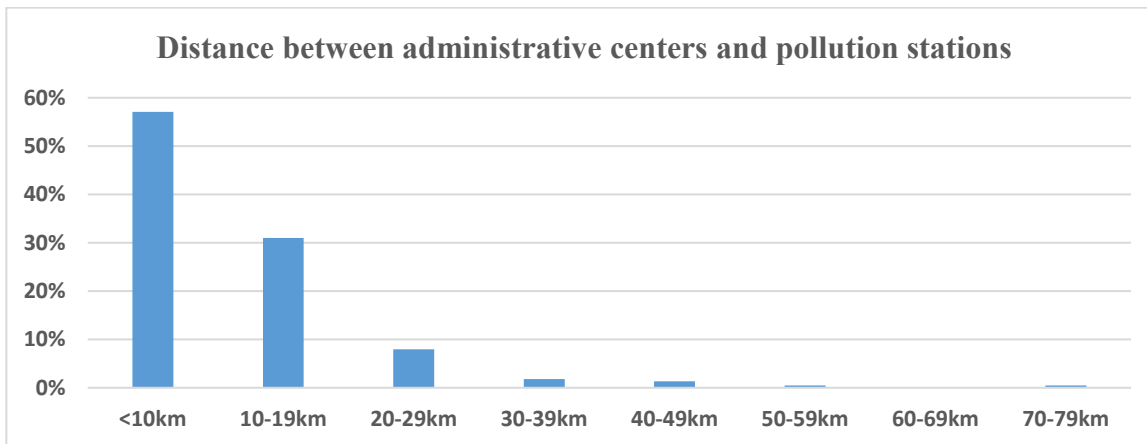


Figure S1 Distance between administrative centers and pollution stations

The bar chart illustrates the distribution of administrative centers categorized by their distance to the nearest monitoring station. The X-axis represents the distance intervals (in kilometers), and the Y-axis displays the percentage of administrative centers within each distance category.