SUPPLEMENTARY MATERIAL

**Supplementary Table 1. Associations between measures of social environment and incident dementia stratified by PM2.5 level (multiplicative interaction)**

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| Measure of Social Environment | HR (95% CI) a |
|  | PM2.5 < median (n=1,303) | PM2.5 > median (n=1,284) |
| Neighborhood Measuresb |  |  |
|  Arts, entertainment, and recreation organizations | 1.03 (0.74, 1.44) | 0.87 (0.63, 1.19) |
|  Eating and drinking places | 0.86 (0.61, 1.19) | 0.96 (0.70, 1.31) |
|  Religious, civic, and social organizations | 1.05 (0.76, 1.46) | 0.93 (0.68, 1.28) |
|  Social services | 1.04 (0.75, 1.45) | 0.89 (0.64, 1.23) |
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| Individual Measures |  |  |
|  Regularly attends clubs or organizations | 0.83 (0.59, 1.17) | 0.91 (0.66, 1.26) |
|  Regularly attends religious services | 0.95 (0.67, 1.35) | 1.11 (0.78, 1.58) |
|  Regularly attends plays or concerts  | 1.02 (0.71, 1.47) | 0.78 (0.55, 1.09) |
| aHazard ratios from Cox proportional hazard models adjusted for age at baseline, sex, education, living situation, neighborhood deprivation index, study site, and treatment assignmentbNeighborhood measures are dichotomized at the median value for each site (reference=<50th percentile)Abbreviations: HR, hazard ratio; CI, confidence interval; PM2.5, fine particulate matter |
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**Supplementary Table 2. Associations between measures of social environment and incident dementia stratified by PM10 level (multiplicative interaction)**

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| Measure of Social Environment | HR (95% CI) a |
|  | PM10 < median (n=1,303) | PM10 > median (n=1,284) |
| Neighborhood Measuresb |  |  |
|  Arts, entertainment, and recreation organizations | 0.79 (0.57, 1.12) | 1.17 (0.85, 1.59) |
|  Eating and drinking places | 0.80 (0.56, 1.13) | 0.96 (0.71, 1.31) |
|  Religious, civic, and social organizations | 1.04 (0.74, 1.46) | 0.99 (0.73, 1.35) |
|  Social services | 1.03 (0.73, 1.44) | 1.03 (0.76, 1.40) |
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| Individual Measures |  |  |
|  Regularly attends clubs or organizations | 0.78 (0.55, 1.10) | 1.00 (0.73, 1.38) |
|  Regularly attends religious services | 0.95 (0.65, 1.38) | 1.09 (0.79, 1.51) |
|  Regularly attends plays or concerts  | 0.96 (0.67, 1.39) | 0.79 (0.57, 1.11) |
| aHazard ratios from Cox proportional hazard models adjusted for age at baseline, sex, education, living situation, neighborhood deprivation index, study site, and treatment assignmentbNeighborhood measures are dichotomized at the median value for each site (reference=<50th percentile)Abbreviations: HR, hazard ratio; CI, confidence interval; PM10, course particulate matter |

**Supplementary Table 3. Associations between measures of social environment and incident dementia stratified by NO2 level (multiplicative interaction)**

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| Measure of Social Environment | HR (95% CI) a |
|  | NO2 < median (n=1,303) | NO2 > median (n=1,284) |
| Neighborhood Measuresb |  |  |
|  Arts, entertainment, and recreation organizations | 1.01 (0.73, 1.41) | 0.92 (0.67, 1.26) |
|  Eating and drinking places | 0.79 (0.56, 1.11) | 1.00 (0.73, 1.36) |
|  Religious, civic, and social organizations | 1.10 (0.79, 1.53) | 0.91 (0.66, 1.25) |
|  Social services | 1.05 (0.76, 1.47) | 0.96 (0.70, 1.33) |
|  |  |  |
| Individual Measures |  |  |
|  Regularly attends clubs or organizations | 0.80 (0.57, 1.14) | 0.96 (0.69, 1.32) |
|  Regularly attends religious services | 1.06 (0.73, 1.55) | 0.96 (0.69, 1.33) |
|  Regularly attends plays or concerts  | 1.01 (0.71, 1.45) | 0.73 (0.51, 1.03) |
| aHazard ratios from Cox proportional hazard models adjusted for age at baseline, sex, education, living situation, neighborhood deprivation index, study site, and treatment assignmentbNeighborhood measures are dichotomized at the median value for each site (reference=<50th percentile)Abbreviations: HR, hazard ratio; CI, confidence interval; NO2, nitrogen dioxide |

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| **Supplementary Table 4. Associations (HR and 95% CI) between air pollution and incident dementia stratified by neighborhood measures of social environment (multiplicative interaction)** |
| Air Pollutant | Arts, Entertainment, and Recreation | Eating and Drinking | Religious, Civic, and Social | Social Services |
|  | High | Low | High | Low | High | Low | High | Low |
| PM2.5 | 1.39 (0.86, 2.24) | 1.78 (1.05, 3.03) | 1.61 (0.96, 2.72) | 1.67 (1.02, 2.71) | 1.36 (0.85, 2.18) | 1.90 (1.11, 3.25) | 1.75 (1.05, 2.91) | 1.43 (0.87, 2.37) |
| PM10 | 1.13 (0.84, 1.51) | 1.58 (1.16, 2.15) | 1.33 (0.98, 1.82) | 1.38 (1.04, 1.83) | 1.26 (0.94, 1.68) | 1.36 (1.01, 1.85) | 1.28 (0.95, 1.72) | 1.39 (1.04, 1.87) |
| NO2 | 1.00 (0.82, 1.23) | 1.44 (1.14, 1.82) | 1.23 (1.01, 1.50) | 1.18 (0.93, 1.49) | 1.10 (0.89, 1.35) | 1.26 (1.01, 1.57) | 1.18 (0.94, 1.48) | 1.18 (0.96, 1.45) |
| aPM2.5 and PM10 per 5µg/m3, NO2 per 5ppb cModels adjusted for sex, race/ethnicity, education, living situation, study site, and treatment assignmentdNeighborhood measures are dichotomized at the median value for each site (≥50th percentile=high; <50th percentile=low)Abbreviations: HR, hazard ratio; CI, confidence interval; fine particulate matter, PM2.5; coarse particulate matter, PM10; nitrogen dioxide, NO2;  |

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| **Supplementary Table 5. Associations (HR and 95% CI) between air pollution and incident dementia stratified by individual measures of social environment (multiplicative interaction)** |
| Air Pollutant | Clubs and Organizations | Religious Services | Concerts |
|  | Yes | No | Yes | No | Yes | No |
| PM2.5 | 1.71 (0.95, 3.09) | 1.57 (1.01, 2.45) | 1.70 (1.05, 2.77) | 1.45 (0.85, 2.47) | 1.84 (0.95, 3.56) | 1.45 (0.94, 2.21) |
| PM10 | 1.25 (0.92, 1.71) | 1.37 (1.04, 1.80) | 1.39 (1.05, 1.83) | 1.24 (0.89, 1.73) | 1.23 (0.88, 1.71) | 1.34 (1.03, 1.76) |
| NO2 | 1.27 (1.01, 1.60) | 1.17 (0.91, 1.35) | 1.20 (0.98, 1.46) | 1.15 (0.90, 1.47) | 1.21 (0.94, 1.55) | 1.16 (0.95, 1.41) |
| aPM2.5 and PM10 per 5µg/m3, NO2 per 5ppb cModels adjusted for sex, race/ethnicity, education, living situation, study site, and treatment assignmentdIndividual measures are classified as regular attendance (yes) or no/infrequent attendance (no). See manuscript for details. Abbreviations: HR, hazard ratio; CI, confidence interval; fine particulate matter, PM2.5; coarse particulate matter, PM10; nitrogen dioxide, NO2;  |