**Supplemental Material**

**Appendix A: Weighting of PM2.5 and Meteorological Measures**

*ZIP Code Population-Weighted Average of PM2.5*

To estimate population-weighted PM2.5 for each ZIP code, a shapefile of U.S. ZIP code boundaries for 2012 was obtained from the U.S. Census Bureau website, and was limited to just ZIP codes within Washington state using the ‘rgdal’ package in R [*Bivand et al.*, 2016]. Our first step was to find the proportion of intersection between each grid box and each ZIP code using the gIntersect command from the ‘rgeos’ package in R [*Bivand and Rundel*, 2016]; null intersect values were set to zero. To estimate population exposed within each grid box, where we used 2010 gridding population estimates from the NASA Socioeconomic Data and Applications Center (SEDAC) which we re-gridded to our study domain.

The following formula was used to estimate daily population-weighted PM2.5 concentrations within each ZIP code:$$ZIP Daily Pop. Wt. PM\_{2.5}=\frac{\sum\_{}^{}PM\_{2.5}Grid×Pop. Grid ×Proportion Intersect Grid and ZIP}{\sum\_{}^{}ZIP Population }$$

Where a matrix of the gridded daily PM2.5 concentrations were multiplied by the scalar of the gridded population vector. The resulting matrix was then multiplied by the proportion of intersection between grid and ZIP code. We then multiplied the matrix of daily PM2.5 concentrations weighted by population by the inverted scalar of total population within each ZIP code, which was produced by multiplying the gridded population matrix by the proportion of intersection matrix. The final product was a matrix of daily population-weighted PM2.5 concentrations for each ZIP code.

*ZIP Code Census-Weighted Average of Meteorological Measures*

We generatedZIP code level daily estimates of meteorological parameters of temperature, humidity, wind speed, and precipitation, from North American Land Data Assimilation System Phase 2 (NLDAS) model, a grid -based model available at 0.125 degree (~12-km) spatial resolution. Meteorological data from the NLDAS model were converted to ZIP code level estimated using a multi-stage geo-imputation process. First, we interpolated daily estimates of weather parameters to CENSUS block centroids from three nearest grid cells. Based on a containment relationship, we then created a weighted average of weather parameters, using CENSUS block population as weights, to obtain ZIP code level estimates.