**SUPPLEMENTARY MATERIAL**

Supplemental Table 1. Associations between daily PM$_{2.5}$ (lagged one day) and mortality in Lima, Peru, 2010-2016. Table reports effects for linear models (per 10 ug/m$^3$ increase in PM2.5) and for quintiles of PM2.5 (using quintile 1 as reference). P-values for interaction are tests for interaction between dichotomized temperature (above or below median maximum temperature) and PM$_{2.5}$.

|                          | Rate ratios For mortality | P value for linear trend | P value for interaction |
|--------------------------|----------------------------|--------------------------|-------------------------|
| All-causes, linear       | 1.04 (1.02-1.06)          | 0.001                    | 0.0002                  |
| All-cause, linear, tmax>=med | 1.08 (1.04-1.12)          | 0.0002                   |                          |
| All-causes, linear, tmax<med | 1.03 (1.00-1.06)          | 0.07                     |                          |
| Respiratory causes, linear | 1.04 (0.99-1.08)          | 0.09                     | 0.02                    |
| Respiratory causes, linear, tmax>=med | 1.11 (1.03-1.19)          | 0.004                    |                          |
| Respiratory causes, linear, tmax<med | 1.04 (0.98-1.10)          | 0.24                     |                          |
| Circulatory causes, linear | 1.07 (1.02-1.13)          | 0.01                     | 0.002                   |
| Circulatory causes, linear, tmax>=med | 1.14 (1.05-1.25)          | 0.002                    |                          |
| Circulatory causes, linear, tmax<med | 1.04 (0.98-1.14)          | 0.21                     |                          |

Supplemental Table 2. Age-specific temperature-PM$_{2.5}$ interactions for mortality: rate ratios for a 10 ug/m$^3$ increase in PM$_{2.5}$ (linear model).

|                          | Number | Tmax<median | Tmax>=median |
|--------------------------|--------|-------------|--------------|
| All deaths 19-64         | 41453  | 0.96 (0.86-1.06) | 1.18 (1.04-1.33) |
| All deaths 65+           | 144389 | 1.05 (0.99-1.11) | 1.09 (1.01-1.17) |
| Resp deaths 19-64        | 11824  | 1.02 (0.91-1.15) | 1.08 (0.94-1.25) |
| Resp deaths 65+          | 39791  | 1.06 (0.99-1.14) | 1.10 (1.01-1.20) |
| Circ deaths 19-64        | 8801   | 0.97 (0.84-1.11) | 1.13 (0.96-1.33) |
| Circ deaths 65+          | 27742  | 1.07 (0.99-1.16) | 1.10 (0.99-1.22) |

Supplemental Table 3. SES-specific temperature-PM$_{2.5}$ interactions for mortality: rate ratios for a 10 ug/m$^3$ increase in PM$_{2.5}$ (linear model).

|                          | Number | Tmax<median | Tmax>=median |
|--------------------------|--------|-------------|--------------|
| All deaths low SES       | 41453  | 1.02 (0.98-1.08) | 1.03 (0.98-1.08) |
| All deaths high SES      | 144389 | 0.96 (0.91-1.01) | 1.06 (0.98-1.14) |
| Resp deaths low SES      | 11824  | 1.06 (0.98-1.14) | 1.05 (0.96-1.14) |
| Resp deaths high SES     | 39791  | 0.95 (0.86-1.05) | 1.11 (0.96-1.27) |
| Circ deaths low SES      | 8801   | 1.05 (0.96-1.22) | 1.09 (0.98-1.22) |
| Circ deaths high SES     | 27742  | 0.98 (0.88-1.10) | 1.10 (0.91-1.27) |
Supplemental Figure 1. Map of Lima showing the locations of ten automatic PM$_{2.5}$ monitoring stations operated by the Ministry of the Environment (MINAM/SENAMHI) and six PM$_{2.5}$ stations operated by a John’s Hopkins University (JHU) research group.
Supplementary text: Details of spline curves used for Figures 3 and 4.

The splines were based on Harrell’s restricted cubic splines (Harrell 1988), using knots at 25%, 50%, and 75% of the PM$_{2.5}$ distribution (across all study days), which were 17.46, 19.39, and 23.47 ug/m$^3$, respectively.

Hence the spline term was:

\[
\text{spline} = \max(pm-17.46, 0)^3 - \frac{(23.47-17.46)}{(23.47-19.39)} \times \max(pm-19.39, 0)^3 + \frac{(19.39-17.46)}{(23.47-19.39)} \times \max(pm-23.47, 0)^3
\]

where \(\max(pm-17.46, 0)\) means the maximum of \(pm-17.46\) or 0, whichever is larger.

The final model then includes both a linear and spline term for PM$_{2.5}$.