

## Supplementary File S1

### Linear Mixed Model equation

The equation for the adjusted mixed model for data zone (denoted by  $i$ ) and time (denoted by  $j$ ) is as follows:

$$\begin{aligned} \text{Log}(m_{ij}) = & (\beta_0 + \beta_1 * d_i + v_{0i}) + (\beta_2 + \beta_3 * d_i + v_{1i}) * t + \beta_4 * \text{SIMD}_{IN} + \beta_5 * \text{SIMD}_{ED} \\ & + \beta_6 * \text{SIMD}_{EM} + \beta_7 * \text{SIMD}_H + \beta_8 * \text{SIMD}_{AC} + \epsilon_{ij} \end{aligned} \quad (1)$$

where mortality is given by  $m_{ij}$ , distance by  $d$ , time by  $t$ , the SIMD domains Income, Education, Employment, Housing and Geographic Access defined by  $\text{SIMD}_{IN}$ ,  $\text{SIMD}_{ED}$ ,  $\text{SIMD}_{EM}$ ,  $\text{SIMD}_H$  and  $\text{SIMD}_{AC}$  respectively, and residual error defined as  $\epsilon_{ij}$ . The model random effect terms  $v_i$  for individuals was assumed to be normally distributed with zero mean and variance  $\sigma^2$ .

$$\begin{bmatrix} v_{0i} \\ v_{1i} \end{bmatrix} \sim N \left( \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_0^2 & \sigma_{01} \\ \sigma_{10} & \sigma_1^2 \end{bmatrix} \right) \quad (2)$$