

### Supplemental material

#### S1. Supplementary methods.

**Weekly age-standardised mortality rates per IMD decile (as opposed to per local authority) were not available at the time of writing, thus they were calculated from other existing data, in a similar but distinct method from local authority rates. This method is as follows:** Firstly, the denominators from local authority-level monthly age standardised mortality rates were calculated using the death counts and rates provided. These 'age-standardised' population estimates were summed across local authorities within the same IMD decile, and counts of COVID-19 deaths were similarly summed by decile. Weekly age-standardised rates per 100,000 people were then calculated as the sum of deaths divided by the modified summed population estimate, multiplied by 100,000.