Comparison of Synthetic Estimates with the National average

1. Although the synthetic estimates\(^1\) of healthy lifestyle behaviours may have large Confidence Intervals\(^2\) associated with them, they can be examined to see whether they are significantly different from the England value as a whole. A ward or Primary Care Organisation (PCO)\(^3\) can be described as significantly different from the national average\(^4\) if the confidence intervals for those estimates do not overlap.

2. For both wards and PCOs, the estimates have been placed in three bands:
   - those areas which have estimates that are significantly lower than the national average;
   - those areas that have estimates that are not significantly different from the national average;
   - those areas that have estimates that are significantly higher than the national average.

3. There are 10 charts in all, displaying comparisons of the synthetic estimates with the national average. These are at ward and PCO level for the 5 variables of:
   - Prevalence of current smoking (at the reference date);
   - Obesity of adults;
   - Binge drinking for adults;
   - Consumption of 5 or more portions of fruit and vegetables a day (adults);
   - Consumption of 3 or more portions of fruit and vegetables day (children).

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\(^1\) The synthetic estimates are not estimated counts of the number of people or prevalence of a behaviour, e.g. smoking in a ward or PCO. They are the expected prevalence of a behaviour for any ward or PCO, given the demographic and social characteristics of that area.

\(^2\) Confidence Intervals have been prepared for each synthetic estimate. The interval reflects the range between which the true value is believed to lie, at a given level of confidence. The confidence intervals therefore represent the uncertainty in the modelling process. At the 95% confidence level, assuming that the model is a good representation of reality, the confidence interval is expected to contain the true value around 95 times out of 100. For example, if a ward estimate of current smoking is 49% and the 95% confidence interval is [32%, 67%] we know that 95% of the time the true prevalence estimate for that ward (based on its local population characteristics) will fall within this range.

\(^3\) Primary Care Organisation is the umbrella term used to describe the 300 Primary Care Trusts and 3 Care Trusts in England.

\(^4\) The National Average is derived directly from the Health Survey for England for the years 2000-2002 and is not a synthetic estimate. However the national average (for England) does have Confidence Intervals associated with it.
4. The charts are formatted slightly differently for wards and PCOs because of the large amount of information to present.

For wards:

- the horizontal line in the centre of the charts shows the synthetic estimate for the ward of a particular healthy lifestyle behaviour – e.g. the consumption of fruit and vegetables amongst children (3+portions). The grey lines surrounding this refers to the upper and lower confidence intervals for the estimate. There are three distinct bands: to refer to the estimates that are significantly below, not different and higher than the synthetic estimate. If we look at the example for fruit and vegetable consumption amongst children, we see that there are a small number of wards that are significantly different from the National average.

For PCOs:

- the names of the PCOs are given on the vertical axis. For each estimate, a bar is plotted and this has a set of ‘whiskers’ that demonstrate the lower and upper Confidence Intervals. There are three distinct bands: to refer to the estimates that are significantly below, not different and higher than the synthetic estimate. If we look at the example for fruit and vegetable consumption amongst children, we see that a greater proportion of PCOs are significantly different from the National average, than wards.

5. Table 1 and 2 show a comparison of the synthetic estimates at the PCO and ward levels as compared with the National Average. It shows that for wards there is a lower percentage of areas that are significantly different than for PCOs. There is also variation by variable. The percentage of the estimates that are significantly different are given below (the first figure refers to wards, the second figure is PCOs):

- Smoking prevalence (12%, 49%);
- Binge Drinking (4%, 41%);
- Fruit and vegetable consumption of adults (4%, 39%)
- Obesity (4%, 32%)
- Fruit and vegetable consumption of children (2%, 30%)

6. The charts can also be used to see if one area is significantly different from another – to discriminate by ward or PCO. When comparing two synthetic estimates for e.g. wards, one ward may be said to have a significantly higher or lower prevalence estimate than another if the confidence intervals for the two wards do not overlap. Further details of how to interpret the synthetic estimates are given in the User guide.

Neighbourhood Statistics Team
Health and Social Care Information Centre
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<table>
<thead>
<tr>
<th>Comparison of estimates against the confidence interval of the national estimate</th>
<th>Frequency of values with CI below CI of National Estimate</th>
<th>Frequency of values with CI overlapping CI of National Estimate</th>
<th>Frequency of values with CI above CI of National Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smoking</strong></td>
<td>(87/303) 29%</td>
<td>(154/303) 51%</td>
<td>(62/303) 20%</td>
</tr>
<tr>
<td><strong>Obesity</strong></td>
<td>(49/303) 16%</td>
<td>(207/303) 68%</td>
<td>(47/303) 16%</td>
</tr>
<tr>
<td><strong>Binge Drinking</strong></td>
<td>(74/303) 24%</td>
<td>(178/303) 59%</td>
<td>(51/303) 17%</td>
</tr>
<tr>
<td><strong>Fruit &amp; Vegetable Consumption in Adults</strong></td>
<td>(61/303) 20%</td>
<td>(185/303) 61%</td>
<td>(57/303) 19%</td>
</tr>
<tr>
<td><strong>Fruit &amp; Vegetable Consumption in Children</strong></td>
<td>(49/303) 16%</td>
<td>(212/303) 70%</td>
<td>(42/303) 14%</td>
</tr>
<tr>
<td>Comparison of estimates against the confidence interval of the national estimate</td>
<td>Frequency of values with CI below CI of National Estimate</td>
<td>Frequency of values with CI overlapping CI of National Estimate</td>
<td>Frequency of values with CI above CI of National Estimate</td>
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<tr>
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</tr>
<tr>
<td><strong>Smoking</strong></td>
<td>(761/7958) 10%</td>
<td>(6988/7958) 88%</td>
<td>(209/7958) 2%</td>
</tr>
<tr>
<td><strong>Obesity</strong></td>
<td>(216/7958) 3%</td>
<td>(7654/7958) 96%</td>
<td>(88/7958) 1%</td>
</tr>
<tr>
<td><strong>Binge Drinking</strong></td>
<td>(273/7958) 3%</td>
<td>(7635/7958) 96%</td>
<td>(50/7958) 1%</td>
</tr>
<tr>
<td><strong>Fruit &amp; Vegetable Consumption in Adults</strong></td>
<td>(241/7958) 3%</td>
<td>(7627/7958) 96%</td>
<td>(90/7958) 0.6%</td>
</tr>
<tr>
<td><strong>Fruit &amp; Vegetable Consumption in Children</strong></td>
<td>(58/7958) 0.7%</td>
<td>(7795/7958) 98%</td>
<td>(105/7958) 1%</td>
</tr>
</tbody>
</table>
Figure A2: Model-Based Estimates and Confidence Intervals for Smoking Prevalence in England, by CAS Ward

Note: The chart displays synthetic estimates for smoking prevalence. The horizontal line on the chart shows combined values for smoking at the ward level. The grey lines running perpendicular to this line are the 95% Confidence Intervals (CIs) surrounding each ward value. The synthetic estimates below, have been compared with the HSIE national estimate (NE) and divided into three groups based on this comparison. The centre section of estimates, and by far the largest group, have CIs that overlap the CI of the HSIE NE (CI = 25.2-26.5%). The section of estimates on the right are those that have CIs significantly above the NE. Those in the group on the left are significantly below.
Figure B2: Model-Based Estimates and Confidence Intervals for Obesity Prevalence (BMI > 30) in England, by CAS Ward

**Note:** The chart displays synthetic estimates for obesity prevalence. The horizontal line on the chart shows combined values for obesity at the ward level. The grey lines running perpendicular to this line are the 95% Confidence Intervals (CIs) surrounding each ward value. The synthetic estimates below, have been compared with the HSIE national estimate (NE) and divided into three groups based on this comparison. The centre section of estimates, and by far the largest group, have CIs that overlap the CI of the HSIE NE (CI = 21.5-22.7%). The section of estimates on the right are those that have CIs significantly above the NE. Those in the group on the left are significantly below.
Figure C2: Model-Based Estimates and Confidence Intervals for Binge Drinking Prevalence in England, by CAS Ward

Note: The chart displays synthetic estimates for binge drinking prevalence. The horizontal line on the chart shows combined values for binge drinking at the ward level. The grey lines running perpendicular to this line are the 95% Confidence Intervals (CIs) surrounding each ward value. The synthetic estimates below, have been compared with the HSIE national estimate (NE) and divided into three groups based on this comparison. The centre section of estimates, and by far the largest group have CIs that overlap the CI of the HSIE NE (CI = 17.6-18.8%). The section of estimates on the right are those that have CIs significantly above the NE. Those in the group on the left are significantly below.
Figure D2: Model-Based Estimates and Confidence Intervals for the Prevalence of 5+ Daily Fruit and Vegetable Consumption (Adults) in England, by CAS ward

Note: The chart displays synthetic estimates for the prevalence of 5+ daily fruit & vegetable (F&V) consumption in adults. The horizontal line on the chart shows combined values for 5+ F&V consumption prevalence at the ward level. The grey lines running perpendicular to this line are the 95% Confidence Intervals (CIs) surrounding each ward value. The synthetic estimates below, have been compared with the HSIE national estimate (NE) and divided into three groups based on this comparison. The centre section of estimates, and by far the largest group have CIs that overlap the CI of the HSIE NE (CI = 22.9-24.4%). The section of estimates on the right are those that have CIs significantly above the NE. Those in the group on the left are significantly below.
Figure E2: Model-Based Estimates and Confidence Intervals for the Prevalence of 3+ Daily Fruit and Vegetable Consumption (Children) in England, by CAS ward

Note: The chart displays synthetic estimates for the prevalence of 3+ daily fruit & vegetable (F&V) consumption in children. The horizontal line on the chart shows combined values for 3+ F&V consumption prevalence at the ward level. The grey lines running perpendicular to this line are the 95% Confidence Intervals (CIs) surrounding each ward value. The synthetic estimates below, have been compared with the HSIE national estimate (NE) and divided into three groups based on this comparison. The centre section of estimates, and by far the largest group have CIs that overlap the CI of the HSIE NE (CI = 36.2-38.8%). The section of estimates on the right are those that have CIs significantly above the NE. Those in the group on the left are significantly below.