KENT PUBLIC HEALTH OBSERVATORY

Comparing sources of local smoking prevalence estimates

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Contents

1. Executive summary

1.1 Key findings

- There are three main sources that are used to estimate prevalence of smoking at district level: the Quality Outcomes Framework (QOF), the Integrated Household Survey, and the General Practice (GP) Patient Survey. Each source uses a different approach and so produces differing estimates.
- We have explored variability in the estimates of smoking prevalence and found there to be significant variation between the data sources both at district and county level, as there is for England as a whole.
- We have compared the methodological approaches of the different sources and explored the advantages and disadvantages associated with each.
    - The Quality & Outcomes Framework uses the complete patient register of all included practices and so draws on the smoking status of a greater proportion of the population than the survey-based estimates. However, any systematic biases in the extent to which the data captured is an accurate reflection of true smoking status, and the extent to which those individuals captured accurately represent the population is not clear.
    - A particular limitation of the Integrated Household Survey is in the limited sample size at district level, resulting in large confidence intervals around the point estimates. A further limitation comes from the use of the South East region age profile within weighting, rather than district age profiles – we are unable to quantify the impact this may have on district-level estimates.
    - The GP Patient Survey has a larger sample size than the Integrated Household Survey, but is still sample based, and so estimates have the uncertainty of moderate confidence intervals.
    - All three sources rely on self-reported smoking whereby individuals have to identify themselves as a current smoker.

1.2 Call to action

We anticipate that this document will support local discussions about the different estimates.

2. Introduction & objectives

There are three main sources that we can use to explore the local prevalence of smoking; all three now appear in Public Health England's Local Tobacco Profiles. Each of these sources derives from a different approach, and so produces differing estimates.

This document presents a comparison of the estimates of smoking prevalence, describes the methodological differences behind them, and explores the ranging precision of these estimates by focusing on the districts within Kent.

3. Sources of data for the production of estimates

Three main data sources are used nationally to produce estimates of smoking prevalence at district level:

- The **Quality & Outcomes Framework.** This source reports on where smoking status has been recorded within the general practice patient record[1] and represents those aged 15 and over who have been recorded at their general practice as current smokers in the previous 24 months.[2]
    - The estimate is presented as a percentage of those, aged 15 and over, registered at a practice.

- The **Integrated Household Survey.**[3] The smoking prevalence indicator from this source reports self-reported smoking in adults, thus representing those aged 18 and over who, when asked about their smoking status, were categorised as a '*current cigarette smoker*.'
    - The estimate is presented as a percentage of respondents aged 18 and over.

[1] Data originates from general practices, aggregated using patient distribution by geography.
[2] SMOK004 denominator with exceptions.
[3] An annual household survey conducted by the Office for National Statistics (ONS), using face-to-face and telephone interviewing.

- The **GP Patient Survey**[4]. The indicator derived from this source reports from a survey of adults registered with a general practice who, when asked "Which of the following best describes your smoking habits?" responded as either occasional or regular smokers.
    - The estimate is presented as a percentage of respondents aged 18 and over.

[4] A large annual survey of adults registered with a general practice for at least six months. Survey conducted by Ipsos MORI on behalf of NHS England.

4. Comparing smoking prevalence estimates

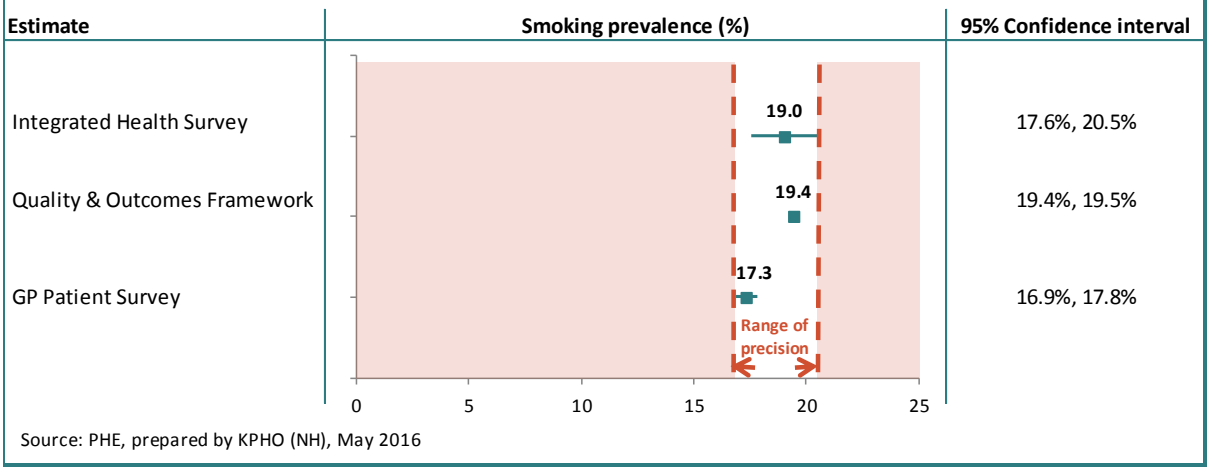
A report has been produced by Public Health England to explore the differing smoking prevalence estimates nationally and at district level; this report is available as a pdf, the URL is listed in Appendix B. PHE's report also shows that there is significant variation between the data sources even at England level. Smoking prevalence estimates for England for 2013 vary between 17.1% and 19.2%.

Forest plots have been used to provide a visual method of examining the variation between estimates and precision at a District level within Kent.

- Each source is shown with a square to represent the estimate.
- The horizontal lines represent the confidence interval around the estimate, indicating precision; we can be 95% certain that the interval contains the true value.
- The intervals will be of varying widths depending on sample sizes. As sample size increases, the interval and its width decrease, thus giving a more precise estimate. For this reason, the estimates based on sample surveys (i.e. the Integrated Household Survey and the GP Patient Survey) have much wider confidence intervals.

Sample sizes for both the Integrated Household Survey and the GP Patients Survey have been included at Appendix A. In the case of the GP Patients Survey, response rates are also given.

Comparison of smoking prevalence estimates: Kent, 2013/14



Source: PHE, prepared by KPHO (NH), May 2016

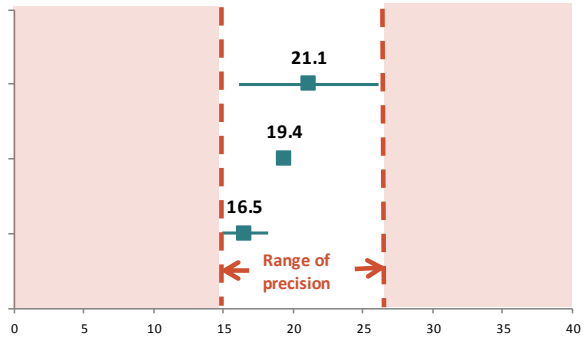
Across Kent, the smoking prevalence estimates range from 17.3% to 19.4% with the **GP Patient Survey** at the lower end and the **Quality & Outcomes Framework** at the upper end**.** The **Integrated Household Survey** was close to the upper range at 19.0%. This is a similar pattern to that seen at England level.

The district charts clearly show different levels of variability for the smoking prevalence estimates.

- Confidence intervals around the IHS estimates are very large. Confidence intervals around the QOF estimates are very small. These differences reflect the difference in sample sizes for each of the sources.
- The greatest variability is seen for **Gravesham,** and **Dover.**
- The least variability can be seen for **Maidstone**.
- Reasons for this variability could be due to the variations in study design and persons studied between the different sources, discussed in section 5.

Comparison of smoking prevalence estimates: Ashford, 2013/14

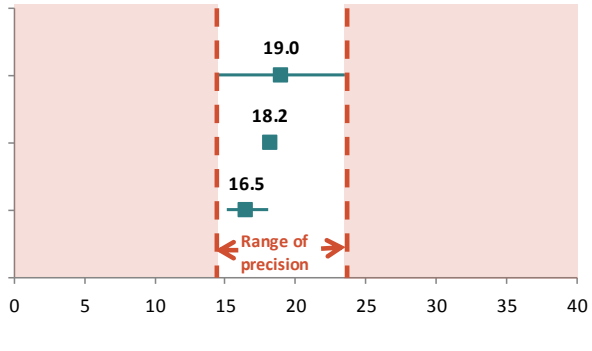
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	21.1	16.1%, 26.1%
Quality & Outcomes Framework	19.4	19.1%, 19.6%
GP Patient Survey	16.5	14.9%, 18.2%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Canterbury, 2013/14

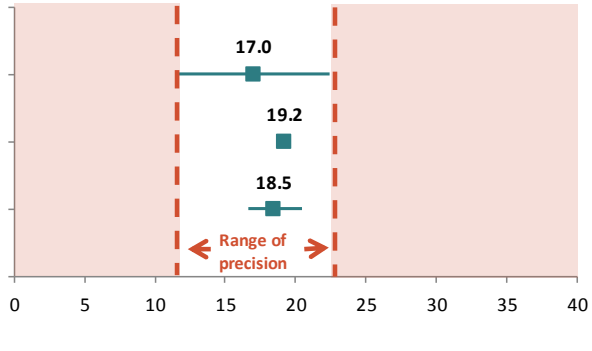
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	19.0	14.5%, 23.5%
Quality & Outcomes Framework	18.2	18.0%, 18.4%
GP Patient Survey	16.5	15.1%, 18.0%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Dartford, 2013/14

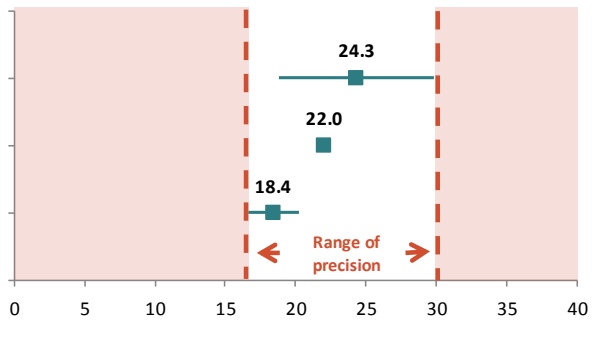
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	17.0	11.6%, 22.4%
Quality & Outcomes Framework	19.2	19.0%, 19.5%
GP Patient Survey	18.5	16.6%, 20.5%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Dover, 2013/14

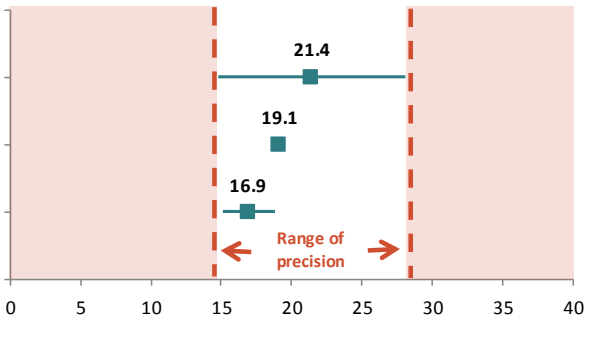
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	24.3	18.8%, 29.9%
Quality & Outcomes Framework	22.0	21.8%, 22.3%
GP Patient Survey	18.4	16.7%, 20.2%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Gravesham, 2013/14

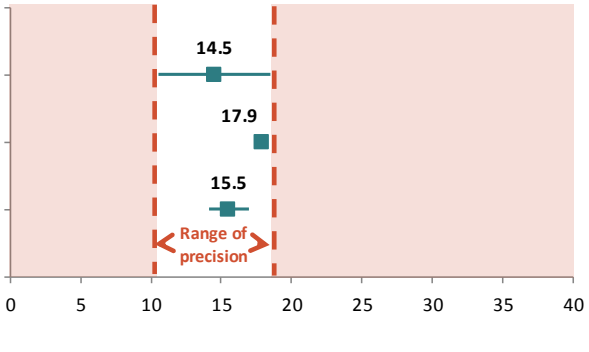
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	21.4	14.8%, 28.1%
Quality & Outcomes Framework	19.1	18.9%, 19.4%
GP Patient Survey	16.9	15.1%, 18.8%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Maidstone, 2013/14

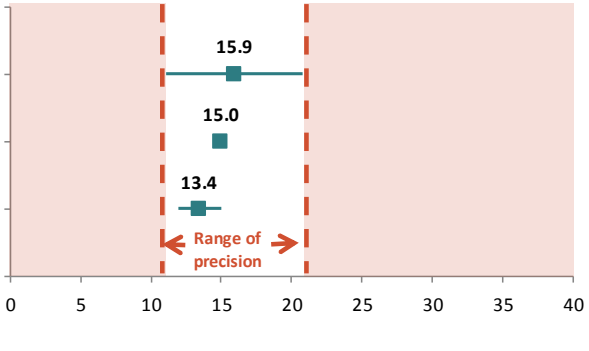
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	14.5	10.5%, 18.5%
Quality & Outcomes Framework	17.9	17.7%, 18.1%
GP Patient Survey	15.5	14.2%, 17.0%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Sevenoaks, 2013/14

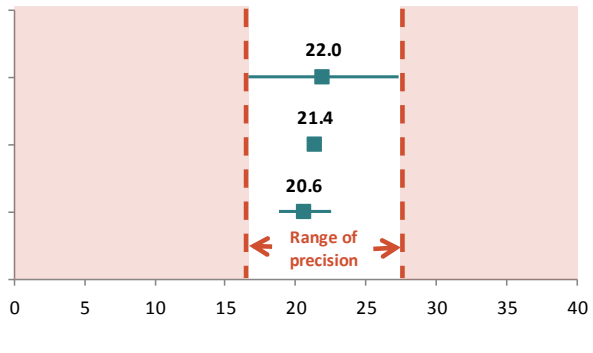
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	15.9	11.1%, 20.7%
Quality & Outcomes Framework	15.0	14.7%, 15.2%
GP Patient Survey	13.4	11.9%, 15.0%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Shepway, 2013/14

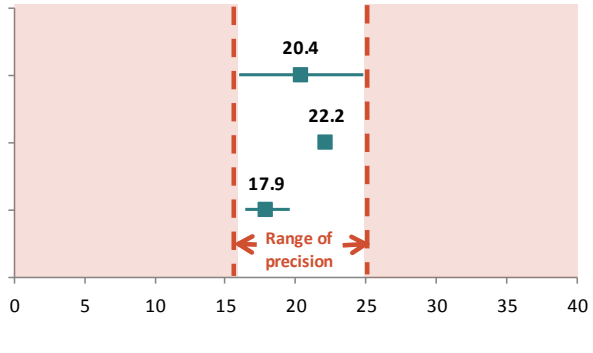
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	22.0	16.6%, 27.4%
Quality & Outcomes Framework	21.4	21.2%, 21.7%
GP Patient Survey	20.6	18.8%, 22.5%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Swale, 2013/14

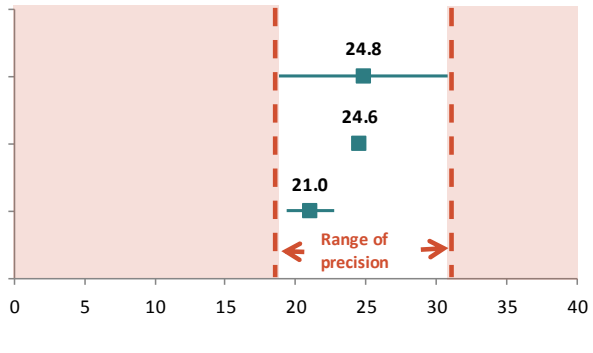
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	20.4	16.0%, 24.8%
Quality & Outcomes Framework	22.2	22.0%, 22.5%
GP Patient Survey	17.9	16.4%, 19.6%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Thanet, 2013/14

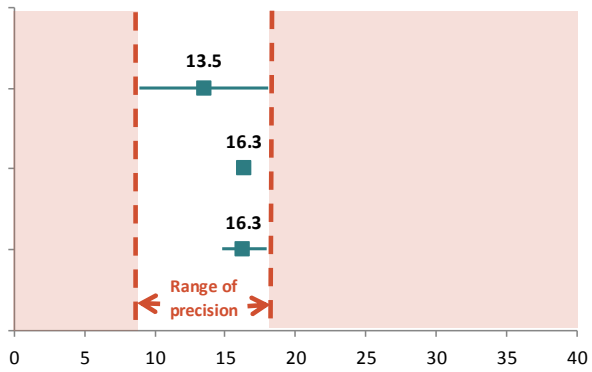
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	24.8	18.8%, 30.9%
Quality & Outcomes Framework	24.6	24.3%, 24.8%
GP Patient Survey	21.0	19.4%, 22.8%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Tonbridge & Malling, 2013/14

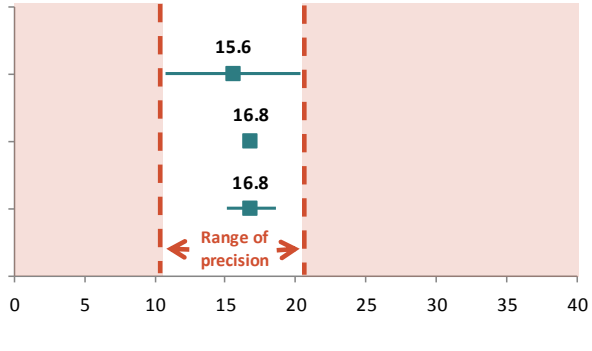
Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	13.5	8.9%, 18.1%
Quality & Outcomes Framework	16.3	16.1%, 16.6%
GP Patient Survey	16.3	14.8%, 18.0%



Source: PHE, prepared by KPHO (ZC), May 2016

Comparison of smoking prevalence estimates: Tunbridge Wells, 2013/14

Estimate	Smoking prevalence (%)	95% Confidence interval
Integrated Health Survey	15.6	10.8%, 20.4%
Quality & Outcomes Framework	16.8	16.6%, 17.1%
GP Patient Survey	16.8	15.1%, 18.6%



Source: PHE, prepared by KPHO (ZC), May 2016

5. Comparing methodologies

Each source uses a different approach in terms of methodology and data processing. This section presents the main strengths and limitations:

- Both the **Quality Outcomes Framework** and **the GP Patient Survey** draw from the patient register.
    - While most people are registered with a GP, registration is not compulsory and variation in patterns of registration by age and sex are seen; for example, it is known that young men are less likely to register with a GP than other groups. Resulting indicators may therefore underestimate true smoking prevalence.
    - In the case of the GP Patient Survey only patients with a valid NHS number and registered with a GP for six months or more are eligible for selection.

- The **Quality & Outcomes Framework (QOF)** is the annual reward and incentive programme[5] for general practices thus report data from the complete patient register of all participating practices in England so reflecting smoking status of a much greater number than for any survey based estimates; narrow confidence intervals on these estimates reflect this.
    - Reporting through the QOF is not compulsory however a high rate of completion is achieved.
    - Some additional bias may be present if patients are reluctant to disclose true smoking status to their GP.
    - Any systematic bias introduced due to the extent to which the full population is accurately represented, or to which smoking status is accurately captured cannot be described by the confidence intervals.
    - This indicator presents smoking prevalence as a percentage of people aged 15+, rather than as a percentage of people aged 18+. This is likely to result in a slightly reduced estimate as prevalence of smoking in those aged 15 to 17 years is lower than in the adult population.

[5] Conducted by the Health and Social Care Information Centre (HSCIC)

- The **Integrated Household Survey** and **GP Patient Survey** both use robust, un-clustered sample design methodologies to promote data quality.
  - The **Integrated Household Survey** uses random un-clustered sampling, meaning that address points within the United Kingdom were independently selected.
  - The **GP Patient Survey** uses random, proportionately stratified and un-clustered sampling, meaning that individuals within practices are independently selected but that individuals registered with smaller practices are more likely to be selected than those registered with larger practices, in order to achieve suitable confidence intervals for each practice. Weighting is then used at the analysis stage to correct for the disproportionate sampling design.

- Both the **Integrated Household Survey** and **GP Patient Survey** use data processing methodologies, such as weighting, to promote data quality.
  - We know that not everyone responds to surveys and this may affect some groups more than others. Therefore, this method corrects for differences in characteristics in the achieved sample due to any non-response bias that may exist.
  - In the case of the GP Patient Survey weighting also accounts for the disproportionate sample design.
  - Both weight for the population size; the former uses the district population size and the latter uses the practice population.
  - Both weight for age and sex distributions; the **Integrated Household Survey** uses the South East region age profile, whereas, the **GP Patient Survey** uses the Clinical Commissioning Group age profiles. Therefore, the latter estimate is likely to better reflect local population age structures.

- To some extent, all sources rely on self-reported smoking; whereby individuals had to identify themselves as a current smoker.
  - We know that self-report tends to underestimate smoking status; individuals may conceal status due to social and medical pressure. Therefore, this may influence the accuracy of the estimates in respect of their ability to measure the true prevalence of smoking.

Appendix A

When sample sizes are small, sampling variability may lead to random error. For example, if too few deprived areas were sampled randomly, this would not be corrected within data processing and so smoking prevalence estimates may not be reliable to be representative of the population.

The sample sizes[6] for each of the sources of data have been included in Table 1; where these are taken from a sampling methodology, as with the Integrated Household Survey, and GP Patient Survey, the sample size presented is that provided in the Local Tobacco Profiles.

Table 1: Sample and register sizes, 2013/14.

	Integrated household survey	Quality Outcomes Framework	GP Patient Survey
Ashford	255	98,604	1,851
Canterbury	292	143,102	1,609
Dartford	187	89,443	1,708
Dover	230	92,971	1,967
Gravesham	145	92,825	1,585
Maidstone	303	130,595	2,788
Sevenoaks	222	79,274	1,683
Shepway	228	95,503	1,965
Swale	320	113,165	2,761
Thanet	196	117,772	2,367
Tonbridge & Malling	212	105,185	1,286
Tunbridge Wells	218	96,267	2,240
Kent	2,808	1,254,713	23,810
England	195,772	46,608,551	871,934

Source: PHE Tobacco profiles, prepared by KPHO (ZC), May 2016.

[6] Sample sizes presented here are taken from the denominator used in PHE's calculations for the prevalence indicators.

Appendix B

The Public Health England, 2016 factsheet: **Comparing smoking prevalence estimates** can be accessed at URL:
http://www.tobaccoprofiles.info/documents/smoking_prevalence_comparisons_May2016.pdf