

Measuring smoking prevalence in local populations



Purpose

This is the seventh in a series of technical briefings produced by the Association of Public Health Observatories (APHO), designed to support public health practitioners and analysts and to promote the use of public health intelligence in decision making.

While smoking surveillance systems are broadly in place to monitor progress towards goals and targets at national and regional level in the UK and Ireland, this is far from being true at a local level. In this briefing we aim to contribute to thinking in this field by providing:

- Brief overviews of potentially useful sources of local-level smoking data
- Brief option appraisals for local-level surveillance of smoking
- Pointers to help local organisations meet their local smoking prevalence information needs

This briefing builds on the information provided in the first APHO technical briefing,¹ which examined sources of data for local surveillance of a range of lifestyle risk factors. Although specific to measuring smoking prevalence, much of the following discussion is also relevant to other lifestyle data topics. Given the ongoing development of primary care data, commercial datasets and other systems, this briefing should be regarded as providing a snapshot at one point in time of a constantly developing scene.

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Introduction

Smoking is the single biggest preventable cause of premature mortality in the United Kingdom and the Republic of Ireland. Smoking is also related to a significant number of long-term health conditions. Differences in the prevalence of smoking among socio-economic groups are a major contributor to health inequalities.

Published in 1998, the *Smoking Kills* White Paper² was the Government's first comprehensive tobacco control strategy for the UK. It set out targets for reducing smoking prevalence both in the overall population and within specific target groups (pregnant women, young people and deprived communities). The publication of *A smokefree future: a comprehensive tobacco control strategy for England* is expected imminently at the time of writing. This will update *Smoking Kills* and provide revised targets. In 2000 the Office of Tobacco Control in the Republic of Ireland published *Towards a Tobacco Free Society*,³ which set out key strategic objectives but did not set specific targets.

The White Papers *Choosing Health: Making Healthier Choices Easier*⁴ and *Towards a Healthier Scotland: A White Paper on Health*⁵, the strategic framework *Better Health – Better Wales*⁶, Northern Ireland's Public Health Strategy Investing for Health⁷ and the Republic of Ireland's health strategy *Quality and Fairness: A Health System for You*⁸ all set out the key principles for supporting the public to make healthier and more informed choices in regard to their health and highlighted the need for better, more timely surveillance of health and lifestyle. The subsequent Government action plan for England, *Delivering Choosing Health*,⁹ specifically included an action 'to develop appropriate systems for recording lifestyle measures'.

The English Department of Health's Public Service Agreement (PSA) target is to 'reduce adult smoking rates (from 26% in 2002) to 21% or less by 2010, with a reduction in prevalence among routine and manual groups (from 31% in 2002) to 26% or less.'¹⁰ The Scottish Government's headline target is to reduce smoking prevalence among adults aged 16 years and over to 22% by 2010.¹¹ Northern Ireland's PSA target is 'by March 2011, reduce to 21% and 25% respectively the proportion of adults and manual worker subset who smoke.'¹² The Health Service Executive in the Republic of Ireland uses the percentage of the population smoking by gender and by age as key performance indicators in its National Service Plan.¹³ No smoking prevalence target has been set in Wales, although the Welsh Assembly is currently developing new indicators for this and other determinants of health.

National policy goals and targets are mirrored in policy guidance and targets for the public sector at a local level, for example in the National Indicators for *Local Authorities and Local Authority Partnerships*¹⁴ and in the Vital Signs performance framework for primary care organisations in England.¹⁵

The need for smoking prevalence data at a local level

Local authorities (LAs), primary care trusts (PCTs) in England, NHS boards in Scotland, health boards in Wales, local government districts (LGDs) in Northern Ireland and local health office areas (LHOAs) in the Republic of Ireland, along with other organisations, need local smoking data at a population level for planning, targeting and evaluating local services and initiatives aimed at improving health and reducing health inequalities through lifestyle change. Data are needed both at a high level (LA/PCT/NHS board/health board/LGD/LHOA) and at a lower level (e.g. neighbourhood, ward or GP practice) to allow analyses such as:

- Measurement of the health outcomes and impacts of interventions at the local level (for example, outcome of local smoking cessation services)
- Monitoring of regional and local progress towards national policy goals and targets (including the impact of the Smokefree legislation recently implemented across the UK)
- Comparisons between areas
- Within-area comparisons to identify inequalities between population sub-groups (differing, for example, by age, gender, ethnicity or area of residence)

Local public sector organisations are increasingly being challenged to provide evidence of their performance in improving the lifestyles of local communities. To date, only partially satisfactory guidance on technical solutions to these challenges has been provided. In England, the lack of comparable, comprehensive, good quality data on smoking prevalence at local level has led to the use of a proxy indicator based on the number of successful self-reported four-week smoking quitters receiving support from the NHS Stop Smoking Services. However, this proxy indicator is problematic. The denominator is the local population, rather than the 'pool' of smokers, or those seeking help with stopping smoking, so the measure is not a true indicator of either smoking prevalence or the success of local services. In addition, the numerator is service-based, and many people access services in a different area from the one in which they live.

The new Integrated Household Survey in England (see page 3) will provide local prevalence data, which will be used in the National Indicators and Vital Signs. However, these results will not be available until December 2010, informing planning for 2011/12.

The lack of local smoking prevalence data also has implications for the ability to evaluate the impact of both local and national interventions. Smokefree legislation banning smoking in enclosed public spaces was implemented in Scotland in March 2006 and a comprehensive and complex portfolio of research and secondary analysis of routine data was commissioned to evaluate the impact of the legislation.¹⁶ Similar evaluation was proposed when the ban was extended to England in July 2007.¹⁷ A collaborative evaluation also followed the

introduction of the workplace smoking ban that was introduced in the Republic of Ireland in March 2004.¹⁸ While a wealth of valuable evidence is being collected, none of the evaluation programmes is yet able to measure the impact on smoking prevalence at a local level.

This briefing describes the main sources of local-level smoking prevalence data in the UK and the Republic of Ireland, and assesses the suitability of these different sources for meeting smoking prevalence information needs. Sources of other types of smoking-related data are also described.

Potential sources of local-level smoking prevalence data

The sources reviewed here have all been used recently to estimate local smoking prevalence. They are:

- National surveys.
- Model-based estimates derived from national surveys.
- Local surveys (including regional surveys).
- NHS primary care data.
- Datasets offered by commercial organisations.
- Combining smoking prevalence estimates from multiple sources.

The advantages and limitations of each source are described below.

National surveys

In the UK there are several ongoing and occasional surveys which are being used for smoking prevalence monitoring at national level. These include:

Health Survey for England (HSE)/Health and Social Care Survey (HSCS)

The HSE was instituted in 1991 and is used to collect information on health and related behaviour (including smoking) annually.¹⁹ Each year around 16,000 adults and 4,000 children in selected households are included and data are collected by interview with each eligible person in the household followed by a nurse visit to obtain clinical measurements (including the smoking biomarker, cotinine). The survey design allows local areas to purchase boosts, i.e. oversampling of the national survey at a local level to increase the sample size to generate more robust local results. From 2011 the HSE will be replaced by the new HSCS.

The Scottish Health Survey (SHeS)

Three SHeSs²⁰ were carried out in 1995, 1998 and 2003, but in a new departure, a continuous programme of surveys is running from 2008 to 2011. The SHeS uses the same approach as the HSE but with a more complex modular design. The main annual sample size is approximately 6,400 adults and 2,000 children, with the opportunity for local areas to purchase boosts. Local data from the new continuous survey (at NHS board level) will be available in 2012 aggregated from 2008 to 2011 (earlier for large and boosted areas).

The Welsh Health Survey (WHS)

The current WHS has been in place since 2003, and is an amalgamation of two previous national health surveys (The WHS and the Health in Wales Survey). The current survey is designed to provide some data, including smoking prevalence, at local government level by aggregating data from consecutive years.²¹ In 2007, productive responses were received from almost 14,000 adults (82% of eligible sample) and over 2,600 children (76% of eligible sample).

Northern Ireland Health and Wellbeing Survey

The Northern Ireland Health and Social Wellbeing Survey²² has been conducted in 1997, 2001 and 2005/06. The surveys are designed to yield a representative sample of all adults aged 16 years and over living in Northern Ireland, the most recent including data from 4,245 individuals.

Survey of Lifestyle, Attitudes and Nutrition (SLÁN) in the Republic of Ireland

SLÁN is a national survey of the lifestyle, attitudes and nutrition of people living in the Republic of Ireland.²³ Surveys have been carried out in 1998, 2002 and 2007. SLÁN 2007 is the largest survey to date and comprises household interviews of a representative random sample of over 10,000 adults. The survey covers general health, behaviours relating to health (including smoking) and the use of certain health services. In addition, over 1,200 respondents to the survey also underwent a detailed medical examination.

General Household Survey (GHS)/General Lifestyle Longitudinal Survey (GLF) and Integrated Household Survey (IHS)

The Office for National Statistics (ONS) GHS began in 1971 and has provided key statistics for Great Britain on household characteristics, fertility, smoking and drinking, healthy life expectancy, income and many other topics over more than 30 years. In 2007 the GHS covered approximately 16,000 adults, and data are available for English Regions, Scotland and Wales.²⁴ The GHS has recently changed to form the GLF, which forms part of the IHS.²⁵

The IHS is a modular single survey system replacing several major surveys previously undertaken by ONS. It is the largest regular government household survey carried out in Britain: the sample size will eventually be 200,000 households (approximately 370,000 individuals) annually across Britain (154,000 households in England, 19,200 in Wales and 27,000 in Scotland). IHS implementation was phased, commencing in January 2008. The core IHS questionnaire contains two questions to determine the prevalence of current smokers, ex-smokers and never smokers. The sample size is sufficient to provide reasonable precision at PCT level in England (although with limited sensitivity for monitoring changes in prevalence from year to year), and at national level for Scotland and Wales. Lower-level analyses will not generally be possible until several years' worth of data have accumulated.

Office of Tobacco Control (OTC) Tracking Survey (Republic of Ireland)

The OTC monitors cigarette smoking prevalence and behaviour on a monthly basis to gain a detailed picture of smoking patterns and to identify trends in this pattern.²⁶ The dataset is compiled from a monthly quota telephone survey conducted by a commercial market research company. The data consist of a collection of 1,000 responses per month from July 2002 from the Irish population over 15 years of age and are weighted by gender, age, social class and region. Cigarette smoking prevalence is analysed under a number of demographic classifications, and consumption and brand choice data are also presented.

Scottish Household Survey (SHoS)

The continuous national SHoS²⁷ commenced in February 1999 and is used to measure progress towards the Scottish Government's smoking targets. The survey is designed so that the interviews from each quarter will provide results which are representative of Scotland as a whole. Statistically reliable results are available for larger LAs on an annual basis (30,235 respondents in 2007) and for all LAs, regardless of size, every 2 years (1999–2000, 2001–2002, 2003–2004, 2005–2006, 2007–2008). Respondents are asked if they are a smoker and how many cigarettes they smoke.

Smoking, Drinking and Drug Use among Young People in England (SDD)

SDD is an annual survey carried out in participating schools across England to provide information on pupils' smoking, drinking and drug use behaviours. The survey focuses on different behaviours in different years, alternating between smoking and drinking one year and drug use the next. However, core information on all three behaviours is included in every year. The most recent report (2008)²⁸ contains results from 7,798 secondary pupils aged 11 to 15 years, presented at national level.

The Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS)

SALSUS is a biennial survey carried out in participating schools across Scotland to provide information on pupils' smoking, drinking and drug use behaviours and attitudes. The most recent report (2008)²⁹ contains results from over 10,000 pupils aged 13 and 15 years from across Scotland. Every four years there are robust prevalence estimates of smoking, drinking and drug use across LAs and NHS boards.

TellUs

TellUs is a series of annual surveys of children and young people in England which was designed to investigate their experiences and views of life, school and local area. Although not just health-related, the survey includes a question on current and previous cigarette smoking. TellUs is completed by a sample of children and young people in all LA areas across England and the sample size

is calculated with a view to obtaining a sufficient number of responses to allow robust analysis at LA level. In total, 253,755 children and young people in England took part in the survey during 2009.³⁰

Although some of the above listed national surveys are not sufficiently large to allow disaggregation below regional level, they are potentially useful sources of local prevalence data using either data aggregation or local boost samples.

Temporal data aggregation

By aggregating data over a number of years, sample sizes can be increased and analyses at geographical levels below regional level might become possible. However, there are three caveats. One is lack of access to data with geo-coding below regional level. (Although there may be exceptions, this is not usually publicly archived for data protection and confidentiality reasons). Second, the smaller the area, the more years' data are required to enable meaningful local data to be presented, affecting timeliness and the ability to monitor trends over time in the shorter term. Finally, cluster sampling methods may mean that not all local areas are sampled and, in this case, aggregation will not be possible.

Local boost samples of national surveys

In some areas, local boosts of national surveys have been commissioned. A local boost means oversampling of the national survey at a local level to increase the sample size to generate more robust local results.

In recent years, boosts of the HSE have been carried out in London and Merseyside and boosts of the SHoS have been carried out in Borders, Fife and Grampian. If affordable, such boosts are ideal for obtaining local-level data that are comparable with regional and national surveys. The surveys are ongoing and employ consistent methodology. With repeat investment, trend data could be obtained and local targets could be set and monitored. However, a local boost would be unlikely to meet all users' needs. For example, a boost survey designed to meet the need for comparative and trend data would probably not be suitable for evaluating the impact of a local intervention and the comparatively high cost per head would probably rule out a sample size sufficiently large to enable detailed local inequality profiling.

Model-based estimates derived from national surveys

The prevalence of smoking in local populations and sub-groups within local populations can be estimated by extrapolation of robust prevalence figures for comparable national or local populations. The crudest approach would be to assume that local prevalence is the same as national or perhaps regional prevalence. However, given the importance of factors such as age, gender, ethnicity and social class as predictors of smoking in populations, these should be taken into account if at all possible in generating local estimates.

Box 1: Example of local boost survey

A boost of the HSE was commissioned in 2006/07 in London.³¹ The survey was designed to be sufficiently large to generate London-wide, strategic health authority (SHA) and (with more limited precision) PCT-level data and to allow sub-group analyses (e.g. by ethnic group, age, social class) for London and SHA areas. It was planned that on average there would be around 275 responses per PCT from adults (the core national sample plus the London boost) and 70 from children. Both Islington PCT and Camden PCT opted to pay for an additional boost, and aimed to get responses from about 420 adults and 110 children. In the event, around 200 adults' responses were achieved per PCT. The extra boost achieved the desired number of adults in Islington, but not in Camden. The planned number of responses among children was achieved.

The 'Core' HSE involved a face-to-face computer assisted interview (CAPI), while the London 'Boost' obtained most of its data using a self-completion questionnaire. A study has compared the socio-demographic characteristics of London respondents to the national HSE and the boost, and their responses to key questions, such as smoking prevalence, to examine the effect on survey results of mode of questioning.³² For many of the results (including current smoking prevalence) it was found that there were no significant differences between the two survey methods. However, there were statistically significant variations between the results for the two methods of data collection for some items, including estimation of the number of cigarettes smoked per day by current smokers. These results are consistent with other research about reporting sensitive behaviours which shows that respondents tend to be more honest in self-completion questionnaires and are likely to under-report in face-to-face interviews.

In England, model-based estimates of lifestyle, including adult smoking prevalence, have been published at middle layer super output area (MSOA), SHA, PCT and LA levels. An initial set of estimates was based on pooled data for three years of the HSE from 2000 to 2002 and a set of area-level covariates from around the same period including data from the 2001 Census. These were updated in 2007, based on pooled HSE data for the years 2003 to 2005.³³ Differences in geographical boundaries, modelling methodologies and data sources mean that the two sets of estimates are not comparable. The estimates represent the expected prevalence of lifestyle behaviour for an area given its demographic and social characteristics and do not reflect any additional local factors that may have influenced lifestyle in the local population (e.g. local health improvement initiatives). The model-based estimates cannot be used to monitor performance or change over time.

Box 2: Advantages and disadvantages/limitations of local boosts of national surveys

Advantages

Flexibility. Commissioners of local boosts can specify the areas/populations to be surveyed.
Robust methodology. Gold standard, well-established data collection methods.
Comparability with national, regional and other benchmarks. Local areas will be able to compare their own populations against these benchmarks.

Disadvantages/limitations

Lack of local historical trend data. Only those areas which have previously commissioned local boosts will have the capacity for historical comparisons.
Limited small area geographical comparisons. Comparisons to other local areas are restricted to those that have also boosted their local samples.
Costs. These can be high (compared to undertaking local survey work).
Timing. A considerable lead time may be involved between approaching the organisation which owns the survey and receipt of results for a local area.

Box 3: Advantages and disadvantages/limitations of current model-based estimates

Advantages

Derived from national benchmark surveys. Local estimates can be related back to national comparators.
Transparency of estimation method. Metadata are generally in the public domain.
Comprehensive geographical coverage. Estimates are available for all local areas in England and Scotland.
Ease of access/cost. The estimates are in the public domain, are immediately accessible to users and are free of charge.

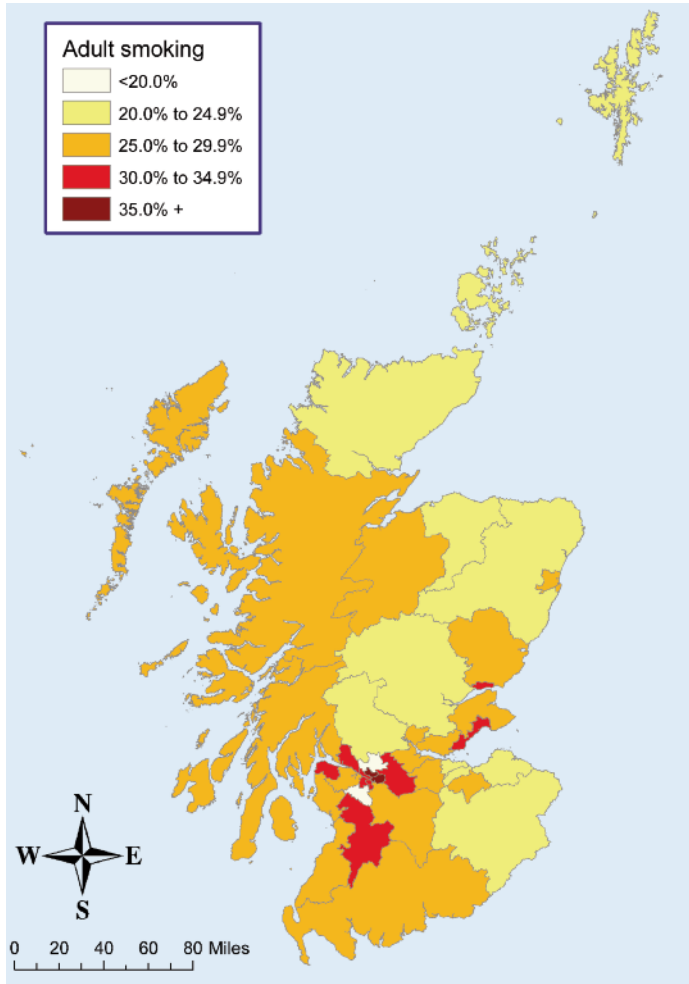
Disadvantages/limitations

Lack of flexibility. From a user's point of view the estimates offer no flexibility – particular local requirements cannot be specified.
Lack of sensitivity to local lifestyle interventions. The estimates represent the expected prevalence of smoking given the social and demographic characteristics of an area. Additional local factors that may impact upon true prevalence are not taken into account. This means that the estimates cannot be used to monitor performance or change at local level over time.

Model-based estimates of smoking prevalence in 2003/04, prepared using a similar methodology but based on SHoS data, are also available for Scotland³⁴ (Figure 1).

No such model-based estimates are used in either Northern Ireland or the Republic of Ireland.

Figure 1: Model-based estimates of smoking prevalence in the adult population (aged 16 years and over) in Scotland by community health partnership, 2003/04



Local surveys (including regional surveys)

In the past, many local organisations have commissioned health and lifestyle surveys of their local populations in order to gather data for health profiling and target setting. Some LAs, PCTs and NHS boards have in-house research teams capable of undertaking survey work while others have chosen to contract the work out to specialist survey providers. The term 'local survey' potentially includes a wide range of different types of survey method, including censuses and sample surveys; postal, phone or interview surveys; surveys including clinical measurements (health examination surveys); and surveys in different settings, such as schools, NHS premises, streets, workplaces, etc. Examples of such surveys, including methodological details, are available from the APHO Lifestyle Survey Toolkit.³⁵

The main advantage of the locally-designed ad hoc survey is that it can be tailored to the local community(ies) and the needs of the local organisations. There is no reason why such surveys cannot be well designed and executed and yield robust data. However, attention to some key issues could markedly improve the effectiveness and utility of local lifestyle surveys. These include use of standard questions with established validity and reliability and (where surveys are repeated) ensuring methodological consistency over time, for example in sampling frames and processes as well as wording of questions. The APHO Lifestyle Survey Toolkit³⁵ includes information on standardised questions and methods, and so aims to improve the quality and consistency of ad hoc local lifestyle surveys.

Timescales for carrying out local survey work can vary widely depending on the mode of data collection and whether the work is carried out in-house or contracted to an external organisation. However it typically takes up to 12 months from conception of the survey to receipt of results to allow for approval, design, fieldwork, data processing and analysis.

Box 4: Advantages and disadvantages/limitations of local surveys

Advantages

Flexibility. Appropriate questionnaire design can allow coverage of a wide range of different aspects of health and lifestyle. It can also allow investigation of aspects of smoking behaviour such as ex-smoking prevalence, age at uptake and the use of different smoking cessation aids, all of which are useful in setting targets and monitoring progress towards reducing smoking prevalence. It is possible to target 'hard to reach' e.g. black and minority ethnic groups, residents in priority or high deprivation areas etc. Data can potentially be generated at small area level, provided the survey sample is large enough.

Disadvantages/limitations

Lack of standardisation of methods, questions and derived indicators. This impacts on comparability. The APHO Lifestyle Survey Toolkit seeks to address this problem.

Risk of biased results. Sampling and response biases are difficult to exclude. Response rates can be low (although this is not inevitable).

Box 5: Examples of local surveys

East of England Regional Lifestyle Survey

In Autumn 2008, East of England SHA commissioned Ipsos MORI to undertake the East of England Regional Lifestyle Survey, to cover self-reported health, lifestyle indicators and demographic information. Public health representatives worked with Ipsos MORI to develop a questionnaire suitable for administration to the adult population in the region, drawing on a bank of validated questions and other lifestyle surveys. All interviews were conducted by telephone using random digit dialling and quotas were set on PCT, age, gender, ethnicity, working status and area deprivation. A total of 26,290 interviews were achieved. The results of the survey have been used to provide PCT-level profiles of lifestyle behaviours, including smoking and ex-smoking prevalence and quitting behaviour.³⁶ Data on smoking prevalence in the 20% most deprived MSOAs within each PCT will be provided as a baseline to measure the impact of smoking cessation activities. The results will also be used to support PCTs in developing social marketing approaches to target NHS Stop Smoking Services at particular priority groups. A second survey using the same methodology will be undertaken during the period October–December 2009.

Schools Health Education Unit (SHEU)

SHEU is an independent organisation offering survey-related services to those working with children. Over the last 30 years it has supported over 5,500 local-level health-related behaviour surveys involving over 685,000 young people. It is therefore likely that many areas will have had one or more SHEU surveys on their local schools (although the data will not necessarily be representative as they will only include children covered by organisations which have chosen to commission SHEU to conduct survey work). Data from all surveys are compiled into Annual Results and Trends reports, for example Young People and Smoking: Attitudes and Trends 1983–2001.³⁷

NHS primary care data

The expansion in the use of IT in patient consultations and communications and the development and application of Read codes (a system of clinical coding used in general practices in the UK) underpin the increasingly systematic recording of some aspects of lifestyle in primary care.

QMAS³⁸ is a national system across Great Britain that automatically receives summarised GP practice data on a routine basis. It is designed to support the payments process associated with the Quality and Outcomes Framework (QOF) of the new General Medical Services contract that came into force in April 2004.³⁹ Although the smoking data currently captured are limited, the system does provide a rough indication of the smoking prevalence of patients who have been recorded by practices as suffering from one or more of the following conditions: coronary heart disease, strokes or transient ischaemic attacks, hypertension, diabetes mellitus, COPD, asthma, schizophrenia, bipolar or other affective disorders. Similarly it indicates to some extent the proportion of patients in this clinical group for whom a smoking status has recently been recorded. QOF is not, however, able to provide measures of overall smoking prevalence in a practice population. In Wales, Audit Plus software is used to give more detailed QOF outputs.

The General Practice Extraction Service (GPES)⁴⁰ is a planned centrally managed primary care data extraction and analysis service that will obtain information from NHS GP systems in England and Wales. GPES objectives include 'improving national and local public health surveillance to target areas of need'. However, it is too early to say whether this will provide a workable basis for local-level smoking prevalence monitoring in future. While it has some potential advantages in terms of coverage and flexibility, and feedback of comparative data should be attractive to GPs, it will still be subject to the extent of coverage and the accuracy of patients' smoking records.

In England the NHS Information Centre (on behalf of the Department of Health) collects and publishes quarterly GP-recorded patient smoking status data via the Omnibus web-based system (<https://www.icapp.nhs.uk/Omnibus/WebPages/Home/Omnibus.aspx>). The figures are based on the same underlying data as GPES⁴⁰ and so the data quality issues are the same. The Quarter 4 report in 2008/09⁴¹ found that 99 out of 152 PCTs did not reach the quality threshold of 70% of adult patients with smoking status recorded (prevalence data from these PCTs are therefore excluded from reports). In addition, 30 of the PCTs with coverage greater than 70% were found to have smoking prevalence outside the 'allowable range'.

An Outline Business Case is being developed to make the case for a Scottish GP data extraction and analysis service. It is too early to say whether the work will provide a workable basis for local-level smoking prevalence monitoring in future, and it will be subject to the quality and coverage issues mentioned above.

There is no universal primary care data system used in the Republic of Ireland.

Box 6: Advantages and disadvantages/limitations of NHS primary care data

Advantages

Standardised national systems. QMAS³⁸ has been rolled out throughout Great Britain.

Ongoing data collection. This will allow accrual of historical lifestyle data about individuals over time.

Established coding systems. Read codes exist which enable categorisation of patients according to their smoking status.

Disadvantages/limitations

Selective focus on particular patient groups. QOF only covers patients with specific conditions. Up-to-date data will generally not exist for patients who have not visited their practice recently. Nor will it be available for people who are not registered with a practice at all.

Variability between practices in the completeness and quality of data recording. Practices differ in terms of level of IT support, staffing levels, staff competencies and attitudes to data collection, all of which affect whether or not a practice records smoking data well.

Lack of a geographical focus. QOF outputs relate to practice populations (i.e. registered patients) rather than resident populations of geographic areas.

Smoking during pregnancy data

English PCT-level data on the prevalence of smoking among pregnant women at the time of delivery are collected and published quarterly by the Department of Health (DH).⁴² Hospital Trust and PCT-level data on smoking during pregnancy are also published annually by the Care Quality Commission (CQC). The definitions used by DH and CQC differ slightly, for example, the latter does not include births at home.⁴³ Scottish NHS board-level data on the prevalence of smoking among women at antenatal booking appointments and at the health visitor's first home visit after the birth are published annually.⁴⁴ No such data are routinely published in Wales.

Datasets offered by commercial organisations

A number of commercial organisations offer lifestyle data derived from consumer surveys designed primarily to inform marketing, and which include questions regarding the purchase of tobacco. Survey methodologies vary and may be postal questionnaires, face-to-face interviews or telephone interviews. Generally, consumer surveys are based on a large sample and, although response rates tend to be low, they can obtain good geographic coverage. In addition, low response groups may be intentionally over-sampled and data are often modelled or weighted to allow for non-response by certain sectors of the population.

Data are often sold as part of a package which includes a geodemographic segmentation tool. These tools are produced primarily for targeting marketing in the commercial sectors but have also been used by NHS organisations, for example, to support social marketing (further information is available in *Technical Briefing 5: Geodemographic Segmentation*).⁴⁵ They could be used to identify small areas where there is a high probability of finding high levels of a particular risk factor based on other survey variables.

Box 7: Advantages and disadvantages/limitations of commercial datasets

Advantages

Extensive geographical coverage. Some datasets cover the whole of England or the UK allowing comparison between areas. Large sample sizes mean that there is often good coverage at local level, potentially providing for direct estimation and measurement of change over time.

Disadvantages/limitations

Potential for bias. Lack of random sampling and poor response rates increase the risk of bias.

Lack of transparency in methodologies. Some of the modelling approaches used by the organisations concerned are complex and metadata may not be made available for reasons of commercial confidentiality.

Cost. The datasets can be relatively expensive.

Combining smoking prevalence estimates from multiple sources

Methods have been developed to obtain estimates of smoking prevalence by combining data from different sources.⁴⁶ This allows triangulation where the quality of data from a single source is uncertain, and can therefore improve the quality of small area estimates. The potential sources of data include many of those described earlier, for example:

- Surveys (IHS, HSE etc.).
- Model-based estimates.
- GP data (QOF etc.).
- Commercial data (CACI, Acxiom etc.).

An example of the application of this method is described in Box 8. Initial results are promising and suggest that the method can be used when direct local level smoking prevalence estimates are not available. However, further work is needed to compare modelled estimates with direct estimates (and also to assess the applicability of the method to other lifestyle areas where data are available from multiple sources). Work is planned to develop the method to track change over time, and also to allow the modelling to be implemented in conventional statistical packages.

Box 8: Example of combining estimates from multiple sources

Experimental LA-level smoking prevalence estimates have been calculated for each of the 48 LAs across the East of England.⁴⁷ The objective was to obtain combined estimates of smoking prevalence in each of the LAs from seven different data sources. The calculations adjust for the biases in commercial surveys but incorporate useful information from all the sources to provide more accurate and precise results. A pooled estimate was produced for each LA, representing the best estimate based on the available data. Figure 2 gives an example of the pooled estimate for two LAs, showing how estimates from seven different surveys, with varying confidence intervals, have been combined into a single pooled estimate with a tighter confidence interval. The graph shows that the estimates were relatively consistent for Local Authority A, on the left, but less so for Local Authority B, where the estimates were more heterogeneous.

The data are regarded as experimental and it is hoped they will be refined with findings from the East of England lifestyle survey.

Box 9: Advantages and disadvantages/limitations of combining estimates from multiple sources

Advantages

Timeliness. New or updated data can be incorporated routinely.

Large sample sizes can be obtained by adding data from multiple sources, potentially allowing greater precision for estimation at a small area level and measurement of change over time.

Flexibility. Perceptions of study quality and expert opinion can be incorporated into models.

Disadvantages/limitations

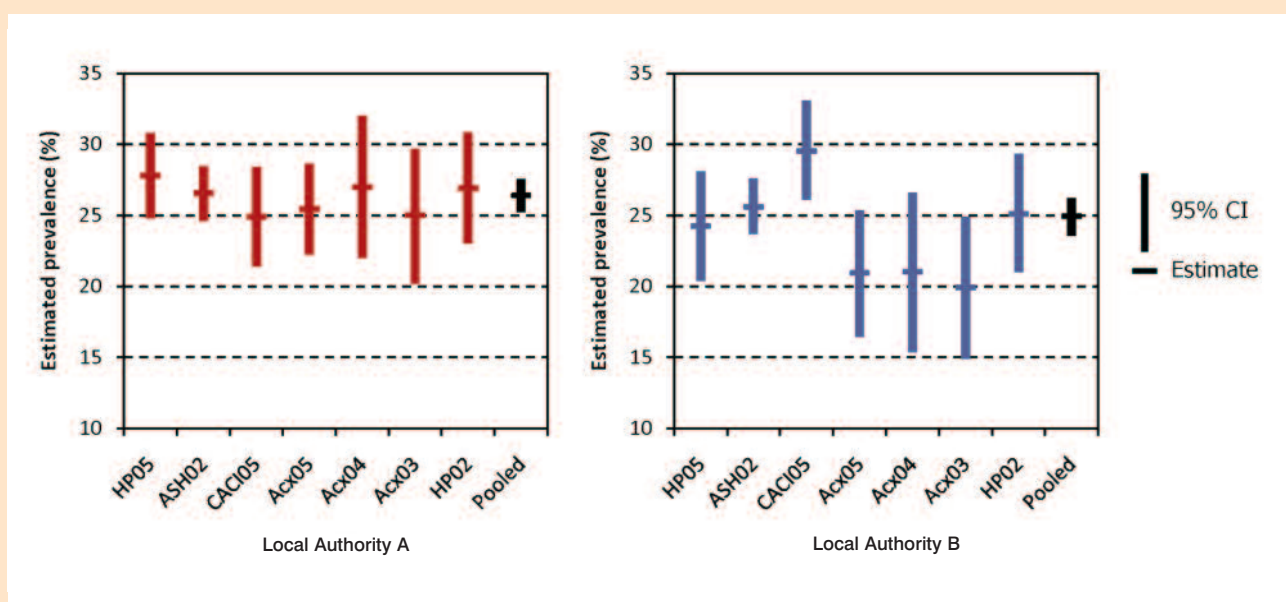
Different answers from different sources. Different sources have been found to give wide variation in smoking prevalence estimates for local areas.

Methods. The methodology of individual data sources may lack transparency and detecting biases is difficult.

Cost. Inclusion of commercial datasets may not be cost effective.

Ease of replication. Currently, the complexity of the methodology makes replication by local analysts difficult. However, work is planned to make it possible to implement the approach using conventional statistical packages.

Figure 2: Examples of pooled estimates and heterogeneity of source data



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Other smoking-related data

Other types of smoking data are available to add to the picture of smoking-related activity in a local population. Further details can be found in a supporting document with the online version of this Technical Briefing at <http://www.apho.org.uk/resource/view.aspx?RID=39306>

- Smoking-related admissions and mortality.
- Nicotine replacement prescribing data.
- Smoking-related behaviour and attitudes towards smoking.
- Statistics on NHS Stop Smoking/Cessation Services
- Smoking Toolkit Study.

Summary of current advice

As outlined earlier, local-level smoking prevalence information is needed to address a number of different service planning, performance monitoring and research challenges.

The sources of smoking prevalence data highlighted in earlier sections have different strengths and weaknesses. It is unlikely that any one source will provide all of the solutions to all of the smoking surveillance challenges faced by local organisations – some sources have definite advantages in some situations, and others have advantages in other situations. This was explored in some depth in *Technical Briefing 1: Sources of data on lifestyle risk factors in local populations*.¹ For example, if a PCT or NHS board needed quickly to identify areas likely to have high smoking prevalence, the model-based estimates provide an easily-accessible, low-cost solution. However, these estimates do not provide a basis for monitoring local trends over time or changes following local interventions. Some commercial companies offer estimates of smoking prevalence at small area level based on survey responses from local residents. However, unless full details of sources and methods are made available, it is not possible to confirm whether these estimates are reliable. High cost is a further drawback, although sponsorship deals and consortium purchases can help to reduce the burden on purchasers.

There are strong arguments for improving the recording of smoking in general practices since these provide a basis for more systematic preventive health care of patients who smoke, or have recently stopped smoking and may relapse. Good practice in informatics demands that maximum use should then be made of these data to avoid

duplicating effort and overburdening patients by asking them similar questions in a local survey. However, the current reality is that across the UK and Republic of Ireland, aggregated primary care lifestyle data for local populations will generally be incomplete and of variable quality even for smoking, which has been a focus for prevention in primary care for many years.

Where a single data source is thought to be inadequate, the use of more than one source should be considered. Results from the analysis undertaken to estimate smoking prevalence in small areas by pooling data from multiple sources are promising and development work is planned to make this more widely available by making it possible for the modelling to be implemented in conventional statistical packages.

Local surveys or local boosts of national surveys are particularly flexible and provide the only currently available solution to some of the smoking prevalence information challenges faced by local organisations.

Box 10: Summary of current advice

- In England the new IHS will provide measured smoking prevalence at PCT level from December 2010.
- In Scotland, the SHoS provides statistically reliable results for larger LAs annually, and for all LAs regardless of size every two years. In addition, NHS board-level data will be available from the SHeS in 2012 (aggregated from 2008 to 2012) – earlier for large and boosted areas. In Wales, similar aggregated smoking prevalence data are available from the WHS.
- Until then, modelled estimates can be used for many purposes, particularly in community profiles and targeting services.
- Where a single source is thought to be inadequate, the use of more than one source should be considered.
- Areas wishing to undertake local surveys should seek advice from their local public health observatory. The APHO Lifestyle Survey Toolkit,³⁵ containing standardised survey questions and methods, should be used to improve the quality and consistency of local survey work.

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Glossary and abbreviations

Boost: Oversampling of a survey at a local level to increase the sample size to generate more robust local results.

CAPI: Computer-assisted personal interviewing. Face-to-face interviewing where the interviewer or respondent enters the answers into a computer.

Cluster sampling: A sampling technique where the entire population is divided into groups, or clusters, and a random sample of these clusters are selected.

CQC: Care Quality Commission. The independent regulator of health and social care in England.

Cotinine: A by-product of nicotine. Testing of blood, hair or urine for cotinine can indicate whether nicotine has been inhaled (either directly or passively).

Geodemographic segmentation: The classification of populations into types, according to the characteristics of their neighbourhood.

HSE: Health Survey for England.

IHS: Integrated Household Survey.

LA: Local authority. These are the basic units of administration of local government in England, Wales and Scotland.

LGD: Local government district. The basic unit of administration of local government in Northern Ireland.

LHOA: Local health office area. Local bodies responsible for health in the Republic of Ireland.

Meta analysis: Techniques used to combine the results of several studies addressing the same research question.

MSOA: Middle layer super output area. An area with fixed boundaries developed after the 2001 Census, with an average population of around 7,200.

National Indicators: National Indicators for Local Authorities and Local Authority Partnerships.¹⁴ A set of 198 indicators used by central government in England to monitor performance against outcomes.

PCT: Primary care trust. Local bodies responsible for public health and provision and commissioning of health services in England.

Prevalence: Prevalence is a statistical concept defined as the number of cases of a disease or characteristic that are present in a particular population at a given time.

QMAS: Quality Management and Analysis System,³⁸ a national IT system which supports QOF.

QOF: Quality and Outcomes Framework, the mechanism for rewarding general practitioners in the UK for meeting a defined set of quality criteria.

SHA: Strategic health authority: regional organisation responsible for the management of the NHS in each English region.

SHeS: Scottish Health Survey.

SHoS: Scottish Household Survey.

Vital Signs: Indicator set used to monitor performance against national and local health priorities.

WHS: Welsh Health Survey.

About the Association of Public Health Observatories (APHO)

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