

# Smoking and socioeconomic status in England: the rise of the never smoker and the disadvantaged smoker

Rosemary Hiscock<sup>1,2</sup>, Linda Bauld<sup>2,3</sup>, Amanda Amos<sup>2,4</sup>, Stephen Platt<sup>4</sup>

<sup>1</sup>Department of Social and Policy Sciences, University of Bath, Bath BA2 7AY, UK

<sup>2</sup>UK Centre for Tobacco Control Studies, UK

<sup>3</sup>Stirling Management School, University of Stirling, Stirling FK9 4LA, UK

<sup>4</sup>Centre for Population Health Sciences, The University of Edinburgh Medical School, Teviot Place, Edinburgh EH8 9AG, UK

Address correspondence to Rosemary Hiscock, E-mail: r.hiscock@bath.ac.uk

## ABSTRACT

**Background** Since 2000 various tobacco control measures have been implemented in the UK. Changes in the smoking status of low and high socioeconomic status (SES) groups in England during this period (2001–08) are explored.

**Methods** Secondary analysis of the Health Survey for England general population samples was undertaken. Over 88 000 adults, age 16 or over, living in England were included. Smoking status (current, ex or never) was reported. SES was assessed through a count of seven possible indicators of disadvantage: National Statistics Socio-Economic Classification (NSSEC), neighbourhood index of multiple deprivation, lone parenting, car availability, housing tenure, income and unemployment.

**Results** Smoking rates were four times higher among the most disadvantaged [60.7% (95% CI: 58.2–63.3)] than the most affluent [15.3% (95% CI: 14.8–15.8)]. Smoking prevalence declined between 2001 and 2008 except among the multiply disadvantaged. This trend appeared to be due to an increase in never smoking rather than an increase in quitting. Disadvantage declined among non-smokers but not smokers.

**Conclusions** In general never smoking and affluence increased in England over this period. The disadvantaged, however, did not experience the decline in smoking and smokers missed out from the increase in affluence. Smoking and disadvantage may increasingly coexist.

**Keywords** smoking, socioeconomics factors

## Background

Each year worldwide 5 million people die from smoking-related diseases and 600 000 die from passive smoking.<sup>1,2</sup> Based on data from the Health Survey for England (HSE) 1998–2001 and mortality data from the same period, it is estimated that there were 86 500 premature deaths caused by tobacco in England every year. This amounted to 23% of deaths among men and 12% of female deaths.<sup>3</sup>

In developed countries smoking is increasingly concentrated among the poor.<sup>4</sup> In Great Britain in 2009, for instance, 21% of adults smoked but 16% of those with non-manual occupations and 26% of those with manual occupations smoked; between 1998 and 2009 smoking fell by over a quarter among non-manual workers but only by a fifth among manual workers.<sup>5</sup> Tobacco is responsible for about

half the socioeconomic status (SES) difference in death rates. In England and Wales, at the ages of 35–69, the risk of dying is 43% amongst the lowest social strata and 19% of this is due to smoking, whereas for the highest social strata the percentages are 21 and 4%, respectively.<sup>6</sup> Although smoking rates have been falling in the developed world, reductions have been slower amongst disadvantaged smokers and inequalities in smoking rates have increased in recent years.<sup>7</sup> This divergence in smoking prevalence is likely to lead to health inequalities—differences in the health

Rosemary Hiscock, Research Officer

Linda Bauld, Professor of Socio-Management

Amanda Amos, Professor of Health Promotion

Stephen Platt, Professor of Health Policy Research

of individuals and population groups;<sup>8</sup> evidence from health inequalities research supports the argument that inequalities are also inequitable (or unjust) because they are the result of underlying social determinants of health rather than personal choice.<sup>8</sup>

A recent review<sup>9</sup> which aimed to determine which tobacco control measures are likely to reduce socioeconomic inequalities in smoking rates, and thus health inequalities, found that many evaluations of tobacco control measures have failed to record SES. Furthermore, those studies that have included SES have often failed to provide sufficiently rigorous data on quit rates. The available evidence suggests that increases in price, targeted media campaigns and smoking cessation programmes can reduce socioeconomic inequalities in smoking rates. For example, NHS Stop Smoking Services (SSSs), the UK's free at the point of use national treatment service for smokers, established in 1999 to target disadvantaged smokers,<sup>10</sup> have been successful in reducing smoking rates among these target groups.<sup>11</sup> However, smoking cessation programmes only reach up to 8% of smokers.<sup>12</sup> Other tobacco control measures that have been enacted or enhanced in the UK include price increases in tobacco products through higher taxes (2001); action against smuggling (2000); increasing the minimum age of purchase to 18 (2007); tobacco advertising bans (2002, with a delay for Formula One); mass media campaigns on the harms of tobacco (such as the British Heart Foundation campaign 2004); larger written (2001) and new pictorial health warnings (2008) on tobacco products and a comprehensive ban on workplace and public place smoking from July 2007.<sup>13–17</sup> Therefore, national surveys need to be studied, in addition to SSS monitoring, in order to understand the broader picture of what happened to inequalities and in England over this period so that inequities in the distribution of health can be countered.

SES has been defined in many different ways<sup>18,19</sup> and the relationship with smoking may depend on the measures chosen.<sup>9</sup> In this study we designed a composite measure of SES, permitting an exploration of the gradient of disadvantage and associated smoking rates to overcome weaknesses in individual indicators.

If only a tiny minority of smokers are disadvantaged, then smoking cessation efforts may be better focused on smoking cessation in general. If, however, disadvantaged smokers are numerous, then it is worth targeting resources at this group. This is a particular issue because disadvantaged smokers appear to benefit most from a targeted approach.<sup>20</sup> To help answer this question we also explored the proportion of smokers who could be classified as disadvantaged.

The three objectives of this study were therefore to examine:

- (1) the gradient of disadvantage and smoking prevalence,
- (2) whether the proportions of current smokers, ex-smokers and never smokers among affluent and disadvantaged groups were higher or lower in 2006–08 compared with 2001–03,
- (3) changes over time in the proportions of smokers and non-smokers who experience low SES.

## Methods

In order to fulfil our objectives, it was necessary to identify an established repeated survey covering a wide geographical area, including questions on SES and smoking and on the basis of which statistical differences could be assessed to address the research questions. National surveys tend not to be simple random samples. Particular geographical areas (usually postcodes) are selected to reduce interviewer travel time. This clustering increases the standard error. The release of survey design variables which allow the user to calculate complex standard errors for confidence intervals makes the HSE arguably the best source of English smoking-related national data.<sup>9</sup> The HSE, published by the NHS Information Centre, is a series of annual surveys covering health and health-related behaviours.<sup>21,22</sup> The response rate is >60%.<sup>23</sup> The sample is stratified and weighted to increase its representativeness of the English population. All confidence intervals reported in this paper took account of the HSE complex sample design and weighting using SPSS 16.0 complex sample module. The years analysed were 2001–2008. Once booster samples (additional samples designed to explore particular topics) and under 16s were excluded, sample sizes ranged between 6000 and 17 000 per annum. There were 88 337 cases available for analysis.

The following seven commonly used<sup>18,19</sup> measures of SES were employed: NSSEC (National Statistics Socio-Economic Classification), neighbourhood index of multiple deprivation, lone parents, car access, housing tenure, income and unemployment. For all measures, low SES groups were identified and then the number of measures where each respondent could be classified as being in a low SES group was counted. These low SES indicators were routine and manual occupation; most deprived quintile of neighbourhoods; lone parent households; no car or van available; renting accommodation; lowest income tertile and unemployed or economically inactive. This method was used so that no cases were excluded from the analysis for being missing or in a residual (or other) category as missing cases were included in the not disadvantaged

category; thus, the scale could be applied across the population. The count ranged from 0 to 7 indicators of low SES. Only 305 cases, however, scored positively on all indicators of low SES and so these cases were merged with those scoring positively on six indicators.

The HSE smoking status categories were current smokers, ex-regular smokers and never been a regular smoker. Percentages of current, ex- and never cigarette smoking by count of low SES indicators [divided into two categories: 'more affluent' (0–3 indicators) and 'multiply disadvantaged' (4–7 indicators)] for 2001–03 and 2006–08 were calculated. These 3 year averages were used to reduce data noise.<sup>24</sup> Using confidence intervals, significant changes over time were noted. The proportions of smokers and non-smokers who would be classified as low SES or multiply disadvantaged in 2001–03 and 2006–08 were also calculated.

## Results

The analysis explored the relationship between levels of disadvantage and smoking rates, changes in smoking rates by disadvantage and the proportion of smokers and non-smokers who could be classified as multiply disadvantaged.

**Table 1** Count of low SES indicator distribution and smoking rates (95% CI)

Number of indicators of low SES	n	%	% Smoking
0	28 956	32.4 (31.8–32.9)	15.3 (14.8–15.8)
1	23 513	26.9 (26.5–27.3)	21.5 (20.8–22.1)
2	14 594	16.7 (16.4–17.1)	26.3 (25.4–27.1)
3	9555	10.9 (10.6–11.2)	30.3 (29.2–31.4)
4	6307	7.2 (6.9–7.4)	36.1 (34.7–37.4)
5	3630	4.0 (3.8–4.3)	46.1 (44.2–48.0)
6/7	2567	1.9 (1.8–2.0)	60.7 (58.2–63.3)
Total	88 337	100.0	24.0 (23.6–24.4)

**Table 2** Rates of current, former and never smoking among the multiply disadvantaged and the more affluent

	Multiply disadvantaged (4–7 indicators)		More affluent (0–3 indicators)	
	2001–03 (n = 5431), % (95% CI)	2006–08 (n = 4393), % (95% CI)	2001–03 (n = 32 253), % (95% CI)	2006–08 (n = 31 482), % (95% CI)
Current	42.6 (41.0–44.2)	42.4 (40.6–44.2)	22.8 (22.2–23.4)	19.4 (18.8–19.9)
Ex	20.0 (18.9–21.1)	17.3 (16.1–18.6)	25.9 (25.4–26.4)	25.4 (24.9–26.0)
Never	37.4 (35.9–39.0)	40.3 (38.5–42.1)	51.3 (50.7–52.0)	55.2 (54.5–55.9)
Total	100.0	100.0	100.0	100.0

## Disadvantage and smoking prevalence

HSE data suggested that, between 2001 and 2008, about a third of English adults were not disadvantaged on any indicator of low SES (Table 1). Over half the respondents scored positively on fewer than two indicators of low SES. The number of cases in each category reduced successively until <2% scored positively on the maximum (six or seven) number of low SES indicators.

Overall, HSE data suggested that ~24% of the English population smoked during the study period. There was a gradient between count of low SES indicators and the smoking rate. Only 15% of those with no indicators of low SES smoked, whereas 60% of those scoring positively on six and seven indicators of low SES smoked. For every indicator of low SES added, smoking increased by ~5% up to four indicators. The difference between four and five indicators was an extra 10% smoking and the difference between five and six/seven indicators was 15% smoking. Thus smoking rates were markedly high among those with multiple indicators of disadvantage.

## Prevalence, quitting and never smoking

Rates of current smoking, ex-smoking and never smoking were compared (Table 2) for those scoring positively on multiple (4–7) indicators of disadvantage and the more affluent (scoring positively on 0–3 indicators). About two-fifths of the multiply disadvantaged smoked, which was a significantly higher proportion than among the more affluent (one-fifth). Thus, smoking rates of the multiply disadvantaged were double that of the more affluent. Among the more affluent, smoking prevalence significantly declined during the study period, from 22.8% (95% CI: 22.2–23.4) in 2001–03 to 19.4% (18.8–19.9) in 2006–08.

While about a quarter of the more affluent were ex-smokers, only about a fifth of the multiply disadvantaged were ex-smokers and the proportion of ex-smokers in this group declined significantly over time [from 20.0% (18.9–21.1) to 17.3% (16.1–18.6)].

There were significantly more never smokers among the more affluent (just over half) than the multiply deprived (about two-fifths). The proportion of never smokers rose significantly among the more affluent from 51.3% (50.7–52.0) in 2001–03 to 55.2% (54.5–55.9) in 2006–08.

### What proportions of smokers were affluent or multiply disadvantaged?

Among smokers about a fifth [20.7% (19.9–21.4)] were affluent (no indicators of disadvantage) and this proportion did not change over time (Fig. 1). Thus, four-fifths of smokers could be classified as being socioeconomically disadvantaged to some degree. Among non-smokers, on the other hand, the proportion that was affluent grew from 34.2% (33.2–35.2) in 2001–03 to 37.5% (36.6–38.4) in 2006–08.

The previous analysis revealed that high rates of smoking were maintained during the study period among the multiply disadvantaged. Nearly one in four smokers were classified as multiply disadvantaged, whereas only a tenth of non-smokers were multiply disadvantaged. Multiple disadvantage significantly declined among non-smokers during the study period [from 11.0 (10.4–11.7) to 9.0 (8.4–9.6)] but not among smokers.

## Discussion

### Main findings of this study

During this period of concentrated policy effort to tackle smoking in England, we found that smoking prevalence fell; and that this decline appeared to result more from a growth

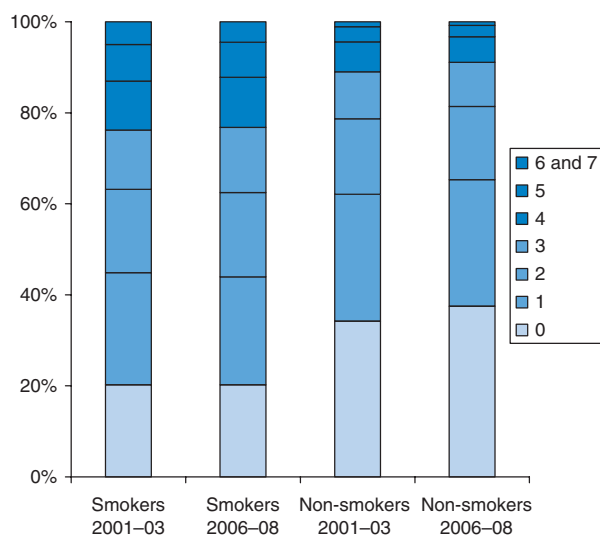


Fig. 1 Distribution of SES among smokers and non-smokers in 2001–03 and 2006–08.

in the proportion of the population who never smoked than an increase in ex-smokers.

This decline did not occur amongst the multiply disadvantaged. Eighty per cent of smokers experienced some form of disadvantage. Disadvantage declined in general but not among smokers.

### What is already known on this topic

Joosens and Raw's tobacco control scale classifies European countries according to the policies they have in place and the UK has occupied the top position in this scale since 2007.<sup>9,22</sup> This reflects the comprehensive national tobacco control strategy that the UK government implemented from 1999 onwards. Furthermore, tobacco control in the UK was, and continues to be, explicitly linked to reducing health inequalities.<sup>25,26</sup> While the evidence base on smoking cessation among disadvantaged smokers is weak, it would appear that current measures have limited effectiveness.<sup>9</sup>

It is beyond the scope of this paper to identify why there was a growth in never smokers during the study period, but this finding is not unique to England. Comparison of the New Zealand 1996 and 2006 censuses revealed a similar decline in smoking resulting from an increase in never smoking rather than an increase in quitting.<sup>27</sup> Further analysis by age showed an increase in never smokers among younger age groups, implying that the reduction in smoking was due to a reduction in smoking uptake. Australian data<sup>28</sup> also suggest that a decline in uptake is one of the main determinants of the fall in smoking, although cessation among older people was also a driver. Smoking uptake among young people in England has declined since the 1980s.<sup>29</sup> Thus, a reduction in uptake is likely to be part of the explanation for the growth in never smokers and may reflect at least in part the success of tobacco control policies aimed at stopping younger people from taking up smoking. Another New Zealand study<sup>30</sup> found that large numbers of non-smokers moved from abroad to the most affluent locations, significantly reducing smoking rates in these areas. Thus immigration can also increase observed never smoking rates.

### What this study adds

Overall, the decline in smoking observed in the population of England 2001–2008 was associated with a growth in never smoking but not with a growth in the proportion of ex-smokers. This decline was not apparent among the multiply disadvantaged.

Among the multiply disadvantaged, the proportion who had quit declined from 2001 to 2008, implying that smoking may become even more concentrated in this group in the

future. Already ~80% of smokers have at least one indicator of disadvantage and nearly a quarter are multiply disadvantaged. Smoking is common among disadvantaged groups but previous research has indicated that achieving higher rates of smoking cessation will be a struggle.<sup>31</sup>

Moreover, the proportion of the population that could be classified as multiply disadvantaged declined among non-smokers but not among smokers, while the proportion of the most affluent grew among non-smokers but not among smokers. This could indicate that smoking may be preventing a potential rise in SES: smokers, through their expenditure on tobacco, have fewer free financial resources.<sup>32</sup> However, the data on which this study were based are (repeat) cross-sectional, so causal attributions cannot be made.

The survey used for our analyses was the HSE rather than the General Household Survey [GHS (now the General Lifestyle Survey)].<sup>33</sup> Our findings are, however, similar to those from the GHS,<sup>5</sup> although we used various measures of disadvantage rather than the simple manual versus non-manual split published for the GHS. If the reader would like to know more about the individual indicators used in the composite measure, more information is available in our extended report.<sup>9</sup> Similarities between results from the GHS and HSE are also encouraging firstly because the complex structure of the GHS limits the accuracy of statistical analysis of publically available data, which is why we used HSE and secondly the GHS is to be discontinued in its current form from 2012<sup>9,34</sup> so future researchers will be more reliant on the HSE.

This study has a number of implications for policy. The first is that smoking cessation interventions need to tackle smoking among the most disadvantaged in society perhaps more than the population in general. In addition, smoking appears to be linked with a loss of opportunity for increments in SES. This could be a basis for mass media campaigns for example, or for policies addressing multiple disadvantage in general rather than smoking itself. Thirdly, smoking in England has declined in recent years due to reduced uptake, suggesting that policies aimed at preventing people from starting smoking in the first place may be a particularly important element of tobacco control.

### Limitations of this study

There were some disadvantages to the scale of indicators of low SES. First, the individual indicators each have disadvantages. For example, the index of multiple deprivation is an area-based indicator; thus, although on average residents of an area may be disadvantaged, there is no guarantee that the survey respondent was disadvantaged (the ecological fallacy).

This is one reason why a composite indicator of SES was used so that issues with individual indicators could be tempered by other indicators. Secondly some population groups were less likely to be low SES on some indicators; for example, men and older people were less likely to be lone parents, and thirdly missing data, which in general is more common among low SES,<sup>35</sup> was not coded as low SES. We believe, however, that having a scale that can be applied to all survey respondents outweighs these issues.

There were some disadvantages to using the HSE. The HSE is a cross-sectional survey so it was not possible to trace quitters to look at relapse rates. It may be possible to conduct longitudinal research using the British Household Panel Survey.<sup>36</sup> HSE data were only available up to 2008 during the period of analysis. Patterns may have changed since then.<sup>37</sup>

Chronology could be explored further: first, possibly using trend analysis, although calculating significance would be difficult given the complex samples used by the main national data sets; and, second, through looking more closely at changes in the English population during the 2000s, for example in the distribution of age groups, genders and ethnic groups and differential mortality and migration rates, to see if these explain the observed changes in the ex-smoking and never smoking rates.

### Conclusion

Smoking prevalence declined in England between 2001 and 2008, a time period when a range of tobacco control policies was put in place. This decline was restricted to the more affluent, however, and was largely attributable to an increase in never smoking rather than an increase in quitting. Smoking rates were highest amongst the multiply deprived who make up almost a quarter of the remaining smoking population in England. It is thus important that current and future tobacco control measures are targeted towards less affluent groups. In particular, England faces the challenge, shared by many developed countries, of encouraging more disadvantaged smokers to quit, if smoking rates are to decline further in the future. Innovative approaches and further research are likely to be required to determine the most effective routes to smoking cessation for this group.

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