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Quit attempts in response to smoke-free legislation in England

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ABSTRACT

Objectives To determine whether England's smoke-free legislation, introduced on 1 July 2007, influenced intentions and attempts to stop smoking.

Design and setting National household surveys conducted in England between January 2007 and December 2008. The sample was weighted to match census data on demographics and included 10 560 adults aged 16 or over who reported having smoked within the past year.

Results A greater percentage of smokers reported making a quit attempt in July and August 2007 (8.6%, n=82) compared with July and August 2008 (5.7%, n=48) (Fisher's exact=0.022); there was no significant difference in the number of quit attempts made at other times in 2007 compared with 2008. In the 5 months following the introduction of the legislation 19% (n=75) of smokers making a quit attempt reported that they had done so in response to the legislation. There were no significant differences in these quit attempts with regard to gender, social grade or cigarette consumption; there was however a significant linear trend with increasing age ($\chi^2=7.755$, df=1, $p<0.005$). The prevalence of respondents planning to quit before the ban came into force decreased over time, while those who planned to quit when the ban came into force increased as the ban drew closer.

Conclusion England's smoke-free legislation was associated with a significant temporary increase in the percentage of smokers attempting to stop, equivalent to over 300 000 additional smokers trying to quit. As a prompt to quitting the ban appears to have been equally effective across all social grades.

INTRODUCTION

England introduced smoke-free legislation on 1 July 2007, making smoking in enclosed public places and workplaces illegal.¹ This followed the introduction of similar legislation in Scotland on 26 March 2006, Wales on 2 April 2007 and Northern Ireland on 30 April 2007. Although smoke-free legislation in England was aimed at protecting non-smokers from exposure to environmental tobacco smoke,¹ some effect on smoking prevalence was also anticipated through prompting quit attempts and reducing relapse.²

Smoke-free legislation has been implemented in a number of other countries and states across the world (see table 1).³

Evaluations of the impact of the introduction of smoke-free legislation in some of these countries including New Zealand, Ireland, Scotland, Norway and the state of New York have found that it was popular among both non-smokers and smokers⁴⁻⁸ and that compliance was high.^{5 7 9 10} Self-reported exposure to environmental tobacco smoke has also

been found to fall significantly after legislation^{5 6 8} and in Scotland it led to a considerable reduction in admissions to hospital for myocardial infarctions.¹¹ In Norway 70% of employees thought that the legislation was an acceptable way to reduce environmental tobacco smoking and 57% agreed that it had improved their work conditions; improvements in health were also seen, particularly among quitters and non-smokers.⁹

Similar findings have also been reported in Northern Ireland and England.^{12 13} Many countries, including New Zealand, have reported an increase in the number of calls to quitlines following the implementation of smoke-free legislation.⁵ Smoke-free worksite policies in areas of the USA and Canada were associated with a reduction in cigarette consumption, and in some cases a quit attempt.¹⁴ A significant increase in self-reported quit attempts were reported in the year following the implementation of legislation in Norway compared with the 12 months preceding it, although recall bias clearly exists when asking smokers to report quit attempts over a two-year period.⁹ To date there has been no accurate national evaluation of changes in the rate of quit attempts leading up to and following the introduction of a smoking ban.

Attempts to stop smoking in England tend to cluster around January (presumably as part of New Year's resolutions) and March (most likely in response to No Smoking Day).¹⁵ Indeed, in both January 2007 and January 2008, 10.7% of smokers questioned tried to quit smoking compared with 7.5% in the other months of the year.¹⁵ It was not known what effect the introduction of legislation banning smoking in enclosed public places and workplaces would have upon the overall number of quit attempts in England, nor upon the distribution of these quit attempts throughout the year.

It is not possible to gain experimental evidence on the effect of policies such as this, but observing the rate at which smokers try to stop at frequent intervals over a period of time provides the most accurate indication available.

This paper aimed to examine quit attempts in England in response to the introduction of smoke-free legislation through examining self-reported intention to quit smoking in the run-up to the introduction of the legislation; self-reported intention to quit smoking following the introduction of the legislation; and self-reported quitting behaviour in the 6 months before and 18 months after the introduction of the legislation.

METHODS

Data were collected as part of the Smoking Toolkit Study which provides statistics on key parameters

Table 1 Comprehensive, enforced smoke-free legislation across the world

Country	Date of implementation and state, region or territory if legislation not introduced across entire country
Australia*	2004: Queensland 2006: Tasmania, Western Australia, Australian Capital Territory 2007: New South Wales, Victoria, South Australia
Bermuda	2006
Bhutan	2004
Canada*	2004: Northwest Territories, Nunavut Territory, New Brunswick, Manitoba 2005: Saskatchewan, Newfoundland and Labrador 2006: Ontario, Quebec, Nova Scotia 2008: Alberta, British Columbia, Yukon
France	2008
Guernsey	2006
Iceland	2007
Isle of Man	2008
Jersey	2007
Montenegro	2005
New Zealand	2004
Norway	2004
Republic of Ireland	2004
UK	2006: Scotland 2007: England, Northern Ireland, Wales
USA*	1998: California 2002: Delaware 2003: New York 2004: Maine, Connecticut, Massachusetts, Rhode Island 2005: Vermont, Washington 2006: New Jersey, Colorado, Hawaii, Ohio 2007: Arizona, New Mexico, New Hampshire, Minnesota 2008: Illinois, Maryland, Pennsylvania 2009: Utah, Oregon, Montana
Uruguay	2006

Adapted from ASH Scotland.³

*Denotes country where some states, regions or territories have not introduced smoke-free legislation.

relating to smoking cessation in England. A series of monthly, face-to-face, computer-assisted, interviews were carried out by trained interviewers with one member per selected household. These provided information on smoking and smoking cessation patterns and behaviour among smokers and recent ex-smokers in England. A cross-sectional national sample of households, involving approximately 1700 adults over 16 years of age, including a subset of smokers and recent ex-smokers, were selected using a random location sampling design. Further details of the methods are described elsewhere.¹⁶

The surveys were conducted in person and respondents were asked, in addition to questions about demographic characteristics (gender, age, social grade, marital status and employment status): 'Which of the following best applies to you?': 'I smoke cigarettes (including hand-rolled) everyday'; 'I smoke cigarettes (including hand-rolled) but not every day'; 'I do not smoke cigarettes at all but I do smoke tobacco of some kind (eg, pipe or cigar)'; 'I have stopped smoking completely in the last year'; 'I stopped smoking completely more than a year ago'; 'I have never been a smoker (ie, smoked for a year or more)'; 'don't know'. This produced a subsample who reported being either current smokers or having smoked during the past year and it is data from this sample that are reported. These subjects were asked a further set of questions related to their smoking and quitting behaviour: 'How many serious quit attempts to stop smoking have you made in the last 12 months?'; for each quit attempt

they were asked how long ago it was made and this was used to work out, for each smoker and ex-smoker, whether a quit attempt had been made in the preceding month.

Additionally, between February and June 2007, respondents who reported smoking in the past 12 months were asked: 'As you may have heard a smoking ban is being implemented in workplaces and enclosed public places in England from the 1 July this year. Which of the following best describes your plans?': 'I plan to quit before the ban comes into force'; 'I plan to quit when the ban comes into force'; 'No definite plan'; 'Don't know'. Between July and November 2007 participants were asked 'Did you make a quit attempt prompted by the smoking ban in workplaces and enclosed public places in England which began on 1 July this year?': 'Yes, my most recent quit attempt'; 'Yes, my second most recent quit attempt'; 'Yes, my third most recent quit attempt'; 'No'; 'Don't know'.

Data were analysed using SPSS version 13.1¹⁷; categorical and continuous data were analysed using χ^2 tests and t tests, respectively. Quit attempts reportedly made in the past month in July and August 2007 were compared with those in 2008. August was included in addition to July to capture all of those who made a quit attempt in the full month following the introduction of the legislation. For comparison, quit attempts made during other months were compared across the two years.

Between January 2007 and December 2008, 41 086 adults were surveyed, of whom 10 560 reported having smoked in the past 12 months and it is data from these adults that are reported here. The mean age of respondents was 41 years (range: 17–92; SD=16.2) with proportionally fewer respondents aged 45 and over. There were slightly more male (52%; n=5468, 95% CI 50.8% to 52.7%) than female respondents (48%, n=5092, 95% CI 47.3% to 49.2%). There was an equal spread of respondents across social grades C1 (supervisory or clerical and junior managerial, administrative and professional) (25%, n=2643, 95% CI 24.2% to 25.9%), C2 (skilled manual) (24.1%, n=2544, 95% CI 23.2% to 24.9%) and D (semi-skilled and unskilled manual) (22.5%, n=2371, 95% CI 21.7% to 23.2%); with slightly fewer respondents in social grades AB (higher managerial, administrative and professional; intermediate managerial, administrative and professional) (16.3%; n=1720, 95% CI 15.6% to 17.0%) and E (casual labourers, state pensioners, the unemployed) (12.1%; n=1281, 95% CI 11.5% to 12.8%). The mean reported number of cigarettes smoked per day was 13.45 (range 0–100; SD=8.69) and the mean Fagerstrom test for nicotine dependence (FTND) score was 3.47 (range 0–10; SD=2.08). The mean FTND score was slightly higher for those included in the 2008 survey (3.6; SD=2.12) compared with 2007 (3.4; SD=2.05) (t=5.56, p<0.001). There were no statistically significant differences between respondents to the 2007 and to the 2008 surveys according to gender, age, social grade and daily cigarette consumption.

RESULTS

It was found that a larger percentage of respondents reported making a quit attempt in July and August 2007 (8.6%, n=82, 95% CI 6.9% to 10.9%) compared with July and August 2008 (5.7%, n=48, 95% CI 4.2% to 7.5%) (Fisher's exact test 0.022).

In order to establish whether or not this difference was due to a higher number of quit attempts overall in 2007 compared with 2008, we compared the percentage of respondents who reported making a quit attempt in 2007 and in 2008, excluding July and August. There was no significant

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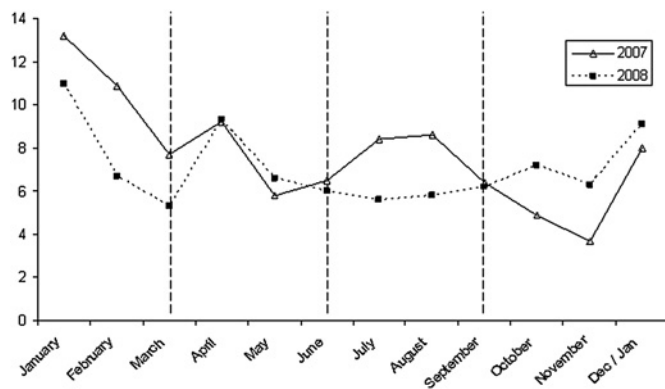


Figure 1 Percentage of respondents making a quit attempt by month for 2007 and 2008.

difference between the proportion of respondents setting a quit date in 2007 (7.8%, $n=391$, 95% CI 7.1% to 8.5%) compared with 2008 (7.2%, $n=270$, 95% CI 6.4% to 8.1%) (Fisher's exact test 0.270).

Figure 1 shows the percentage making a quit attempt by month for 2007 and 2008. Both 2007 and 2008 show a peak in quit attempts in January and a second peak three months later in April, probably reflecting quit attempts made in response to No Smoking Day on the second Tuesday of March. The other shared peak in December/January is most likely an artefact of the fact that the December data collection ran into January for both years and hence picked up New Year quitting. The higher number of quit attempts during July and August 2007 compared with 2008 seems to have been at least partially offset during October and November.

If we consider these data by quarter (see table 2), we see that in the first and third quarters the percentage of current smokers making a quit attempt in 2007 was significantly higher than for 2008. The percentage making a quit attempt in the second quarter was identical but, while the percentage of quit attempts was lower in 2007 than 2008 in the fourth quarter; this did not reach statistical significance.

In July and August 2007 19% ($n=75$) of all smokers making a quit attempt ($n=394$) said they did so in response to the introduction of the ban on smoking in public places and workplaces in England on 1 July 2007. There was no statistically significant difference between men (21%, $n=40$) and women (17%, $n=35$) in their reported quit attempts in response to smoke-free legislation (Fisher's exact test=0.443). There was also no difference in reported quit attempts in response to the smoke-free legislation according to social grade (Fisher's exact test=0.727) or cigarette consumption (Fisher's exact test=0.553). There was, however, a significant inverse linear association by increasing age: 16–24 (28%, $n=21$); 25–34 (21%, $n=16$); 35–44 (31%, $n=23$); 45–54 (13%, $n=10$); 55–64 (5%, $n=10$) and 65+ (1%, $n=1$) ($\chi^2=7.755$, $df=1$, $p<0.005$).

In each monthly survey between February and June 2007 (inclusive) respondents were asked whether they had any plans

to quit smoking in response to the impending smoke-free legislation coming into force on 1 July 2007 (see table 3).

A large majority of smokers surveyed had no plans to quit and this remained largely static each month, apart from in March when there was an increase in the percentage who planned to quit before the ban came into force. There was a significant trend across months for intention to quit, both for before and after the ban was introduced ($\chi^2=27.175$, $df=1$, $p<0.0001$). The percentage of respondents planning to quit before the ban came into force decreased over time, from over 18% in March to 7% in June. Meanwhile, those who planned to quit when the ban came into force increased from under 7% in March to nearly 16% in June.

DISCUSSION

This is the first time that intentions to quit and quit attempts in response to the introduction of smoke-free legislation have been reliably reported on a national scale. The percentage of smokers who reported making an attempt to stop smoking in July and August 2007 (8.6%) was significantly higher than for July and August 2008 (5.7%). This difference, which equates to about 320 000 smokers making a quit attempt when extrapolated to the general smoking population, coincided with the ban on smoking in public places and workplaces.

This finding provides policy-makers, in countries where banning smoking in public places and workplaces has yet to occur, with potentially useful estimates of the size of effect on quitting that may be expected. The fact that there was a non-significant dip in quit attempts later in 2007 suggests that the smoke-free effect may be mitigated by subsequent reduction in quitting activities (see figure 1). Table 2 showed that there was a significant difference in quit attempt rates between 2007 and 2008 in the first quarter and third quarter. It could be hypothesised that the difference in the first quarter may have occurred because those who would have quit in the 2008 New Year period may already have quit around the time that the smoke-free legislation was introduced (ie, July 2007; third quarter). It can also be seen that the third quarter in 2007 showed a similar percentage of people making a quit attempt as the first quarter in 2008, thus any effect of smoke-free legislation was of a similar magnitude to the annual 'New Year' effect.

Roughly one-quarter of smokers surveyed in the five months leading up to implementation of smoke-free legislation in England intended to quit because of the ban, either before or after it came into force. Once the ban was in place from 1 July 2007 nearly one in five smokers who made a quit attempt in the 5 months following the implementation stated that they had stopped because of the legislation; this was equally true for smokers in routine and manual groups as it was for smokers from higher social grades. The fact that we were not able to observe an increase in quitting directly ahead of the ban suggests that intention to quit at this time was not enacted in large numbers.

It is encouraging that reported quitting in response to the introduction of the smoking ban did not differ according to

Table 2 Percentage of respondents making a quit attempt by quarter for 2007 and 2008

Quarter	2007 % of quitters (95% CI; n/N)	2008 % of quitters (95% CI; n/N)	Fisher's exact test (two-sided)
1st (January–March)	10.2 (9.4 to 11.0; 191/1866)	7.8 (6.9 to 8.7; 98/1255)	$p=0.023$
2nd (April–June)	7.2 (6.5 to 7.9; 98/1360)	7.2 (6.4 to 8.1; 90/1247)	$p=1.0$
3rd (July–September)	7.9 (7.2 to 8.7; 110/1393)	5.9 (5.2 to 6.7; 75/1282)	$p=0.039$
4th (October–December/January)	5.5 (4.9 to 6.1; 74/1339)	6.7 (5.9 to 7.5; 55/817)	$p=0.26$

Table 3 Intention to quit in response to the introduction of the ban on smoking in public places: February–June 2007

Response	February % (n, 95% CI)	March % (n, 95% CI)	April % (n, 95% CI)	May % (n, 95% CI)	June % (n, 95% CI)
Don't know	0.9 (4, 0.2 to 2.2)	0.4 (3, 0.08 to 1.1)	0.2 (1, 0.006 to 1.3)	0 (0)	0.5 (2, 0.07 to 1.9)
I plan to quit before the ban comes into force	18.4 (84, 14.8 to 21.9)	26 (215, 23 to 29)	19 (84, 15.3 to 22.6)	12 (54, 9 to 15)	7 (26, 4.6 to 10.1)
I plan to quit when the ban comes into force	6.8 (31, 4.7 to 9.5)	8.8 (73, 7 to 11)	9.7 (43, 7.1 to 12.8)	11.6 (52, 8.6 to 14.5)	15.9 (59, 12.2 to 19.7)
No definite plan	73.9 (337, 69.7 to 77.8)	64.8 (536, 61.6 to 68.1)	71.7 (315, 66.9 to 75.3)	76.4 (344, 72.5 to 80.4)	76.5 (283, 72.2 to 80.8)
Total number	457	827	443	450	370

What is already known about this topic?

Smoke-free legislation has resulted in decreased exposure to environmental tobacco smoke and increased calls to national quitlines. Increased numbers of quit attempts and reduction in smoking prevalence have been associated with the introduction of smoke-free legislation, although causation has not been established.

What this study adds?

This is the first time that intentions to quit and quit attempts in response to the introduction of smoke-free legislation have been reported on a representative and reliable national sample. The legislation was associated with a significant increase in the percentage of smokers attempting to stop around the time of implementation, equivalent to over 300 000 additional smokers trying to quit.

social grade. This suggests that while smoke-free legislation may not necessarily have contributed to reducing the gap in smoking prevalence between lower and higher social grades, it did not widen inequalities. Smokers in lower social grades are just as likely to try and stop smoking as those in higher social grades; however the former are half as likely to succeed.¹⁸ Smokers under 45 years of age were significantly more likely to report stopping smoking because of the ban than older smokers. This has additional health implications as the increased benefits to an individual's health experienced when they stop smoking at a younger age are well established,¹⁹ as well as the fact that young people are more likely to try and quit.¹⁵

This study had a number of limitations. First of all, quit attempts were self-reported and smokers may forget or misreport attempts to stop. It is recommended that in most settings biochemical verification is provided as additional insurance that the participants' self-reports are accurate.²⁰ It should also be noted that not all quit attempts are sustained in the longer term, with around 5% of quit attempts lasting at least one year and about 3% lasting indefinitely.²¹ In addition, the question could be asked whether people can reliably attribute a quit attempt to one particular event, such as the smoking ban. However the comparison between July–August 2007 and July–August 2008 suggests that the period of time where the smoking ban was introduced coincided with a significantly higher number of quit attempts, which can justifiably be attributed to the smoking ban. In addition to this, data were unavailable for 2006, thus

comparisons could not be made with the period before January 2007. It may have been of interest to explore links between the current data and national smoking prevalence rates; however this was not covered in the scope of this research. Finally, other events may have occurred during this time that could have made a difference; however these were not recorded.

CONCLUSION

The introduction of legislation banning smoking in public places and workplaces in England in 2007 was associated with a significant increase in the percentage of smokers attempting to stop at the time that the legislation was introduced. The ban appears to have had an equal impact on quitting behaviour across social grades and was particularly effective as a prompt to quitting among smokers less than 45 years of age.

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Ethical approval Ethical approval was sought and gained from the University College London Graduate School Ethics Committee.

Provenance and peer review Not commissioned; externally peer reviewed.

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