

Non-daily smoking in England - addressing common misconceptions

Aleksandra Herbec¹, Jamie Brown¹, Robert West^{1,2}

¹ Cancer Research UK Health Behaviour Research Centre, Department of Epidemiology and Public Health, University College London, 1-19 Torrington Place, London, WC1E 7HB, UK

² National Centre for Smoking Cessation and Training, 1-6 Yarmouth Place, London, W1J 7BU, UK

Abstract

Aims: This study examined whether what appear to be commonly held views about non-daily smoking in England are borne out by the evidence: that it is increasing, cigarette consumption is very low, it is undertaken primarily for social reasons, and addiction is minimal. It also examined smoking motives, motivation to quit and quitting activity in non-daily smokers compared with daily smokers.

Methods: Monthly household surveys of representative samples of the adult population in England (the 'Smoking Toolkit Study') were conducted between November 2006 and December 2013 including 31,797 daily smokers, 3,525 non-daily smokers, and 96,245 never smokers. Prevalence of non-daily smoking was assessed over this period and smoking as well as quitting patterns, and attitudes to smoking and quitting.

Results: The prevalence of non-daily smoking was stable at around 2% in the adult population; cigarette consumption averaged an equivalent of 5.2 cigarette per day; socialising was cited as a reason for smoking by only 19.4%; 39.5% had tried and failed to quit in the past year. Non-daily smokers were somewhat more motivated to quit than daily smokers and enjoyed smoking less, but a majority were still not concerned about risks to their health.

Conclusions: Non-daily smoking remains rare in England and cigarette consumption is the equivalent of more than 5 per day. Non-daily smokers mostly do not report smoking for social reasons.

Correspondence to:

aleksandra.herbec.11@ucl.ac.uk

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Commentaries: Readers are invited to comment on this article including presenting results of additional data analyses by going to: www.smokinginbritain.co.uk.

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Introduction

Cigarette smoking causes substantial morbidity and premature mortality (Doll et al, 2004; Pirie et al, 2012). Historically the large majority of smokers have been daily smokers, with average consumption in England at 12-13 cigarettes per day (Brown et al, 2013). Smoking prevalence has been gradually decreasing in the high income countries (Centers for Disease Control and Prevention, 2011; OECD, 2012; Sacks, et al, 2012; Brown & West, 2014). However, non-daily smoking, also referred to as occasional, intermittent or 'some days' smoking, appears to be becoming more prevalent in some countries, with several studies in US and Europe reporting an increase in its prevalence among the current smoking population up to the levels of 16-22% of smokers (Bogdanovica et al., 2011; Centers for Disease Control and Prevention, 2011; Schane et al, 2009; Wortley et al, 2003) and even as high as 36% in some communities (Sacks, et al; 2012). Non-daily smoking has been found to increase morbidity and premature mortality (Shane et al, 2010; US Department of Health and Human Services; 2004).

There has been some research into the characteristics of non-daily smokers. These have found them to be younger, more likely to be female, have higher socio-economic status and higher educational attainment, (Berg, et al, 2012; Lindström et al, 2002; Sacks et al, 2012; Shiffman, et al, 2012a; West, Hajek & Wilson, et al, 1995; Wortley et al, 2003), and be from an ethnic minority (Husten et al, 1998; Wortley et al, 2003). Non-daily smokers were also found to be less dependent on cigarettes, more interested in quitting smoking (Tong, et al, 2006), and more likely to have made a quit attempt in the past year (Shiffman, et al, 2012b; Wortley et al, 2003). However, they were still shown to struggle to quit smoking (Tindle & Shiffman, 2011; Kotz, et al, 2012) and be less likely to receive and seek smoking cessation treatment (Rutten, et al, 2009; Tong et al., 2006).

It remains to be seen whether prevalence of non-daily smoking is increasing in England and a number of assumptions continue to be made that it would be useful to examine, including the assumptions that non-daily smokers smoke only very few cigarettes, primarily for social reasons, they are not addicted, and run minimal health risks (Hainer, 2010).

We used data from an ongoing survey of smokers (daily and non-daily) to examine these assumptions and to characterise non-daily smokers on a range of other dimensions.

Methods

Design: A series of cross sectional household surveys (the Smoking Toolkit Study).

Sample: Data were collected using monthly household surveys of people aged 16 years and above in England between November 2006 and December 2013. The methods have been shown to produce a sample representative of the adult population (Fidler et al, 2011). In total 156,011 respondents were interviewed, and the present study is based on data from all of the respondents who were current daily smokers (31,797, 20.4%), current non-daily smokers (3,525, 2.3%), and never smokers (96,245, 61.7%). The remaining 23,472 (15.0%) respondents were ex-smokers, and for 972 (.6%) the data on smoking status was missing. An open access paper provides full details of the survey procedures (Fidler et al, 2011). See also www.smokinginengland.info.

Measures: Supplementary Materials 1 provides all questions used to collect the data that were analysed in the present study. In each wave of the survey data were collected on demographic characteristics (age and gender), socio-economic status ('higher' vs. 'lower' SES; lower SES was indicated by long-term unemployment, or employment in a manual or routine setting assessed by social grade (IPSOS, 2009), and smoking status (current daily smoking, current non-daily smoking, and never smoking).

The current daily and non-daily smokers provided information on their cigarette consumption (the number of cigarettes smoked per day or per week, including hand-rolled), how soon after waking they

smoked their first cigarette (based on Fagerström Test for Cigarette Dependence; FTCD; Heatherton et al, 1992), and their history of serious quit attempts. Additionally, at different survey waves the respondents were assessed on a range of additional characteristics (the number of respondents providing data on each characteristic is indicated in each table), including cigarette dependence levels measured through strength of urges to smoke (Fidler et al, 2010) and items from Fagerström Test for Cigarette Dependence (FTCD; Heatherton et al, 1992); their motivation to quit; harm reduction behaviours; attitudes and feelings regarding smoking (e.g. health concerns, satisfaction from smoking); and reasons for continued smoking. In addition, all respondents between the beginning of the survey and April 2012 who were smoking (daily or non-daily) in the 12 months up to the baseline survey, and who provided consent, were followed up at 6 months and their smoking status (still smoking or not; cutting down or not) was assessed.

In addition, as a preliminary test of the hypothesis that non-daily smokers suffer on-going health problems, in six waves of the study non-daily smokers, daily smokers and never smokers aged 40 and above provided data on health-related quality of life (HRQoL) using EQ-5D (The EuroQol Group, 1990), consisting of dichotomous HRQoL indicators (experiencing/not experiencing 'some' or 'severe' problems in five domains: mobility, self-care, usual activities, pain and discomfort, as well as anxiety and depression), as well as a continuous visual analogue scale (VAS) of self-rated health, on which respondents rated their general health from 'Worst imaginable health state' (0) to 'Best imaginable health state' (score 100).

Analysis: Prevalence of non-daily smoking in the general population and among the smoking population was analysed using data weighted to match the general population as ascertained by the 2001 census (weighting was not applied to the other analyses). Descriptive statistics for each comparison between daily smokers and non-daily smokers are presented. The initial comparisons on categorical variables were performed using chi-square, with Fisher's exact test reported for 2x2 comparisons. T-tests were used for continuous variables.

Logistic and linear regressions were used to further compare the two smoking groups on binary and continuous variables respectively, after adjusting for respondents' age, sex and SES which could have confounded some of the findings. Associated odds ratios from logistic regressions, B-coefficients for linear regressions, as well as 95% confidence intervals for the two are presented.

Chi-squared tests were used to compare daily, non-daily and never smokers on the five domains of EQ-5D, and ANOVA was used to compare VAS scores, with Tukey's post-hoc test used to identify significant pair-wise comparisons. Logistic regression and linear regression were used to compare the EQ-5D domains and VAS scores, respectively, among non-daily smokers in comparison to daily smokers and never smokers.

It is possible that some of the non-daily smokers may be in the aftermath of a quit attempt, having lapsed but not fully resumed their previous smoking patterns. This may lead to an inflated impression of the level of motivation to stop smoking. Therefore motivation to quit was also assessed in a subset who had not made a quit attempt in the past 12 months and compared with daily smokers who had not tried to quit in the same period.

Results

Turning first to examination of assumptions about non-daily smoking, between November 2006 and December 2013, the prevalence of non-daily smoking did not change significantly, remaining at approximately 2% of the adult population and just over 10% of smokers (Figure 1).

The results of the comparisons between daily and non-daily smokers on socio-demographic characteristics and cigarette dependence are presented in Table 1. Compared with daily smokers, non-daily smokers were slightly younger, and from higher SES (Table 1). Non-daily smokers averaged the equivalent of 5.2 cigarettes per day compared with 13.9 for daily smokers. Fewer non-daily smokers

were strongly dependent on cigarettes, as indicated by their answers to full FTCD and its individual items. Additionally, fewer non-daily smokers reported strong urges to smoke than did daily smokers, but it was still a substantial minority (14.5% versus 41.5%). (see Table 1)

Table 2 presents data on motivation to quit, quitting behaviour and harm reduction. Motivation to stop smoking was slightly higher in non-daily than daily smokers even when the sample was restricted to those who had not tried to quit in the past 12 months. Similarly, non-daily smokers were more likely to have made an attempt to quit in the past month and year, as well as to be currently cutting down.

Prevalence of nicotine replacement therapy (NRT) use for harm reduction (temporary abstinence and cutting down) was similar across daily-smokers and non-daily smokers. A slightly higher percentage of non-daily smokers had tried to quit in the past year than daily smokers (39.5% versus 33.5%).

At 6-month follow up 459 non-daily smokers and 5298 daily smokers provided follow-up data. More non-daily smokers reported not smoking than did daily smokers but the proportion was still low. Of the non-daily smokers and daily-smokers who were still smoking, a similar proportion was currently trying to cut down, at around 62%.

Views on smoking are presented in Table 3. Fewer non-daily smokers felt addicted to smoking, were happy about being a smoker and fewer enjoyed smoking than did daily smokers. A similar proportion of daily smokers and non-daily smokers worried about their current and future health, and would like to be non-smokers. However, a greater proportion of non-daily smokers did not feel that smoking does serious harm to them.

Table 4 presents data on reasons for continued smoking. A significant minority of both non-daily smokers and daily smokers reported enjoying smoking and believing that it helped to deal with stress. Only a minority of non-daily smokers reported that they smoked for social reasons, although this was greater than for daily smokers (19.4% versus 8.2%).

The sample providing data on HRQoL consisted of 1094 (21.4%) current daily smokers, 104 (2.0%) current non-daily smokers, and 3903 (76.5%) never smokers aged 40 and above (Table 5). In the multiple logistic regressions, non-daily smokers had almost twice the odds compared with never smokers of suffering from mobility problems, problems with self-care, as well as experiencing pain or discomfort, and anxiety or depression, but not having problems with usual activities, compared to never smokers. On the overall rating of health on the visual analogue scale non-daily smokers scored slightly, though not significantly lower than never smokers.

Discussion

Non-daily smoking remains rare in England at around 2% of the adult population and just over 10% of smokers. Non-daily smokers' cigarette consumption is higher than might be expected at an equivalent of 5 per day averaged out over the week. Social smoking was higher for non-daily than daily smokers but still only applied to a minority. Evidence of addiction was less than for daily smokers but was still substantial. Among middle-aged and older non-daily smokers, there was evidence of impairment in a number of domains of quality of life compared with never smokers. This study also catalogued a number of other features of non-daily smokers which can help build a picture of this population and identify potential ways of encouraging and helping them to stop.

When it comes to identifying health impairment in non-daily smokers, a limitation of this study is that it could not adjust for other behaviours that might contribute to the difference. In particular, non-daily smokers might exercise less, eat less healthy and drink more alcohol than never smokers. Future research should assess how far the impairment in non-daily smokers can be attributed to these other factors. However, the fact that the impairment was similar to daily smoking suggests that any amount of smoking may lead to a reduction in quality of life.

Although non-daily smokers were somewhat more motivated to stop smoking than daily smokers, approximately half of them did not express concern about the health effects of their smoking. This suggests that there is still a major educational opportunity in helping non-daily and daily smokers to appreciate the harm their behaviour is causing them.

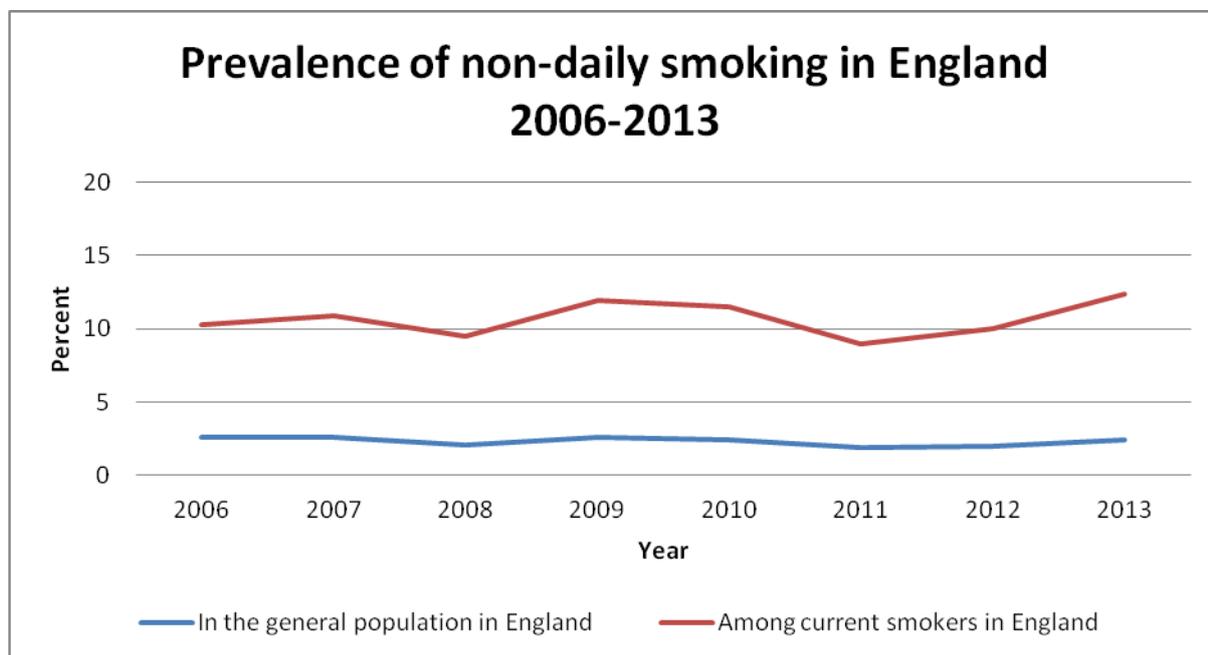
In conclusion, many assumptions about non-daily smokers in England are not borne out by the evidence. It is not increasing and remains rare and in most non-daily smokers cigarette consumption is substantial. Socialising is not the main reason for smoking and there is considerable evidence of addiction. Health related quality of life is lower than never smokers in a number of domains. Although motivation to stop is somewhat higher than in daily smokers, a substantial proportion of non-daily smokers appear to be unconcerned about the harm being caused by their smoking.

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Figure 1. Prevalence of non-daily smoking in England



Smoking in Britain

Table 1. Socio-demographic characteristics and cigarette dependence

Characteristic	All current smokers	daily smokers	Non-daily smokers	Linear regression (daily smokers a ref group)		
				Mean (SD) [Sample used]	p-value	B (95% CI) p-value
Age in years	42.1 (16.6) [35313]	42.4 (16.6) [31790]	38.8 (16.2) [3523]	<0.001	-3.65 (-4.23 to -3.08) [‡]	<0.001
Cigarette consumption						
Cigarettes smoked per week	91.1 (60.5) [35175]	97.1 (58.9) [31667]	36.5 (45.0) [3508]	<0.001	-57.67 (-59.67 to 55.68)	<0.001
Cigarettes smoked per day (weekly consumption/7)	13.0 (8.6) [35175]	13.9 (8.4) [31667]	5.2 (6.4) [3508]	<0.001	-8.24 (-8.52 to -7.95)	<0.001
Logistic Regression (daily smokers a ref group)						
	% (N/sample used)			p-value	OR (95% CI)	p-value
% Female	50.8% (17927/35322)	50.9% (16187/31797)	49.4% (1740/3525)	.082	.94 (.88- 1.01) [‡]	.082
'Lower' SES classification[‡]	68.3% (24112 / 35322)	69.7% (22151/31797)	55.6% (1961/96245)	<0.001	.55 (.519-.59) [‡]	<0.001
Cigarette dependence						
Smokes within 5 min of waking	20.6% (7253/35189)	22.2% (7031/31717)	6.4% (222/3472)	<0.001	.25 (.22-.29)	<0.001
Finds it difficult to refrain from smoking in no-smoking areas	18.0% (3026/16841)	18.9% (2869/15180)	9.5% (157/1661)	<0.001	.45 (.38-.54)	<0.001
Would hate to give up the first cigarette in the morning the most	46.3% (7614/16440)	49.0% (7273/14828)	21.2% (341/1612)	<0.001	.30 (.26-.34)	<0.001
Smokes most frequently in the mornings	14.9% (2496/16808)	16.0% (2417/15146)	4.8% (79/1662)	<0.001	.25 (.20-.32)	<0.001
Smokes even when ill in bed most the day	32.2% (5415/16796)	34.4% (5204/15139)	12.7% (211/1657)	<0.001	.30 (.26-.35)	<0.001
Dependence (Strong urges) [±]	38.8% (12702/ 32754)	41.5% (12231/29497)	14.5% (471/ 3257)	<0.001	.25 (.23 -.28)	<0.001

[‡]'lower' SES include those from routine and manual, including unemployed;

[‡]unadjusted;

[±] based on (Fidler et al, 2010)

Table 2. Motivation to quit, quit attempts and harm reduction

	All current smokers	daily smokers	non-daily smokers		Logistic regression (daily smokers a ref group)	
	% (N/sample used)			p-value	OR (95% CI)	p-value
Motivation to Quit						
Motivation to quit	63.9% (15733/24633)	63.1% (13974/22140)	70.6% (1759/2493)	<0.001	1.29 (1.18-1.142)	<0.001
Motivation to quit [¥]	52.8% (8715/16504)	52.3% (7839/14985)	57.7% (876/1519)	<0.001	1.13 (1.01-1.26)	.032
Motivation and intention to quit in the next 3 months time	20.3% (5007/ 24633)	19.5% (4310/ 22140)	28.0% (697/ 2493)	<0.001	1.51 (1.37-1.66)	<0.001
Motivation to quit and intention to quit in the next 3 months time [¥]	12.5 (2056/16504)	12.1 (1808/14985)	16.3 (248/1519)	<0.001	1.32 (1.14-1.52)	<0.001
Quit attempts						
Made a quit attempt in the past month	6.5% (2288 / 35322)	6.0% (1902 / 31797)	11.0% (386/3525)	<0.001	1.87 (1.66-2.10)	<0.001
Made a quit attempt in the past year	34.1% (11975 / 35102)	33.5% (10594 / 31606)	39.5% (1381 /3496)	<0.001	1.23 (1.15-1.33)	<0.001
Three or more quit attempts in the past year [¶]	14.3 (1629/11427)	13.6 (1362/10027)	19.1 (267/1400)	<0.001	1.53 (1.33-1.77)	<0.001
Harm reduction						
Actively cutting down	53.8% (17736/ 32995)	53.2% (15811 / 29721)	58.8% (1925/ 3274)	<0.001	1.23(1.15 - 1.33)	<0.001
Use NRT [◇] to cut down	11.7% (4121/ 35322)	11.6% (3679/ 31797)	12.5% (442 / 3525)	.091	1.09 (.98-1.21)	.112
Use NRT for temporary abstinence	10.7% (3643/33980)	10.7% (3282/30592)	10.7% (361/3388)	.928	.99 (.89 – 1.11)	.896
Use NRT for harm reduction	15.9% (5614/35322)	15.9% (5059/31797)	15.7% (555/3525)	.825	.98 (.89-1.08)	.704
Smoking and cessation at 6 month follow up						
Not smoking	8.9% (514/5757)	8.3% (438/5298)	16.6% (76/459)	<0.001	2.13 (1.63- 2.78)	<0.001
Actively cutting down	61.3% (3213/5243)	61.2% (2973/4860)	62.7% (240/383)	.456	.90 (.73-1.12)	.361

[¥]among those who have not made a quit attempt in the past 12 months

[¶]among those who have made a quit attempt in the past 12 months

[◇]NRT – nicotine replacement therapy

Table 3. Feelings and views on smoking

	All current smokers	daily smokers	non-daily smokers	Logistic regression (daily smokers a ref group)		
	% (N/sample used)			p-value	OR (95% CI)	p-value
Feelings and views on smoking						
Feel addicted to smoking	35.5% (3454/9742)	37.5% (3317/8846)	15.3% (137/896)	<0.001	.30 (.25-.36)	<0.001
Worried about smoking harming their health now	26.0% (5196/20011)	26.1% (4719 / 18089)	24.8% (477 /1922)	.240	.91 (.82 - 1.02)	.091
Worried about smoking harming their health in the future	32.1% (5673/ 17671)	32.0% (5108/ 15953)	32.9% (565/ 1718)	.463	.962 (.86 - 1.07)	.484
Worried about smoking harming their family	35.5% (3454/ 9742)	37.5% (3317/ 8846)	15.3% (137/ 896)	<0.001	.301 (.25 - .36)	<0.001
Does not feels smoking does serious harm to them	7.7% (397/5165)	7.2% (339/4689)	12.2% (58/476)	<0.001	1.94 (1.44-2.62)	<0.001
Confident in the ability to quit, if tried	25.5% (3791/14846)	24.0% (3219/13400)	39.6% (572/1446)	<0.001	1.98 (1.76-2.22)	<0.001
People they care about want them to quit smoking	29.7% 4412 / 14846	30.1% (4035/ 13400)	26.1% (377/1446)	.001	.79 (.70-.90)	<0.001
Enjoy smoking (quite a bit and very much)	72.5% (9012/12437)	73.7% (8283/11238)	60.8% (729/1199)	<0.001	.56 (.49 - .63)	<0.001
Enjoys smoking (very much only)	23.7% (2947/12437)	25.2% (2829/11238)	9.8% (118/1199)	<0.001	.34 (.28-.41)	<0.001
Happy about being a smoker	24.8% (1280/5165)	25.8% (1209/4689)	14.9% (71/476)	<0.001	.54 (.41 - .70)	<0.001
Have had enough of being a smoker	16.9% (3383/ 20011)	16.8% (3031/ 18089)	18.3% (352/1922)	.083	1.06 (.94- 1.20)	<0.001
Would love to be a non-smokers	30.6% (3031 / 9903)	31.0% (2768/ 8919)	26.7% (263/984)	.006	.79 (.68-.92)	<0.001

Table 4. Reasons for continued smoking

	All current smokers	daily smokers	non-daily smokers	Logistic regression (daily smokers a ref group)		
	% (N/sample used)			p-value	OR (95% CI)	p-value
Reasons for continued smoking						
Enjoys smoking	48.0% (5950 / 12402)	48.8% (5475/11215)	40.0% (475/1187)	<0.001	.70 (.62-.79)	<0.001
Helps cope with stress	43.3% (5367/12402)	44.1% (4942/11215)	35.8% (425/1187)	<0.001	.70 (.62-.80)	<0.001
Helps to socialize	9.3% (1153/ 12402)	8.2% (923/ 11215)	19.4% (230/ 1187)	<0.001	2.45 (2.09-2.88)	<0.001
Smoking helps me feel less anxious	20.3% (1446/7113)	20.6% (1315/6373)	17.7% (131/740)	.067	.85 (.70-1.04)	.115
Gives something to do	19.3% (2392/12402)	19.7% (2206/11215)	15.7% (186/1187)	.001	.75 (.63-.88)	<0.001
I am addicted to cigarettes	37.5% (1209/3228)	40.1% (1159/2889)	14.7% (50/339)	<0.001	.23 (.18-.34)	<0.001
Smoking helps me feel less depressed	12.2% (865/7113)	9.7% (72/740)	12.4% (793/6373)	.032	.86 (.67-1.12)	.264
I like being a smoker	18.0% (2237/12402)	18.9% (2123/11215)	9.6% (114/1187)	<0.001	.48 (.39-.58)	<0.001
Keeps weight down	11.4% (1409/12402)	11.7% (1307/11215)	8.6% (102/1187)	.002	.73 (.59-.91)	<0.001
Helps me concentrate	8.9% (1099/12402)	9.2% (1028/11215)	6.0% (71/1187)	<0.001	.66 (.52-.85)	<0.001
I feel bad when I try to stop	10.0% (569/5686)	10.6% (549/5202)	4.1% (20/484)	<0.001	.37 (.23-.58)	<0.001
It gives me confidence	2.8% (346/12402)	2.9% (323/11215)	1.9% (23/1187)	.068	.75 (.49-1.15)	.191
Smoking and cessation at 6 month follow up						
Not smoking	8.9% (514/5757)	8.3% (438/5298)	16.6% (76/459)	<0.001	2.13 (1.63- 2.78)	<0.001
Actively cutting down	61.3% (3213/5243)	61.2% (2973/4860)	62.7% (240/383)	.456	.90 (.73-1.12)	.361

Table 5. Smoking status and risk for reporting ‘some’ or ‘severe’ problems in EQ-5D domains

	(1) Non-daily smokers (N=104)	(2) Daily Smokers (N=1094)	(3) Never Smokers (N=3903)	(1) vs. (2 – reference)	(1) vs. (3 - reference)
EQ-5D Domains	% (N)			OR (95% CI) Adj OR (95% CI)	OR (95% CI) Adj OR (95% CI)
Mobility	26.0 (27)	31.9 (349)	21.3 (831)	.75 (.47 - 1.18) .82 (.50 - 1.35)	1.30 (.83-2.02) 1.91 (1.18-3.11)*
Self-care	8.7 (9)	8.5 (93)	5.0 (197)	1.02 (.50 - 2.09) 1.22(.59 - 2.53)	1.78 (.89- 3.58) 2.13 (1.04- 4.35)*
Usual activities	15.4 (6)	22.8 (249)	14.0 (548)	.62 (.36 - 1.07) .67 (.38-1.19)	1.11 (.65- 1.91) 1.39 (.80- 2.42)
Pain and Discomfort	36.5 (38)	42.5 (465)	30.6 (1193)	.78 (.51 - 1.18) .86 (.55-1.33)	1.31 (.87 - 1.96) 1.68 (1.10 - 2.58)*
Anxiety /Depression	20.2 (21)	23.6 (258)	11.4 (444)	.82 (.40 - 1.35) .92 (.55-1.52)	1.97 (1.21- 3.21) 1.97 (1.20 - 3.24)*
	Mean (SD)			B (95% CI) Adj B (95% CI)	B (95% CI) Adj B (95% CI)
VAS	74.0 (18.4)	67.9 (21.5)	75.4 (17.9)	6.12 (1.84-10.40)* 4.65 (.42 to 8.87)	-1.41(-4.90 to 2.09) -2.40 (-5.76 to .97)

* P<0.05