Cost-effectiveness of a mass media campaign and a point of sale intervention to prevent the uptake of smoking in children and young people:

Economic modelling report

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November 2021: NICE guidelines PH10 (February 2008) and PH14 (July 2008) have been updated and replaced by NG209.

The recommendations labelled [2008] or [2008, amended 2021] in the updated guideline were based on these evidence reviews.

See www.nice.org.uk/guidance/NG209 for all the current recommendations and evidence reviews.

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Executive Summary

The aim of this study is to assess the cost-effectiveness of a mass media campaign/point of sale intervention aiming at the prevention of the uptake of smoking among young people. A cohort simulation model was used to estimate incremental cost-per-QALY for both interventions. The estimated cost-effectiveness ratios were based on the interventions being effective enough to reduce smoking prevalence by a given percentage by age 18. For the mass media campaign, under a range of assumptions on the effectiveness, drawn from existing literature, and costs, relating to the direct costs of the intervention and the treatment costs of smoking related diseases, the incremental cost-effectiveness ratio compared to no intervention was always under £500 per QALY. For the point-of-sale intervention, under a range of assumptions the incremental cost-effectiveness ratio compared to no intervention was always under £6,500 per QALY.

Introduction

The UK Government has identified the reduction in childhood smoking rates as a major priority to reduce future morbidity and mortality from smoking. Identification of appropriate policies to inhibit uptake and thereby stop young people from starting smoking which subsequently affects smoking prevalence rates in adult life is likely to be highly effective. The 1998 White paper Smoking Kills aimed at reducing the number of children (11-15 years old) who take up smoking or who smoke regularly from a baseline of 13% in the mid-1990s to 9% by 2010. This seems achievable as the current proportion of 11-15 years old who smoke is approximately 10%. As part of the strategy to achieve this objective the Government is considering a range of smoking prevention policies aimed particularly at young people. The aim of this study is to assess the cost-effectiveness of a mass media campaign/point of sale intervention aiming at the prevention of the uptake of smoking among young people.

Two interventions are compared separately against an alternative of the status quo (i.e. no intervention). The first comparison relates to a mass media campaign lasting for 5 years and is compared with no intervention. The second comparison considers a point of sale intervention lasting for 5 years and this is compared to a no intervention alternative. These campaigns are not mutually exclusive.

The aim of this study is then to assess the cost-effectiveness relating to smoking prevention strategies amongst young people based on a mass media intervention and a point of sale measure through development of an incremental cost-effectiveness model. While these prevention strategies are not well defined, making assumptions concerning cost and effect which are drawn from the literature allow indicative, as opposed to authoritative, conclusions to be drawn on the cost-effectiveness of these public health interventions.

The analysis is undertaken from the perspective of an organisation developing such a campaign/point of sale intervention and the NHS (paying for the cost of treating smoking related diseases). It is therefore a public health sector analysis and does not consider the full public sector costs of these interventions. There is therefore no attempt to calculate the reduction in tax take

resulting from a decrease in smoking prevalence as a result of these interventions. The target population group is defined to be 13-17 years old teenagers.

The perspective of the analysis means that the relevant costs are the implementation cost of the two interventions, (mass media campaign/point-of-sale intervention) and the costs of treatment arising from smoking related diseases. The direct intervention cost of these policies as used in this analysis is based on figures drawn from the Department of Health Regulatory Impact Assessment of the Health Act 2006 and the Department of Health Final Regulatory Impact Assessment entitled "The tobacco advertising and promotion (point of sale) regulations 2004".

The effectiveness of these strategies is based on evidence obtained from the literature relating to these interventions. Effectiveness is measured as the gain attributed to the specific intervention in life expectancy and quality adjusted life expectancy calculated as the difference between the no intervention and the intervention groups. The specific intervention's effect is expressed as the reduction in smoking prevalence determined after the mass media campaign/point of sale intervention has ended. The reduction in smoking prevalence observed at the last point of evaluation is then used to predict the gain in life expectancy and the reduction in smoking related diseases leading to NHS cost savings and gain in quality adjusted lifetime. The reduction in prevalence was based on evidence drawing on the NICE review of interventions to prevent the uptake of smoking in children and young people. This evidence was selected using criteria consistent with those of the effectiveness review. Given the uncertainties surrounding data on both effect and cost extensive sensitivity analysis was also undertaken.

The model

The model is a cohort simulation model and evaluates smoking prevention in young people through the impact this has on up-take in young people and subsequent reduction in up-take in adult life. The cohort model is based on the impact that such a prevention strategy has on a representative individual within the population in England. The model has two distinct phases: first there are the intervention years with immediate impact on the uptake of smoking among young people aged 13-17 which is modelled as a reduction in smoking prevalence achieved at the end of the intervention; then there is a second phase that follows the cohort over their lifetime assuming that the reduction in smoking prevalence at the 18^{th} birthday caused by the youth prevention programme is maintained throughout adult life. For ages 13-17, it is assumed that no health impact is discernible during this period of cohort lifetime. From the age of 18, a cohort model was developed using a hypothetical population of 1000 male and female individuals with annual cycles over their lifetime. In each cycle the model assumes a proportionate split of the population across smokers, never-smokers and former smokers. In each cycle a smoker can remain a smoker, quit or die. Never-smokers between the age of 18 and 25 can commence smoking, continue in their present state or die, while former smokers of all ages and never-smokers over the age of 25 can continue in their present state or die.

At the start of the model, for each of the 3 smoking categories (smoker, never-smoker and former smoker) the age and gender specific prevalence of smoking status was applied to mirror the known prevalence of these states in the English population. The prevalence rates were taken from the Health Survey for England and are reported in Appendix A1 (Health Survey for England 2003). In each cycle, until the age of 25 the transition from never-smoker to smoking status was modelled so that the numbers in each smoking category would be close to the prevalence figures stated above using the information given in Table 1 below obtained from the 2005 General Household Survey that reports on the age adults started smoking regularly and the transition from smoking to being a former smoker was modelled using a quit rate of 0.02 per year. (The figure of 2% per year "background quit rate" can be thought of as a net quit rate, in that after the age of 25, it is assumed that no never-smokers become smokers, and that former smokers never relapse. Rather than

attempting to model the many quit attempts that ultimately fail or to account for small numbers of never-smokers over the age of 25 starting the habit, the whole process has been simplified such that after all these things have been accounted for, it is assumed that 2% of smokers of a given age quit each year. This is consistent with recent work undertaken by West (personal communication (2008)).

The youth prevention programme is assumed to affect smoking uptake which is modelled as a reduction in smoking prevalence. The model assumes that the benefit achieved over the duration of the preventative programme continues over the cohort's lifetime and the baseline assumption is of a 5% reduction in smoking prevalence at the end of the 5 year mass media campaign (which resulted in 196 male smokers and 186 male smokers out of 1000 in the no intervention and intervention groups respectively at age 18) and of a 0.5% reduction in smoking prevalence at the end of a 5 year point of sale intervention (which resulted in 196 male smokers and 195 male smokers out of 1000 in the no intervention and intervention groups respectively at age 18). The 5% reduction was chosen based on effect sizes of mass media campaigns reported in the literature ranging from approximately 2% to 7% [Farrelly et al (2005) report that the "truth" campaign accounted for 22% of an observed decline in smoking prevalence from 25.3% to 18% among all students between 1999 and 2002; Niederdeppe et al (2004) report that as a result of the "truth" campaign Florida teens were less likely to have smoked in the past 30 days compared to their national counterparts (Florida 6.6% vs. national 14%); Secker-Walker et al (1997) report that the difference in smoking prevalence at the end of a 4 year mass media campaign between those exposed to the campaign and those not exposed was 5.5%] whereas for the point of sale the effect size of 0.5% was chosen based on a Department of Health Full final regulatory impact assessment entitled "The tobacco advertising and promotion (point of sale) regulations 2004", http://www.dh.gov.uk/publications, where the following is stated: "If as an illustrative example there were a 0.5% reduction in smoking over five years as a result of the regulations restricting point of sale advertising, the NHS could ultimately save £10 million per annum".

Table 1. Age adults started smoking regularly, by gender (Source: General Household Survey 2005, Office for National Statistics)*

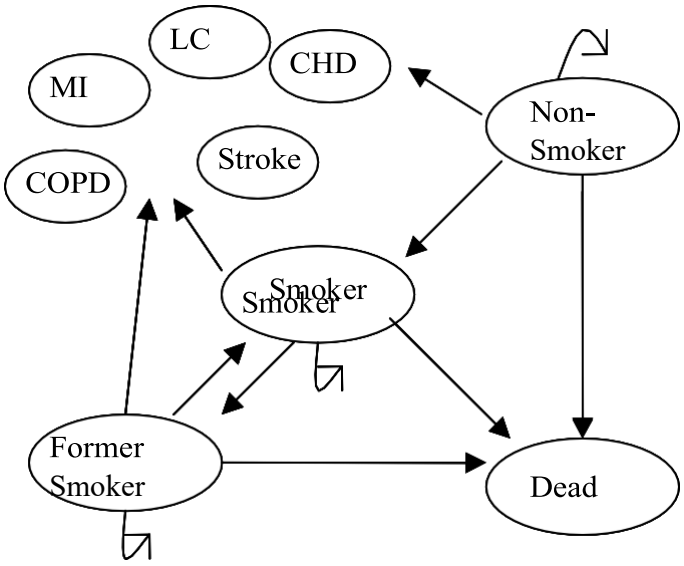
Age (years)	Percentages
Under 16	39
16-17	27
18-19	17
20-24	11
25 and over	6

*More up-to-date figures from more recent surveys change these figures minimally and have no impact on the overall conclusions.

In each cycle of the model an individual can die or develop one or more of the following major smoking related diseases:

Lung cancer;
Coronary heart disease (CHD);
COPD;
Myocardial infarction (MI);
Stroke
as presented in Figure 1.

Figure 1. Schematic outline of the model.



The probability of any given individual in the cohort developing one or more of these diseases changes within each cycle as they age. The same applies to the probability of an individual dying. For simplicity, no interaction between disease states is assumed.

To determine the number of never-smokers, current smokers and former smokers at the start of the model, smoking prevalence figures by age, gender and smoking status for England were obtained from the Health Survey for England 2003 (see Appendix 1). Data on mortality by age, gender and smoking status were obtained from Doll et al, 1994 and are reported in Table 2.

Table 2. Mortality by age and smoking status per 1,000 (Doll et al 1994)

Age	Current smoker	Former smoker	Non-smoker
35-44	2.8	2	1.6
45-54	8.1	4.9	4
55-64	20.3	13.4	9.5
65-74	47	31.6	23.7
75-84	106	77.3	67.4
85+	218.7	179.7	168.6

These data were combined with data on mortality by age and gender of the general population for England obtained from The Office for National Statistics http://www.gad.gov.uk/Demography_Data/Life_Tables/Interim_life_tables.asp and reported in Table A.2.1 in Appendix A2 to allow estimation of age and gender specific mortality rates

according to smoking status in each cycle of the model. Following the same methodology as the one adopted in the York Health Economics Consortium NICE Report "Cost-effectiveness of interventions for smoking cessation" (August 2007), mortality rates by age, gender and smoking status were calculated using the following equation:

$$M = (MS \times PS) + (MFS \times PFS) + (MNS \times PNS)$$

where M is the mortality rate by age and gender, MS, MFS and MNS are the mortality rates for smokers, former smokers and non-smokers respectively and PS, PFS and PNS are the smoking prevalence figures for smokers, former smokers and non-smokers respectively for each age. The resultant estimates are reported in Appendix 2 in Table A.2.2. The number of people dying within each cycle was then calculated by multiplying the age, gender and smoking status mortality rate by the number of individuals in each cycle.

A similar approach was followed to calculate the number of individuals with a smoking related disease. For each disease, data on disease prevalence by age and gender in the general population was combined with data on the relative risk of an individual developing a given disease according to smoking status to provide age and gender specific prevalence figures for each disease among non-smokers, current smokers and former smokers. Following the same methodology as the one adopted in the York Health Economics Consortium NICE Report "Cost-effectiveness of interventions for smoking cessation" (August 2007), disease prevalence was calculated based on the following equation:

$$DP = (DPS \times PS) + (DPFS \times PFS) + (DPNS \times PNS)$$

where DP is the prevalence of disease by age and gender, DPS, $DPFS$ and $DPNS$ are the disease prevalence figures for smokers, former smokers and non-smokers respectively and PS, PFS and PNS are the smoking prevalence figures for smokers, former smokers and non-smokers respectively for each age. The data on disease prevalence and relative risk of disease by smoking status were obtained from the following sources. Prevalence of lung cancer from Forman et al. (2003); Prevalence of COPD from Britton M. (2003); Prevalence of CHD, MI and stroke from Allender et al. (2006); Relative risk of lung cancer by smoking status from Peto et al (2000); Relative risk of CHD, COPD, MI and stroke by smoking status from Department of Health and Human Services, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, Washington DC: A Report by the Surgeon General (2004).

The calculated prevalence figures by age, gender and smoking status for lung cancer, CHD, COPD, MI and stroke are given in Appendices A3, A4, A5, A6 and A7 respectively. In any given cycle disease prevalence by age, gender and smoking status was multiplied by the number in the cycle to give the total number of smokers, never-smokers and former smokers with each disease.

Utility values associated with each disease state were obtained from the literature and were multiplied by the length of each cycle to estimate quality adjusted life expectancy. The incremental cost-effectiveness of the intervention compared to no intervention was then assessed as cost per QALY gained. The specific utility values used in this analysis were based on sources referred to in the York Health Economics Consortium NICE Report "Cost-effectiveness of interventions for smoking cessation" (August 2007) and are as follows. Lung cancer: 0.58, stroke: 0.48, CHD: 0.80, MI:0.80 [calculated as averages of the respective utility scores reported in Tengs and Wallace (2000) for each of these disease states], COPD: 0.73 [calculated as an average of the utility scores across the different stages of severity of COPD reported in Rutten van Molken et al. (2006)], current smoker in the absence of disease: 0.75 and former smoker in the absence of disease: 0.78 (Tillman and Silcock, 1997).

The number of individuals with each disease was multiplied by the annual cost of treatment for the disease to provide an estimate of total cost in that cycle which was then discounted at an annual rate of 3.5%. The data on the annual cost of treatment were based on sources referred to in the York Health Economics Consortium NICE Report "Cost-effectiveness of interventions for smoking cessation" (August 2007) and are as follows (in 2006 prices): Lung cancer: £5,500; stroke: £2,060; CHD: £1,060; MI: £2,175 and COPD: £926.

The cost of the mass media campaign was assumed to be incurred for a period of 5 years at an annual cost of £15 per person discounted at 3.5% per year for the 5 years of the campaign. This figure was based on an annual cost of £10 million for each year of a mass media campaign which was divided by the number of people aged 13 to 17 years old in England obtained from the Office for National Statistics (http://www.statistics.gov.uk/census2001/pop2001/england_ages.asp) to give a £15 annual intervention cost per person exposed to the campaign. The £10 million annual cost is 10 times the cost of education and communication programmes aimed at supporting the implementation of smoke-free legislation, the latter estimated at £1 million per year based on the experience of current Department of Health tobacco education and awareness campaigns as reported in the Final Regulatory Impact assessment of the Health Act 2006 (Department of Health, http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_074063.pdf)

The assumed cost of the point of sale intervention was £50 million in the first year which is half the estimated cost of replacing all existing gantries across the UK as part of an intervention aimed at banning all forms of point of sale advertising reported in the Full Final Regulatory Impact Assessment entitled "The tobacco advertising and promotion (point of sale) regulations 2004" (Department of Health, http://www.dh.gov.uk/en/Publicationsandstatistics/Legislation/Regulatoryimpactassessment/DH_4088278) plus an additional £1 million every year for the 5 years of the intervention which is the estimated cost of education and communication stated above. This resulted in £17.4 per person discounted at 3.5% per year for the 5 years of the intervention.

Life expectancy and quality adjusted life expectancy were also discounted at 3.5% per year.

In each cycle population figures for England obtained from the Office for National Statistics (http://www.statistics.gov.uk/census2001/pop2001/england_ages.asp) providing the number of males and females in the general population were used to determine the proportion of males and females in each age group in the cohort. This allowed an estimate of costs and QALYs in each cycle that accounted for the proportion of males and females observed in the English population.

Results and discussion

Base case analysis

Tables 3 and 4 report the results on the cost-effectiveness of a mass media campaign and a point of sale intervention respectively for different levels of effect measured as change in adult smoking prevalence achieved by the end of the intervention at an assumed annual cost of £15 per person for the mass media campaign and £17 per person for a general point of sale intervention assuming an adult quit rate of 2% per year and an annual discount rate of 3.5%.

Table 3. Cost-effectiveness of mass media campaign for different effect sizes

mass media

intervention annual cost 15 per person after 5 years | quit rate=2% | discount rate=3.5%

prevalence

reduction (%)	nointerv cost	no interv L	no interv qaly	interv cost	interv LY	interv qaly	cost/LY	cost/qaly
2	2033	21.100	19.058	2044	21.105	19.097	2049	279
3	2033	21.100	19.058	2042	21.108	19.116	1112	152
4	2033	21.100	19.058	2040	21.110	19.136	643	88
5	**2033**	**21.100**	**19.058**	**2038**	**21.113**	**19.155**	**362**	**49**
6	2033	21.100	19.058	2036	21.116	19.175	174	24
7	2033	21.100	19.058	2034	21.118	19.194	41	6

Table 4. Cost-effectiveness of point of sale intervention for different effect sizes

point of sale

intervention annual cost 17 per person after 5 years | quit rate=2% | discount rate=3.5%

prevalence

reduction (%)	nointerv cost	no interv LY	no interv qaly	interv cost	interv LY	interv qaly	cost/LY	cost/qaly
0.5	**2033**	**21.100**	**19.058**	**2050**	**21.101**	**19.068**	**12399**	**1690**
1.0	2033	21.100	19.058	2049	21.102	19.078	5818	793
1.5	2033	21.100	19.058	2048	21.104	19.087	3624	494
2.0	2033	21.100	19.058	2047	21.105	19.097	2527	344

For the base case analysis for the two interventions the incremental cost-effectiveness ratio as compared to a no intervention status quo was never above £500 per QALY for the mass media campaign or £2,000 per QALY for the point-of-sale intervention. Thus even although the direct costs of the campaign are difficult to estimate given the lack of precision over the detail of these interventions, with a subsequent problem in defining the expected prevalence reduction, the base case scenarios highlight that under reasonable assumptions both interventions would be highly cost-effective.

Sensitivity analysis

Given the lack of precision over the definition of the interventions and the many assumptions used to populate the model extensive sensitivity analysis was undertaken. One way sensitivity analysis was undertaken to assess the impact of varying the following parameters on the cost-effectiveness ratio.

The size of effect of the intervention was varied between 2% and 7% for the mass media campaign and between 0.5% and 2% for the point of sale measure. The cost of the intervention was doubled and tripled and the background quit rate was varied to 1.2% and 3% per year.

Tables 5, 6 and 7 report the results of the sensitivity analyses for the mass media campaign while Tables 8, 9 and 10 report the corresponding results for the point of sale intervention.

Table 5. Cost-effectiveness of mass media campaign for different effect sizes at an intervention cost of £30 and £45 per person

mass media	**quit rate=2%**											
	discount rate=3.5%								**intervention annual cost**			
prevalence	**intervention annual cost**								**45**			
reduction	**30** per person after 5 years								per person after 5 years			
(%)	**nointerv c**	**no interv**	**no interv**	**interv cos**	**interv LY**	**interv qal**	**cost/LY**	**cost/qaly**	**interv cos**	**cost/LY**	**cost/qaly**	
2	2033	21.100	19.058	2059	21.105	19.097	4862	**663**	2074	7674	**1046**	
3	2033	21.100	19.058	2057	21.108	19.116	2987	**407**	2072	4862	**663**	
4	2033	21.100	19.058	2055	21.110	19.136	2049	**279**	2070	3456	**471**	
5	2033	21.100	19.058	2053	21.113	19.155	1487	**203**	2068	2612	**356**	
6	2033	21.100	19.058	2051	21.116	19.175	1112	**152**	2066	2049	**279**	
7	2033	21.100	19.058	2049	21.118	19.194	844	**115**	2064	1648	**225**	

Table 6. Cost-effectiveness of mass media campaign for different effect sizes assuming a background quit rate of 1.2%

mass media	intervention annual cost			**quit rate=1.2%**				
	15 per person after 5 years discount rate=3.5%							
prevalence								
reduction (%)	**nointerv co**	**no interv**	**no interv qa**	**interv cos**	**interv LY**	**interv qal**	**cost/LY**	**cost/qaly**
2	2079	21.080	19.032	2089	21.086	19.072	1746	**252**
3	2079	21.080	19.032	2086	21.089	19.091	874	**126**
4	2079	21.080	19.032	2084	21.091	19.111	438	**63**
5	2079	21.080	19.032	2081	21.094	19.130	176	**25**
6	2079	21.080	19.032	2079	21.097	19.150	2	**0**
7	2079	21.080	19.032	2076	21.100	19.170	dominant	**dominant**

Table 7. Cost-effectiveness of mass media campaign for different effect sizes assuming a background quit rate of 3%

mass media	intervention annual cost			**quit rate=3%**				
	15 per person after 5 years discount rate=3.5%							
prevalence								
reduction (%)	**nointerv co**	**no interv**	**no interv qa**	**interv cos**	**interv LY**	**interv qal**	**cost/LY**	**cost/qaly**
2	1994	21.117	19.083	2006	21.122	19.121	2354	**303**
3	1994	21.117	19.083	2004	21.125	19.140	1349	**174**
4	1994	21.117	19.083	2003	21.127	19.160	847	**109**
5	1994	21.117	19.083	2001	21.130	19.179	546	**70**
6	1994	21.117	19.083	1999	21.132	19.198	345	**44**
7	1994	21.117	19.083	1998	21.135	19.217	202	**26**

Table 8. Cost-effectiveness of point of sale intervention for different effect sizes at an intervention cost of £35 and £52 per person

point of sale	quit rate=2% discount rate=3.5%										
prevalence reduction	intervention annual cost 35 per person after 5 years								intervention annual cost 52 per person after 5 yea		
(%)	nointerv co	no interv	no interv	interv cos	interv LY	interv qal	cost/LY	cost/qaly	interv cos	cost/LY	cost/qaly
0.5	2033	21.100	19.058	2067	21.101	19.068	25561	**3484**	2084	38723	**5278**
1.0	2033	21.100	19.058	2066	21.102	19.078	12399	**1690**	2083	18980	**2587**
1.5	2033	21.100	19.058	2065	21.104	19.087	8012	**1092**	2082	12399	**1690**
2.0	2033	21.100	19.058	2064	21.105	19.097	5818	**793**	2081	9108	**1241**

Table 9. Cost-effectiveness of point of sale intervention for different effect sizes assuming a background quit rate of 1.2%

point of sale								
	intervention annual cost			quit rate=1.2%				
prevalenc reduction	17 per person after 5 yea			discount rate=3.5%				
(%)	nointerv co	no interv	no interv	interv cos	interv LY	interv qal	cost/LY	cost/qaly
0.5	2079	21.080	19.032	2095	21.081	19.042	11373	**1644**
1	2079	21.080	19.032	2094	21.083	19.052	5251	**759**
1.5	2079	21.080	19.032	2093	21.084	19.062	3211	**464**
2	2079	21.080	19.032	2091	21.086	19.072	2190	**317**

Table 10. Cost-effectiveness of point of sale intervention for different effect sizes assuming a background quit rate of 3%

point of sale								
	intervention annual cost			quit rate=3%				
prevalenc reduction	17 per person after 5 yea			discount rate=3.5%				
(%)	nointerv co	no interv	no interv	interv cos	interv LY	interv qal	cost/LY	cost/qaly
0.5	1994	21.117	19.083	2011	21.119	19.093	13440	**1732**
1	1994	21.117	19.083	2010	21.120	19.102	6390	**824**
1.5	1994	21.117	19.083	2009	21.121	19.112	4041	**521**
2	1994	21.117	19.083	2008	21.122	19.121	2866	**369**

Assuming an annual cost of £15 per person over the 5-year duration of the mass media campaign – a total of £10 million per year for the total population of 13-17 years old in England – and assuming a quit rate of 2% per year in adult life, the results of the base case cost-effectiveness modelling for the mass media campaign suggest that that this is a cost-effective strategy as compared to no intervention if smoking prevalence is reduced at the end of the campaign by 5% with a cost per QALY gained estimated to be £49 (£362 per LY gained) while it results in £279 per QALY gained (£2,049 per LY gained) if the reduction in smoking prevalence at the end of the campaign falls to 2%. A range of one way sensitivity analyses based on doubling and tripling the cost of the campaign and changing adult quit rate to 1.2% and 3% show that the cost per QALY is never greater than £1,046 for this intervention.

For the point of sale measure the base case analysis assumes an annual cost of £17.5 per person over the 5 year duration of the intervention – a total of £51 million in the first year and £1 million annually for the 4 subsequent years of the intervention for the total population of 13-17 years old in England – and assuming a quit rate of 2% per annum in adult life the cost-effectiveness is estimated to lie between £1,690 per QALY gained (£12,399 per LY gained) and £344 per QALY gained (£2,527 per LY gained) as the effect changes from a 0.5% reduction in smoking prevalence at the end of the intervention to a 2% reduction in smoking prevalence by the end of the intervention. A range of one way sensitivity analyses based on doubling and tripling the cost of the intervention and changing the adult quit rate to 1.2% and 3% per annum shows the cost per QALY gained is always less than £5,500 for this intervention.

If the cost-effectiveness threshold is assumed to be £20,000 per QALY the effect size to achieve that threshold has to be lowered to approximately 0.04% for both interventions For the mass media campaign the results show that when the effect size is 0.04% reduction in prevalence per year the incremental cost per QALY is £19,063 (£139,860 per LY) and it becomes £25,453 per QALY (£186,735 per LY) when the effect size falls to 0.03% per year. For the point of sale intervention when the effect size is 0.04% reduction in prevalence per year the incremental cost per QALY is £22,321 (£163,760 per LY) and it decreases to £17,836 per QALY (£130,856 per LY) when the effect size becomes 0.05% per year.

Conclusions

On the basis of this analysis, using the QALY as the appropriate measure of health related outcome, it is suggested that both a general mass media campaign aimed at 13-17 year old people and a general point of sale intervention aimed at reducing access to tobacco amongst the young would be cost-effective if they achieved the reduction in smoking prevalence assumed above and incurred the costs assumed above.

Limitations of the study include the fact that explicit concerns over whether the interventions merely delay the up-take of smoking have not been addressed. Given that the overwhelming majority of individuals have either taken up smoking by age 25, or stated differently if individuals have not started smoking by age 25 they are extremely unlikely to start smoking, that we model the impact of the interventions on prevalence at age 18, and that the sensitivity analysis covers a large range of effectiveness outcomes we would argue that the range of estimated results given in the sensitivity analysis would encompass the impact that smoking delay would have on modelled results. In other words, as both programmes remain extremely cost-effective under a range of effectiveness outcomes it is extremely unlikely that if smoking is merely delayed, noting that the vast majority of smokers start prior to age 25, there will be any major impact on the calculations; the programmes are likely to remain highly cost-effective. Moreover the same conclusion holds true if the adult campaigns relating to smoking cessation have a residual impact on the prevention programmes.

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Appendix A1

Self-reported cigarette smoking status, by age and sex (survey year 2004)

Age	Men	Women
Current cigarette smoker		
16-24	25.404	28.940
25-34	37.425	27.693
35-44	26.414	27.062
45-54	25.208	24.758
55-64	19.175	19.806
65-74	10.188	13.295
75 and over	6.935	9.354

Age	Men	Women
Ex-regular cigarette smoker		
16-24	5.420	6.956
25-34	13.958	15.809
35-44	20.753	17.643
45-54	30.448	23.948
55-64	44.439	30.439
65-74	55.861	29.440
75 and ove	60.960	33.775

Age	Men	Women
Never regularly smoked cigarette		
16-24	69.176	64.104
25-34	48.617	56.498
35-44	52.833	55.295
45-54	44.344	51.294
55-64	36.386	49.755
65-74	33.952	57.265
75 and over	32.105	56.871

Source: Health Survey for England 2003
http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles/health-survey-for-england/health-survey-for-england-2004-updating-of-trend-tables-to-include-2004-data

Appendix A2. Table A 2.1. Mortality in the general population 2006

Age	male	female
18	0.000601	0.000261
19	0.000628	0.000293
20	0.000672	0.000269
21	0.000632	0.000261
22	0.000733	0.000283
23	0.00073	0.0003
24	0.000693	0.000279
25	0.00078	0.000316
26	0.000751	0.000347
27	0.0008	0.000347
28	0.000739	0.000366
29	0.000842	0.000357
30	0.000874	0.000411
31	0.00092	0.000409
32	0.001039	0.000447
33	0.001044	0.000517
34	0.001063	0.000551
35	0.001169	0.000577
36	0.001262	0.000661
37	0.001302	0.000732
38	0.001302	0.000783
39	0.001403	0.00086
40	0.001532	0.000896
41	0.001644	0.00099
42	0.001794	0.001126
43	0.002039	0.001242
44	0.002156	0.00139
45	0.002316	0.001484
46	0.002493	0.001611
47	0.00278	0.001845
48	0.003121	0.002101
49	0.003397	0.002199
50	0.003709	0.00255
51	0.004219	0.002668
52	0.004524	0.002863
53	0.004853	0.003145
54	0.005317	0.003409
55	0.005726	0.003636
56	0.006196	0.004117
57	0.0069	0.004444
58	0.007332	0.004714
59	0.008095	0.005292
60	0.009433	0.005666
61	0.010373	0.006405
62	0.011561	0.007026
63	0.012554	0.007715
64	0.014005	0.008597
65	0.015325	0.009256
66	0.016746	0.01047
67	0.018331	0.011412
68	0.020247	0.012776
69	0.022174	0.013812
70	0.024629	0.015151

Appendix A2. Table A 2.1. Mortality in the general population 2006 (contd.)

Age	male	female
71	0.027556	0.016837
72	0.030791	0.019307
73	0.033777	0.02139
74	0.037759	0.024347
75	0.041933	0.027465
76	0.04723	0.030855
77	0.052538	0.034577
78	0.05863	0.039347
79	0.065442	0.043829
80	0.072777	0.048621
81	0.080283	0.055612
82	0.089894	0.061802
83	0.099328	0.06977
84	0.110524	0.07849
85	0.115512	0.086389
86	0.130625	0.096889
87	0.14081	0.107885
88	0.165993	0.127892
89	0.184895	0.142379
90	0.194843	0.156578
91	0.216547	0.177591
92	0.233399	0.197006
93	0.257081	0.218451
94	0.277844	0.241982
95	0.302966	0.263987
96	0.328658	0.288671
97	0.36303	0.313412
98	0.383838	0.339623
99	0.399065	0.360455
100	0.455431	0.379679

Source: The Office for National Statistics
http://www.gad.gov.uk/Demography_Data/Life_Tables/Interim_life_tables.asp

Appendix A2. Table A.2.2. Mortality by age and gender and smoking status

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
18	0.000873	0.00037	0.000624	0.0002643	0.000357	0.000151
19	0.000913	0.000415	0.000652	0.0002967	0.000373	0.00017
20	0.000977	0.000381	0.000698	0.0002724	0.000399	0.000156
21	0.000919	0.00037	0.000656	0.0002643	0.000375	0.000151
22	0.001065	0.000401	0.000761	0.0002866	0.000435	0.000164
23	0.001061	0.000425	0.000758	0.0003038	0.000433	0.000174
24	0.001007	0.000396	0.000719	0.0002825	0.000411	0.000161
25	0.001038	0.000443	0.000741	0.0003167	0.000423	0.000181
26	0.000999	0.000487	0.000714	0.0003478	0.000408	0.000199
27	0.001064	0.000487	0.00076	0.0003478	0.000434	0.000199
28	0.000983	0.000514	0.000702	0.0003668	0.000401	0.00021
29	0.00112	0.000501	0.0008	0.0003578	0.000457	0.000204
30	0.001163	0.000577	0.00083	0.0004119	0.000475	0.000235
31	0.001224	0.000574	0.000874	0.0004099	0.0005	0.000234
32	0.001382	0.000627	0.000987	0.000448	0.000564	0.000256
33	0.001389	0.000725	0.000992	0.0005182	0.000567	0.000296
34	0.001414	0.000773	0.00101	0.0005522	0.000577	0.000316
35	0.001637	0.00081	0.001169	0.0005784	0.000668	0.00033
36	0.001767	0.000928	0.001262	0.0006626	0.000721	0.000379
37	0.001823	0.001027	0.001302	0.0007337	0.000744	0.000419
38	0.001823	0.001099	0.001302	0.0007848	0.000744	0.000448
39	0.001964	0.001207	0.001403	0.000862	0.000802	0.000493
40	0.002145	0.001257	0.001532	0.0008981	0.000875	0.000513
41	0.002302	0.001389	0.001644	0.0009923	0.000939	0.000567
42	0.002512	0.00158	0.001794	0.0011286	0.001025	0.000645
43	0.002855	0.001743	0.002039	0.0012449	0.001165	0.000711
44	0.003018	0.001951	0.002156	0.0013933	0.001232	0.000796
45	0.003535	0.002298	0.002138	0.0013902	0.001056	0.000687
46	0.003805	0.002495	0.002302	0.0015092	0.001137	0.000745
47	0.004243	0.002857	0.002567	0.0017284	0.001267	0.000854
48	0.004763	0.003254	0.002881	0.0019682	0.001423	0.000972
49	0.005184	0.003405	0.003136	0.00206	0.001549	0.001017
50	0.00566	0.003949	0.003424	0.0023888	0.001691	0.00118
51	0.006439	0.004132	0.003895	0.0024994	0.001923	0.001234
52	0.006904	0.004434	0.004177	0.002682	0.002063	0.001324
53	0.007406	0.00487	0.00448	0.0029462	0.002213	0.001455
54	0.008114	0.005279	0.004909	0.0031935	0.002424	0.001577
55	0.008737	0.005755	0.005767	0.0037987	0.002699	0.001778
56	0.009454	0.006516	0.006241	0.0043012	0.002921	0.002013
57	0.010528	0.007034	0.00695	0.0046428	0.003252	0.002173
58	0.011188	0.007461	0.007385	0.0049249	0.003456	0.002305
59	0.012352	0.008376	0.008153	0.0055288	0.003816	0.002587
60	0.014393	0.008968	0.009501	0.0059195	0.004446	0.00277
61	0.015828	0.010137	0.010448	0.0066916	0.004889	0.003132
62	0.01764	0.01112	0.011644	0.0073403	0.005449	0.003435
63	0.019156	0.012211	0.012645	0.0080602	0.005917	0.003772
64	0.02137	0.013606	0.014106	0.0089816	0.006601	0.004203
65	0.023626	0.014937	0.015885	0.0100431	0.00801	0.005064
66	0.025817	0.016897	0.017357	0.0113603	0.008753	0.005728
67	0.02826	0.018417	0.019	0.0123824	0.009581	0.006244
68	0.031214	0.020618	0.020986	0.0138624	0.010582	0.00699
69	0.034185	0.02229	0.022984	0.0149865	0.01159	0.007557
70	0.037969	0.024451	0.025528	0.0164393	0.012873	0.00829

Appendix A2. Table A.2.2. Mortality by age, gender and smoking status (contd.).

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
71	0.042482	0.027172	0.028562	0.0182687	0.014403	0.009212
72	0.047469	0.031158	0.031915	0.0209487	0.016093	0.010564
73	0.052072	0.03452	0.03501	0.0232089	0.017654	0.011703
74	0.058211	0.039292	0.039138	0.0264173	0.019735	0.013321
75	0.0584	0.039154	0.042588	0.028553	0.027079	0.018155
76	0.065777	0.043987	0.047967	0.0320773	0.0305	0.020396
77	0.073169	0.049293	0.053358	0.0359467	0.033928	0.022857
78	0.081653	0.056093	0.059545	0.0409057	0.037862	0.02601
79	0.09114	0.062483	0.066464	0.0455653	0.042261	0.028973
80	0.101356	0.069314	0.073913	0.0505471	0.046998	0.03214
81	0.111809	0.079281	0.081536	0.057815	0.051845	0.036762
82	0.125194	0.088105	0.091297	0.0642502	0.058051	0.040853
83	0.138333	0.099464	0.100879	0.0725339	0.064144	0.046121
84	0.153925	0.111896	0.112249	0.0815993	0.071374	0.051885
85	0.141257	0.10672	0.116067	0.0876892	0.089478	0.067601
86	0.159738	0.119691	0.131253	0.0983472	0.101185	0.075818
87	0.172193	0.133275	0.141486	0.1095087	0.109075	0.084422
88	0.202989	0.157991	0.16679	0.1298168	0.128582	0.100078
89	0.226104	0.175887	0.185783	0.1445219	0.143224	0.111415
90	0.238269	0.193428	0.195779	0.1589346	0.15093	0.122526
91	0.26481	0.219386	0.217587	0.1802638	0.167742	0.138969
92	0.285418	0.24337	0.23452	0.199971	0.180796	0.154161
93	0.314378	0.269862	0.258316	0.2217388	0.199141	0.170943
94	0.339769	0.298931	0.279179	0.2456239	0.215224	0.189356
95	0.37049	0.326115	0.304422	0.2679601	0.234684	0.206576
96	0.401908	0.356608	0.330237	0.2930156	0.254586	0.225891
97	0.44394	0.387172	0.364774	0.318129	0.281211	0.245252
98	0.469386	0.419552	0.385682	0.3447344	0.29733	0.265762
99	0.488007	0.445286	0.400982	0.36588	0.309125	0.282064
100	0.556935	0.469035	0.457619	0.3853933	0.352787	0.297107

Appendix A3. Prevalence of lung cancer by age, gender and smoking status.

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
18	6.7E-05	5.95E-05	2.95E-05	1.2498E-05	2.009E-06	2.976E-06
19	6.7E-05	5.95E-05	2.95E-05	1.2498E-05	2.009E-06	2.976E-06
20	6.7E-05	5.95E-05	2.95E-05	1.2498E-05	2.009E-06	2.976E-06
21	6.7E-05	5.95E-05	2.95E-05	1.2498E-05	2.009E-06	2.976E-06
22	6.7E-05	5.95E-05	2.95E-05	1.2498E-05	2.009E-06	2.976E-06
23	6.7E-05	5.95E-05	2.95E-05	1.2498E-05	2.009E-06	2.976E-06
24	6.7E-05	5.95E-05	2.95E-05	1.2498E-05	2.009E-06	2.976E-06
25	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
26	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
27	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
28	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
29	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
30	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
31	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
32	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
33	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
34	4.44E-05	5.91E-05	1.95E-05	1.2412E-05	1.333E-06	2.955E-06
35	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
36	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
37	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
38	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
39	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
40	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
41	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
42	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
43	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
44	5.39E-05	5.96E-05	2.37E-05	1.2525E-05	1.616E-06	2.982E-06
45	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
46	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
47	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
48	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
49	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
50	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
51	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
52	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
53	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
54	0.003831	0.002133	0.001686	0.00044789	0.0001149	0.0001066
55	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
56	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
57	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
58	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
59	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
60	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
61	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
62	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
63	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
64	0.003842	0.002405	0.001691	0.00050513	0.0001153	0.0001203
65	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
66	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
67	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
68	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
69	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
70	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036

Prevalence of lung cancer by age, gender and smoking status (contd.).

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
71	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
72	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
73	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
74	0.022356	0.010071	0.009837	0.00211497	0.0006707	0.0005036
75	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
76	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
77	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
78	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
79	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
80	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
81	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
82	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
83	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
84	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
85	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
86	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
87	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
88	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
89	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
90	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
91	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
92	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
93	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
94	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
95	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
96	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
97	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
98	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
99	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832
100	0.023041	0.011664	0.010138	0.00244938	0.0006912	0.0005832

Appendix A4. Prevalence of CHD by age, gender and smoking status.

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
18	0	0.003777727	0	0.001876756	0	0.00121081
19	0	0.003777727	0	0.001876756	0	0.00121081
20	0	0.003777727	0	0.001876756	0	0.00121081
21	0	0.003777727	0	0.001876756	0	0.00121081
22	0	0.003777727	0	0.001876756	0	0.00121081
23	0	0.003777727	0	0.001876756	0	0.00121081
24	0	0.003777727	0	0.001876756	0	0.00121081
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
32	0	0	0	0	0	0
33	0	0	0	0	0	0
34	0	0	0	0	0	0
35	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
36	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
37	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
38	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
39	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
40	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
41	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
42	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
43	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
44	0.016773096	0.007469699	0.00833279	0.003710908	0.005375992	0.002394134
45	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
46	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
47	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
48	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
49	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
50	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
51	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
52	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
53	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
54	0.064164505	0.03766804	0.0318766	0.018713289	0.020565546	0.01207309
55	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
56	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
57	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
58	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
59	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
60	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
61	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
62	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
63	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
64	0.209772495	0.115970404	0.1042139	0.057613502	0.067234774	0.037170001
65	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
66	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
67	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
68	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
69	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
70	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922

Appendix A4. Prevalence of CHD by age, gender and smoking status (contd.).

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
71	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
72	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
73	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
74	0.440384009	0.209616956	0.21878052	0.104136629	0.141148721	0.067184922
75	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
76	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
77	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
78	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
79	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
80	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
81	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
82	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
83	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
84	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
85	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
86	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
87	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
88	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
89	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
90	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
91	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
92	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
93	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
94	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
95	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
96	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
97	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
98	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
99	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813
100	0.555679058	0.414775335	0.27605851	0.206058259	0.178102262	0.132940813

Appendix A5. Prevalence of COPD by age, gender and smoking status.

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
18	0.012988	0.010572	0.01091	0.0101487	0.008832	0.009726
19	0.012988	0.010572	0.01091	0.0101487	0.008832	0.009726
20	0.012988	0.010572	0.01091	0.0101487	0.008832	0.009726
21	0.012988	0.010572	0.01091	0.0101487	0.008832	0.009726
22	0.012988	0.010572	0.01091	0.0101487	0.008832	0.009726
23	0.012988	0.010572	0.01091	0.0101487	0.008832	0.009726
24	0.012988	0.010572	0.01091	0.0101487	0.008832	0.009726
25	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
26	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
27	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
28	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
29	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
30	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
31	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
32	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
33	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
34	0.012164	0.010543	0.010218	0.0101215	0.008272	0.0097
35	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
36	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
37	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
38	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
39	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
40	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
41	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
42	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
43	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
44	0.012536	0.010541	0.01053	0.010119	0.008524	0.009697
45	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
46	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
47	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
48	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
49	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
50	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
51	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
52	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
53	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
54	0.012355	0.010533	0.010378	0.0101118	0.008401	0.00969
55	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
56	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
57	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
58	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
59	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
60	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
61	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
62	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
63	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
64	0.012308	0.010548	0.010339	0.0101264	0.00837	0.009704
65	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
66	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
67	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
68	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
69	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
70	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811

Appendix A5. Prevalence of COPD by age, gender and smoking status (contd.).

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
71	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
72	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
73	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
74	0.062346	0.053055	0.052371	0.0509331	0.042395	0.048811
75	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
76	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
77	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
78	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
79	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
80	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
81	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
82	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
83	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
84	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
85	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
86	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
87	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
88	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
89	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
90	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
91	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
92	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
93	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
94	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
95	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
96	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
97	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
98	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
99	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769
100	0.125043	0.106271	0.105036	0.1020198	0.085029	0.097769

Appendix A6. Prevalence of MI by age, gender and smoking status.

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
18	0	0	0	0	0	0
19	0	0	0	0	0	0
20	0	0	0	0	0	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24	0	0	0	0	0	0
25	0	0	0	0	0	0
26	0	0	0	0	0	0
27	0	0	0	0	0	0
28	0	0	0	0	0	0
29	0	0	0	0	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
32	0	0	0	0	0	0
33	0	0	0	0	0	0
34	0	0	0	0	0	0
35	0	0	0	0	0	0
36	0	0	0	0	0	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	0	0	0	0
40	0	0	0	0	0	0
41	0	0	0	0	0	0
42	0	0	0	0	0	0
43	0	0	0	0	0	0
44	0	0	0	0	0	0
45	0	0	0	0	0	0
46	0	0	0	0	0	0
47	0	0	0	0	0	0
48	0	0	0	0	0	0
49	0	0	0	0	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	0
53	0	0	0	0	0	0
54	0	0	0	0	0	0
55	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
56	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
57	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
58	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
59	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
60	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
61	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
62	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
63	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
64	0.092101	0.042499	0.063895	0.0170919	0.057563	0.015398
65	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
66	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
67	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
68	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
69	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
70	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635

Appendix A6. Prevalence of MI by age, gender and smoking status (contd.).

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
71	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
72	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
73	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
74	0.172461	0.092832	0.119645	0.0373344	0.107788	0.033635
75	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
76	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
77	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
78	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
79	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
80	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
81	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
82	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
83	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
84	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
85	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
86	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
87	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
88	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
89	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
90	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
91	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
92	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
93	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
94	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
95	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
96	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
97	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
98	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
99	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547
100	0.174625	0.098111	0.121146	0.0394575	0.10914	0.035547

Appendix A7. Prevalence of stroke by age, gender and smoking status.

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
18	0.001246	0.002458	0.001009	0.0019915	0.000909	0.001794
19	0.001246	0.002458	0.001009	0.0019915	0.000909	0.001794
20	0.001246	0.002458	0.001009	0.0019915	0.000909	0.001794
21	0.001246	0.002458	0.001009	0.0019915	0.000909	0.001794
22	0.001246	0.002458	0.001009	0.0019915	0.000909	0.001794
23	0.001246	0.002458	0.001009	0.0019915	0.000909	0.001794
24	0.001246	0.002458	0.001009	0.0019915	0.000909	0.001794
25	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
26	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
27	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
28	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
29	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
30	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
31	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
32	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
33	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
34	0.004749	0.00367	0.003848	0.0029736	0.003467	0.002679
35	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
36	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
37	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
38	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
39	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
40	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
41	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
42	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
43	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
44	0.003668	0.007342	0.002972	0.0059489	0.002677	0.005359
45	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
46	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
47	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
48	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
49	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
50	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
51	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
52	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
53	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
54	0.01459	0.011029	0.011821	0.008936	0.01065	0.00805
55	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
56	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
57	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
58	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
59	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
60	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
61	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
62	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
63	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
64	0.026915	0.030946	0.021807	0.0250731	0.019646	0.022588
65	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
66	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
67	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
68	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
69	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
70	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927

Appendix A7. Prevalence of stroke by age, gender and smoking status (contd.).

	SMOKERS		FORMER SMOKERS		NON-SMOKERS	
Age	Male	Female	Male	Female	Male	Female
71	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
72	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
73	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
74	0.094728	0.0684	0.076751	0.0554191	0.069145	0.049927
75	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
76	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
77	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
78	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
79	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
80	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
81	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
82	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
83	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
84	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
85	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
86	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
87	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
88	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
89	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
90	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
91	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
92	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
93	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
94	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
95	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
96	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
97	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
98	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
99	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041
100	0.16675	0.113766	0.135104	0.0921752	0.121715	0.083041