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NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

Economic Analysis of Interventions for Smoking Cessation Aimed at Pregnant Women

Supplementary Report

November 2021: NICE guidelines PH10 (February 2008) and PH14 (July 2008) have been updated and replaced by NG209.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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C O N S O R T I U M

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1. INTRODUCTION

This additional analysis aims to determine the cost effectiveness of smoking cessation interventions aimed at pregnant smokers, using the economic model described in an earlier report[1].

2. METHODS

This report investigated the impact of smoking cessation interventions for pregnant women in terms of the cost and QALY implications.

The smoking-related illness costs associated with a woman, over a five-year period, were calculated using the original cost-effectiveness model. The reader is referred to the previous report for a full description of the model's methods[1]. Additional costs associated with the infant were combined with the costs of the mother. Estimates of the average additional costs associated with children whose mothers smoked during pregnancy (i.e. the healthcare costs over the child's first five years of life), were identified from the literature.

Smoking whilst pregnant increases the probability of neonatal death. An intervention that reduces the number of smokers will therefore lead to a reduction in infant deaths. The number of deaths averted as a result of each intervention were calculated and used to derive the associated gain in quality adjusted life years (QALYs).

The incremental cost-effectiveness ratios (ICERs) associated with interventions with a cessation rate from 4% to 24% and a cost-per-quitter from £0 to £7,000, using a range of background cessation rates were calculated using the following formula:

$$ICER = \frac{CostPerAddQuitter - CostSavings(mother) - CostSavings(child)}{IncQALYs(mother) + IncQALYs(child)}$$

Where:

CostPerAddQuitter =cost per additional quitter
CostSavings(mother) = cost savings to the mother
CostSavings(child) = cost savings to the child
IncQALYs(mother) = incremental QALYs for the women
IncQALYs(child) = gains in QALYs for the child

3. RESULTS AND CONCLUSIONS

This analysis allows the user to determine, for any given cessation rate, the maximum cost-per-quitter required for the intervention to be cost-effective (based on a threshold of £20,000). The majority of the interventions studied were shown to be cost-effective providing the cost-per-quitter was less than £1,500 (using a background cessation rate of 3%). However, for higher background rates, interventions were shown to be decreasingly likely to be cost-effective. In one example, a quit rate of 21% versus 19% for placebo was shown to have an incremental cost-effectiveness ratio in excess of £200,000 per QALY.

[1] Flack S, Taylor M & Trueman P. *Cost-Effectiveness of Interventions for Smoking Cessation*. Report to NICE, 2007.

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The authors would like to thank the Centre for Reviews and Dissemination at the University of York, who carried out literature searches for the data required for the model.

Section 1: Methods

This supplementary report aims to investigate the impact of smoking cessation interventions for pregnant women in terms of the cost and QALY implications.

To calculate the cost implications of smoking whilst pregnant, the following steps were taken:

- The five-year costs associated with a woman were calculated;
- Additional costs associated with the infant were calculated;
- The cost of the intervention was calculated;
- The above costs were summed to give a total cost.

Smoking whilst pregnant has implications for the infant in terms of:

- Higher rates of sudden unexpected death in infancy (SUDI);
- Higher rates of mortality;
- Breathing difficulties;
- Prematurity;
- Smaller birth weight;
- Smaller stature when older;
- Slower growth and head circumference;
- Learning difficulties, hyperactivity and behavioural problems;
- Lower IQ.

Smoking whilst pregnant increases the probability of neonatal death. An intervention that reduces the number of smokers will therefore lead to reduction in infant deaths. The number of deaths averted as a result of each intervention were calculated and used to derive the associated gain in quality adjusted life years (QALYs).

1.1 COSTS AND BENEFITS ASSOCIATED WITH THE PREGNANT WOMAN

1.1.1 Additional Cost of Smoking for a Woman who is Pregnant

The original cohort simulation model was used to provide an estimate of the cost of continuing to smoke for a woman, over a five-year period, where no further cost was assumed when a woman was pregnant. The model was run using female-specific data. The reader is referred to the previous report for a full description of the model[2].

The model used in this further analysis compares different smoking cessation interventions to determine their incremental cost-effectiveness. The interventions modelled in this analysis are different from those used in the main report and focus on interventions aimed specifically at pregnant women.

[2] Flack S, Taylor M & Trueman P. *Cost-Effectiveness of Interventions for Smoking Cessation*. Report to NICE, 2007.

A hypothetical cohort of 1,000 pregnant smokers has been modelled in six-monthly cycles over a five-year period. A five-year period has been used because the literature suggests that smoking during pregnancy is associated with "increased hospital service utilisation and costs through the first five years of the infant's life" [2]. Data beyond a five-year period were not available.

As in the original model, during each cycle smokers could either quit (become former smokers), remain smokers or die; and former smokers could either relapse (become smokers), remain as quitters or die.

Each cycle, smokers and former smokers face a probability of five co-morbidities included:

- Lung cancer;
- Coronary heart disease (CHD);
- COPD;
- Myocardial infarction (MI);
- Stroke.

There are a number of further co- morbidities associated with being pregnant, namely:

- Ectopic pregnancies;
- Placenta praevia;
- Premature separation of the placenta;
- Pre-eclampsia.

The probability of developing these additional co-morbidities is increased if the woman smokes during pregnancy, see Table 1.1 [3]. However, a search of the literature failed to identify the extent to which these co-morbidities would impact upon the mother's utility and/or associated costs. The co-morbidities have, therefore, been excluded from the model. As such, this exclusion will lead to an underestimation of the total cost and QALYs lost associated with smoking whilst pregnant.

Table 1.1: Co-morbidities associated with being pregnant

Co-morbidity	Smoking during pregnancy increases the risk:
Ectopic pregnancies	1.5-2.5 times
Placenta praevia	1.5-3.0 times
Premature separation of the placenta	1.4-2.4 times
Pre-eclampsia	Associated with a 30-50% reduction*

*The mechanisms underlying this effect are not known [3].

The economic analysis showed that the total discounted QALYs associated with a quitter was 7.58, compared to 7.56 for a non-quitter. Therefore, quitting is associated with a gain of 0.02 QALYs. The model also demonstrated that an average quitter is likely to cost £61 (discounted) less than a non-quitter over the patient's lifetime.

1.2 COSTS AND BENEFITS ASSOCIATED WITH THE INFANT

1.2.1 Additional Costs Associated with Children of Smoking Mothers

Petrou *et al.* 2005 [2] carried out a comprehensive assessment of the long term economic consequences of maternal smoking during pregnancy. The study used data from the Oxford Record Linkage Study (ORLS), which is a collection of linked birth and death certificates and statistical abstracts (NHS inpatient and day cases). The study period was the 1st January 1980 to the 31st December 1989. 120,106 infants were born during the study period, of which 119,028 were born alive. Information on maternal smoking and resource utilisation were available for 101,332 (85.1%) of the infants and are shown in Table 1.2. To calculate the additional costs associated with children whose mothers smoked during pregnancy the authors summed together the total hospital stay for each infant (for each admission, regardless of diagnosis) and multiplied this by the *per diem* cost of the relevant speciality, during:

- The first year of life;
- The first five years of life.

The reasons for admission were not provided in the study. However, the authors do report that children of mothers who smoke are more likely to be admitted as a result of a broad range of conditions and disease in addition to "admissions directly attributable to intrauterine growth restriction, low birth weight, preterm delivery and respiratory illness". As such, it was assumed that these costs were reflective of all the additional costs associated with smoking during pregnancy.

The Health Survey for England 2004 [3] reports that 27% of pregnant women aged 16 to 54 are smokers. 7% of **all** women are light smokers (fewer than 10 per day), 10% are medium smokers (10 to 19 per day) and 6% are heavy smokers (20 or more per day). Due to lack of data it has been assumed that these figures are the same for all pregnant women aged 16 to 44[3]. The above information was used to calculate the weighted cost associated with children whose mothers smoked during pregnancy and only affects the weighted average in Table 1.2.

77% of all conceptions result in a live birth (http://www.statistics.gov.uk/downloads/theme_population/PopulationTrends128.pdf [4]). The 77% was calculated by dividing the number of births by the number of conceptions, in 2005 (the most recent available date with data):

645,800 (page 56)
837,400 (page 59)

It has been assumed that the woman receives the smoking cessation intervention at or soon after conception and before the loss of any fetus.

[3] http://www.ic.nhs.uk/pubs/hlthsvyeng2004upd/04TrendTabs.xls/file, 07/08/2006

Table 1.2: Additional hospitalisation costs associated with children whose mothers smoked during pregnancy

	Mean cost difference (£UK 1998-1999)	Mean cost difference (£UK 2006)
First year of life:		
1-9 cigarettes per day compared to no smokers	£83	£103.52
10-19 cigarettes per day compared to no smokers	£172	£214.52
Heaviest smoker compared to no smokers	£300	£374.17
Weighted average	-	£223.54
First five years of life:		
1-9 cigarettes per day compared to no smokers	£138	£172.12
10-19 cigarettes per day compared to no smokers	£307	£382.90
Heaviest smoker compared to no smokers	£462	£576.22
Weighted average	-	£370.90

1.2.2 QALY gains – for the infant

The gains in QALYs associated with each smoking cessation intervention were calculated using the following formula:

QALY gains = Deaths averted x expected lifetime QALYs

Deaths averted

During the first four weeks following birth the neonatal death rate is 3.5 per 1,000 live births, for the population as a whole [4]. The probability of death for a non-smoker was calculated using the following equation:

$$Death(non\text{-}smoker) = \frac{Death(population)}{(1.4xS)+N}$$

Where:

Death(non-smoker) = probability death for a non-smoker
Death(population) = probability of death for the population as a whole
S= Percentage who are smokers
N= Percentage who are non-smokers

The probability of death for a non-smoker is increased by 40% if the mother smokes during pregnancy [3]. A smoking intervention that reduces the number of women who smoke during pregnancy will, therefore, lead to a reduction in the number of infants who die. The number of deaths averted was calculated as follows:

Deaths averted = Reduction in the number of smokers x difference in the probability of death

Where:

Reduction in the number of smokers =
[(No. smokers following 'no intervention') – (No. smokers following the intervention)] x 77%[4]

Difference in the probability of death = Probability of neonatal death for a smoker – probability of neonatal death for the population as a whole

Expected lifetime QALYs

At birth an infant can expect to live for 79 years (average of the male and female life expectancy at birth) [5]. Each year of life has an associated QALY weight, which can be any value from zero (equivalent to death) to one (full health) and varies by age (see Table 1.2) [6]. These values were used to calculate the total number of QALYs an infant can expect to receive in their lifetime.

Table 1.2: QALY weights

Age group	EQ 5D UK		
	Average	Men	Women
0-19	Assumed to be the same as the 20-29 age group		
20-29	0.901	0.91	0.892
30-39	0.881	0.897	0.864
40-49	0.837	0.854	0.82
50-59	0.801	0.816	0.785
60-69	0.767	0.786	0.747
70-79	0.713	0.736	0.689
80-89	0.667	0.711	0.622
Total number of expected QALYs	**67 (=24 after discounting at 3.5% per year)**		

Accounting for early mortality, the child of a quitting mother is likely to experience 23.56 QALYs, compared to 23.54 for the child of a non-quitting mother. As described above, the child of a smoking mother is estimated to cost around £371 more than the child of a quitting mother.

1.3 INTERVENTIONS

A Cochrane review [1] was identified that focussed on interventions for promoting smoking cessation during pregnancy. This review did not investigate the costs of the interventions and was not therefore included in the Rapid Reviews.

[4] 77% of all conceptions result in a live birth [4] (i.e. not all pregnant women who participate in a smoking cessation intervention will have a baby). Therefore the results were adjusted to take account of the fact that only 77% of pregnancies result in a live birth.

The aim of the Cochrane review was to assess smoking cessation interventions that were implemented during pregnancy, on the health of the fetus, infant and mother. Full papers were obtained, where possible, of any paper included in the review that was published from 1996 onwards and studied a smoking cessation intervention. The identified papers are discussed below and summarised in Table 1.5.

'Proactive calls'

Solomon *et al.* 2000, in a US study, [7] tested the impact of physician/midwife advice to stop smoking with printed material, with or without proactive telephone peer support provided by a female ex-smoker. 18.2% in the intervention and 14.9% in the comparison group quit smoking (the difference was not statistically significant). The physician/midwife advice was delivered during the prenatal visits and, therefore, would have no additional associated cost. The proactive calls were provided on a weekly bases, although the frequency was increased around the quit date period and became less frequent as smoking changes stabilised. The calls lasted for an average of ten minutes. It is unclear what the cost associated with these calls would be and we have, therefore, assumed 'worst case' and 'best case' scenarios:

- 'Worst case':
  - The women would receive a call every week for 36 weeks at cost of £10 per call (based on ten minutes of a GP practice nurse time) [8].
- 'Best case';
  - The calls would not have any associated cost.

The cost of the self help material was taken from Parrott *et al.* 1998 (£1.14) [9]

'NRT'

Wisborg *et al.* 2000 [10] carried out a randomised controlled study where participants were randomly assigned to nicotine patches or placebo. Participants in the intervention group received:

- Smoking cessation four counselling sessions with a midwife, one lasting 45 minutes and the rest lasting 15 minutes (independent of the routine antenatal visits). Due to lack of data surrounding the cost of midwife visit, a health visitor has been used as a proxy (cost for four sessions = £140).
- Nicotine patches, a pamphlet on stopping smoking was also distributed and nicotine patches (£93.29 for the nicotine patches and £1.14 for the brochure).
- Total cost = £234.43 (£1,114 per quitter, based on a quit rate of 21%).

The study did not find any effect of nicotine patches on smoking cessation compared to placebo (the 'proportion of pregnancy women who were continuously abstinent after the start of the intervention was 21% in the nicotine group and 19% in the placebo group'). The authors report that 'pregnant women who still smoked at the end of the first trimester might not be willing to stop or might need more intensive support'.

Kapur *et al.* 2001 [11] carried out a study of the use of NRT in Canada, amongst pregnant woman who were heavy smokers. The study was a randomised, double-blind, placebo-controlled trial. In additional to the NRT the women received counselling at 1, 4 and 8 weeks and weekly telephone contact with an investigator. Of the 17 women who received NRT 4 quit (23.53%), compared to none of the placebo group.

'Peer counselling'

Malchodi *et al.* 2003 [12] carried out a prospective randomised trial where usual care was compared to usual care plus peer support counselling for smoking cessation in low risk women. The study was carried out in the US. During the first prenatal visit, the health care provider delivered a strong quit message and discussed the risk, to the mother and infant, of continuing to smoke. Smoking cessation education materials were also distributed. This material contained self-help behavioural strategies aimed specifically at pregnant women. The stage of readiness to quit smoking was assessed at subsequent prenatal visits. The intervention group received smoking counselling from lay community health outreach workers (peer counsellors); this was provided during a median of 6 contact sessions (45% occurred at the subject's home, 38% by telephone and 17% in the hospital or clinic). The peer counsellors were 'selected from an existing pool of non-smoking, female, community outreach workers who possessed the same social-environmental and cultural qualities of the study participants'.

The cost of the intervention was not directly provided in the study. However, it was reported that the interventions were made up of the following components (in this study, we applied costs to each of the components):

- Smoking cessation advice during prenatal visits;
    - Assumed to have zero additional associated cost and delivered during usual care.
- Smoking cessation pamphlet;
    - Self help material costs, at £1.14 [9];
- Peer counselling, provided by lay community outreach workers;
    - As it was not clear as to whether the counsellors were paid to provide the counselling, two scenarios were carried out:
        - One assumed there would be no cost associated with the counsellors.
        - One assumed that the counsellors would be paid on the same rate as a health visitor (where a health visitor cost £35 per home visit or £70 per hour of clinic time). This gives a cost of £22 per visit (or £133 for six).

At the end of the study 38 participants were in the intervention group and 48 in the control. At follow-up, no statistically significant differences were found between the two groups in terms of smoking abstinence, although more of the intervention group quit at some point. At 36 weeks gestation 21% of the usual care and 24% of the intervention group were abstinent (not statistically significant). The cost per quitter was, therefore, £559.

'Computer counselling'

Lawrence *et al.* 2003 [13] compared the effects of three interventions on smoking cessation amongst pregnant women, who were heavy smokers, in the UK:

- Control (n=289): standard smoking cessation advice delivered by midwives with a *'Thinking about Stopping'* leaflet.
- Manuals (n=305): participants received six, 30-page stage-based self help manuals, '*Pro-Change Programme for a Healthy Pregnancy'.* Midwives assessed participants' stage of change three times during pregnancy, providing brief support as needed.
- Computer (n=324): participants received six, 30 page stage based self help manuals. Women worked alone with the aid of a computer. The computer programme assessed the stage of change of the participants (by a questionnaire) and delivered on-screen and audio feedback. Women used the programme three times during their pregnancy.

At 30 weeks, smoking cessation was 1.7% in the control group, 4.3% in the manuals group and 5.7% in the computer group. 10 days postnatal smoking cessation was 3.5% in the control group, 4.7% in the manuals group and 8.1% in the computer group (or 1.0%, 3.0% and 2.8% respectively for sustained abstinence). The trial recruited women who were smoking at <20 weeks. The authors reported that most women stopped smoking before conception or in the early stages of pregnancy. The cost of the intervention was not provided in the study and it is unclear if the manual and computer interventions would require any additional midwife time.

'Midwife BA'

Hajek *et al*. 2001 [14] randomised 871 pregnant smokers to receive the intervention or usual care, in the UK. The intervention consisted of:

- Advice by the midwife;
- Written material;
- Women were paired with another woman for mutual support;
- Women's notes were marked, so that reinforcements could be made during future contacts.

The cost of the intervention was reported to be no more than £4 (including materials, administration and training but excluding midwifes training). Assuming this cost relates to 2001, the inflated cost is £5. At six months post-birth, 2.9% of the intervention group (who were current smokers at booking) and 2.5% of the control were abstinent.

Health Education Methods

Walsh *et al.* 1997 [15] during 1990 and 1991 Australian women identified as smoking at their first prenatal visit were randomised to a control group (usual care) or an intervention group. The intervention group received;

- Advice from the doctor;
- A videotape containing risk information, rebuttal of barriers to quitting and cessation tips.
- Midwife counselling.
- Self-help manual.
- Entry into a lottery, if a validated abstainer at the second visit.
- Social support.
- A chart reminder.

The cost of the intervention was $13.95 per patient and $121.41 per abstainer (assuming the costs are 1991, the inflated costs are UK£12 and UK£107 respectively). The point prevalence of cessation estimates are shown in Table 1.4, below.

Table 1.4: Point prevalence of smoking cessation

	% abstaining	
	Control group	**Experimental group**
Self report		
At midpoint	7	20
At end of pregnancy	8	19
At postpartum	6	13
Chemical validation		
At midpoint	2	16
At end of pregnancy	6	13
At postpartum	1	10

Health Authority Cessation Services

Taylor and Hajek [16] provide a summary of smoking cessation services for pregnant women provided by UK Health Authorities (HAs). Within the HAs interviewed the majority had dedicated smoking cessation staff available for pregnant smokers with the remainder providing smoking cessation advice as part of the routine care provided by the midwife. Treatment was provided in a variety of settings ranging from the clients home to a hospital or health centre. Taylor and Hajek report that 'the average cost across the services of each 4-week quitter (in terms of staff salaries only) was £3,309. This is based on a quit rate of 29% (for women who set a quit date).

Survey of NHS Smoking Cessation Services

Lee *et al* 2006 [17] carried out a survey to identify examples of good practice for smoking cessation services for pregnant women. They identified three leading services (beacon services) who provide exceptional output and reported details of these services in their study:

- Service A:

    - Requires (for one year) - (i) a full time midwife, (ii) full time Sure Start registered nurse (iii) administrator at six hours per week.
        - Using the cost of a GP practice nurse as an approximation of the cost of a midwife, a Sure Start nurse and an administrator gives a total annual cost of £46,459.
    - The scheme covers 3,200 births each year.
    - Not all of the schemes will involve smoking women and 27% of pregnant women smoke (27% of 3,200 = 864).
    - 267 women set a quit date, of which 99 (37%) were successful.
    - The cost-per-quitter is £46,459/99 = £469.
- Service B
    - Requires (for one year) - (i) a key clinician spends six hours per day, five days per week on home visits and one and a half hours an evening telephoning clients.
        - Using the cost of a GP practice nurse as an approximation of the cost of the key clinician gives a total annual cost of £21,118.
    - The scheme covers 5,600 births each year.
    - Not all of the schemes will involve smoking women and 27% of pregnant women smoke (27% of 5,600 = 1512).
    - 120 women set a quit date, of which 61 (51%) were successful.
    - The cost-per-quitter is £21,118/61 = £346.
- Service C
    - Requires (for one year) - (i) two full time clinicians (ii) 1.7 midwives fulltime midwives (iii) administrator (working 0.4 of a full time position)
        - Using the cost of a GP practice nurse as an approximation of the cost of the midwife and an administrator gives a total annual cost of £86,584.
    - The scheme covers 3,200 births each year.
    - Not all of the schemes will involve smoking women and 27% of pregnant women smoke (27% of 3,200 = 864).
    - 215 women set a quit date, of which 105 (49%) were successful.
    - The cost-per-quitter is £86,584/105 = £825.

It should be noted that, whilst Service B has the lowest cost per quitter (i.e. £346, compared to £469 and £825 for A and C respectively), this does not necessarily imply that it s the preferred service. In fact, Service C provides the highest number of quitters (105), and incremental analysis shows that the additional cost per quitter for Service C compared to the next best option in terms of quitters (Service A) is £6,687. The decision-maker should use this figure to decide whether Service C should be preferred instead of Service A. Service B provides the fewest number of quitters, and should only be used if: (i) Services A and C are shown to be not cost-effective, and (ii) Service B is cost-effective compared against doing nothing.

1.3.1 Interventions modelled

In order to provide meaningful analysis, three specific data inputs are needed:

- The *additional* cost of the intervention;
- The number of quitters due to the intervention;
- The number of people who would have quit *without* the intervention.

Whilst there is reasonable evidence for the first two factors, it is the latter which is not readily available in most (if not all) of the studies investigated. It is not possible to estimate an incremental cost-effectiveness ratio without knowing the *additional*, rather than *absolute* benefit from the intervention. In such cases where full data are not available, threshold analysis will be undertaken in order to identify the scenarios under which each interventions might be deemed to be cost-effective. Table 1.5 provides summary details of the interventions studied, and details of the available evidence and suggested analysis.

Table 1.5: Interventions

Study / data source	Intervention	Comparator	Cost details	Number of quitters (% who quit)		Notes
				Intervention	Comparator	
Department of Health[1]	NHS stop smoking services in England	None stated	During April 2006 to December 2007 there were 188,162 successful quitters. The total expenditure was £36,428,000, giving a cost per quitter of £193.60. Note that this information is for all smokers, not just pregnant smokers.	6,329/12,146 (52%), had successfully quit at 4 weeks (self report). 3,442/12,456 (28%) had successfully quit at 4 weeks (self report) and were confirmed by CO validation.	None stated	Because the intervention was not compared against a suitable comparator, it is necessary to make assumptions around the effectiveness of the alternative approach (i.e. 'do nothing'). The background cessation rate, for pregnant women, was varied from 3% to 12%.
Lee *et al.* 2006	Provides examples of good practice: Service A	None stated	Cost per quitter = £469 (£46,459/99).	267 women set a quit date, of which 99 (37%) were successful.	None stated	As discussed previously, incremental analysis demonstrates that Service C provides the highest number of quitters, at an incremental cost per quitter (compared to Service A) of
	Service B	None stated	Cost per quitter = £346 (£21,118/61).	120 women set a quit date, of which 61 (51%) were successful.	None stated	

	Service C	None stated	Cost per quitter = £825 (£86,584/105).	215 women set a quit date, of which 105 (49%) were successful.	None stated	approximately £6,700.
Study / data source	**Intervention**	**Comparator**	**Cost details**	**Number of quitters (% who quit)**		**Analysis**
				Intervention	**Comparator**	
Wandsworth PCT	Stop smoking services	None stated	£18,000 for a smoking-in-pregnancy post. It is not clear how many posts would be required.	2,281 maternities in 2004. Of which: 345 (15%) were smokers at delivery. However, the proportion smoking at the start of pregnancy is not known.	None stated	No information for the comparator's effectiveness. See above.
West *et al*	'You two can quit'	None stated	Budget = £32,000 (cost per quitter = £400).	80 (44%) quitters at four-week follow up (CO validated); with 52 week follow up indicating 10-20% long term successes (no further details regarding this range are provided).	None stated	No information for the comparator's effectiveness. See above.
Priestly	Huddersfield smoking advice service	None stated	There were 32 staff for all referrals, but it was not stated what proportion of referrals were for pregnant smokers.	In 2005/06 there were 204 pregnant smokers 106 (52%) of whom quit, with a relapse rate of 34% of all quitters.	None stated	No information for the comparator's effectiveness. See above.

Presentation by Hancock	Sheffield stop smoking service	None stated	There appears to be one midwife delivering the service.	303 pregnant referrals; 172 set a quit date; 90 quit at four weeks (52.3%). 16.3% of women smoked during pregnancy.	None stated	No information for the comparator's effectiveness. See above.
Study / data source	**Intervention**	**Comparator**	**Cost details**	**Number of quitters (% who quit)**		**Analysis**
				Intervention	**Comparator**	
Hereford PCT	Details of the smoking cessation service offered are not provided.	None stated	One FTE midwife band 7	2006/07 154 referred to the LSSS, 121 set a quit date and 34 had quit at 4 weeks.	None stated	No information for the comparator's effectiveness. See above.
South Birmingham PCT	Details of the smoking cessation service offered are not provided.	None stated	One FTE practice nurse band 7	2006/07 325 referred to the LSSS, 150 accessed the LSSS, 150 set a quit date and 72 had quit at 4 weeks.	None stated	No information for the comparator's effectiveness. See above.

[1] http://www.ic.nhs.uk/statistics-and-data-collections/health-and-lifestyles/smoking-and-stopping/statistics-on-nhs-stop-smoking-services-in-england-april-2006-to-december-2006-q3--quarterly-report

[2] Cost threshold analysis = using the cessation rate to determine the cost-per- pregnant quitter required for the intervention to be cost-effective

[3] Quit rate threshold analysis = using the cost-per-quitter to determine the cessation rate required for the intervention to be cost-effective

1.3.2 No Intervention

Because each of the interventions described in Table 1.5 were not compared against a suitable comparator, it was necessary to make assumptions around the effectiveness of the alternative approach (i.e. 'do nothing'). The counterfactual (i.e. if the intervention was not offered) cessation rate, for pregnant women, was varied from 3% to 12%.

1.3.3 Incremental cost-effectiveness ratio

The incremental cost-effectiveness ratios (ICERs) associated with interventions with a cessation rate ranging from 4% to £24 and a cost-per-quitter ranging from £0 to £7,000, using a range of background cessation rates, were calculated using the following formula:

$$ICER = \frac{CostPerAddQuitter - CostSavings(mother) - CostSavings(child)}{IncQALYs(mother) + IncQALYs(child)}$$

Where:

CostPerAddQuitter =cost per additional quitter
CostSavings(mother) = cost savings to the mother
CostSavings(child) = cost savings to the child
IncQALYs(mother) = incremental QALYs for the women
IncQALYs(child) = gains in QALYs for the child

A two-way table, with cost-per quitter on the x axis and cessation rates on the y axis was drawn up, allowing the ICER for any combination of cost-per-quitter and cessation rate to be determined. For example, the user can see the cost-per-quitter needed for the 'Midwife BA' (cessation rate equals 11.6%) to be cost-effective (i.e. have an ICER ≤ £20,000).

The cost-per-additional-quitter was calculated as follows:

$$CostPerAddQuitter = \frac{CostPerQuitter * No.QuittersWithIntervention}{No.AddionalQuitters}$$

Where:

- The number of quitters with the intervention was a constant (A);
- The number of quitters without the intervention was calculated by dividing the number of quitters with the intervention by the ratio of the background quit rate to the intervention cessation rate (B);
- The number of additional quitters was equal to A-B.

The original cohort simulation model was used to provide an estimate of the additional costs and QALYs of a smoker, compared to a non-smoker, Table 1.6 (see Section 1.1.1 for details of the model).

Table 1.6: 5-year cost (for both mother and child) to the NHS and lifetime QALYs of a smoker and non-smoker

	5-year cost	Lifetime QALYs
Smoker	£681.58	7.56
Non-smoker	£620.22	7.58
Additional	**-£61**	**0.03**

The additional costs associated with children of smoking mothers were taken from Petrou *et al.* 2005 and are described in Section 1.2.1. The calculation of the QALY gains for the infant is described in Section 1.2.2.

Personal communication with Peter Hajek suggests that 70% of pregnant women who stop smoking will relapse within a year. The cessation rates were adjusted to take account of this.

Section 2: Results

Table 2.1 provides a matrix of the ICERs for a range of cessation rates and cost-per-quitters, using a background quit rate equal to 3% and assuming that the mothers smoke an average number of cigarettes. Tables for mothers who smoke a light, medium and heavy number of cigarettes are provided in Appendix A to D (for different background cessation rates).

Table 2.1 (along with the Tables provided in the Appendix) allow the user to see for any given quit rate the maximum cost-per-quitter required for the intervention to be cost-effective (based on a threshold of £20,000 per QALY). For example, with a background quit rate of 3% and assuming that the mother smoked an average number of cigarettes, Table 2.1 shows that all interventions will be cost-effective if:

- The cost per quitter is £1,000 and the resulting cessation rate is 10%+;
- The cost per quitter is £500 and the resulting cessation rate is 5%+;
- The cost per quitter is less than £500.

Table 2.1: ICER for a range of quit rates and cost-per-quitters, for a woman who is an average smoker (background quit rate = 3%)

	Additional cost per quitter					
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**	**£2,500**
4%	**Dominant**	£31,369	£71,388	£111,406	£151,425	£191,443
5%	**Dominant**	**£16,362**	£41,374	£66,385	£91,397	£116,408
6%	**Dominant**	**£11,360**	£31,369	£51,378	£71,388	£91,397
7%	**Dominant**	**£8,859**	***£26,367***	£43,875	£61,383	£78,891
8%	**Dominant**	**£7,358**	***£23,366***	£39,373	£55,380	£71,388
9%	**Dominant**	**£6,358**	***£21,365***	£36,372	£51,378	£66,385
10%	**Dominant**	**£5,643**	**£19,935**	£34,228	£48,520	£62,812
11%	**Dominant**	**£5,107**	**£18,863**	£32,620	£46,376	£60,133
12%	**Dominant**	**£4,690**	**£18,030**	£31,369	£44,709	£58,048
13%	**Dominant**	**£4,357**	**£17,363**	£30,369	£43,375	£56,381
14%	**Dominant**	**£4,084**	**£16,817**	***£29,550***	£42,283	£55,017
15%	**Dominant**	**£3,857**	**£16,362**	***£28,868***	£41,374	£53,880
16%	**Dominant**	**£3,664**	**£15,978**	***£28,291***	£40,604	£52,918
17%	**Dominant**	**£3,499**	**£15,648**	***£27,796***	£39,945	£52,093
18%	**Dominant**	**£3,356**	**£15,362**	***£27,367***	£39,373	£51,378
19%	**Dominant**	**£3,231**	**£15,112**	***£26,992***	£38,873	£50,753
20%	**Dominant**	**£3,121**	**£14,891**	***£26,661***	£38,431	£50,201
21%	**Dominant**	**£3,023**	**£14,695**	***£26,367***	£38,039	£49,711
22%	**Dominant**	**£2,935**	**£14,519**	***£26,104***	£37,688	£49,272
23%	**Dominant**	**£2,856**	**£14,361**	***£25,867***	£37,372	£48,877
24%	**Dominant**	**£2,785**	**£14,219**	***£25,652***	£37,086	£48,520

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table 2.1 (and the Tables in the Appendices) can be used to determine the cessation rate required for an intervention to be cost-effective (based on a threshold of £20,000 per QALY), for interventions with a known cost-per-quitter.

Table 2.2 provides details of the cost-effectiveness threshold analyses for the interventions described in Table 1.5, above.

Table 2.2: Cessation rate required for each intervention to be cost-effective

Intervention	**Cost per quitter**	**% quitting**	**Threshold analysis**
NHS Stop Smoking Services In England	£193.60	28%	Cost-effective if at least 1.5% more than background quitters.
Lee *et al*. Service A	£469	37%	Cost-effective if at least 4% more than background quitters.
Lee *et al*. Service B	£346	51%	Cost-effective if at least 4% more than background quitters.
Lee *et al*. Service C	£825	49%	Cost-effective if at least 9% more than background quitters.

Wandsworth PCT Stop Smoking Services	Not stated	Not stated	Not enough information to calculate threshold analysis.
West *et al*. You Two Can Quit	£400	15% (median)	Cost-effective if at least 1.5% more than background quitters.
Huddersfield Smoking Advice Service	Not stated	18%	Not enough information to calculate threshold analysis.
Sheffield Stop Smoking Service	Not stated	Not stated	Not enough information to calculate threshold analysis.
Hereford PCT	Not stated	28%	Not enough information to calculate threshold analysis.
South Birmingham PCT	Not stated	48%	Not enough information to calculate threshold analysis.

The NRT intervention described by Wisborg *et al.* 2000 [10] demonstrated that the cost per quitter was approximately £1,114. However, the quit rate was 21%, compared to 19% on placebo. It is, therefore, the cost per *additional* quitter (i.e. the total cost divided by the proportion of extra quitters) that is of interest here. This is actually estimated to be £11,700 (i.e. £234 / 0.02). When this figure is used in the analysis, after accounting for the additional costs and QALY benefits associated with quitting, the incremental cost-effectiveness ratio is £225,399 per QALY.

The peer counselling intervention described by Malchodi *et al.* 2003 [12] implied that the cost per quitter was £559. Again, however, it is important to calculate the cost per *additional* quitter (24% quit, compared to 21% with usual care). In this instance, the expenditure required to gain one extra quitter is £4,471. This results in a cost per QALY gained of £80,832.

Section 3: Conclusions

3.1 MAIN FINDINGS AND CONCLUSIONS

This analysis allows the user to determine, for any given cessation rate, the maximum cost-per-quitter required for the intervention to be cost-effective (based on a threshold of £20,000 per QALY). The majority of the interventions studied were shown to be cost-effective providing the cost-per-quitter was less than £1,500 (using a background cessation rate of 3%). However, for higher background rates, interventions were shown to be decreasingly likely to be cost-effective. In one example, a quit rate of 21% versus 19% for placebo was shown to have an incremental cost-effectiveness ratio in excess of £200,000 per QALY. The true 'background' quit rate for pregnant smokers is not known.

This analysis highlighted a significant lack of evidence of head-to-head comparisons between interventions and the counterfactual scenario (i.e. no intervention). As such, in all analyses, it was impossible to estimate the true impact of each intervention. Therefore, the results presented in this report should be treated with caution. The analysis highlights a need for future studies to investigate the true nature and *incremental* impact of stop smoking services for women who smoke during pregnancy.

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APPENDIX A

Additional cost associated with children of smoking mothers:

1-9 cigarettes smoked by the mother

Table A1: ICER for a range of quit rates and cost-per-quitters, for a woman who is a light smoker (background quit rate = 3%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
4%	**Dominant**	£35,347	£75,365	£115,384	£155,402
5%	**Dominant**	***£20,340***	£45,351	£70,363	£95,374
6%	**Dominant**	**£15,337**	£35,347	£55,356	£75,365
7%	**Dominant**	**£12,836**	£30,344	£47,852	£65,361
8%	**Dominant**	**£11,336**	***£27,343***	£43,350	£59,358
9%	**Dominant**	**£10,335**	***£25,342***	£40,349	£55,356
10%	**Dominant**	**£9,621**	***£23,913***	£38,205	£52,497
11%	**Dominant**	**£9,085**	***£22,841***	£36,597	£50,354
12%	**Dominant**	**£8,668**	***£22,007***	£35,347	£48,686
13%	**Dominant**	**£8,334**	***£21,340***	£34,346	£47,352
14%	**Dominant**	**£8,061**	***£20,795***	£33,528	£46,261
15%	**Dominant**	**£7,834**	***£20,340***	£32,846	£45,351
16%	**Dominant**	**£7,642**	**£19,955**	£32,268	£44,582
17%	**Dominant**	**£7,477**	**£19,625**	£31,774	£43,922
18%	**Dominant**	**£7,334**	**£19,339**	£31,345	£43,350
19%	**Dominant**	**£7,209**	**£19,089**	£30,970	£42,850
20%	**Dominant**	**£7,098**	**£18,868**	£30,639	£42,409
21%	**Dominant**	**£7,000**	**£18,672**	£30,344	£42,016
22%	**Dominant**	**£6,913**	**£18,497**	£30,081	£41,665
23%	**Dominant**	**£6,834**	**£18,339**	***£29,844***	£41,349
24%	**Dominant**	**£6,762**	**£18,196**	***£29,630***	£41,064

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table A2: ICER for a range of quit rates and cost-per-quitters, for a woman who is a light smoker (background quit rate = 6%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
7%	**Dominant**	£65,361	£135,393	£205,425	£275,457
8%	**Dominant**	£35,347	£75,365	£115,384	£155,402
9%	**Dominant**	***£25,342***	£55,356	£85,370	£115,384
10%	**Dominant**	***£20,340***	£45,351	£70,363	£95,374
11%	**Dominant**	**£17,338**	£39,349	£61,359	£83,369
12%	**Dominant**	**£15,337**	£35,347	£55,356	£75,365
13%	**Dominant**	**£13,908**	£32,488	£51,068	£69,648
14%	**Dominant**	**£12,836**	£30,344	£47,852	£65,361
15%	**Dominant**	**£12,003**	***£28,677***	£45,351	£62,026
16%	**Dominant**	**£11,336**	***£27,343***	£43,350	£59,358
17%	**Dominant**	**£10,790**	***£26,252***	£41,713	£57,175
18%	**Dominant**	**£10,335**	***£25,342***	£40,349	£55,356
19%	**Dominant**	**£9,950**	***£24,572***	£39,195	£53,817
20%	**Dominant**	**£9,621**	***£23,913***	£38,205	£52,497
21%	**Dominant**	**£9,335**	***£23,341***	£37,348	£51,354
22%	**Dominant**	**£9,085**	***£22,841***	£36,597	£50,354
23%	**Dominant**	**£8,864**	***£22,400***	£35,935	£49,471
24%	**Dominant**	**£8,668**	***£22,007***	£35,347	£48,686

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table A3: ICER for a range of quit rates and cost-per-quitters, for a woman who is a light smoker (background quit rate = 9%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
10%	**Dominant**	£95,374	£195,420	£295,467	£395,513
11%	**Dominant**	£50,354	£105,379	£160,404	£215,430
12%	**Dominant**	£35,347	£75,365	£115,384	£155,402
13%	**Dominant**	***£27,843***	£60,358	£92,873	£125,388
14%	**Dominant**	***£23,341***	£51,354	£79,367	£107,380
15%	**Dominant**	***£20,340***	£45,351	£70,363	£95,374
16%	**Dominant**	**£18,196**	£41,064	£63,931	£86,799
17%	**Dominant**	**£16,588**	£37,848	£59,108	£80,367
18%	**Dominant**	**£15,337**	£35,347	£55,356	£75,365
19%	**Dominant**	**£14,337**	£33,346	£52,355	£71,363
20%	**Dominant**	**£13,518**	£31,709	£49,899	£68,089
21%	**Dominant**	**£12,836**	£30,344	£47,852	£65,361
22%	**Dominant**	**£12,259**	***£29,190***	£46,121	£63,052
23%	**Dominant**	**£11,764**	***£28,201***	£44,637	£61,073
24%	**Dominant**	**£11,336**	***£27,343***	£43,350	£59,358

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table A4: ICER for a range of quit rates and cost-per-quitters, for a woman who is a light smoker (background quit rate = 12%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
13%	**Dominant**	£125,388	£255,448	£385,508	£515,568
14%	**Dominant**	£65,361	£135,393	£205,425	£275,457
15%	**Dominant**	£45,351	£95,374	£145,397	£195,420
16%	**Dominant**	£35,347	£75,365	£115,384	£155,402
17%	**Dominant**	***£29,344***	£63,360	£97,375	£131,391
18%	**Dominant**	***£25,342***	£55,356	£85,370	£115,384
19%	**Dominant**	***£22,484***	£49,639	£76,794	£103,950
20%	**Dominant**	***£20,340***	£45,351	£70,363	£95,374
21%	**Dominant**	**£18,672**	£42,016	£65,361	£88,705
22%	**Dominant**	**£17,338**	£39,349	£61,359	£83,369
23%	**Dominant**	**£16,247**	£37,166	£58,084	£79,003
24%	**Dominant**	**£15,337**	£35,347	£55,356	£75,365
25%	**Dominant**	**£14,568**	£33,808	£53,047	£72,287
26%	**Dominant**	**£13,908**	£32,488	£51,068	£69,648
27%	**Dominant**	**£13,337**	£31,345	£49,353	£67,361
28%	**Dominant**	**£12,836**	£30,344	£47,852	£65,361
29%	**Dominant**	**£12,395**	***£29,462***	£46,528	£63,595
30%	**Dominant**	**£12,003**	***£28,677***	£45,351	£62,026
31%	**Dominant**	**£11,652**	***£27,975***	£44,298	£60,621
32%	**Dominant**	**£11,336**	***£27,343***	£43,350	£59,358
33%	**Dominant**	**£11,050**	***£26,771***	£42,493	£58,214
34%	**Dominant**	**£10,790**	***£26,252***	£41,713	£57,175
35%	**Dominant**	**£10,553**	***£25,777***	£41,001	£56,226
36%	**Dominant**	**£10,335**	***£25,342***	£40,349	£55,356
37%	**Dominant**	**£10,135**	***£24,942***	£39,749	£54,556
38%	**Dominant**	**£9,950**	***£24,572***	£39,195	£53,817
39%	**Dominant**	**£9,779**	***£24,230***	£38,682	£53,133

*__bold green__ denotes a cost-effective intervention, based on a threshold of £20,000

bold italic orange denotes a value between £20,000 and £30,000

APPENDIX B

Additional cost associated with children of smoking mothers:

10-19 cigarettes smoked by the mother

Table B1: ICER for a range of quit rates and cost-per-quitters, for a woman who is a medium smoker (background quit rate = 3%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
4%	**Dominant**	£31,129	£71,148	£111,166	£151,184
5%	**Dominant**	**£16,122**	£41,134	£66,145	£91,157
6%	**Dominant**	**£11,120**	£31,129	£51,138	£71,148
7%	**Dominant**	**£8,619**	***£26,127***	£43,635	£61,143
8%	**Dominant**	**£7,118**	***£23,125***	£39,133	£55,140
9%	**Dominant**	**£6,118**	***£21,125***	£36,131	£51,138
10%	**Dominant**	**£5,403**	**£19,695**	£33,988	£48,280
11%	**Dominant**	**£4,867**	**£18,623**	£32,380	£46,136
12%	**Dominant**	**£4,450**	**£17,790**	£31,129	£44,469
13%	**Dominant**	**£4,117**	**£17,123**	£30,129	£43,135
14%	**Dominant**	**£3,844**	**£16,577**	***£29,310***	£42,043
15%	**Dominant**	**£3,616**	**£16,122**	***£28,628***	£41,134
16%	**Dominant**	**£3,424**	**£15,737**	***£28,051***	£40,364
17%	**Dominant**	**£3,259**	**£15,408**	***£27,556***	£39,705
18%	**Dominant**	**£3,116**	**£15,122**	***£27,127***	£39,133
19%	**Dominant**	**£2,991**	**£14,872**	***£26,752***	£38,633
20%	**Dominant**	**£2,881**	**£14,651**	***£26,421***	£38,191
21%	**Dominant**	**£2,783**	**£14,455**	***£26,127***	£37,799
22%	**Dominant**	**£2,695**	**£14,279**	***£25,864***	£37,448
23%	**Dominant**	**£2,616**	**£14,121**	***£25,627***	£37,132
24%	**Dominant**	**£2,545**	**£13,978**	***£25,412***	£36,846

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table B2: ICER for a range of quit rates and cost-per-quitters, for a woman who is a medium smoker (background quit rate = 6%)

	Cost per quitter				
Quit rate	£0	£500	£1,000	£1,500	£2,000
7%	Dominant	£61,143	£131,175	£201,207	£271,240
8%	Dominant	£31,129	£71,148	£111,166	£151,184
9%	Dominant	***£21,125***	£51,138	£81,152	£111,166
10%	Dominant	**£16,122**	£41,134	£66,145	£91,157
11%	Dominant	**£13,121**	£35,131	£57,141	£79,151
12%	Dominant	**£11,120**	£31,129	£51,138	£71,148
13%	Dominant	**£9,691**	***£28,271***	£46,851	£65,431
14%	Dominant	**£8,619**	***£26,127***	£43,635	£61,143
15%	Dominant	**£7,785**	***£24,459***	£41,134	£57,808
16%	Dominant	**£7,118**	***£23,125***	£39,133	£55,140
17%	Dominant	**£6,572**	***£22,034***	£37,496	£52,957
18%	Dominant	**£6,118**	***£21,125***	£36,131	£51,138
19%	Dominant	**£5,733**	***£20,355***	£34,977	£49,599
20%	Dominant	**£5,403**	**£19,695**	£33,988	£48,280
21%	Dominant	**£5,117**	**£19,124**	£33,130	£47,137
22%	Dominant	**£4,867**	**£18,623**	£32,380	£46,136
23%	Dominant	**£4,646**	**£18,182**	£31,718	£45,253
24%	Dominant	**£4,450**	**£17,790**	£31,129	£44,469

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table B3: ICER for a range of quit rates and cost-per-quitters, for a woman who is a medium smoker (background quit rate = 9%)

	Cost per quitter				
Quit rate	£0	£500	£1,000	£1,500	£2,000
10%	Dominant	£91,157	£191,203	£291,249	£391,295
11%	Dominant	£46,136	£101,161	£156,187	£211,212
12%	Dominant	£31,129	£71,148	£111,166	£151,184
13%	Dominant	***£23,626***	£56,141	£88,656	£121,171
14%	Dominant	**£19,124**	£47,137	£75,149	£103,162
15%	Dominant	**£16,122**	£41,134	£66,145	£91,157
16%	Dominant	**£13,978**	£36,846	£59,714	£82,581
17%	Dominant	**£12,370**	£33,630	£54,890	£76,150
18%	Dominant	**£11,120**	£31,129	£51,138	£71,148
19%	Dominant	**£10,119**	***£29,128***	£48,137	£67,146
20%	Dominant	**£9,301**	***£27,491***	£45,681	£63,871
21%	Dominant	**£8,619**	***£26,127***	£43,635	£61,143
22%	Dominant	**£8,042**	***£24,972***	£41,903	£58,834
23%	Dominant	**£7,547**	***£23,983***	£40,419	£56,855
24%	Dominant	**£7,118**	***£23,125***	£39,133	£55,140

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table B4: ICER for a range of quit rates and cost-per-quitters, for a woman who is a medium smoker (background quit rate = 12%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
13%	**Dominant**	£121,171	£251,231	£381,290	£511,350
14%	**Dominant**	£61,143	£131,175	£201,207	£271,240
15%	**Dominant**	£41,134	£91,157	£141,180	£191,203
16%	**Dominant**	£31,129	£71,148	£111,166	£151,184
17%	**Dominant**	***£25,126***	£59,142	£93,158	£127,173
18%	**Dominant**	***£21,125***	£51,138	£81,152	£111,166
19%	**Dominant**	**£18,266**	£45,421	£72,577	£99,732
20%	**Dominant**	**£16,122**	£41,134	£66,145	£91,157
21%	**Dominant**	**£14,455**	£37,799	£61,143	£84,487
22%	**Dominant**	**£13,121**	£35,131	£57,141	£79,151
23%	**Dominant**	**£12,029**	£32,948	£53,867	£74,786
24%	**Dominant**	**£11,120**	£31,129	£51,138	£71,148
25%	**Dominant**	**£10,350**	***£29,590***	£48,830	£68,069
26%	**Dominant**	**£9,691**	***£28,271***	£46,851	£65,431
27%	**Dominant**	**£9,119**	***£27,127***	£45,136	£63,144
28%	**Dominant**	**£8,619**	***£26,127***	£43,635	£61,143
29%	**Dominant**	**£8,177**	***£25,244***	£42,311	£59,377
30%	**Dominant**	**£7,785**	***£24,459***	£41,134	£57,808
31%	**Dominant**	**£7,434**	***£23,757***	£40,081	£56,404
32%	**Dominant**	**£7,118**	***£23,125***	£39,133	£55,140
33%	**Dominant**	**£6,832**	***£22,554***	£38,275	£53,997
34%	**Dominant**	**£6,572**	***£22,034***	£37,496	£52,957
35%	**Dominant**	**£6,335**	***£21,560***	£36,784	£52,008
36%	**Dominant**	**£6,118**	***£21,125***	£36,131	£51,138
37%	**Dominant**	**£5,918**	***£20,724***	£35,531	£50,338
38%	**Dominant**	**£5,733**	***£20,355***	£34,977	£49,599
39%	**Dominant**	**£5,562**	***£20,013***	£34,464	£48,915
40%	**Dominant**	**£5,403**	**£19,695**	£33,988	£48,280
41%	**Dominant**	**£5,255**	**£19,400**	£33,544	£47,688
42%	**Dominant**	**£5,117**	**£19,124**	£33,130	£47,137
43%	**Dominant**	**£4,988**	**£18,865**	£32,743	£46,620

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

APPENDIX C

Additional cost associated with children of smoking mothers:

>19 cigarettes smoked by the mother

Table C1: ICER for a range of quit rates and cost-per-quitters, for a woman who is a heavy smoker (background quit rate = 3%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
4%	**Dominant**	***£27,261***	£67,279	£107,298	£147,316
5%	**Dominant**	**£12,254**	£37,266	£62,277	£87,289
6%	**Dominant**	**£7,252**	***£27,261***	£47,270	£67,279
7%	**Dominant**	**£4,751**	***£22,259***	£39,767	£57,275
8%	**Dominant**	**£3,250**	**£19,257**	£35,265	£51,272
9%	**Dominant**	**£2,249**	**£17,256**	£32,263	£47,270
10%	**Dominant**	**£1,535**	**£15,827**	£30,119	£44,412
11%	**Dominant**	**£999**	**£14,755**	***£28,512***	£42,268
12%	**Dominant**	**£582**	**£13,921**	***£27,261***	£40,600
13%	**Dominant**	**£249**	**£13,254**	***£26,260***	£39,266
14%	**Dominant**	**Dominant**	**£12,709**	***£25,442***	£38,175
15%	**Dominant**	**Dominant**	**£12,254**	***£24,760***	£37,266
16%	**Dominant**	**Dominant**	**£11,869**	***£24,183***	£36,496
17%	**Dominant**	**Dominant**	**£11,539**	***£23,688***	£35,836
18%	**Dominant**	**Dominant**	**£11,254**	***£23,259***	£35,265
19%	**Dominant**	**Dominant**	**£11,003**	***£22,884***	£34,764
20%	**Dominant**	**Dominant**	**£10,783**	***£22,553***	£34,323
21%	**Dominant**	**Dominant**	**£10,587**	***£22,259***	£33,931
22%	**Dominant**	**Dominant**	**£10,411**	***£21,995***	£33,580
23%	**Dominant**	**Dominant**	**£10,253**	***£21,758***	£33,264
24%	**Dominant**	**Dominant**	**£10,110**	***£21,544***	£32,978

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table C2: ICER for a range of quit rates and cost-per-quitters, for a woman who is a heavy smoker (background quit rate = 6%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
7%	**Dominant**	£57,275	£127,307	£197,339	£267,372
8%	**Dominant**	***£27,261***	£67,279	£107,298	£147,316
9%	**Dominant**	**£17,256**	£47,270	£77,284	£107,298
10%	**Dominant**	**£12,254**	£37,266	£62,277	£87,289
11%	**Dominant**	**£9,253**	£31,263	£53,273	£75,283
12%	**Dominant**	**£7,252**	***£27,261***	£47,270	£67,279
13%	**Dominant**	**£5,823**	***£24,402***	£42,982	£61,562
14%	**Dominant**	**£4,751**	***£22,259***	£39,767	£57,275
15%	**Dominant**	**£3,917**	***£20,591***	£37,266	£53,940
16%	**Dominant**	**£3,250**	**£19,257**	£35,265	£51,272
17%	**Dominant**	**£2,704**	**£18,166**	£33,628	£49,089
18%	**Dominant**	**£2,249**	**£17,256**	£32,263	£47,270
19%	**Dominant**	**£1,865**	**£16,487**	£31,109	£45,731
20%	**Dominant**	**£1,535**	**£15,827**	£30,119	£44,412
21%	**Dominant**	**£1,249**	**£15,255**	***£29,262***	£43,268
22%	**Dominant**	**£999**	**£14,755**	***£28,512***	£42,268
23%	**Dominant**	**£778**	**£14,314**	***£27,849***	£41,385
24%	**Dominant**	**£582**	**£13,921**	***£27,261***	£40,600

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table C3: ICER for a range of quit rates and cost-per-quitters, for a woman who is a heavy smoker (background quit rate = 9%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
10%	**Dominant**	£87,289	£187,335	£287,381	£387,427
11%	**Dominant**	£42,268	£97,293	£152,319	£207,344
12%	**Dominant**	***£27,261***	£67,279	£107,298	£147,316
13%	**Dominant**	**£19,757**	£52,272	£84,787	£117,302
14%	**Dominant**	**£15,255**	£43,268	£71,281	£99,294
15%	**Dominant**	**£12,254**	£37,266	£62,277	£87,289
16%	**Dominant**	**£10,110**	£32,978	£55,846	£78,713
17%	**Dominant**	**£8,502**	***£29,762***	£51,022	£72,282
18%	**Dominant**	**£7,252**	***£27,261***	£47,270	£67,279
19%	**Dominant**	**£6,251**	***£25,260***	£44,269	£63,278
20%	**Dominant**	**£5,433**	***£23,623***	£41,813	£60,003
21%	**Dominant**	**£4,751**	***£22,259***	£39,767	£57,275
22%	**Dominant**	**£4,173**	***£21,104***	£38,035	£54,966
23%	**Dominant**	**£3,679**	***£20,115***	£36,551	£52,987
24%	**Dominant**	**£3,250**	**£19,257**	£35,265	£51,272

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

Table C4: ICER for a range of quit rates and cost-per-quitters, for a woman who is a heavy smoker (background quit rate = 12%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
13%	**Dominant**	£117,302	£247,362	£377,422	£507,482
14%	**Dominant**	£57,275	£127,307	£197,339	£267,372
15%	**Dominant**	£37,266	£87,289	£137,312	£187,335
16%	**Dominant**	***£27,261***	£67,279	£107,298	£147,316
17%	**Dominant**	***£21,258***	£55,274	£89,290	£123,305
18%	**Dominant**	**£17,256**	£47,270	£77,284	£107,298
19%	**Dominant**	**£14,398**	£41,553	£68,709	£95,864
20%	**Dominant**	**£12,254**	£37,266	£62,277	£87,289
21%	**Dominant**	**£10,587**	£33,931	£57,275	£80,619
22%	**Dominant**	**£9,253**	£31,263	£53,273	£75,283
23%	**Dominant**	**£8,161**	***£29,080***	£49,999	£70,917
24%	**Dominant**	**£7,252**	***£27,261***	£47,270	£67,279

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

APPENDIX D

Additional cost associated with children of smoking mothers:

Average number of cigarettes smoked by the mother

Table D.2: ICER for a range of quit rates and cost-per-quitters, for a woman who is an average smoker (background quit rate = 6%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
7%	**Dominant**	£61,383	£131,415	£201,448	£271,480
8%	**Dominant**	£31,369	£71,388	£111,406	£151,425
9%	**Dominant**	***£21,365***	£51,378	£81,392	£111,406
10%	**Dominant**	**£16,362**	£41,374	£66,385	£91,397
11%	**Dominant**	**£13,361**	£35,371	£57,381	£79,391
12%	**Dominant**	**£11,360**	£31,369	£51,378	£71,388
13%	**Dominant**	**£9,931**	***£28,511***	£47,091	£65,671
14%	**Dominant**	**£8,859**	***£26,367***	£43,875	£61,383
15%	**Dominant**	**£8,025**	***£24,700***	£41,374	£58,048
16%	**Dominant**	**£7,358**	***£23,366***	£39,373	£55,380
17%	**Dominant**	**£6,812**	***£22,274***	£37,736	£53,197
18%	**Dominant**	**£6,358**	***£21,365***	£36,372	£51,378
19%	**Dominant**	**£5,973**	***£20,595***	£35,217	£49,839
20%	**Dominant**	**£5,643**	**£19,935**	£34,228	£48,520
21%	**Dominant**	**£5,357**	**£19,364**	£33,370	£47,377
22%	**Dominant**	**£5,107**	**£18,863**	£32,620	£46,376
23%	**Dominant**	**£4,886**	**£18,422**	£31,958	£45,493
24%	**Dominant**	**£4,690**	**£18,030**	£31,369	£44,709

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table D.3: ICER for a range of quit rates and cost-per-quitters, for a woman who is an average smoker (background quit rate = 9%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
10%	**Dominant**	£91,397	£191,443	£291,489	£391,535
11%	**Dominant**	£46,376	£101,402	£156,427	£211,452
12%	**Dominant**	£31,369	£71,388	£111,406	£151,425
13%	**Dominant**	***£23,866***	£56,381	£88,896	£121,411
14%	**Dominant**	**£19,364**	£47,377	£75,390	£103,402
15%	**Dominant**	**£16,362**	£41,374	£66,385	£91,397
16%	**Dominant**	**£14,219**	£37,086	£59,954	£82,822
17%	**Dominant**	**£12,611**	£33,870	£55,130	£76,390
18%	**Dominant**	**£11,360**	£31,369	£51,378	£71,388
19%	**Dominant**	**£10,360**	***£29,368***	£48,377	£67,386
20%	**Dominant**	**£9,541**	***£27,731***	£45,921	£64,112
21%	**Dominant**	**£8,859**	***£26,367***	£43,875	£61,383
22%	**Dominant**	**£8,282**	***£25,213***	£42,143	£59,074
23%	**Dominant**	**£7,787**	***£24,223***	£40,659	£57,095
24%	**Dominant**	**£7,358**	***£23,366***	£39,373	£55,380

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000

Table D.5: ICER for a range of quit rates and cost-per-quitters, for a woman who is an average smoker (background quit rate = 12%)

	Cost per quitter				
Quit rate	**£0**	**£500**	**£1,000**	**£1,500**	**£2,000**
13%	**Dominant**	£121,411	£251,471	£381,531	£511,591
14%	**Dominant**	£61,383	£131,415	£201,448	£271,480
15%	**Dominant**	£41,374	£91,397	£141,420	£191,443
16%	**Dominant**	£31,369	£71,388	£111,406	£151,425
17%	**Dominant**	***£25,366***	£59,382	£93,398	£127,414
18%	**Dominant**	***£21,365***	£51,378	£81,392	£111,406
19%	**Dominant**	**£18,506**	£45,662	£72,817	£99,972
20%	**Dominant**	**£16,362**	£41,374	£66,385	£91,397
21%	**Dominant**	**£14,695**	£38,039	£61,383	£84,727
22%	**Dominant**	**£13,361**	£35,371	£57,381	£79,391
23%	**Dominant**	**£12,270**	£33,188	£54,107	£75,026
24%	**Dominant**	**£11,360**	£31,369	£51,378	£71,388
25%	**Dominant**	**£10,590**	***£29,830***	£49,070	£68,309
26%	**Dominant**	**£9,931**	***£28,511***	£47,091	£65,671
27%	**Dominant**	**£9,359**	***£27,367***	£45,376	£63,384
28%	**Dominant**	**£8,859**	***£26,367***	£43,875	£61,383
29%	**Dominant**	**£8,418**	***£25,484***	£42,551	£59,618
30%	**Dominant**	**£8,025**	***£24,700***	£41,374	£58,048
31%	**Dominant**	**£7,674**	***£23,997***	£40,321	£56,644
32%	**Dominant**	**£7,358**	***£23,366***	£39,373	£55,380
33%	**Dominant**	**£7,072**	***£22,794***	£38,515	£54,237
34%	**Dominant**	**£6,812**	***£22,274***	£37,736	£53,197
35%	**Dominant**	**£6,575**	***£21,800***	£37,024	£52,248
36%	**Dominant**	**£6,358**	***£21,365***	£36,372	£51,378
37%	**Dominant**	**£6,158**	***£20,964***	£35,771	£50,578
38%	**Dominant**	**£5,973**	***£20,595***	£35,217	£49,839
39%	**Dominant**	**£5,802**	***£20,253***	£34,704	£49,155
40%	**Dominant**	**£5,643**	**£19,935**	£34,228	£48,520
41%	**Dominant**	**£5,495**	**£19,640**	£33,784	£47,929
42%	**Dominant**	**£5,357**	**£19,364**	£33,370	£47,377
43%	**Dominant**	**£5,228**	**£19,106**	£32,983	£46,860

***bold green** denotes a cost-effective intervention, based on a threshold of £20,000

****bold italic orange** denotes a value between £20,000 and £30,000