



The University of
Nottingham

**Investigating and increasing smokers' use of
effective cessation support**

Rachael L Murray, BSc (hons), MS

**Thesis submitted to the University of Nottingham for the
degree of Doctor of Philosophy**

July 2009

ABSTRACT

Tobacco smoking is the leading avoidable cause of death and disability in the world. The UK is unique in that it offers a dedicated smoking cessation service providing behavioural support to all smokers, freely available through the National Health Service and with pharmacotherapy available at prescription cost. The service has been proven effective and cost-effective, yet only a small minority of smokers are currently using these services. The research in this thesis examines smokers' use of support and how more smokers might be identified and encouraged to use it.

The first study investigated whether proactive identification of smokers in a primary care setting and referral into such services is a potential means by which awareness and use of services may be increased. As such a study is reliant on the identification of smokers from primary care records and the accuracy of this data, a precursor to this study investigated the completeness and accuracy of smoking status recording in primary care medical records. General practices in this study had a smoking status recorded for between 42.4 and 100% of patients, and comparison of medical records with responses to self-completion questionnaires revealed that this recording is likely to be inaccurate in approximately 20% of cases. Even so, approximately 40% of smokers who responded to the questionnaire were interested in speaking to a smoking cessation advisor when asked, indicating that there is potential to intervene with smokers identified in this way in primary care and that there is a need which is currently not being met.

In the trial, all smokers in 12 intervention practices were proactively identified and offered referral into evidence based support, and compared to 12 'usual care' control practices, a significantly greater proportion of

these smokers reported using local smoking cessation services (16.6% and 8.9% respectively). Validated 7-day point prevalence from smoking at 6 months was higher in the intervention than the control groups, although this difference was not statistically significant (3.5% and 2.5% respectively). Post-hoc analysis in the sub-group of smokers who had initially reported that they wanted to speak to a smoking cessation advisor did, however, reveal a significant difference between intervention and control groups (4.0% and 2.2% respectively). A proactive approach to enrolling smokers in smoking cessation services is, therefore, effective if you can identify smokers who want support for their quit attempt.

Use of an NHS support service traditionally involves some degree of pre-planning. Anecdotal evidence from the proactive trial indicated that many smokers did not pre-plan their quit attempts and as recent evidence from elsewhere has indicated that a large proportion of smokers make an attempt to quit smoking without any pre-planning, this may in part explain the relatively low proportion of smokers accessing services. The next study therefore was a questionnaire survey designed to investigate the occurrence, determinants and use of support in planned and unplanned quit attempts. The study findings revealed that over one third of quit attempts were made without pre-planning, and over half of these unplanned attempts were made without the use of any support and unplanned quit attempts appeared to be more likely to be successful, in line with previous findings. However, the use of evidence-based support is known to increase the likelihood of a quit attempt being successful and thus for each successful unplanned and unsupported quitter there are likely to be many more who are unsuccessful.

There has been no detailed exploration of how unplanned quitters engage in quit attempts, why they may or may not choose to use support and their attitudes to the support currently available. Gaining a greater insight into these factors may result in the identification of better ways to support those who make unplanned quit attempts. The final study therefore involved qualitative research with a group of unplanned quit attempters and revealed that smokers' reports of 'unplanned' quit attempts may indeed involve elements of planning and delay, and often this delay is in order to gain access to cessation support. The majority of smokers and ex-smokers interviewed were receptive to the idea of support being immediately available whether or not their last quit attempt had involved support. Engaging smokers in using support at an appropriate time, without the need to delay their quit attempt in order to achieve this, may be a potential means of increasing smokers' uptake of effective cessation support and subsequently improving quit rates. It is therefore important to investigate ways in which smoking cessation support can be made available to potential quitters within a much shorter timescale.

ACKNOWLEDGEMENTS

The work in this thesis was conducted under the supervision of Professor Sarah Lewis, Dr Tim Coleman and Professor Ann McNeill in the Division of Epidemiology and Public Health, University of Nottingham and was part funded by a grant from the British Heart Foundation and by a fellowship from Cancer Research UK.

I would like to thank my supervisors for their hard work in all stages in the production of this thesis, from the conception of the project ideas through to the final draft with many questions in between! Your support and guidance has been invaluable over the past years and I would not have reached this point without you.

I am extremely grateful to John Britton, Head of Division, for giving me the opportunity to start upon my tobacco control journey and, along with Ann McNeill, having the belief in my ability to allow me to move to the next stage of my career.

To the current and previous occupants of B35: thank you for being a continual source of knowledge, advice, encouragement and support throughout the entire project.

To my friends: you know who you are, what you've done for me and hopefully how much I appreciate you.

Finally, my biggest thank you is to my family, who have always instilled in me the belief that I can achieve anything I set my mind to and are always there to provide love and support without question.

TABLE OF CONTENTS

<i>ABSTRACT</i>	i
<i>ACKNOWLEDGEMENTS</i>	v
<i>ABBREVIATIONS</i>	xv
<i>CHAPTER 1: INTRODUCTION</i>	1
1.1 The health and economic costs of smoking	2
1.1.1 Economic costs	2
1.1.2 Health costs of smoking	3
1.1.2.1 Cancer	3
1.1.2.2 Respiratory disease	6
1.1.2.3 Cardiovascular disease	7
1.1.2.4 Smoking and reproductive health	8
1.1.2.5 Smoking and pregnancy	9
1.1.2.6 Cigarette smoking and inequalities in health	9
1.1.2.7 Conclusions	10
1.2 Trends in smoking	11
1.2.1 Smoking uptake	11
1.2.2 Cigarette smoking and age	12
1.2.3 Cigarette smoking and gender	12
1.2.4 Cigarette smoking and socio-economic classification	13
1.2.5 Cigarette smoking and pregnancy	14
1.2.6 Cigarette smoking and mental illness	14
1.3 Smoking and nicotine addiction	15
1.3.1 Symptoms of nicotine dependence	15
1.3.2 Symptoms of nicotine withdrawal	17
1.4 Interventions to reduce smoking	18
1.4.1 Pharmacotherapy	21

1.4.1.1 Nicotine replacement therapy	21
1.4.1.2 Non-nicotine pharmacotherapies for smoking cessation	24
1.4.2 Behavioural support	26
1.4.2.1 Brief interventions.....	26
1.4.2.2 Telephone counselling.....	28
1.4.2.3 Internet support	29
1.4.2.4 Self help	29
1.4.2.3 Intensive support	31
1.5 Government initiatives regarding smoking cessation	34
1.5.1 Stop Smoking Services	35
1.5.2 Current performance of Stop Smoking Services	36
1.5.3 The UK Quality and Outcomes Framework.....	37
1.6 Efforts to increase the accessibility of Stop Smoking Services / programmes.....	38
1.6.1 Qualitative research with disadvantaged smokers	39
1.6.2 Location of Stop Smoking Services.....	39
1.6.3 Method of accessing Stop Smoking Services.....	42
1.6.4 Incentive schemes	43
1.6.5 Proactive Identification and Recruitment	44
1.7 The process of quitting smoking	48
1.8 Summary	49
1.9 Aims and Objectives	51
 <i>CHAPTER 2: TRIAL DESIGN AND METHODOLOGY</i>	 52
2.1 Study design.....	53
2.2 Sample size determination.....	53
2.3 Identification of smokers from general practice records.	54
2.4 Trial study population.....	55
2.5 Estimation of numbers of smokers	55

2.6 Intervention.....	56
2.7 Control.....	57
2.8 Follow up.....	58
2.9 Biochemical validation of smoking status	58
2.10 Calculation of the Townsend Material Deprivation Index score	59
 <i>CHAPTER 3: ASCERTAINMENT OF SMOKING STATUS IN PRIMARY CARE AND SMOKERS REQUIREMENTS FOR SUPPORT TO QUIT</i>	
3.1 INTRODUCTION	61
3.2 METHODS.....	63
3.2.1 Primary outcomes.....	63
3.2.2 Data analysis	63
3.3 RESULTS.....	65
3.3.1 Recording of smoking status and response to the questionnaire...65	
3.3.2 Smokers' interest in support to stop smoking	68
3.4 DISCUSSION	70
3.4.1 Main findings.....	70
3.4.2 Strengths and limitations.....	71
3.4.3 Comparison with previous research	72
3.4.4 Conclusions.....	74
 <i>CHAPTER 4: THE EFFECT OF PROACTIVELY IDENTIFYING SMOKERS AND OFFERING SMOKING CESSATION SUPPORT IN PRIMARY CARE POPULATIONS: A CLUSTER RANDOMISED TRIAL</i>	
4.1 INTRODUCTION	76
4.2 METHODS.....	77
4.2.1 Primary Outcomes	77
4.2.2 Secondary Outcomes	77
4.2.3 Data analysis	78

4.3 RESULTS	80
4.3.1 Characteristics of intervention and control practices	80
4.3.2 Abstinence from smoking at 6 month follow up.....	83
4.3.3 Receipt of smoking cessation advice and use of NHS stop smoking services	84
4.3.4 Smoking and quitting behaviour amongst those continuing to smoke at 6 month follow up	85
4.3.5 Characteristics of NHS stop smoking service users	86
4.3.6 Post-hoc analysis in the subgroup of smokers who wanted to speak to a smoking cessation advisor	87
4.4 DISCUSSION	88
4.4.1 Main findings.....	88
4.4.2 Comparison with previous research	90
4.4.3 Strengths and limitations.....	90
4.4.4 Conclusions.....	93
<i>CHAPTER 5: UNPLANNED QUIT ATTEMPTS – INCIDENCE, TRIGGERS AND USE OF SUPPORT.....</i>	<i>95</i>
5.1 INTRODUCTION	96
5.2 METHODS.....	97
5.2.1 Primary Outcomes	98
5.2.2 Proportion of planned and unplanned quit attempts.....	98
5.2.3 Triggers for quit attempts	99
5.2.4 Support used in quit attempts	99
5.2.5 Data analysis	100
5.3 RESULTS	101
5.3.1 Response to questionnaire	101
5.3.2 Quit attempts made in the last six months	102
5.3.3 Triggers for quit attempts	106

5.3.4 Sources of support for quit attempts	113
5.3.5 Success of quit attempts made within the last six months	120
5.4 DISCUSSION	121
5.4.1 Main findings	121
5.4.2 Strengths and limitations	121
5.4.3 Comparison with previous research	123
5.4.4 Conclusions	126
CHAPTER 6: A QUALITATIVE EXPLORATION OF THE USE OF AND	
ATTITUDES TOWARDS SUPPORT IN A GROUP OF SMOKERS AND EX-	
SMOKERS	127
6.1 INTRODUCTION	128
6.2 METHODS	128
6.2.1 Study design and participants	128
6.2.2 Primary outcomes	129
6.2.3 Interviews	130
6.2.4 Data analysis	131
6.3 RESULTS	133
6.3.1 Response and characteristics of interviewees	133
6.3.2 Triggers for quit attempts	133
6.3.3 The nature of quit attempts: spontaneous vs delayed	134
6.3.4 Support used in 'true spontaneous' and 'delayed' unplanned quitters	136
6.3.5 Reasons for not using support	137
6.3.6 Support for smokers who want to quit	138
6.3.7 Perceptions of why quit attempts are successful	139
6.3.8 Better supporting smokers	141
6.3.9 Quit packs	144
6.4 DISCUSSION	145

6.4.1 Main findings.....	145
6.4.2 Strengths and limitations	145
6.4.3 Comparison with previous research	146
6.4.4 Conclusions.....	151
 <i>CHAPTER 7: SUMMARY CONCLUSIONS AND FUTURE DIRECTIONS</i>	 153
 <i>APPENDICES</i>	 160
APPENDIX I: Initial questionnaire	161
APPENDIX II: Initial letter	164
APPENDIX III: Telephone script	166
APPENDIX IV: Follow up questionnaire.....	168
APPENDIX V: Follow up letter	171
APPENDIX VI: Final questionnaire	173
APPENDIX VII: Final letter.....	181
APPENDIX VIII: Invitation to interview.....	183
APPENDIX IX: Interview information sheet	185
APPENDIX X: Interview schedule.....	189
APPENDIX XI: Coding table	192
APPENDIX XII: Coding framework	195
APPENDIX XIII: Publications and presentations arising.....	197
APPENDIX XIV: Postgraduate training courses attended	223
 REFERENCES	 225

LIST OF FIGURES

Figure 1: Recommended procedure for the delivery of brief advice for smoking cessation (adapted from ⁷⁵)	30
Figure 2: Cumulative distribution of the percentage of patients in a practice with a smoking status recorded	66
Figure 3: Triggers for unplanned quit attempts made within the last six months.....	107
Figure 4: Triggers for unplanned quit attempts made within the last three months.....	108
Figure 5: Triggers for unplanned quit attempts made within the last 12 months.....	109
Figure 6: Triggers for planned quit attempts made within the last six months.....	110
Figure 7: Triggers for planned quit attempts made within the last three months.....	111
Figure 8: Triggers for planned quit attempts made within the last 12 months.....	112
Figure 9: Sources of support used in unplanned quit attempts made within the last six months	114
Figure 10: Sources of support used in unplanned quit attempts made within the last three months	115
Figure 11: Sources of support used in unplanned quit attempts made within the last 12 months.....	116
Figure 12: Sources of support used in planned quit attempts made within the last six months	117
Figure 13: Sources of support used in planned quit attempts made within the last three months	118
Figure 14: Sources of support used in planned quit attempts made within the last 12 months.....	119

LIST OF TABLES

Table 1: Symptoms of substance dependence (adapted from ⁴⁹)	16
Table 2: Symptoms of substance and nicotine withdrawal (adapted from ⁴⁹)	17
Table 3: Forms of NRT currently licensed for use in the UK	22
Table 4: Incremental effects of smoking cessation interventions on abstinence for six months or longer. Adapted from West et al ⁵⁶	33
Table 5: Questionnaire response rates and numbers of self-reported smokers	67
Table 6: Number of current smokers who would like support to quit smoking	69
Table 7: Characteristics of the intervention and control practices and participants at baseline.....	81
Table 8: Effect of intervention versus control on main outcomes in all smokers responding at baseline.....	83
Table 9: Effect of intervention versus control on main outcomes in all responders at 6 months.....	84
Table 10: Effect of intervention versus control on main outcomes in continuing smokers at 6 months	85
Table 11: Characteristics of service users during the study period, and for the preceding year	86
Table 12: Effect of intervention versus control on main outcomes in those smokers who indicated they would like speak to a smoking cessation advisor at baseline	87
Table 13: Socio-demographic characteristics of those individuals sent and responding to the questionnaire.....	101
Table 14: Characteristics of those making quit attempts in the last 6 months.....	103

Table 15: Characteristics of those making quit attempts in the last 3 months.....	104
Table 16: Characteristics of those making quit attempts in the last 12 months.....	105
Table 17: Current abstinence in those making a planned or unplanned quit attempt in the last 6 months, overall, and stratified by how long ago the attempt was made.	120

ABBREVIATIONS

95% CI:	95% Confidence Interval
CHD:	Coronary Heart Disease
CO:	Carbon monoxide
COPD:	Chronic Obstructive Pulmonary Disease
ELISA:	Enzyme Linked Immunosorbent Assay
ETS:	Environmental Tobacco Smoke
GHS:	General Household Survey
GP:	General Practitioner
GSL:	General Sale License
HAZ:	Health Action Zone
IHD:	Ischaemic Heart Disease
nAChR:	nicotine acetylcholine receptors
NICE:	National Institute for Health and Clinical Excellence
NHS:	National Health Service
NRT:	Nicotine Replacement Therapy
ONS:	Office for National Statistics
OR:	Odds Ratio
PCT:	Primary Care Trust
QOF:	Quality and Outcomes Framework
RCT:	Randomised Controlled Trial
SSS:	Stop Smoking Service
THIN:	The Health Improvement Network
UK:	United Kingdom
US:	United States

CHAPTER 1: INTRODUCTION

1.1 The health and economic costs of smoking

The UK suffers a huge burden of premature mortality and morbidity as a direct result of tobacco use. The burden of cigarette smoking is not limited to the UK, but is a worldwide epidemic. Tobacco smoking is predicted to become the leading single cause of death worldwide by the 2020s¹, becoming responsible for more than 1 in every 8 deaths².

1.1.1 Economic costs

Smoking related illness in England has been recently estimated to cost the National Health Service £2.7 billion³. In addition, there are also economic costs arising from smoking related disease. In England and Wales, it is estimated that some 34 million work days are lost through smoking related illness per year⁴. In Scotland alone, lost productivity as a result of smoking (for example, working time lost for smoking breaks) costs employers approximately £450 million, with a cost of £40 million arising from smoking related absence from work⁵. Environmental tobacco smoke (ETS) also costs the NHS; at least 1000 deaths per year in adult non-smokers can be attributed to passive ETS, costing approximately £12.8 million per year, and around £410 million per year is spent treating childhood illness resulting from ETS⁴. The costs attributable to ETS may have decreased following the introduction of smoke free legislation in 2007, however, although this has not yet been assessed.

The financial cost to the smoker is also noteworthy. In 2007, the total household expenditure on tobacco was £16.6 billion⁶. A 20 a day smoker will spend around £1800 per year on cigarettes. The proportion of income

spent on cigarettes is much higher in those on low incomes. Those households with the lowest 10% income spent 2.61% of the weekly household expenditure on cigarettes in 2006, compared to 0.35% in households with the highest 10% income⁷.

1.1.2 Health costs of smoking

There is another significant cost to the smoker, that of their health. On average, a cigarette smoker will die some 10 years earlier than non-smokers⁸. Approximately half of all smokers will eventually die as a result of their habit^{9 10}, although it has been reported that this figure may be as high as two thirds⁸. These deaths are usually as a result of one of the three major diseases caused by smoking: lung cancer, chronic obstructive pulmonary disease (COPD) and coronary heart disease.

Over 1 million GP consultations in 1997/8 were attributable to cigarette smoking¹¹. In 2007, the proportion of deaths attributable to smoking in England was estimated at 18% in adults over 35 years of age, with the number of hospital admissions attributable to smoking being an estimated 445,100⁶.

1.1.2.1 Cancer

Cancer is a major public health problem in most developed countries and the UK is no exception, with at least 1 in 3 people being diagnosed with some form of cancer in their lifetime¹². Cancer is the major cause of death in men and women in the UK, accounting for around 25% of all deaths¹². In the year 2000 this amounted to just over 150,000 deaths, of which around a third (over 43,000) were smoking-attributed¹³.

Lung cancer

Lung cancer is currently the most common cancer in the world; about 90% of cases are caused by tobacco smoking¹² and is generally between four and six times higher in men than women¹². One of the first to examine the relationship between tobacco smoking and lung cancer were Doll and Hill, who set up a cohort study of British doctors starting in 1951. After 40 years of follow up of the cohort, Doll and colleagues reported that lung cancer was 15 times more likely in current than never smokers in their study population¹⁴. In a study of a population of over one million men and women aged over 35 years, the risk of lung cancer was reportedly elevated 20-fold in smokers compared with non-smokers⁹.

The risk of individual smokers developing lung cancer is influenced by both the amount smoked and the duration of smoking. Smoking more than 40 cigarettes per day doubles the risk of lung cancer compared to smoking 20 or less a day, and individuals who start smoking before the age of 15 are four times more likely to develop lung cancer than those who started after the age of 25¹⁰. Stopping smoking can dramatically reduce the risk of developing lung cancer; it has been suggested that stopping smoking even at 50 or 60 years of age avoids most of the subsequent risk of developing lung cancer, and stopping smoking before the age of 30 avoids more than 90% of the risk attributed to tobacco consumption¹⁵. Passive smoking may contribute to approximately 25% of lung cancer cases in non-smokers, and the risk is increased for non-smokers living with smokers¹².

There are several other cancers in which tobacco smoking has been implicated to some extent, including cancer of the oesophagus, bladder, pancreas, kidney, lip, mouth, pharynx, and larynx.

Oesophagus

Cancer of the oesophagus is the seventh most common cancer in men and thirteenth in females with over 6000 new cases diagnosed in England and Wales in 1997¹². There is an apparent strong association with tobacco smoking, although an interaction with alcohol consumption has also been suggested. Smokers have approximately a 7.5 times greater risk of developing oesophageal cancer than lifetime non-smokers^{9 14}.

Bladder

Bladder cancer is the fourth most common cancer in males and ninth most common cancer in females in England and Wales, with over 12,000 cases diagnosed in 1997 and tobacco smoking being one of the main risk factors¹². Smokers have a 2-3 times increased risk of developing cancer of the bladder and other urinary organs than lifelong non-smokers^{9 14}.

Pancreas

Pancreatic cancer is the tenth most common cancer in males and eleventh most common in females in England and Wales, with around 5700 new cases diagnosed in 1997¹². Pancreatic cancer is rapidly fatal, and the only consistent risk factor identified is tobacco smoking. Smokers have approximately twice the risk of developing pancreatic cancer than lifetime non-smokers^{9 14}, with little difference between males and females.

Kidney

Cancers of the kidney are the eighth most common cancer in males and fourteenth most common cancer in females in England and Wales, with nearly 5000 cases diagnosed in 1997¹². Tobacco smoking is one of a number of factors implicated in the development of these particular cancers. Smokers are around twice as likely to develop kidney cancers than lifetime non-smokers⁹.

Lip, mouth and pharynx

Cancer of these three sites combined are the eleventh most common cancer in males and sixteenth in females, with around 3800 new cases diagnosed each year¹². Tobacco smoking is a major risk factor for developing oral cancer.

Larynx

Cancer of the larynx is the fourteenth most common cancer in males in England and Wales, with 1500 new cases diagnosed in males in 1997 and only a small numbers of cases diagnosed in women¹². Along with alcohol, and possibly in a multiplicative effect, tobacco smoking is a major risk factor for laryngeal cancer, particularly in glottal cancers¹².

1.1.2.2 Respiratory disease

Cigarette smoking alters the structure and function of the central and peripheral airways, alveoli, capillaries and immune system of the lung¹⁰. Current smokers generally have a lower FEV₁ and accelerated decline in FEV₁ compared to former and never smokers, and these are the two most useful findings for identifying smokers who are likely to develop severe pulmonary impairment¹⁰. It has been suggested that moderate to heavy smoking men have an average decline in FEV₁ of 15ml/year more than

non-smokers¹⁶. The decline in lung function in smokers is related to duration of smoking and number of pack years¹⁷. A large scale randomised clinical trial investigated the effect of smoking cessation on the decline in FEV₁ in smokers aged 35 to 60 years with mild obstructive pulmonary disease and reported that there was a significant reduction in the decline in FEV₁ in those patients who quit smoking¹⁸. Pulmonary function improves by approximately 5% within several months of quitting smoking¹⁷.

Cigarette smoking is the principal risk factor for developing chronic obstructive pulmonary disease (COPD)^{10 19 20}, with current smokers being nearly 10 times as likely to suffer COPD as lifetime non-smokers⁹. However, Doll and colleagues reported chronic obstructive lung disease was nearly 13 times more likely in current than never smokers in their study of male British doctors¹⁴. In the year 2000, there were nearly 30,000 deaths from COPD, of which 73% were attributable to smoking¹³. An estimated 10-15% of all smokers develop clinically significant airflow obstruction¹⁰. The age of the smoker at commencement of smoking, total pack-years smoked and current smoking status are all predictive of COPD mortality²⁰. Passive smoking has little effect on lung function, and has a limited clinical relevance for developing COPD²⁰.

1.1.2.3 Cardiovascular disease

Smoking causes more deaths from ischaemic heart disease (IHD) than any other disease, and this is the most common cause of death in economically developed countries⁹. In the UK each year, smoking currently causes nearly 18,000 deaths from coronary heart disease (CHD) and over 10,000 from aortic aneurysm and stroke²¹. Smokers have a two- to four-fold increased risk of CHD and sudden death than non-smokers¹⁰ and

approximately 50% or more of non-fatal myocardial infarctions have been attributed to cigarette smoking^{22 23}. In a study looking at the decline in risk of a major coronary event following smoking cessation, McElduff and colleagues reported that whilst the risk of suffering a major coronary event was 3.5 times higher than in never smokers (95% CI 3.0-4.0), this fell to 1.5 (95% CI 1.1-1.9) for men who had quit for between 1 and 3 years. Likewise for women, the risk of suffering a major coronary event was 4.8 times higher than in never smokers (95% CI 4.0-5.9), this fell to 1.6 (95% CI 1.0-2.5) for those who had quit for between 1 and 3 years. In both males and females who had quit smoking for 4-6 years or more, the risk had decreased to a similar level to that of never smokers²⁴.

Exposure to cigarette smoke has been shown to be associated with atherosclerosis, with current smoking being associated with a 50% increase in the progression of atherosclerosis²⁵. There is a direct relationship between disease severity and total pack years of tobacco, but there is no association between current vs. past smoking. This suggests that some of the adverse atherosclerotic effects of smoking may be cumulative and irreversible²⁵. Smoking has also been implicated in stroke, with up to one quarter of all strokes being directly attributable to cigarette smoking and an approximate three-fold increase independent increase in risk²⁶. The risk of stroke is dependent on the number of cigarettes smoked, and declines considerably and rapidly after cessation²⁶.

1.1.2.4 Smoking and reproductive health

Smoking has an effect on all aspects of reproductive health, from male and female fertility to the health of the developing foetus. It is reported that women who smoke take longer to conceive, and a dose-response exists for

>20 cigarettes per day²⁷. In males, cotinine concentrations consistent with heavy smoking have been shown to exert a detrimental effect on sperm motility and sperm membrane function²⁸.

1.1.2.5 Smoking and pregnancy

Smoking during pregnancy is an important problem. Smoking related causes of preterm birth may include spontaneous preterm labour, premature rupture of the membranes and antepartum bleedings²⁹. It has been reported that smokers compared to non-smokers have adjusted ORs of preterm birth of 1.9 (95% CI 1.0-3.6) and 2.6 (95% CI 1.1-1.6) for moderate and heavy smokers respectively, and very preterm birth of 1.4 (95% CI 0.8-2.4) and 2.9 (95% CI 1.5-5.7) for moderate and heavy smokers respectively²⁹. A study by Larsen and colleagues reported the gestational age of babies born to mothers who smoked 11-20 cigarettes per day was significantly lower than non-smoking mothers, and the median birth weight was also significantly reduced in those babies born to mothers who smoked compared to non-smokers³⁰. A study by Cliver and colleagues found that an overall reduction in birth weight of 130g was seen in those babies born to mothers who smoked during the first trimester, and an average adjusted reduction in birth weight of 189g for babies born to mothers who continued to smoke throughout the pregnancy³¹. It is suggested that cigarette smoking modifies the placental blood flow, diminishing the capacity for gas and nutrient exchange between the mother and foetus³⁰.

1.1.2.6 Cigarette smoking and inequalities in health

Inequalities in health are apparent whether measured in terms of mortality, life expectancy or health status³² and are endemic throughout the world³³.

Smoking is one of the main contributors to health inequalities in industrial countries³⁴ and a recent analysis of causes of death in England and Wales by the ONS argued that smoking played a key role in the relationship between deprivation and mortality³⁵. Amongst men, smoking is responsible for over half of the excess risk of premature death between the highest and lowest socio-economic groups³⁶.

1.1.2.7 Conclusions

Smoking clearly has wide-reaching economic and health costs to both smokers and society as a whole. Finding ways of reducing smoking prevalence remains, therefore, a key area for research.

1.2 Trends in smoking

The key source for monitoring changes in the prevalence of cigarette smoking in the adult population in Great Britain is the General Household Survey (GHS), a multi-purpose continuous survey carried out by the Office for National Statistics (ONS). Questions about smoking behaviour were first asked of respondents aged over 16 biennially from 1974, and annually from 2000 onwards. Also, since 1995 (with the exception of 1998) an annual survey has been carried out by the ONS for the Department of Health to specifically explore views on smoking behaviour.

In 1974, the first year smoking was included in the GHS, the prevalence of cigarette smoking was 51 percent of men and 41 percent of women. Cigarette smoking prevalence decreased sharply in the late 1970s/early 1980s, from 45 percent in 1974 to 35 percent in 1982. After this point, the rate of decline slowed, with falls of 1 percent per 2 years until 1990, with little change in subsequent years. Overall the GHS reports a gradual decrease in cigarette smoking between 1998 and 2007, from 28 percent to 21 percent, although there have been some fluctuations in figures for men and women separately³⁷.

1.2.1 Smoking uptake

The majority of regular adult smokers take up smoking in adolescence³⁸. The initiation of smoking behaviour is more common in teenagers from smoking-favourable backgrounds, such as those with parents, siblings or peers who smoke, from deprived neighbourhoods, and in those who may consider themselves as under-achievers at school, have low self esteem,

impaired psychological wellbeing and are overweight³⁹. About two thirds of respondents to the 2007 GHS who were either current or previous regular smokers started before the age of 18³⁷.

Although this age group are likely to experience constraints on their smoking behaviour, such as financial and legal limitations and not being able to smoke at home or school, indicators of nicotine intake are apparent from an early age. A longitudinal study of adolescent school girls showed that levels of cotinine (a major metabolite of nicotine) indicated significant intake of nicotine even in occasional smokers. In daily 11-14 year old smokers, cotinine levels of half the average adult concentration were seen initially, and when levels were measured in the same subjects two years later, this had increased to two-thirds. There were also signs of nicotine dependence apparent in these young smokers: they reported a calming effect of smoking, with withdrawal symptoms evident when they attempted to quit⁴⁰.

1.2.2 Cigarette smoking and age

Since the early 1990s, the GHS has indicated that highest prevalence of cigarette smoking amongst men and women is in the 20-24 age group (31% in 2007), and the lowest prevalence in those aged 60 and over, standing at just 12 percent in 2007³⁷.

1.2.3 Cigarette smoking and gender

Cigarette smoking has been consistently higher in men than women in the years that the GHS has been carried out, and in 2007 (the last date for which GHS data has been published), this stood at 22 percent of men and 20 percent of women³⁷. However, the difference in prevalence of smoking

between men and women has been decreasing for many years. It has been suggested that there may be gender differences in smoking cessation rates, with men being more successful at quitting than women^{41 42}. A study by Jarvis⁴³ reported differences in cessation rates are apparent with age. Up to the age of 40, cessation rates were significantly higher in women than men but this trend was reversed in those aged 50-65 where rates were higher in men.

1.2.4 Cigarette smoking and socio-economic classification

Data from the General Household Survey has shown consistent differences in smoking prevalence relative to socio-economic group, with a considerably higher prevalence amongst those in manual groups than in non-manual groups. A sharp decline in smoking prevalence in the 1970s and 1980s was more apparent in the non-manual groups, which widened the gap between them and manual groups further and this gap has changed little in subsequent years³⁷. Current smoking prevalence rates (2007) stand at 30% in the routine and manual occupations compared to 16 percent in the managerial and professional occupations⁴⁴. These data, however, should be treated with caution as they may be affected by changes to socio-economic groupings introduced in 2001. Other studies have similarly found socioeconomic differences in smoking, for example, a prospective cohort study by Jefferis and colleagues⁴⁵ followed a group of individuals from birth to age 41, and collected brief smoking information aged 23, 33 and 41. At each point in time, cohort members from manual and unskilled manual backgrounds were more likely to be smokers than those from non-manual and professional backgrounds.

Cessation rates in the lower socio-economic groups are also reportedly lower³². Jefferis⁴⁵ and colleagues, in the study described above, reported that annual cessation rates were higher in men from a professional-managerial background than in those from unskilled manual backgrounds (4.0 percent and 2.9 percent respectively). As low socio-economic status has also been identified as a risk factor for uptake of smoking in children, it is likely that differences in smoking prevalence in these groups will continue to be evident, if not increasing in the foreseeable future without successful interventions.

1.2.5 Cigarette smoking and pregnancy

According to a UK survey published by The Information Centre for health and social care, 33% of all UK mothers in 2005 smoked at some point in the 12 months before, or during their pregnancy and 17% of all UK mothers continued to smoke throughout their pregnancy⁴⁶.

1.2.6 Cigarette smoking and mental illness

Current smoking, particularly heavy smoking, are associated with a number of mental disorders⁴⁷. A study in the United States using data from the National Comorbidity Survey found smoking rates of 41% in those who had an incidence of mental illness in the last month, compared to 22.5% in those who had no mental illness⁴⁸. When compared to those without mental illness, those with any history of mental illness were significantly more likely to be lifetime smokers (OR 2.1, 95% CI 1.9-2.4) or current smokers (OR 1.9, 95% CI 1.7-2.2). The effect was stronger when there was an occurrence of mental illness in the last month (OR 2.7, 95% CI 2.3-3.1 for current smokers, OR 2.7, 95% CI 2.4-3.2 for lifetime smokers)⁴⁸. The ONS have reported that those with a significant level of

neurotic symptoms were more likely to smoke than those without (44% compared to 27%), those with probable psychosis had significantly higher rates of heavy smoking than those without psychosis (35% compared to 9%) and those with depressive episodes, phobias or obsessive compulsive disorder were twice as likely to smoke as those with no neurotic disorder⁴⁷. Additionally, there is a progressive increase in rates of heavy smoking with comorbid neurotic disorders-from 7% in those with no disorders to 15% for one disorder and 23% for 2 or more disorders⁴⁷.

1.3 Smoking and nicotine addiction

Whilst smoking has traditionally been regarded as a social habit by many, it has been proposed that it would be reasonable to conclude that nicotine, delivered through tobacco use should be regarded as an addictive drug¹¹, resulting in a dependence on tobacco.

1.3.1 Symptoms of nicotine dependence

Dependence has been defined as a cluster of three or more of the following cognitive, behavioural and/or psychological symptoms (Table 1) occurring at any time within the same 12 month period⁴⁹.

Table 1: Symptoms of substance dependence (adapted from⁴⁹)

Criteria for substance dependence	Potential application to nicotine dependence
A markedly diminished effect with continued use of the same amount of the substance (<i>tolerance</i>). Greater amounts are needed to achieve the desired effect	An absence of nausea and dizziness with continued smoking
Blood or tissue concentrations of the substance decline, producing unpleasant symptoms (<i>withdrawal</i>). The individual is likely to take the substance to avoid or relieve the symptoms	Cessation of nicotine use may result in symptoms of nicotine withdrawal syndrome
Use of the substance in larger quantities, or over a longer period of time than originally planned.	Smokers may consuming their nicotine supplies faster than intended
Many unsuccessful attempts to stop or reduce usage	35% of smokers try to stop each year, less than 5% are successful unaided
A great deal of time spent obtaining, using or recovering from the effects of the substance	For example, chain smoking
Use of the substance interferes with important social, occupational or recreational activities	Smokers may avoid activities which occur in a smoking restricted environment
Continued use of the substance despite recognition of psychological or physical problems arising from its use	An individual may continue to smoke despite having a tobacco-induced general medical condition such as COPD

1.3.2 Symptoms of nicotine withdrawal

The key feature of substance withdrawal is the development of a substance-specific change in behaviour as a consequence of cessation or reduction in heavy, prolonged substance use⁴⁹. The cessation of or reduction in smoking and nicotine intake may lead to a well known condition known as the 'nicotine withdrawal syndrome'. There are many signs and symptoms which have been proposed as being part of the nicotine withdrawal syndrome; the American Psychiatric Association have proposed the following diagnostic criteria, although the diagnostic criteria for withdrawal do not cover all potential symptoms (Table 2).

Table 2: Symptoms of substance and nicotine withdrawal (adapted from⁴⁹)

Criteria for substance withdrawal	Diagnostic criteria for nicotine withdrawal
The development of a substance-specific syndrome following the cessation or reduction of heavy or prolonged substance use	Abrupt cessation or reduction of nicotine use following at least several weeks of use is followed within 24 hours by four or more of the following: <ol style="list-style-type: none">1. dysphoric or depressed mood2. insomnia3. irritability, frustration or anger4. anxiety5. difficulty concentrating6. decreased heart rate7. increased appetite or weight gain
The substance-specific syndrome causes clinically significant distress or impairment in social, occupational or other important areas of functioning	The symptoms above cause clinically significant distress or impairment in social, occupational or other important areas of functioning
The symptoms are not attributable to a general medical condition or best accounted for by an alternative mental disorder	The symptoms above are not attributable to a general medical condition or best accounted for by an alternative mental disorder

1.3.3 A theory of motivation

Numerous theories of addiction have been proposed over the years to attempt to explain the phenomenon, however whilst capturing important aspects of addiction they fail to encompass all features. West has proposed a synthetic theory that attempts to draw together factors proposed in these existing theories⁵⁰. West offers a starting definition of addiction as 'impaired control over a reward-seeking behaviour from which harm ensues'. It is present in varying degrees and may be assessed by the severity of urges or cravings, the intensity or frequency of harm-causing behaviour and a failure of repeated attempts to limit or cease the behaviour. West proposes that, given these factors, any theory of addiction should be based upon a theory of motivation as addictions are activities that are given an unhealthy priority because of disorders in the motivational system. In a susceptible individual, drug-taking behaviours such as tobacco use become out of control because they have an increased motivation to seek out and engage in the drug taking activity and an artificial drive is created for a number of possible reasons: abstinence is unpleasant, the drug taking behaviour is rewarding or motivation to resist engagement in the activity is diminished⁵¹.

West suggests that there are five underlying themes to his theory of motivation, the first of which is the structure of the motivational system itself. It is proposed that there are five levels of operation which are encompassed by the acronym PRIME: plans, responses, impulses, motivations and evaluations. PRIME theory proposes that higher elements feed into and influence each other, i.e. plans (highest level) influence evaluations which subsequently influence motives which act through impulses or inhibitory forces to directly influence responses (lowest level),

i.e. behaviour⁵⁰. The hierarchical nature of the motivational system offers an advantage to impulses over desires and desires over evaluations in the control of behaviour. The second theme is the focus on the moment and this states that actions can only be influenced by forces operating at that point in time, and PRIME theory focuses on the dynamic nature of motivation and behaviour. The third theme, neural plasticity, concerns the way in which the motivational system changes in response to experience with the potential for the formation of causal connections between patterns of activity in the motivational system becoming more habitual. Identity and self-awareness, and the role these have in self-control compose the penultimate theme of the motivational system. According to PRIME theory, self-control consists of the operation of evaluations and motives arising from self-awareness and is based on a desire or evaluation of oneself. Identity is the one factor which provides some stability to the motivational system. The final unifying theme is the unstable mind and concerns the application of 'chaos theory' to the motivational system which suggests that motivation is inherently unstable and is controlled by constant balancing input and explains how the smallest influence can send the system in a different direction if it occurs at a critical time⁵¹.

The PRIME theory is largely untested although West has used some data from a national survey of smokers to test aspects of the PRIME model in relation to smoking and nicotine dependence.

1.4 Interventions to reduce smoking

Smoking cessation interventions can have far reaching benefits to both smokers and society as a whole. In addition to improving the health status of smokers, cessation interventions also reduce healthcare costs and improve attendance and productivity in the workplace⁵². Cessation

interventions may be seen as falling along a public health-clinical continuum. Public health interventions tend to be briefer and can reach more smokers⁵³ and include, for example, quit-lines, mass media campaigns and No Smoking Day. Public health interventions may achieve lower quit rates but they have a larger reach into the population, thus having the potential for a higher impact. Similarly, less intensive clinical interventions, such as brief advice by a GP, achieve modest smoking cessation rates but reach a larger number of smokers than more intensive interventions. More intensive clinical interventions, such as intensive counselling, are generally delivered by trained professionals. Intensive interventions tend to achieve higher quit rates but reach a relatively small and selected number of smokers. All types of clinical cessation interventions have, however, been found to be highly cost-effective medical interventions⁵⁴.

Clinical interventions for smoking cessation can also be referred to as tobacco dependence treatment. The definition of tobacco dependence treatment includes (singly or in combination) behavioural and pharmacological interventions such as brief counselling, intensive support, and administration of pharmaceuticals⁵⁵. Evidence from randomised studies has shown that the use of intensive support and medications increases the success rate of quit attempts by up to four fold⁵⁶. On an individual level, however, the likelihood of a quit attempt being successful is dependent on a number of factors which fall into one of three categories. These are: the personal and socio-economic characteristics of the smoker; smoking history and the level of dependence; and the nature of the treatment received⁵⁷. Recent advances in pharmacotherapy have meant that there are now more options available to smokers than ever before. What follows is a summary of commonly used cessation interventions in England.

1.4.1 Pharmacotherapy

1.4.1.1 Nicotine replacement therapy

Nicotine replacement therapy (NRT) products are licensed as an aid to smoking cessation to relieve withdrawal symptoms⁵⁸ (Recently some have been licensed for the purposes of temporary abstinence or cutting down to stop). NRT was launched as the first licensed pharmacological treatment for smoking cessation in the form of nicotine gum in 1981⁵⁸ but was not made available on NHS prescriptions until 2001. There are currently six types of NRT products licensed for use in the UK^{59 60} (Table 3). Efforts have been made to increase the accessibility of NRT. In 1999, the 2mg chewing gum was made available on a general sale category (GSL), and the Medicines Commission subsequently made the 4mg gum, patches and lozenges⁵⁸ and inhalator⁶¹ available on GSL. NRT can be offered to any regular cigarette smoker (more than 10 cigarettes per day⁵⁵) who wants to quit. If possible, smokers should also be offered behavioural support for the quit attempt, and given the option of referral to smoking cessation services when available⁵⁹. NRT aims to replace the nicotine from cigarettes and is thought to stimulate the nicotinic receptors in the ventral tegmental area of the brain to release dopamine in the nucleus accumbens⁶⁰. This leads to a reduction in symptoms of nicotine withdrawal experienced by smokers attempting to quit. NRT products currently available alleviate but do not eliminate all withdrawal symptoms, most likely because no form allows the rapid systemic arterial delivery experienced when cigarette smoke is inhaled^{11 60}.

Table 3: Forms of NRT currently licensed for use in the UK

Product	Dose			Precautions
Transdermal patch	5mg, 10mg, 15mg/16 hours 7mg, 14mg, 21mg/24 hours	1 patch every 16 or 24 hours	Enters the body through the Skin	Stomach ulcers, CV disease, diabetes, liver & kidney disease, pregnant/breast feeding, psoriasis/chronic dermatitis
Chewing gum	2mg, 4mg	Up to 15 pieces per 24 hours	Enters the body through the lining of the mouth	Stomach ulcers, CV disease, diabetes, liver & kidney disease, pregnant/breast feeding
Sublingual tablet	2mg	Up to 2 microtabs per hour, maximum of 40 per 24 hours	Enters the body through the lining of the mouth	Stomach ulcers, CV disease, diabetes, liver & kidney disease, pregnant/breast feeding
Lozenge	1mg, 2mg, 4mg	1 lozenge every 1-2 hours, maximum of 30 per 24 hours	Enters the body through the lining of the mouth	Stomach ulcers, CV disease, diabetes, liver & kidney disease, pregnant/breast feeding
Inhalation cartridge	10mg	Up to 12 cartridges per 24 hours	Enters the body through the lining of the mouth	Stomach ulcers, CV disease, diabetes, liver & kidney disease, pregnant/breast feeding
Nasal spray	0.5mg per puff	Up to 2 sprays in each nostril per hour, maximum of 64 sprays per 24 hours	Enters the bloodstream through the lining of the nose	Stomach ulcers, CV disease, diabetes, liver & kidney disease, pregnant/breast feeding

It is recommended that initial prescriptions of NRT should cover a period of up to 2 weeks after the target quit date, with additional prescriptions only subsequently given to individuals who are still abstinent at this point⁵⁹. There is growing evidence that smoking cessation is more effective with combination treatment: for example, using the patch and gum together will provide the smoker with a steady supply of nicotine during the day but an option to increase intake in response to cravings or stressful situations⁵⁸. Research has shown that combining these 2 products has been shown to be more effective in reducing nicotine withdrawal symptoms than either treatment alone⁶². Recent guidelines published by the National Institute of Health and Clinical Excellence recommend that a combination of nicotine patches and another form of NRT (although not in combination with bupropion or varenicline) should be offered to people who are highly dependent on nicotine or have previously found use of a single form of NRT ineffective⁵⁹.

A recent Cochrane review of 132 studies reported that the pooled odds ratio (OR) of abstinence for any form of NRT compared to control was 1.58 (95% CI: 1.50 to 1.66). When looking at different forms of NRT, this value ranged from 1.43 with nicotine gum to 2.02 with the nasal spray (95% CI: 1.33 to 1.53 and 1.49 to 3.73 respectively)⁶³. There was no evidence to suggest that there was a significant difference in effectiveness between the different forms of NRT.

Currently no form of NRT uses the same pulmonary route of absorption resulting from smoking a cigarette. It is not, therefore, possible to achieve the same high arterial concentrations of nicotine in as short a time. Several neurochemical pathways mediate nicotine withdrawal, a result of the many actions nicotine has within the central nervous system. A

number of non-nicotine medications have been investigated for smoking cessation, acting at various points in these pathways.

1.4.1.2 Non-nicotine pharmacotherapies for smoking cessation

The relationship between smoking behaviour and a depressed mood suggested that there may be a role for antidepressant drugs in smoking cessation. Results of clinical trials of antidepressant therapy for smoking cessation suggest that this group of drugs are more effective than placebo, especially using bupropion and nortriptyline⁶⁴

Bupropion sustained release (SR) (Zyban®, GSK) is an aminoketone antidepressant licensed for use in the UK for smoking cessation⁶⁵. In the US, bupropion is also used as an anti-depressant. The exact mechanism by which bupropion aids smoking cessation is not fully understood, but is hypothesised to inhibit the reuptake of dopamine in the mesolimbic dopamine system (the so-called reward centre of the brain)⁶⁶.

Bupropion is a prescription only drug. Recent guidance states that bupropion should not be offered to pregnant or breastfeeding women or those under the age of 18, but may be offered to those with unstable cardiovascular disorders, subject to clinical judgement⁵⁹. The recommended dosage is one 150mg tablet per day for the first 6 days, followed by 2 tablets per day for the next 6-8 weeks. A quit date should be set for 7-14 days after starting the course to allow the drug to achieve its optimal effect⁵⁹. Hughes and Colleagues⁶⁷ reviewed 31 trials which have been conducted comparing bupropion alone to placebo and concluded that bupropion produced a pooled OR of 1.94 (95% CI 1.72 to 2.19). Like NRT,

bupropion should be prescribed alongside advice or counselling to assist the smoker in their quit attempt.

Nortriptyline is believed to reduce withdrawal symptoms through its noradrenergic mechanism⁶⁸. It is generally considered to be a second-line treatment for tobacco dependence as it tends to have more side effects than bupropion and has been less well-researched as a cessation aid⁶⁹. A recent Cochrane review reported that from six studies which have been carried out comparing nortriptyline to placebo, a significant benefit of this therapy has been suggested (OR 2.34, 95% CI: 1.61 to 3.41)⁶⁷.

Other antidepressants which have been used, but not proven effective, for smoking cessation include imipramine, doxepin, venlafaxine, fluoxetine and moclobemide⁶⁵.

Varenicline is a highly selective $\alpha 4\beta 2$ nicotine acetylcholine receptors (nAChR) partial agonist developed specifically for smoking cessation⁷⁰. Nicotine dependence begins with nicotine binding to nicotinic nAChRs in the central nervous system⁷¹. It has been suggested that $\alpha 4\beta 2$ partial agonists may be more effective as a smoking cessation aid than therapies which are currently available. Through its agonistic actions, varenicline theoretically could reduce cigarette craving and nicotine withdrawal whilst simultaneously blocking the binding of, and subsequent reinforcing effects of nicotine through an antagonistic action^{66 72}. Recent guidance states that varenicline should not be offered to pregnant or breastfeeding women or those under the age of 18, but may be offered to those with unstable cardiovascular disorders, subject to clinical judgement⁵⁹.

Varenicline is a relatively new potential treatment for smoking cessation and studies into its efficacy are limited. A recent Cochrane review identified seven trials which compared varenicline to placebo and reported a pooled risk ratio of 2.33 for continuous abstinence at 6 months (95% CI 1.95 to 2.80). Three trials also included a comparison with bupropion, for which a pooled risk ratio of 1.52 was reported for continuous abstinence at 12 months (95% CI 1.22 to 1.88)⁷³.

Clonidine is an α -noradrenergic agonist which suppresses sympathetic activity. It has been used to reduce withdrawal symptoms associated with alcohol and opiate misuse and increased smoking cessation in 8 out of 9 trials in both its low dose and patch formation⁶⁵. Mecamylamine is a nicotinic agonist which blocks the effects of nicotine but does not precipitate withdrawal symptoms⁶⁵.

1.4.2 Behavioural support

1.4.2.1 Brief interventions

Brief advice against smoking has been defined by the Cochrane Tobacco Addiction Group as "verbal instructions to stop smoking with or without added information about the harmful effects of smoking"⁷⁴. Recent guidelines⁷⁵ have made several recommendations for the provision of brief advice including, but not limited to: every smoker should be advised to quit unless there are exceptional circumstances; smokers should be asked how interested they are in stopping and GPs and nurses in primary and community care should offer cessation advice to all smokers and Figure 1 (page 30) illustrates the recommended procedure for the delivery of brief advice. Brief advice achieves modest cessation rates, but is one of the most cost effective interventions in medicine at a discounted cost to society

of £212 per life year gained⁷⁶. The general practitioner has good opportunities to intervene with smoking patients, largely due to the level of trust and respect that patients generally hold for their doctor. The level of involvement of the GP in smoking management has been summarised in different ways, but in the UK is frequently summarised by the five "A"s: ask (ascertain smoking status), assess (interest in stopping), advise (against smoking), assist (a quit attempt if the smoker is interested in stopping) and arrange (referral to specialised support services if appropriate)⁷⁷.

Recent smoking cessation guidelines recommend that health professionals should provide brief advice (as described below) to smokers during routine consultations whether or not they are seeking help to stop^{75 78} and that GPs offer a prescription of NRT for interested smokers during routine consultations regardless of whether the smoker wishes to be referred to intensive specialist support⁷⁵. As levels of nicotine dependence increase systematically with deprivation⁷⁹, and more deprived smokers tend to be harder to reach with healthcare interventions, this group of smokers in particular may benefit from this approach. However, other research has been published indicating that smoking cessation advice should be delivered periodically and not necessarily at every consultation⁸⁰, with one study reporting that not all primary care physicians agree that advice should be given at every consultation⁸¹ and another that offering smoking cessation advice to asymptomatic smokers actually represented a strong negative reinforcement to quitting⁸². Many GPs are concerned about maintaining good doctor-patient relationships and are keen to avoid negative responses from patients about their smoking behaviour. For this reason, many GPs restrict most discussions about smoking to situations where patients present with smoking related illnesses⁸³. It has been

suggested that GPs should be offered the opportunity to undertake smoking cessation training in order to increase the involvement of general practices. It may give the GP confidence in the efficacy of brief intervention and improve their skills in smoking cessation techniques, both of which should help the GP realise their potential to decrease smoking prevalence⁸⁴.

Thirty nine trials involving over 31,000 smokers were included in a recent Cochrane review of physician advice for smoking cessation⁸⁵. The pooled effect of a minimal intervention equated to an increase in cessation rates of approximately 2.5% when comparing those who had received advice and those who had not.

1.4.2.2 Telephone counselling

Telephone counselling is becoming more popular as a method of helping people to stop smoking. Telephone provision of support and problem solving assistance appears to be an efficacious intervention for cigarette smoking⁸⁶. Advantages of telephone counselling include the potential to provide individual counselling to a large number of people relatively cheaply, convenient access, and the centralised nature of services⁸⁷. Telephone counselling may be used in combination with self-help interventions and pharmacotherapy as a substitute to face-to-face contact, or as a supplement to face to face counselling. Telephone helplines may be reactive (a dedicated phone line is established and its availability is advertised to a target population) or proactive (calls are initiated by intervention staff)⁵³. Proactive telephone counselling has been shown to help smokers interested in quitting, with evidence of a dose-response relationship existing between number of calls and success⁸⁸. Less evidence

exists for the efficacy of reactive services due to the lack of randomised trials in this area.

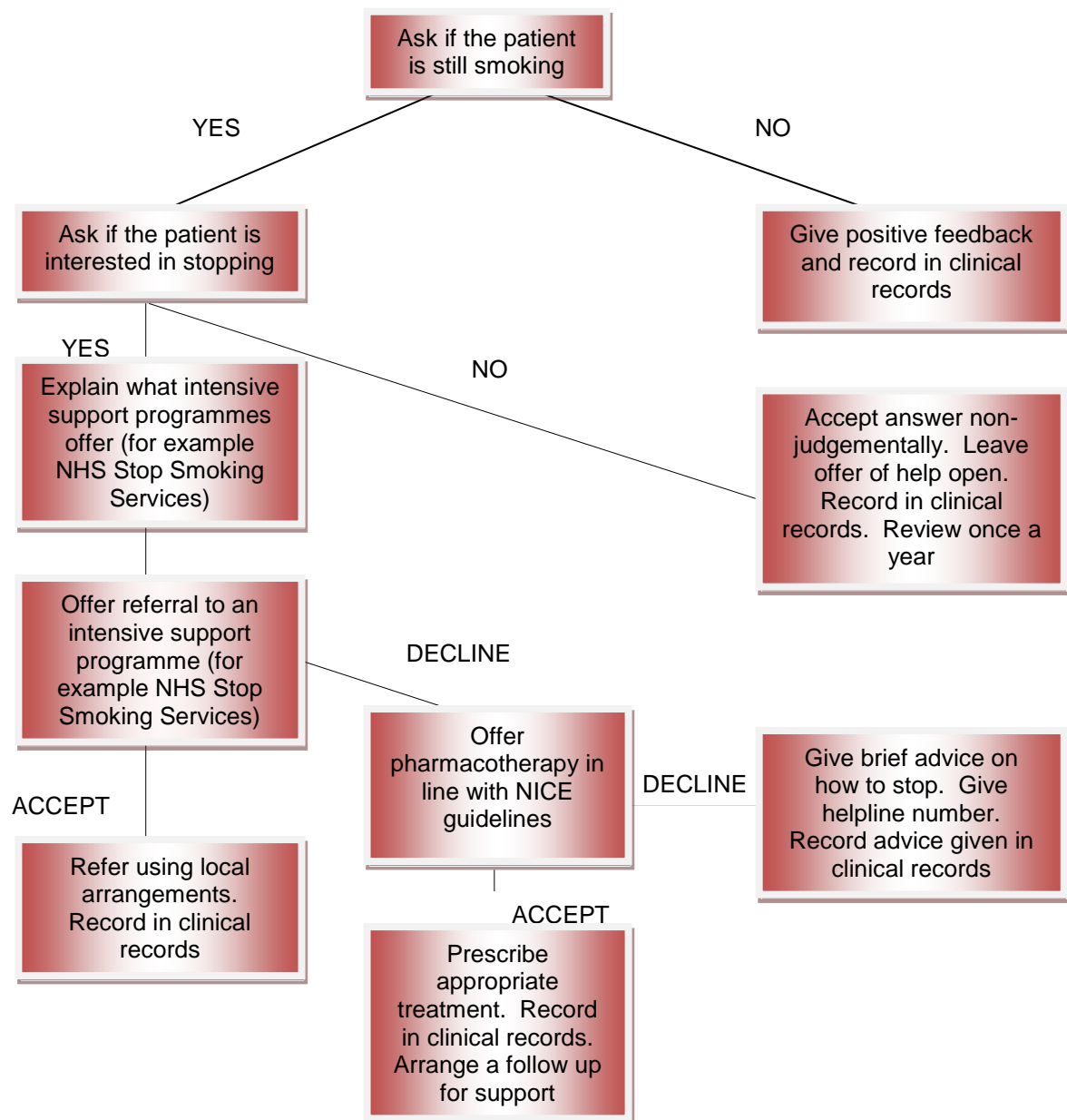
1.4.2.3 Internet support

The use of the internet as an intervention tool has many potential benefits, such as relatively low cost per user, widespread availability, convenience and anonymity for the user and an extended reach compared to traditional smoking cessation support. The internet is a promising avenue for the provision of smoking cessation support, either as an adjunct to pharmacotherapy or as a stand-alone programme^{89 90}. It has been shown that tailored web based programmes have significant advantages over a non-tailored programme⁹¹, although limited research has been conducted to date looking at the effects from intervention studies.

1.4.2.4 Self help

The primary aim of self-help interventions is to reach a greater proportion of the smoking population than would be possible through more intensive interventions such as face-to-face or telephone counselling. Self help materials include, but are not limited to written materials, audio or videotape and internet sources. Self help materials may also be of benefit to those who would like advice or support to quit smoking but do not wish to attend treatment sessions for any reason. A recent Cochrane review pooled the results of 11 studies which compared self help materials sent by post to no information at all and reported an odds ratio of 1.24 (95% CI 1.07 to 1.45)⁵⁸. The review reported a non-significant effect for self help materials being given with face to face contact, as an adjunct to face to face advice from a healthcare provider or in addition to NRT.

Figure 1: Recommended procedure for the delivery of brief advice for smoking cessation (adapted from⁷⁵)



1.4.2.3 Intensive support

Intensive support by a smoking cessation specialist is the most effective non-pharmacological intervention available for those smokers with a strong desire to quit⁷⁴ and is often delivered in combination with NRT, bupropion or varenicline. Combining intensive behavioural support with pharmacotherapy has been shown to have an effect size of up to 19% on abstinence for six months or longer⁵⁶. A smoking cessation specialist is trained and paid to deliver skilled advice to smokers who need more support to quit than is offered from brief advice⁵⁵. Intensive behavioural support usually involves assessment of the patient's smoking history, motivation to quit, identification of potential relapse situations and development of strategies to overcome these situations. Stop smoking services (SSS) are typically based on the premise that smokers are in the preparation phase of the stages of change model (see section 1.7) and the first meeting typically involves an introduction, smoking cessation medication is made available and a quit date set for some point in the following week depending on which medication is being used⁹². Expired carbon monoxide levels should be measured at this point, and in each subsequent meeting. It is advised that specialist services should include weekly meetings over approximately 6 weeks, covering at least 4 weeks after the quit date⁹³.

Intensive counselling sessions may be conducted on a one-to-one basis or in a group setting. Arguments exist for the benefits of each, but ultimately it may come down to the individual requirements of the smoker. Individual counselling is more expensive than group, but some smokers may not be comfortable in a group situation, for example those with psychiatric

problems. Findings from the Cochrane Library report that individual counselling results in an OR of 1.56 (95% CI 1.32 to 1.84) compared to minimal contact⁹⁴. Group counselling is more cost effective, but may also have other benefits to participants. A group situation may allow smokers the opportunity to share experiences and problems with other smokers trying to quit, thus increasing potential quit rates. When comparing group therapy to various self-help materials, an OR of 1.97 (95% CI 1.57 to 2.48) was reported in a recent Cochrane review⁹⁵. The same review also reports no significant difference between group and individual therapy (OR 0.86, 95% CI 0.66 to 1.12). A recent study compared the outcomes of users accessing pharmacy one-to-one and group based smoking cessation treatments and found that group users were nearly twice as likely to be CO-validated abstinent compared to those who had used the pharmacy based service. One study conducted in the US and Canada offered a more intensive intervention than other studies, with groups meeting 12 times over a 10 week period combined with aggressive use of NRT. The study resulted in one of the highest validated quit dates reported, with approximately 35% of those in the intervention groups being abstinent at one year compared to 10% of those receiving usual care¹⁸.

Table 4 summarises some commonly employed smoking cessation interventions, their target population and the estimated effect size.

Table 4: Incremental effects of smoking cessation interventions on abstinence for six months or longer. Adapted from West et al⁵⁶.

Intervention	Target population	Effect size ^a	95% confidence interval
Brief opportunistic advice from a physician to stop	Smokers attending GP surgeries or outpatient clinics	2%	1% to 3%
Face to face intensive behavioural support from a specialist ^b	Moderate to heavy smokers seeking help with stopping	7%	3% to 10%
Proactive telephone counselling ^b	Smokers wanting help with stopping but not receiving face to face support	2%	1% to 4%
Written self-help materials	Smokers seeking help and not receiving other support	1%	0% to 2%
Nicotine gum	Moderate to heavy smokers receiving <i>limited</i> behavioural support ^c	5%	4% to 6%
Nicotine gum	Moderate to heavy smokers receiving <i>intensive</i> behavioural support	8%	6% to 10%
Nicotine transdermal patch	Moderate to heavy smokers receiving <i>limited</i> behavioural support	5%	4% to 7%
Nicotine transdermal patch	Moderate to heavy smokers receiving <i>intensive</i> behavioural support	6%	5% to 8%
Nicotine nasal spray	Moderate to heavy smokers receiving <i>intensive</i> behavioural support	12%	7% to 17%
Nicotine inhalator	Moderate to heavy smokers receiving <i>intensive</i> behavioural support	8%	4% to 12%
Nicotine sublingual tablet	Moderate to heavy smokers receiving <i>intensive</i> behavioural support	8%	1% to 14%
Bupropion (300mg/day sustained release)	Moderate to heavy smokers receiving <i>intensive</i> behavioural support	9%	5% to 14%
Intensive behavioural support plus NRT or bupropion ^d	Moderate to heavy smokers seeking help from a smokers' clinic	13-19%	-

^aDifference in >6 month abstinence rate between intervention and control/placebo in the studies reported; data from Cochrane meta-analyses unless otherwise stated.

^bEfficacy figures based on a subset of studies from the general population with biochemical verification

^cThe term “limited behavioural support” refers to brief sessions, required primarily for collecting data. Following the Cochrane definition, “intensive” behavioural support was defined as an initial session of more than 30 minutes, or an initial session of less than 30 minutes plus more than 2 subsequent visits.

^dExpected effect combining effects of medication with effects of behavioural support.

1.5 Government initiatives regarding smoking cessation

In 1997, an Independent Inquiry into Inequalities in Health Report was commissioned by the Minister of Public Health to address health inequalities, including smoking, and to identify priority areas for future policy development³². A number of government policies have been implemented to encourage smokers to quit smoking, with considerable emphasis on those in lower socio-economic groups, pregnant women and young people³³. These policies either aim to act as a disincentive to smoking (such as increasing tobacco sales tax and restricting smoking in public places), or to provide incentives to give up smoking (through health promotion campaigns and interventions in the NHS)³⁴.

In 1998, the government published a strategy to reduce smoking in England called *Smoking Kills: a White Paper on Tobacco*⁹⁶. The paper aimed to reduce smoking in all adult smokers, particularly amongst children and young people, pregnant women and disadvantaged adults. A number of policies therein were designed to encourage smokers to quit smoking and placed considerable emphasis on those in lower socio-economic groups⁹⁶.

Targets were established nationwide to reduce the prevalence of smoking in England, with the specific aim of reducing adult smoking across social classes to 24% or less by 2010⁹⁶ and a target to reduce adult smoking prevalence in routine and manual groups to 26% or less by 2010⁹⁷. It was recognised that significant health gains were likely to be achieved by reducing the proportion of current smokers and if more of these smokers are drawn from disadvantaged groups then this could make a significant contribution to reducing inequalities in health.

1.5.1 Stop Smoking Services

As part of the White Paper in the same year, the government announced funding for NHS SSS offering intensive cessation support and medications as detailed above initially for a period of a year but with funding for a further two years, providing the first year was successful. The new services were initially set up in 26 areas known as Health Action Zones (HAZs)⁹³. These were areas with high levels of deprivation and a high smoking prevalence⁹⁸. From the second year, the services were expanded to cover the whole of England and funding has been provided every year since then. Current government guidelines state that stop smoking services should be able to treat at least 5% of the local smoking population, with an expected success (four week quit rate) range of 35% to 70%⁹⁹.

Intensive services are designed to be as accessible as possible to clients. Access to services may be either on referral from a GP or other health professional or from the smokers themselves and sessions most commonly take place in the primary care setting. A broad range of approaches are, however, being employed to maximise the likelihood of SSS reaching

target populations, particularly those who are more disadvantaged. These include basing smoking cessation advisors and advertising services in primary care venues in deprived areas, basing advisors in easily-accessible city centre venues and training pharmacists and others as advisors, utilising community venues such as community centres and libraries and training people from deprived neighbourhoods to provide smoking cessation advice¹⁰⁰. In certain instances, advisors may see clients in their own homes when circumstances deem this appropriate¹⁰¹. The impact of these different strategies has not been measured although some evaluations are ongoing.

A number of barriers to reaching and supporting more disadvantaged smokers in their quit attempts still exist however. Health services in the UK are traditionally more accessible in the more affluent areas—a phenomenon known as the 'inverse care law'¹⁰², and those living in disadvantaged communities may be less willing to seek help from statutory health services¹⁰³. Developing appropriate strategies to identify, contact, support and keep smokers in treatment is therefore of key importance for the NHS SSS, particularly in disadvantaged communities where smoking prevalence and tobacco addiction are often higher⁷⁹.

1.5.2 Current performance of Stop Smoking Services

Between April 2007 and March 2008, over 680,000 people set a quit date through NHS stop smoking services, with over 350,00 people being successfully quit (by self report) at 4-week follow up¹⁰⁴. The total expenditure on NHS SSS in England for the same period was almost £61 million (excluding pharmacotherapy prescriptions) with a cost per quitter of £173¹⁰⁴.

The English SSS have been reported to be one of the most cost effective health interventions available in medicine today^{56 59 76}. Godfrey et al report a cost-effectiveness of £684 per life year gained, reducing to £438 per life year gained when adjusted for future health care costs⁵².

Recent statistics on NHS SSS reported that a lower number of smokers in Spearhead PCTs (areas with the worst health and deprivation in England) set a quit date with SSS than non-Spearhead PCTs and had slightly lower quit rates (49 percent and 54 percent respectively)¹⁰⁴. These figures indicate that SSS may not be reaching as many smokers in deprived areas, and disadvantaged smokers may benefit from approaches to increase the reach of, and their access to, these services as previously discussed.

1.5.3 The UK Quality and Outcomes Framework

The Quality and Outcomes Framework (QOF) is the annual reward and incentive programme detailing GP practice achievement results. QOF is a voluntary process for all surgeries in England and was introduced as part of the GP contract in 2004¹⁰⁵. Its introduction means that up to a quarter of GP's income is dependent upon practice performance which is measured against 146 indicators. Two specific targets were established for smoking cessation management¹⁰⁶: determining smoking status for all patients aged 15-75 years and recording the delivery of brief smoking cessation advice for patients with CHD, hypertension, asthma, diabetes, COPD and stroke/TIA.

GPs can now earn a proportion of the new quality payments by complying with these targets. This provides a direct incentive for GPs to routinely ask about smoking status and also provide cessation advice to specific groups of patients. As yet, the QOF does not include any specific incentive for GPs to then refer smokers on to specialist services, although some do this as part of routine clinical practice.

1.6 Efforts to increase the accessibility of Stop Smoking Services / programmes

Recent research in England suggests that, at the national level, less than 10% of smokers who make a quit attempt do so with the support of NHS SSS⁴⁴. As discussed earlier, disadvantaged smokers in particular are not accessing services as much as other smokers. Improving access and increasing reach is therefore essential but it is equally important that services are appropriately meeting the needs of the clients it attracts. The evidence-base for smoking cessation interventions depends upon the assumption that treatments that have been proven to be effective in research trials will work for all or the majority of smokers^{56 107}. However, not all smokers are alike and some may respond better to interventions that appeal to their individual circumstances. A recent systematic review¹⁰⁸ conducted as part of a review for the National Institute for Health and Clinical Excellence (NICE) identified a number of studies which have looked at methods by which the acceptability of, access to and reach of SSS may be improved, particularly for disadvantaged smokers.

1.6.1 Qualitative research with disadvantaged smokers

Two qualitative studies have been undertaken with smokers to identify these types of barriers and explore how they can be overcome.

A study by Roddy et al¹⁰⁹ conducted focus groups with 39 socio-economically deprived smokers in Nottingham, UK, to explore how they viewed SSS and to identify specific barriers and motivations to improve access to cessation services. It was concluded that this group of smokers displayed a fear of being judged, fear of failure and demonstrated a lack of correct knowledge about cessation services and the medication available. Many smokers were unaware of the smoking cessation services available to them, but believed that a personal invitation to, and information about, these services would make them more likely to use them and it was recommended that services be promoted in a personalised, non-judgemental and flexible manner.

Wiltshire and colleagues¹¹⁰ conducted interviews with 100 disadvantaged smokers to investigate their perceptions of smoking and past experiences of attempts to quit. The authors concluded that smokers lack the motivation to access cessation services unless they feel they will not only get help with their nicotine addiction, but also help dealing with the wider life circumstances linked to their smoking habits.

1.6.2 Location of Stop Smoking Services

As discussed earlier, SSS are designed with the aim of being as accessible as possible for clients and basing services in community locations outside of the general practice is one means of doing so. Studies in both the UK

and the US have investigated the use of pharmacy, dental and works-based settings for smoking cessation services with potentially promising results.

The pharmacy setting is a promising means to reach a wide variety of smokers as it provides access to trained health professionals without the need to book an appointment. A recent systematic review by Blenkinsopp and colleagues¹¹¹ including 2 randomised controlled trials and 3 non-randomised experimental studies in the UK, demonstrated the importance of training pharmacists in smoking cessation counselling. Both RCTs recruited participants from customers asking for smoking cessation advice or NRT in the UK during a 12 month period but only one of the trials showed a statistically significant effect of pharmacist counselling. In addition, a recent study by Bauld and colleagues¹¹² investigated a number of components of stop smoking services in Glasgow, including pharmacy-based treatments, and provided evidence that pharmacy-based interventions may be a valuable means of reaching and improving smoking cessation rates in disadvantaged smokers. The study examined pharmacy services that provided behavioural support and NRT and reported 4 week CO-validated cessation rates of 20% (28% including self reported cases). The study suggests that basing services in pharmacies on the "high street" is effective in reaching smokers and improving their access to services. In the US, a pilot study by Doescher and colleagues¹¹³ reported that pharmacist-delivered treatment is feasible, although participation in the study was low and there was a significant drop out rate.

Dental healthcare providers may see patients on a regular basis and thus have a unique opportunity to identify smokers and provide smoking cessation advice. A recent review in the UK¹¹⁴ focused on a variety of

study types examining smoking cessation in dentistry and barriers to providing smoking cessation advice in this environment. The review concluded that behavioural and pharmacological interventions are effective, although the magnitude of the effect is unclear. The review also included studies which investigated barriers to implementing smoking cessation support in the dental setting. It reported a large number of barriers including a lack of training for dental professionals and a need for cultural and policy changes to facilitate the provision of cessation support. The authors suggested that further research is needed in this area, and should include qualitative or mixed methods designs to explore the issue further and studies that evaluate the impact of changing these barriers on the provision of smoking cessation support. More research as to the benefit of using the dental setting as a means of supporting smoking cessation has been conducted in the US. A systematic review of 6 RCTs¹¹⁵ reported a statistically significant increase in the odds of tobacco abstinence at 12 months when results of all 6 studies were pooled (OR 1.44, 95% CI 1.16-1.78), a 3% difference in cessation rates was reported between intervention and control groups. Three of these studies were conducted in a dental office setting and three involved oral health professionals providing interventions within high schools or community college settings. Five studies targeted smokeless tobacco users and only 1 targeted cigarette smokers and so there was insufficient evidence to draw any conclusions as to the effectiveness of the intervention in cigarette smokers.

A further review in the US¹¹⁶ reviewed 7 RCTs in dental settings utilizing a range of interventions including self-help materials, NRT provision and behavioural support. Duration of follow-up varied between trials, but all showed a positive effect for interventions in the dental setting on quit attempts or cessation. The reviewers conclude that cessation interventions

in the dental setting are effective, include a proactive case finding element, and should be part of routine care.

The possibility of basing SSS in the workplace has been investigated by one cohort study in the US¹¹⁷. Barbeau and colleagues investigated the feasibility of a smoking cessation intervention with a specific manual group (unionised apprentice iron workers). This was a multi-faceted intervention involving 139 smokers and resulted in a 7-day point prevalence smoking abstinence rate of 19.4% and statistically significant positive changes in intention and self efficacy to quit within 6 months and 30 days. Participants in the intervention were 3 times more likely to quit than those who did not participate. Although there was no formal control group in this study and cessation outcomes were short, the results suggest that providing a smoking cessation programme within the workplace may have the potential to reach a number of smokers and increase quit rates in blue collar workers.

1.6.3 Method of accessing Stop Smoking Services

Access to SSS in the UK typically requires booking an appointment in advance. However, several initiatives in the UK have attempted to move away from this 'traditional' model of NHS stop smoking services with positive results. Fag Ends is a smoking cessation service in Liverpool which is community-based, staffed by lay advisors and clients are able to drop in to their nearest meeting without pre-booking an appointment. Smokers are also able to return to the service immediately following relapse. An observational study based around this service¹¹⁸ reported CO-validated quit rates at 4 weeks between 2001 and 2005 from 34%-45%, rising to 57% overall when self-report cases were included. At 52 weeks, self-reported

quit rates ranged from 16%-22% between 2001 and 2004. The authors claim that these rates are higher than existing published evidence although limitations of the study design mean these conclusions should be regarded as preliminary in nature. The proportion of 'walk in' clients increased from 19% in 2001 to 41% in 2004, indicating that the service may be reaching more smokers. A qualitative study (face to face interviews)¹¹⁹ aimed to explore the main characteristics of the service and factors which contributed to its effectiveness. The main findings were that using lay advisors rather than health professionals can be successful and that the nature of a drop-in service was valued by clients. This service is now being independently evaluated.

A qualitative study (face to face interviews)¹²⁰ reported on 'Smokey Joe', a group-based NHS smoking cessation intervention in a low income area of Scotland. This service encourages 'drop in' clients at any stage of the quitting process. 11 interviewees who had used the service at least 3 times in 6 months were selected and suggested that flexible services available to smokers at all stages of quitting are beneficial and valuable and interventions should be shaped to the local community and culture. The service reported 52 week quit rates of 16% but this was not a robust evaluation.

1.6.4 Incentive schemes

Incentive schemes are intended to motivate smokers to either make a quit attempt or engage with some sort of smoking cessation support, and are usually used alongside other interventions such as GP advice or quitlines. In recent years, a number of Primary Care Trusts have offered a variety of

incentives for smokers, particularly pregnant, deprived and adolescent smokers to quit and remain abstinent, although the success of these schemes have not been formally assessed.

Cahill and Perera carried out a Cochrane review of 17 studies of smoking cessation interventions offering a material or financial incentive.¹²¹ Twelve studies were based in the US, three in the UK, one in Australia and one in the US and Canada. The authors reported that none of the studies demonstrated significantly higher quit rates for the intervention group than for the control group beyond six-month abstinence and there was no evidence of one type of incentive being more beneficial than another.

1.6.5 Proactive Identification and Recruitment

The introduction of the QOF discussed previously has the potential to have increased the recording of smoking status in patient's primary care medical record, and thus improved the value of this resource in identifying smokers. Coleman and colleagues¹²² examined the impact of QOF on the identification of smokers in primary care and the delivery of brief advice, as well as smoking cessation medication prescribing patterns. Using The Health Improvement Network (THIN) database which includes patient records from a large number of primary care practices in England, they were able to track changes between 1990 and 2005. They found that recording of smoking status and recording of advice delivery increased around the time of the 2004 contract but did not find any change in prescribing patterns over and above existing trends. This would suggest that the new GP contract has improved the recording of smoking status and the recording of advice to stop smoking but the lack of concurrent

increase in prescribing of smoking cessation medication suggests that opportunities to support successful cessation are possibly being missed.

Most smoking cessation services rely on smokers to contact them but some settings provide an ideal environment for services themselves to proactively identify smokers and then target them for intervention. Primary care in particular has been identified as an important source of referrals to stop smoking services and it is suggested that all local GPs are aware of the need to refer smokers who are motivated to quit to the local stop smoking service⁹⁹. Proactive recruitment approaches have the capacity to reach a much larger number of smokers than reactive alternatives, although the vast majority of research on this approach has been conducted in the US.

Two studies have described how smokers in two US states^{123 124} were identified by primary care staff as part of a routine appointment. In both studies, smokers were provided with brief advice to quit and asked whether they would consent to their details being either faxed to the State telephone quit line who then contacted the smoker at home and provided follow-up telephone support¹²⁴ or given a brochure advertising the quit line number so that the client could contact the quit line for support themselves¹²³. Fax referral resulted in greater uptake (59% successfully contacted from fax referral compared with 19% of those receiving the brochure who then contacted the quit line) although the cost of the two approaches was not compared. Both studies reported that the intervention was well-received by primary care staff and patients and resulted in an increased number of referrals from primary care to the state quit line. Both articles argued that this proactive approach was more cost-effective than relying on costly media campaigns to trigger reactive calls to the quit lines.

Milch and colleagues¹²⁵ conducted a trial examining how two different screening tools could affect the proactive identification of smokers and the delivery of cessation advice to patients attending a primary care practice in the USA. Smokers were identified by filling in a short questionnaire when attending the practice for an un-related appointment. They were then randomised into one of three groups: control, minimal (a 'vital sign stamp' note on their files that identified their smoking status) or 'enhanced' (completion of a 6 part smoking questionnaire attached to their files). Smoking status was documented more often (86%, 91% and 49% ($p<0.001$)) and cessation advice was delivered more often (38%, 47% and 30% $p<0.014$) in the minimal and enhanced groups compared with the control group. Self-reported quit rates were higher at 9 months for the enhanced group (12% compared with 4% for minimal and 2% for control $p<0.001$). The study demonstrates how a short questionnaire that assesses readiness to quit and documents whether cessation advice was given can improve rates of advice giving and smoking cessation.

Prochaska and colleagues¹²⁶ conducted a randomized controlled trial of two forms of smoking cessation support with just over 4,000 smokers who had been identified by a random digit dialling procedure in the US, involving 'cold calling' all households in three parts of Rhode Island to identify smokers. A large number of calls (32,456) were made and 4296 eligible smokers were eventually identified, of which 80% agreed to participate in the study. These smokers were then randomised to an 'expert system' intervention (who received intervention materials by post tailored to their 'stage of change' at baseline, 3 and 6 months) and an 'assessment only' intervention, the control group. The study found higher quit rates in the intervention group at each stage of follow-up (culminating in 25.6% point

prevalence and 12% prolonged abstinence at 24 months which were 30% and 56% greater than in the control group). The authors concluded that proactively identifying smokers in this way was effective both in encouraging them to participate in the study and in achieving cessation.

Tillgren and colleagues¹²⁷ carried out an observational study in Sweden to examine the impact of direct mail as a method to recruit smoking mothers into a 'Quit and win' contest. Direct mail resulted in the most participation (compared with local newspapers and personal communication) and higher quit rates, but very small numbers overall were abstinent although this appears to be a potentially useful way of targeting smokers.

The only research in the UK which has taken a proactive approach to offering smoking cessation was a cohort study¹²⁸ which followed up 120 smokers recruited opportunistically by GPs following a discussion on smoking initiated by the GP, although the majority of the consultations concerned other matters, and were given a prescription for NRT as an incentive to quit. The smokers were followed up 3 months later when around a fifth had stopped smoking with over twice as many having cut down their cigarette consumption. Although no details were provided on how GPs recruited smokers into the trial, and self-report was used for outcomes, the findings suggest that proactive targeting of patients by GPs in a deprived area for prescriptions of NRT and cessation advice may be effective.

1.7 The process of quitting smoking

The prevailing model of smoking cessation assumes that smokers have the best outcomes when quit attempts involve advance planning. This assumption is probably typically based around theories of behaviour change such as the Stages of Change concept, i.e. where the smoker is in terms of readiness to attempt to quit smoking^{129 130}. There are five key stages of change:

- Precontemplation – there is no intention to change behaviour in the near future
- Contemplation – people are aware that a problem exists and are seriously considering making a change, although they have not committed to taking action
- Preparation – individuals are intending to take action in the next month
- Action – individuals modify their behaviour to overcome their problem
- Maintenance – people work to prevent relapse and consolidate gains accomplished in the action phase^{131 132}.

It is suggested that the smoker moves through the 5 stages gradually and sequentially, although relapse to an earlier stage can occur¹³³. Typically, NHS stop smoking services and health professionals advise individuals in the preparation stage to plan ahead and set a quit date, subsequently moving into the action stage. The model has been criticised for numerous reasons including a lack of qualitative distinctness of categories^{134 135}, the fact that that the approach assumes that individuals make stable plans¹³⁶

and that the Stages of Change algorithm systematically underestimates motivation to quit smoking relative to other measures^{137 138} and it has been suggested that a discrete 5-stage model does not fit reality well¹³⁹. Additionally, it has been suggested that far from being productive to advise smokers to plan a quit date in advance it may in some cases be counter-productive by pushing the decision to quit further into the future, an action which may be dangerous for ambivalent potential quitters¹⁴⁰.

Recent evidence from Canada¹⁴⁰, the US¹⁴¹ and the UK¹⁴² indicates that a substantial proportion of quit attempts are made spontaneously and are, therefore, not compatible with the Stages of Change concept. It has also been reported that unplanned quit attempts may be up to three times more likely to be successful for six months or more than planned ones¹⁴². West and Sohal¹⁴² suggest an alternative model to the stages of change approach which provides many of the underlying principles for traditional NHS SSS which is based on "catastrophe theory"¹⁴³. This model proposes that beliefs, past experiences and the current situation create varying levels of motivational tension which can lead to an attempt to quit smoking with small triggers.

The impact of these findings on helping people to stop smoking and the design of the NHS SSS has not yet been evaluated.

1.8 Summary

There is consistent evidence that smoking has huge economic and health costs and even though prevalence is decreasing, over one in five of the population still smoke, and a higher proportion in more deprived groups, so further research is needed to find new ways of tackling smoking and

encouraging cessation. Evidence suggests that primary care provides an ideal opportunity for the identification of smokers and, independently, that a proactive approach to smokers may be an effective way of increasing access to smoking cessation services. To date, however, limited research has been conducted in the UK as to the effectiveness of a proactive approach to identify smokers and no research has attempted to combine these two approaches. In addition, little attention has been paid to how smokers stop and the implications of the finding that a large proportion quit spontaneously, without prior planning.

1.9 Aims and Objectives

The overall aim of this thesis is to investigate novel approaches to providing smoking cessation support, initially focused on a proactive approach through primary care and then on the nature of unplanned quit attempts and how these may be supported.

Specifically, the objectives are:

- To establish the feasibility of identifying and reaching smokers in primary care by evaluating the completeness and accuracy of smoking status recording in primary care medical records, and the demand by these smokers for support to quit smoking (chapter 3).
- To test the effectiveness of a proactive approach to identifying smokers and offering smoking cessation support in primary care using a cluster randomised controlled trial (chapter 4)
- To determine the prevalence and characteristics of smokers who make unplanned quit attempts, and the type of support they currently use (chapter 5)
- To explore the factors surrounding the use of support in unplanned quit attempts (chapter 6)

The remaining part of the thesis is divided into individual chapters addressing the above four objectives. However, the following chapter, Chapter 2, details the methodology used in the subsequent two chapters (Chapter 3 & 4)

CHAPTER 2: TRIAL DESIGN AND METHODOLOGY

Chapter 2 describes the methods used to collect data presented in both chapters 3 and 4. Chapter 3 describes the completeness and accuracy of smoking status recorded in primary care, the data for which was collected as part of a cluster randomised trial discussed in chapter 4, investigating whether a systematic, proactive and personalised identification and invitation system can encourage smokers to use smoking cessation services to stop smoking.

2.1 Study design

To recruit practices, all 90 practices with list sizes of up to 10,000 patients in three Nottingham Primary Care Trust areas were written to requesting their participation in the study. Of those who agreed to participate (n=27), 24 practices were randomly selected (based on the power calculation for this study, see below) and allocated to either intervention or control groups by simple cluster randomisation. The use of cluster randomisation is common in general practice research¹⁴⁴ and although the use of this study design results in a loss of power due to variability between clusters¹⁴⁵, it avoids contamination of control groups through contact with those in treatment groups¹⁴⁶.

2.2 Sample size determination

With 12 practices in each treatment group, and expecting to recruit 500 smokers per practice and assuming an intra-cluster correlation coefficient of not more than 0.007¹⁴⁷, the study was designed to have 80% power to detect a change from a quit rate of 2.5% in the control group to 4% in the intervention group (an odds ratio of 1.625).

2.3 Identification of smokers from general practice records.

In both groups, practice records were used to identify all patients aged 18 years or over who were either recorded as smokers, or had no smoking status recorded. These patients were sent a short self-completion questionnaire (Appendix I) from the participating practice, with a covering letter (Appendix II) explaining that the practice was using the questionnaire to update medical records and for a research study aimed at helping smokers to quit in collaboration with the University of Nottingham. In accordance with the approval for the study given by the Nottingham Ethics Committee, respondents were asked to provide written consent for the information provided on the questionnaire to be seen by the research team.

The contents of the letters and questionnaires to patients in the intervention and control practices were identical to try to ensure that the initial contact with, and response from, participants was comparable between the two groups. The questionnaire elicited details of smoking status, which may have been missing or out of date on patient records¹⁴⁸, by asking respondents whether they had smoked any cigarettes or tobacco in the last 12 months, the frequency of smoking (every day, most days or occasionally) and number of cigarettes smoked per day (≤ 10 , 11-20, 21-30, 31-40, 41+). The questionnaire also asked current smokers whether they would like to speak to a smoking cessation advisor to receive help or advice to quit smoking, and if so, to provide telephone contact details so that a smoking cessation advisor could contact them. Respondents were given an option to receive postal information if they were not contactable

by telephone. All subjects were informed that this contact might happen after a short delay, as was the case for those in the control group.

For logistic reasons, and to minimise any seasonal affects, letters to patients in each practice were posted over a period of a few days for each practice, and in random order of practices over a 6 month period. The date of distribution of the initial letter was defined as *baseline* for each practice, with a reminder sent to any non-responders three weeks after baseline.

Completed questionnaires were returned directly to the practice and, if written consent had been given, collected by the research team and photocopied with a copy being returned to the practice to enable the clinical team to update smoking status on the medical record.

These questionnaires collected at baseline were analysed to assess the completeness and accuracy with which smoking status is recorded in general practice, the results of which are detailed in Chapter 3.

2.4 Trial study population

The completed questionnaires were used to identify those who were current smokers (smoke every day, most days or occasionally and have smoked within the last 7 days) at baseline and these individuals formed the study population for the trial. Completed questionnaires were used, with data provided from practice databases, to estimate the prevalence of smoking at baseline.

2.5 Estimation of numbers of smokers

Since smoking status in primary care records is incomplete and can be inaccurate¹⁴⁸, the number of true current smokers in intervention and

control practices at baseline was estimated using the responses to the baseline questionnaire, and these estimates used in turn as the denominators to estimate the response rates in our study. The number of true current smokers in each practice was estimated by calculating the proportion of those documented to be smokers in medical records, and of those with no recorded smoking status, who confirmed in the baseline questionnaire that they were current smokers, and applying these proportions to the total number of documented smokers and those with no smoking status in each practice. The estimated number of true current smokers, therefore, uses questionnaire responses as a 'gold standard' for current smoking status and corrects for the fact that smoking status recorded in medical records becomes inaccurate with time elapsing after this is ascertained as some smokers tend to stop smoking as they age.

2.6 Intervention

All smokers in the intervention group who indicated that they would like help or advice to quit smoking were contacted by the research team, who had undertaken the same basic training as that of NHS stop smoking advisors and all calls followed a similar format (Appendix III) but in summary: patients were asked if they were still interested in stopping smoking and if so, were given brief advice on smoking cessation in accordance with evidence-based guidelines⁵⁶. They were also given information about their local NHS SSS-clinic locations, times and format (one to one or group) and the benefits this could offer. If desired, an appointment with the NHS SSS was booked by the research team on their behalf, and if not, smokers were given the option of being sent an information pack about the local service. The information pack included an information leaflet from the service, encouragement to the smoker to use

the service, and contact details for the research team and the local NHS SSS for further information or to book an appointment. Smokers who were not contactable by telephone were sent the postal information pack detailed above. These contacts were made within 8 weeks of baseline for each practice.

Smokers who attended the local NHS SSS will have received an initial consultation with a trained advisor and offered the standard range of evidence-based smoking cessation interventions offered by services throughout England⁵⁷, including the option of one-to-one or group behavioural support lasting an average of 8 weeks, and nicotine replacement, bupropion or varenicline therapy, depending on the preferences and needs of the smoker. At the initial consultation, smokers are asked to provide their age, sex, ethnicity, postcode and employment status. They are also asked a series of questions about their smoking behaviour, including amount smoked, reasons for smoking, number of previous quit attempts and motivation to quit. The SSS advisors routinely record whether the smoker sets a quit date while using the local NHS SSS, and smoking status at 4 weeks after the quit date. These data, which are routinely collected by the NHS SSS, were provided to the research team in an anonymised form, for clients who used the service in the period of the study and for the same period of the previous year (June to December) to determine whether the intervention had altered the characteristics of service attendees.

2.7 Control

For six months from baseline, smokers in the control practices received no further intervention other than that provided by usual care. Previous

studies suggest that in most cases, this will have amounted to little or no advice or support being given¹⁴⁹.

2.8 Follow up

Seven months after baseline, and at least six months after the research team contacted smokers from each intervention practice, a follow up questionnaire (Appendix IV) and accompanying letter (Appendix V) was sent to all who had reported being current smokers at baseline and who gave consent for their information to be used by the research team, excluding any who had died during the seven months. This questionnaire repeated baseline questions and also asked about current desire to quit, the number of quit attempts made and the number of attempts that had lasted more than 24 hours, receipt of smoking cessation advice, and any use of any smoking cessation service over the previous six months. Any non-responders were sent a reminder after 3 weeks, and those who did not reply at follow up were presumed to be continuing to smoke in accordance with the suggested 'Russell Standard'¹⁵⁰. Respondents who indicated that they were abstinent at six months were asked when they stopped, and to consent to further contact with the research team to validate this. After the follow-up measurements were complete, smokers in the control group who indicated that they would like help or advice to stop smoking were contacted directly by the local NHS SSS to offer specialist cessation support.

2.9 Biochemical validation of smoking status

The validation of smoking status is important when evaluating the effectiveness of a smoking cessation intervention¹⁵¹. Validation in this

study involved respondents providing either a sample of saliva for cotinine estimation (a metabolite of nicotine) or, in the case of those reporting use of nicotine replacement therapy, exhaled air carbon monoxide (CO) measurement in line with the 'Russell standard'¹⁵⁰. The use of saliva cotinine validation was selected as it has a relatively long half life when compared to exhaled carbon monoxide and is non-invasive and easily collected when compared to serum and urine¹⁵¹. Those consenting to provide samples were given the option of a visit from the research team at home or work, or attending Nottingham City Hospital for sample collection. Up to six attempts were made to contact these individuals at different times of the day. Individuals providing a saliva sample were asked to chew on the cotton wool roll from a Salivette collection device (Sarstedt AG & Co, Germany) until it was saturated, then place into the salivette. Saliva cotinine concentrations were measured by enzyme-linked immunosorbent assay (ELISA) (Salimetrics, PA, USA). Non smokers were defined as those with a salivary cotinine level below 15ng/ml¹⁵² or, if using NRT, an exhaled carbon monoxide level below 10ppm¹⁵³.

2.10 Calculation of the Townsend Material Deprivation Index score

The Townsend Material Deprivation Index was used as an estimate of social deprivation¹⁵⁴ and is based on the following four 1991 Census variables¹⁵⁵:

1. Unemployment: unemployed residents over 16 years as a percentage of all economically active residents aged over 16
2. Overcrowding: households with one and over person per room as a percentage of all households
3. Non car ownership: households with no car as a percentage of all households

4. Non home ownership: households not owning their own home as a percentage of all households

The percentage produced for unemployment and overcrowding are transformed using the natural log function and each of the variables are then standardised using Z scores (observed value – mean value divided by the standard deviation) using the mean and standard deviation for the whole area. The resulting Z scores are added together to produce the Townsend Index score.

Townsend Material Deprivation Index scores have been found to explain variations in health measures and adhere closely to the concept of material disadvantage¹⁵⁶. Townsend scores were divided into quintiles for the purpose of data analysis.

***CHAPTER 3: ASCERTAINMENT OF SMOKING STATUS IN
PRIMARY CARE AND SMOKERS REQUIREMENTS FOR
SUPPORT TO QUIT***

3.1 INTRODUCTION

Previous research, discussed in Chapter 1, identified the use of primary care medical records as being a potential avenue for identifying and proactively contacting smokers in the population. This chapter therefore focuses on ascertaining whether primary care records concerning smoking status are accurate, and also whether smokers are receptive to receiving smoking cessation advice if offered.

Well established clinical guidelines in both the US¹⁵⁷ and UK⁵⁶ recommend that systematic recording of smoking status and intervention to promote cessation in all smokers is highly cost-effective and should be a fundamental component of all health care provision. Previous studies indicate, however, that the recording of smoking status in primary care medical records is often inaccurate^{148 158} and that it is probably updated infrequently^{148 158}. This potentially limits the utility of smoking status recorded in patients' medical records for either clinical practice or for determining smoking prevalence within practices^{148 158}. Following the introduction of the QOF (discussed in section 1.5.3), the frequency with which GPs ascertain patients' smoking status has increased¹²², therefore the completeness and accuracy of smoking status data in such records may have improved.

This chapter, therefore, aims to establish the completeness and accuracy of smoking status recording in patients' primary care medical records by comparing computerised medical records and responses to a questionnaire

asking about smoking behaviour one year after the introduction of the QOF. It will also assess the level of interest in receiving smoking cessation support amongst primary care patients in an inner city UK population and determine how this varies with their socio-demographic characteristics.

3.2 METHODS

Smokers were identified and questionnaire data collected as detailed in Chapter 2, "Trial Design and Methodology".

3.2.1 Primary outcomes

Primary outcomes were the completeness and accuracy of smoking status recording in primary care records and interest of smokers in receiving smoking cessation support.

3.2.2 Data analysis

Questionnaire data were entered into SPSS Version 14. Townsend scores based on patient's postcodes were calculated as previously described.

The proportion of patients with a smoking status recorded was calculated from medical records and the proportions of recorded smokers who were misclassified as smokers and of self-reported smokers with no record of this in their medical records were calculated by comparing medical records with questionnaire responses. The proportion of smokers wanting to speak to an advisor was calculated from questionnaire responses. These variables were calculated at the practice level, and presented as the median and range because the distributions of some of these data were skewed.

The correlation between the proportion of patients at each practice with a recorded smoking status and the proportion misclassified as smokers was assessed using Spearman rank correlation coefficients, to determine whether better apparent recording of smoking status was associated with increased misclassification. The effect of individual characteristics such as age, sex and Townsend Index on whether individuals responded to the questionnaire, were misclassified as smokers, and whether smokers wanted help to quit, was analysed at the individual level using logistic regression, and robust standard errors to allow for clustering by practice using STATA release 9.0; STATA Corp., College Station, TX.

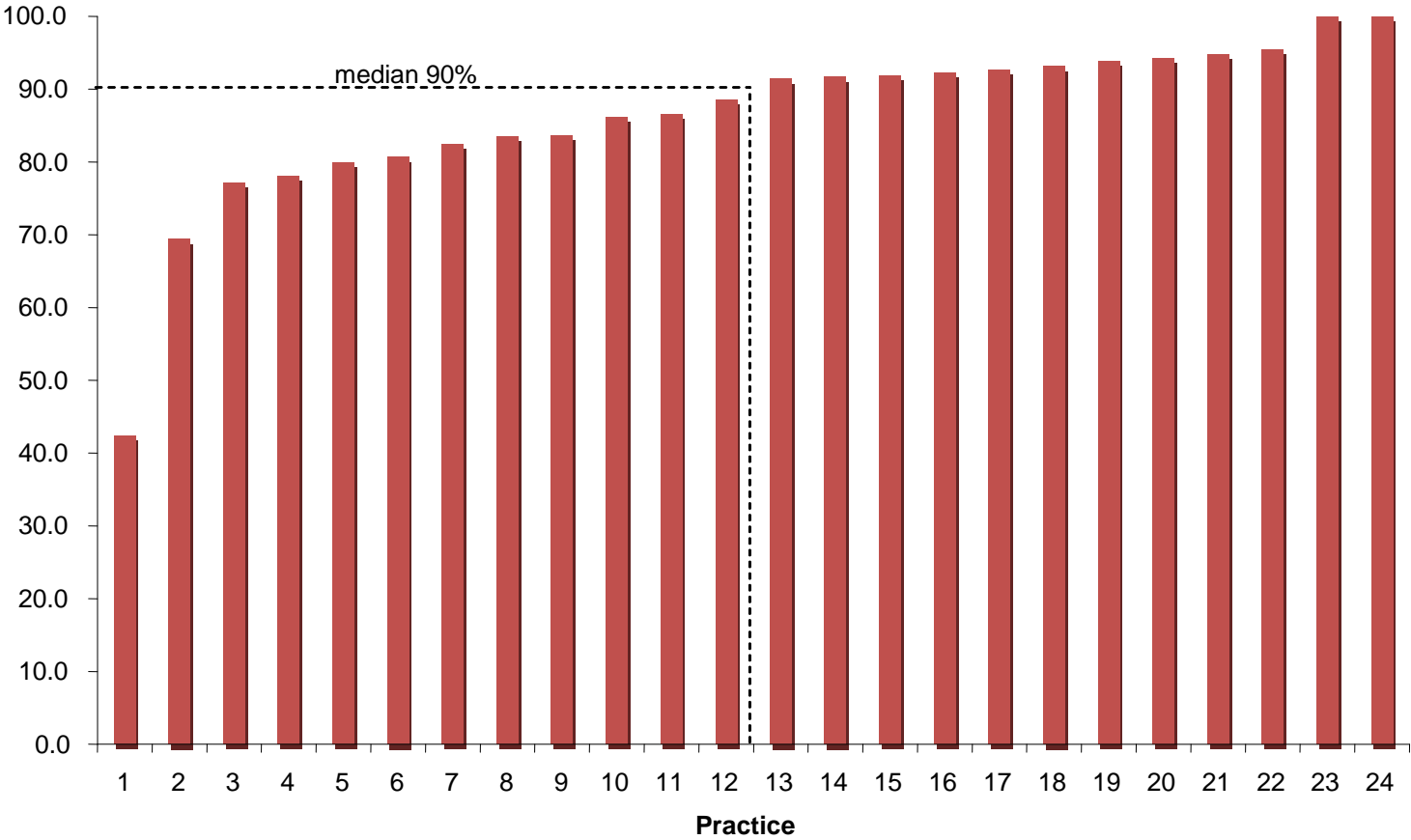
3.3 RESULTS

3.3.1 Recording of smoking status and response to the questionnaire

Within the 24 participating general practices there were 87,861 patients aged 18 or over, of whom 23,044 were recorded as smokers, 52,629 as non-smokers and 12,188 had no record of smoking status in their medical records. The proportion of patients with smoking status recorded varied between practices from 42.4% to 100% (median 90.0%, Figure 2).

Figure 2: Cumulative distribution of the percentage of patients in a practice with a smoking status recorded

Cumulative percentage with a smoking status recorded



35,232 questionnaires were dispatched to general practices' patients recorded as smokers and also to those with no smoking status recorded. The proportions of patients returning the questionnaire and giving signed consent for their information to be shared with the research team varied between practices from 13.9% to 41.1% (median 33.2%). Respondents recorded as smokers in their medical records were more likely to respond than those with no smoking status recorded [35.5% (8176/23044) and 24.2% (2951/12188) respectively], and males and younger patients were less likely to respond to the questionnaire (Table 5).

Table 5: Questionnaire response rates and numbers of self-reported smokers

	NUMBER SENT	NUMBER (%) RETURNED	NUMBER OF SELF-REPORTED CURRENT SMOKERS
TOTAL	35232	11127 (31.6)	6856
Practice median (range)	1312 (432-2985)	33.2% (13.9-41.4%)	258 (52-766)
SMOKER	23044	8176 (35.5)	5943
NO STATUS	12188	2951 (24.2)	913
MALE	20040	5839 (29.1)	3515
FEMALE	15192	5288 (34.8)	3340
AGE			
<=30	9965	2161 (21.7)	1344
31-40	8176	2187 (26.7)	1430
41-50	6635	2205 (33.2)	1440
51-60	5007	2052 (41.0)	1305
61+	5449	2522 (46.3)	1337

The proportion of responding patients who were recorded as smokers on practices' clinical information systems but who denied tobacco use in the previous 12 months varied between 6.3% and 58.1% across practices (median 20.3%). Across all practices, there was no correlation between the proportions of patients with a smoking status recorded and the proportions of patients who were recorded as smokers but denied tobacco use in the previous 12 months (Spearman's $r = -0.14$). The proportion of patients with no record of smoking

status who, as defined by questionnaire responses, were self reported current smokers varied from 5.7% to 60.2% across practices (median 29.8%).

The proportion of patients misclassified as smokers in their medical record was unrelated to gender, but did vary with age. In those aged 30 or below, 13.1% of patients recorded as smokers in their medical record reported not smoking in the past year on questionnaires and this increased to 31.7% in those aged over 61.

3.3.2 Smokers' interest in support to stop smoking

Of the 6856 respondents who were current smokers, 2840 (41.4%) indicated that they would like to speak to a specialist smoking cessation advisor to help them stop smoking (Table 6). This varied between practices from 30.6% and 51.8% (median 39.8%). Individuals who were previously recorded as smokers tended to be more likely to want to speak to a cessation adviser than those who previously had no smoking status recorded (42.7% and 33.4% respectively).

Interest in support did not vary with gender (40.7% and 42.2%, for men and women respectively, $p=0.20$) but did vary with age and economic disadvantage. Those aged between 31 and 50 were most likely to want to speak to an advisor and the oldest and youngest age groups were least likely to desire this (33.4% and 34.1% respectively) and this effect was significant overall ($p<0.01$). Smokers' reported desire to talk with smoking cessation advisors increased linearly with economic disadvantage (measured by Townsend index) such that demand for support was highest (44.6%) from the most disadvantaged and lowest (39.1%) from the least socially disadvantaged groups although this was not significant ($p=0.20$) (Table 6).

Table 6: Number of current smokers who would like support to quit smoking

	Number of smokers who responded	Number who wanted help to quit	%	Adjusted odds ratios (95% CI)	P value
Total	6856	2840	41.4		
Males	3516	1430	40.7	1	0.20
Females	3340	1410	42.2	1.07 (.97-1.17)	
AGE					
<=30	1344	447	33.4	1	<0.01
31-40	1430	674	47.1	1.82 (1.55-2.13)	
41-50	1440	680	47.2	1.83 (1.45-2.31)	
51-60	1305	583	44.7	1.63 (1.34-1.99)	
61+	1337	456	34.1	1.05 (.89-1.25)	
Townsend quintile 1	1373	537	39.1	1	0.20
Townsend quintile 2	1343	530	39.5	1.00 (.81-1.23)	
Townsend quintile 3	1335	552	41.3	1.09 (.93-1.29)	
Townsend quintile 4	1362	576	42.3	1.12 (.89-1.40)	
Townsend quintile 5	1354	604	44.6	1.26 (1.01-1.56)	

*Townsend quintile 1 (least deprived) = ≤ -1.60

*Townsend quintile 2 = -1.60 to -0.49

*Townsend quintile 3 = -0.49 to 3.03

*Townsend quintile 4 = 3.03 to 5.09

*Townsend quintile 5 (most deprived) = 5.09 +

**Townsend data for 84 consenting smokers was unavailable

3.4 DISCUSSION

3.4.1 Main findings

Practices in this study had a recording of smoking status in the primary care medical record for, on average, 90% of registered patients, but this was probably not accurate in about 20% of cases. Additionally, among smokers who responded to questionnaires sent from their general practitioners, over 41% were interested in talking to a smoking cessation advisor to obtain support with stopping smoking and interest was highest amongst the most economically deprived smokers. The findings of this study indicate that although the ascertainment of smoking status in primary care is apparently high, these data are relatively inaccurate and more regular updating of smoking status records might increase the numbers of opportunities which health professionals use to intervene and promote smoking cessation.

Although 41% of smokers who responded to the questionnaire reported that they would like to speak to a smoking cessation advisor, this figure is almost certainly an overestimate of the true proportion. If it were conservatively presumed that all those who wanted help to quit responded then the true denominator would be all current smokers who were sent a questionnaire, which, based on the accuracy of smoking status recording found in our study, may be estimated to be 20,521, reducing the proportion wanting to speak to an adviser to 13.8%. Nevertheless, between April 2007 and March 2008 over 680,000 smokers set quit dates using English NHS SSS⁶ and as this represents less than 10% of English smokers, our findings suggest that there is considerable interest in speaking to cessation advisors, and potentially receiving cessation support amongst smokers that is not currently translated into their use of NHS stop smoking services.

The challenge for the UK NHS is to find ways of engaging smokers who are interested in talking to smoking cessation advisors and receiving support with stopping smoking and encouraging them to access such support. In particular, these results throw into question the reluctance of many GPs to raise the topic of smoking due to concern of negative responses from their patients⁸³ and suggests that this attitude results in missed opportunities to provide help and advice to smokers who would welcome this. The findings here suggest that the most economically disadvantaged smokers who suffer from the greatest smoking-related morbidity³³ are also the most interested in receiving support. It is important to ensure that this group is appropriately assisted, possibly by using novel methods of 'marketing' NHS SSS to this group.

3.4.2 Strengths and limitations

To our knowledge, this study is the first to systematically contact large numbers of smokers living in a large, relatively-deprived urban area and ascertain their interest in engaging with smoking cessation support. This systematic approach within a defined population allows estimates of smokers' desire for support with smoking cessation to be made.

The limitations of the study include the fact that participation was relatively low, which is likely to be partly attributable to inaccuracies in addresses on practices' registers. In addition, ethical constraints dictated that the research team obtained signed consent from questionnaire respondents before their data could be used for research purposes. As not all respondents gave their consent for their information to be used in this way, this will have lowered the response rate.

The findings reported rely on self reported smoking status, which may be a potential limitation of the study. However, it has been assumed that the smoking status reported by questionnaire respondents was reliable, since questionnaire data obtained by similar means in previous studies^{148 158} have been found to be accurate¹⁵⁹, and informing recipients that their responses would be used to update their medical records should, if anything, have improved the validity of responses. In addition, the figures reported here for the accuracy of smoking status recording in general practice use only the self-reported prevalence of current smokers compared with medical records and did not investigate the accuracy of registered non-smokers with self-reported data. However, as 90% of adult smokers start smoking before the age of 18¹⁶⁰, it is unlikely that many recorded non smokers would have taken up smoking since this was recorded, therefore having a minimal effect on the results presented here.

It is also possible that there may have been selection bias in the practices that took part, as only 30% of those approached agreed to take part in the study. For example, they may have had a greater interest in smoking cessation than others meaning that they may have had a greater likelihood of maintaining up to date records on smoking status.

3.4.3 Comparison with previous research

The proportion of primary care patients in these inner city practices whose records included a note of smoking status (median 90%) was higher than in previous studies (73.4% and 76%)^{148 158} and this more comprehensive recording could be due to the introduction of the 2004 general practice contract (discussed in section 1.5.3) which has increased rates of smoking status ascertainment¹²².

However, no data from study practices during the period before the contract was introduced was available to compare the findings of this study with and recording rates may be higher for other reasons. Higher rates of smoking status recording amongst women and older people have been observed previously¹⁴⁸, and are probably influenced by these patients' higher general practice consultation rates¹⁶¹.

Nevertheless, across practices, an average of 20% of individuals recorded in their medical records as smokers were not currently smoking; whilst this may be an overestimate of the true figure for our study population if smokers who had successfully quit were more likely to return the questionnaire, it is also possible that offering support to stop smoking may have encouraged more current smokers to return the questionnaire. This level of accuracy of recorded smoking status is no better than that found in earlier studies. In the late 1990s, Wilson et al¹⁴⁸ found that around 18% of patients recorded as smokers in general practice medical records reported in postal questionnaires that they were not. The rate reported here is very similar, and moreover, we found a large variation between practices in the proportion of smokers who were misclassified such that in one practice this reached 58.1%. It was also observed that the proportion misclassified as smokers increases with age, suggesting that once patients' smoking status has been ascertained, it is not routinely updated, so that the accuracy of this information reduces as time passes. A previous study found that although 99% of GPs record smoking status when patients first join their practices, only 57% claim to routinely update this information⁵⁶ and the findings reported here may reflect this. Nevertheless, no correlation was found between the level of recording and misclassification suggesting that high ascertainment of smoking status among practices in this sample was not necessarily at the expense of accuracy, and that both may be achieved.

3.4.4 Conclusions

Data on smoking status recorded in patients' primary care medical records were found to contain inaccuracies which reduce its utility for either effective health planning or research purposes. A significant minority of smokers are interested in talking to smoking cessation advisors about receiving support and help with stopping smoking. Currently a very much smaller proportion than this is actually trying to stop smoking with the support of NHS stop smoking services.

***CHAPTER 4: THE EFFECT OF PROACTIVELY IDENTIFYING
SMOKERS AND OFFERING SMOKING CESSATION SUPPORT
IN PRIMARY CARE POPULATIONS: A CLUSTER RANDOMISED
TRIAL***

4.1 INTRODUCTION

As previous research has identified the use of primary care medical records as a potential avenue for identifying and proactively contacting smokers in the population, this chapter tests the effectiveness of such an approach to identifying smokers and offering smoking cessation support in primary care using a cluster randomised controlled trial.

The aim was to determine whether proactively identifying all smokers in a primary care population, followed by personal contact giving advice and information about local cessation services increases abstinence from smoking, increases access to and uptake of NHS stop smoking services, changes smoking and quitting behaviour and/or changes the characteristics of NHS SSS attendees.

4.2 METHODS

Trial participants, the intervention and follow up procedure are detailed in Chapter 2, "Trial Design and Methodology".

4.2.1 Primary Outcomes

The primary outcome was 7-day validated point abstinence from smoking at the 6 month follow-up. Validated point abstinence from smoking at 6 months was used rather than sustained abstinence over the 6 months period. Although sustained abstinence would have been a better indicator of likelihood to stay stopped and in line with the 'Russell Standard'¹⁵⁰, point abstinence was the only feasible outcome in this community-based study. All non-responders, and those who did not provide a validation sample at 6 months, were assumed to be still smoking in accordance with the suggested 'Russell Standard'¹⁵⁰.

4.2.2 Secondary Outcomes

Secondary outcomes included self-reported abstinence for the past seven days at 6 months calculated for all those reported as smokers at baseline as it was likely that a proportion of those who reported having quit smoking would be unable or unwilling to provide a saliva sample for biochemical validation of smoking status. The proportion of smokers who reported using the local NHS SSS or receiving smoking cessation advice, calculated for those who responded at 6 months was used to evaluate whether the intervention had increased smokers' receipt (or recollection of receipt) of smoking cessation advice and support.

In those who were still smoking at 6 months, the proportion of people who reported a desire to quit and had made at least one quit attempt lasting more than 24 hours was calculated to see if the intervention had had any effect on smokers' desire to or efforts to try and quit. In those who were still smoking, a lower category of cigarette consumption at follow-up was taken as representing reduced cigarette consumption. Townsend scores based on patient's postcodes were used to adjust for socio-economic status.

4.2.3 Data analysis

Since smoking status in primary care records is incomplete and can be inaccurate¹⁶², we estimated the number of true current smokers in intervention and control practices at baseline using the responses to the baseline questionnaire (the method for this calculation has been previously described in section 2.5), and used these estimates in turn as the denominators to estimate the response rates in our study. For each primary and secondary outcome, we calculated the percentage of positive responses for each practice and compared the means of these percentages between intervention and control practices by an independent samples t-test, having first checked the normality of the distribution of percentages.

To obtain odds ratios comparing abstinence from smoking, receipt of smoking cessation advice and quitting behaviour between intervention and control practices and to adjust for apparent baseline differences between practices, we used logistic regression in MLWin Version 2.02¹⁶³. We used a two-level hierarchical model with subjects nested within practices, a random effect of practice, intervention fitted at the practice level. Age, sex, Townsend Score and amount smoked per day were included as a priori confounders at the subject level. With 12 practices in each treatment group, and expecting to recruit 500

smokers per practice and assuming an intra-cluster correlation coefficient of not more than 0.007¹⁴⁷, the study was designed to have 80% power to detect a change from a quit rate of 2.5% in the control group to 4% in the intervention group (an odds ratio of 1.625).

Characteristics of service attendees between the period of the study and the same months in the previous year were compared by an independent samples t-test, Mann-Whitney U test for non-normally distributed data, or chi-squared test for categorical data to assess whether the intervention influenced the characteristics of smokers using smoking cessation services. A post hoc subgroup analysis of validated and self-reported abstinence at 6 month follow-up in those who responded to the initial questionnaire that they wanted help or advice from a smoking cessation adviser.

4.3 RESULTS

4.3.1 Characteristics of intervention and control practices

In intervention and control practices, there were 10,402 and 12,642 patients respectively aged 18 or over recorded as smokers, and 6523 and 5665 with no record of smoking status in their medical records. We estimate the total number of true current smokers in intervention and control practices at baseline to have been 10,177 and 11,783 respectively, of whom 3051 (30%) and 3805 (32%) respectively (total 6856) participated in our study (Table 7). The distribution of gender and age was similar for participants in intervention and control practices (Table 7). Townsend Scores were slightly higher (implying greater relative deprivation), and cigarette consumption also higher, for participants in intervention practices. A similar proportion of smokers in intervention and control practices requested help with quitting smoking (mean 40.6% (range 30.6 to 51.8) and 41.6% (range 36.4 to 50.2) respectively). Of those requesting help from intervention practices, 67% received telephone contact from the research team. The remaining 33% were sent postal information, either on their request (12%) or because they were un-contactable by telephone (21%).

Table 7: Characteristics of the intervention and control practices and participants at baseline

	Intervention		Control	
	Individual (%)	Mean per practice (range)	Individual (%)	Mean per practice (range)
Estimated number of eligible individuals (smokers aged 18 or over)	10,177	848 (307,1834)	11,783	982 (312,2070)
Number of participants	3051 (30.0)	254 (52,529)	3805 (32.3)	317 (53,766)
Age				
18-39	1082 (35.5)	36.6	1510 (39.7)	39.7
40-59	1276 (41.8)	41.5	1536 (40.4)	40.3
60+	693 (22.7)	21.9	759 (19.9)	20.1
Mean age	46.6	46.1 (39.2 to 49.4)	45.0	44.9 (39.2 to 48.8)
Gender				
Male	1584 (51.9)	54.9 (43.5 to 69.2)	1932 (50.8)	51.5 (47.1 to 58.5)
Female	1467 (48.1)		1873 (49.2)	
Townsend Score				
≤ - 1.6 (least deprived)	430 (14.3)		943 (25.0)	
-1.599 to 0.497	451 (15.0)		892 (23.7)	
0.498 to 3.037	550 (18.3)		785 (20.8)	
3.038 to 5.098	752 (25.1)		610 (16.2)	
≥ 5.099 (most deprived)	816 (27.2)		538 (14.3)	
Missing	52		37	
Mean Townsend	2.71 (3.39)	2.73 (-0.42 to 5.14)	1.05 (3.35)	1.43 (-1.24 to 5.49)
Cigarettes/day				
<10	944 (30.9)		1382 (36.3)	
11-20	1357 (44.5)		1507 (39.6)	
21-30	422 (13.8)		545 (14.3)	
31-40	98 (3.2)		125 (3.3)	
41+	33 (1.1)		26 (0.7)	
No response	197 (6.5)		220 (5.8)	

Of the 6856 participants at baseline, 3512 provided follow up questionnaire data at six months. This proportion was similar in intervention and control practices, the mean response being 47.9% (range 28.8 to 55.6) and 53.7% (range 39.6 to 63.3) respectively. Of those smokers who reported that they had quit smoking, the proportion consenting for further contact for validation was similar between intervention and control groups (58.3% and 56.2% respectively), but a higher proportion of these individuals in control practices (73.5%) than in the intervention group (56.7%) proved either to be not contactable or else subsequently refused to provide a sample.

4.3.2 Abstinence from smoking at 6 month follow up

There was no significant difference in self-reported point abstinence from smoking at 6 months in intervention and control groups (8.6% and 7.4% respectively), either before or after adjusting for age, sex, Townsend score and amount smoked at baseline (Table 8). Of those who had quit by self-report, 41.0% and 30.6% were respectively confirmed as non-smokers by salivary cotinine or exhaled carbon monoxide validation. The prevalence of validated point abstinence from smoking at 6 months was 3.5% and 2.5% in the intervention and control groups respectively, and the difference between them was not statistically significant different, either before or after adjustment for age, sex, Townsend Score and amount smoked (adjusted OR 1.64, 95% CI 0.92, 2.89). There was no evidence of interaction between the effect of the intervention and Townsend score or cigarette consumption at baseline.

Table 8: Effect of intervention versus control on main outcomes in all smokers responding at baseline

	Intervention	Control	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
Of all smokers participating at baseline	Mean % per practice (range)	Mean % per practice (range)		
Self-reported smoking abstinence (last 7 days) at 6 months †	8.6 (5 to 14.4)	7.4 (2.3 to 12.1)	1.20 (0.86 to 1.69)	1.23 (0.90 to 1.67)
Validated smoking abstinence at 6 months †	3.5 (1.9-6.4)	2.5 (0-5.4)	1.60 (0.89 to 2.87)	1.64 (0.92 to 2.89)

† those who did not respond at 6 months presumed to be continuing to smoke

*adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline

4.3.3 Receipt of smoking cessation advice and use of NHS stop smoking services

A significantly higher percentage of participants in the intervention than in the control group reported that they had used the local stop smoking service during the period of the study (16.6% and 8.9% respectively), or had received advice on quitting from any source (29.3% and 21.8% respectively). Some respondents indicated that they had tried to see an advisor from the local NHS SSS but were unable to make an appointment (Table 9). An average of 17.9% of those in the intervention practices and 10.5% of those in the control practices either used, or tried to make an appointment with, the local NHS SSS during the course of the study.

Table 9: Effect of intervention versus control on main outcomes in all responders at 6 months

Of all those responding at 6 months	Intervention Mean % per practice (range)	Control Mean % per practice (range)	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
Overall	125 (15 to 277)	167 (26 to 415)		
Used local smoking cessation service	16.6 (11.6 to 22.4)	8.9 (4.9 to 13.8)	2.11 (1.61 to 2.76)	2.09 (1.57 to 2.78)
Given advice on quitting from any source	29.3 (13.3 to 38.6)	21.8 (15.3 to 38.5)	1.72 (1.38 to 2.16)	1.68 (1.36 to 2.07)

*adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline

4.3.4 Smoking and quitting behaviour amongst those continuing to smoke at 6 month follow up

Among continuing smokers at follow-up, those in the intervention group were slightly more likely to have made a quit attempt during the course of the study (adjusted OR 1.23, 95% CI 1.01 to 1.51), although these attempts were no more likely to have lasted more than 24 hours than those in the control practices. Smokers in intervention practices were no more likely to have reduced their cigarette consumption over the 6 months, and were less likely to want to quit at follow up than their counterparts in the control practices (adjusted OR 0.80, 95% CI 0.67 to 0.94) (Table 10).

Table 10: Effect of intervention versus control on main outcomes in continuing smokers at 6 months

Of current smokers responding at 6 months	Intervention N per practice Mean 102 Range 12,210	Control N per practice Mean 143 Range 24,345	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
Reduced cigarette consumption	14.3 (7.3 to 22.0)	13.9 (4.2 to 18.0)	1.12 (0.89 to 1.41)	1.10** (0.86 to 1.40)
Want to quit	62.7% (57.6 to 75.0)	67.3% (59.7 to 75.0)	0.83 (0.70 to 0.98)	0.80 (0.67 to 0.94)
Tried to quit in last 6 months	37.4% (26.8 to 47.5)	33.3% (25.0 to 41.2)	1.22 (1.01 to 1.50)	1.23 (1.01 to 1.51)
At least one attempt lasting 24hrs or more	28.2% (19.0 to 39.0)	27.4% (21.4 to 36.0)	1.12 (0.94 to 1.39)	1.14 (0.92 to 1.42)

*adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline

** adjusted for age, gender, quintiles of Townsend score only (for model convergence).

4.3.5 Characteristics of NHS stop smoking service users

More people attended the local NHS SSS during the period of the study than in the equivalent period of the previous year (Table 11). There was also a notable difference in the proportion of attendees who set a quit date, which at 66.4% in the study period was significantly lower than the 73.1% in the previous year (Table 11). There was a significant increase in the proportion of non-white Caucasian clients attending the local NHS SSS in the year of the study as compared with the previous year, but no difference in socio-economic status.

Table 11: Characteristics of service users during the study period, and for the preceding year

	Year before study (2004)	Year of study (2005)	p value
Number of users	3468	4148	
Mean age (yrs) (n=7616)	43.1 (12 to 88)	41.9 (11 to 90)	<0.001
Mean Townsend score (n=7141)	1.75 (-5.770 to 9.070)	1.69 (-6.510 to 9.070)	0.491
Gender % Male (n=7616)	41.2	43.0	0.122
Ethnicity % White Caucasian (n=7423)	93.4	91.7	0.007
% Set quit date (n=7616)	73.1	66.4	<0.001
% Quit at 4 weeks (n=7616)*	41.8	40.9	0.442
<i>Median (range) motivation to quit score (n=5976)</i>	9.0 (1 to10)	9.0 (1 to 10)	0.096

*Clients lost to follow up assumed to be continuing to smoke at 4 weeks

4.3.6 Post-hoc analysis in the subgroup of smokers who wanted to speak to a smoking cessation advisor

In those smokers who indicated at baseline that they would like to speak to a smoking cessation advisor (n = 1289 and 1551 in the intervention and control practices respectively), the response rate at 6 month follow-up was comparable with that for the complete study population. Validated quit rates were significantly higher in the intervention group than control (4.0% and 2.2% respectively), although the difference in self-reported abstinence was not statistically significant (Table 12).

Table 12: Effect of intervention versus control on main outcomes in those smokers who indicated they would like speak to a smoking cessation advisor at baseline

	Intervention	Control	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
Of all smokers who indicated they would like to speak to a smoking cessation advisor at baseline	Mean % per practice (range)	Mean % per practice (range)		
Self-reported smoking abstinence (last 7 days) at 6 months †	7.5 (2.3-13.0)	5.9 (2.5-9.5)	1.35 (0.97 to 1.87)	1.37 (0.99 to 1.90)
Validated smoking abstinence at 6 months †	4.0 (0-10.0)	2.2 (0-4.0)	1.96 (1.08 to 3.58)	2.05 (1.11 to 3.76)

*adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline

4.4 DISCUSSION

4.4.1 Main findings

This study aimed to proactively identify smokers in Primary Care and offer help or advice about smoking cessation, which for those who requested it, included information about and referral to a range of evidence-based cessation support available through the UK NHS SSS. The intervention increased the proportion of smokers reporting attendance at the local NHS SSS and had a modest effect on the number of quit attempts made, but at the population level had no significant impact on actual quit rates or reported cigarette consumption.

Smokers in the intervention group were more likely to have received advice on smoking cessation from any source during the period of study. It is surprising that this proportion for the intervention group is only 29%, since advice was provided by phone or letter for the 40% who requested help or advice. This discrepancy is likely to be the result of poor recall of advice, or misunderstanding of what we meant by receiving advice from 'any source'. It is notable that smokers in the intervention group were less likely to want to quit at the end of the study than those in the control group, but this is most likely to be explained by their being more likely to have made a recent (unsuccessful) quit attempt.

Smokers in the intervention group reported a significantly higher use of NHS SSS and there was an increase in service usage during the period of our study. Whilst we cannot be sure that this increase was due to this study rather than other initiatives, it would be consistent with the intervention being effective in increasing the number of smokers contacting the service. When comparing the characteristics of those attending the local SSS during the course of this study with a similar time period in the previous year, little evidence was found of a

difference in socio-demographic characteristics, but service users in the period of our study were less motivated to quit and less likely to set a quit date than those attending in the previous year. It is possible that by proactively offering smoking cessation support, we encouraged a group of smokers to access NHS SSS who were perhaps not as ready or motivated to quit as previous service users. Though this study was based in Nottinghamshire, a relatively deprived population, the local NHS SSS provides a standard range of evidence-based smoking cessation interventions with group or individual support at flexible times and locations which is typical of services available nationally⁹³, and as such these results are likely to be generalisable to deprived populations and NHS cessation services across the country.

The study was designed to detect a 1.5 percentage point difference in cessation between active and control groups based on recruiting 500 smokers per practice. This sample size was not achieved in a number of practices, and it remains possible that a true effect on cessation rates of this magnitude or smaller was missed. The observed difference in quit rates attributable to the intervention was between 1 and 1.5% in all smokers, which though not statistically significant in this study, is potentially important in public health terms.

The primary analysis compared smoking cessation at follow-up between all smokers in intervention and control practices, whether or not they asked for help or advice from a smoking cessation adviser. This approach was adopted to establish the public health impact of the intervention which encompassed a proactive approach to all smokers, but then targeted help to those who requested it. Although the study did not show a significant effect of the intervention on smoking cessation in the whole study population, there was post hoc evidence of a greater effect in the subgroup who requested help or advice from the smoking cessation advisor, with validated smoking abstinence increased two fold in the

intervention compared to the control group (adjusted OR 2.05 (95% CI 1.11, 3.76)). This suggests that, whilst a pro-active approach to smokers in general may have no more than a small but limited impact on cessation rates in the smoking population, an intervention which successfully targets smokers who want help to quit, with pro-active provision of evidence-based smoking cessation support to these individuals, may be more effective.

4.4.2 Comparison with previous research

The previous UK study which has taken a proactive approach to offering smoking cessation¹²⁸ which followed up 120 smokers recruited opportunistically by GPs following a discussion on smoking initiated by the GP and were given a prescription for NRT as an incentive to quit found that around a fifth had stopped smoking at three month follow up, with over twice as many having cut down their cigarette consumption. However, this study did not specifically refer smokers to NHS stop smoking services. Whilst a US study found that smokers were much more likely to attend a smoking cessation programme if they had first received detailed information about the programme and strong encouragement to attend, the study did not report smoking cessation rates so the effect of contacting the service on cessation is unknown¹⁶⁴.

4.4.3 Strengths and limitations

This study is the first to assess whether proactive contacting and referral into evidence-based cessation services^{57 165} would not only encourage more smokers to use the service but also lead to increased cessation. The findings suggest that a proactive approach is successful in smokers who want help to quit, but is not an effective means of increasing cessation in the population.

The response rate to the initial questionnaire was low at around 30% of the estimated number of current smokers in the practices, but importantly it was comparable between intervention and control practices so that this is unlikely to have introduced bias, but may limit the generalisability of our results. Both self-reported and validated control group cessation rates were higher than anticipated spontaneous quit rates (approximately 2% annually)⁵⁶ after 6 months, and this is probably due to overrepresentation of motivated smokers among our participants. Whilst this response rate is not unusual for a community based study, smokers may also have been deterred by the two stage process imposed by ethical considerations of returning the questionnaire to the general practice and providing signed consent for these data to be seen by researchers.

The response rate at follow-up was also relatively low and there was a small difference in response between intervention and control groups, with a poorer response from intervention group smokers, possibly as a result of response fatigue since some of this group would have been contacted in the interim. We have assumed that non-responders at follow-up were still smoking, as is standard practice in clinical trials, and to the extent that this may not have been true in some cases, smoking cessation rates in both groups would have been underestimated, and the marginally poorer response for intervention practices would have tended to reduce the apparent size of effect. This seems unlikely to have had more than a minimal impact on our results however.

One of the potential limitations of this study was the chance differences at baseline between our intervention and control groups, those in intervention practices being on average more deprived and smoking more heavily, factors which predict lower cessation rates¹⁶. Adjusting for the variables measured had little impact on the results, but there may be residual confounding by unmeasured related factors, which would have tended to reduce the apparent

size of effect of the intervention. Nevertheless, we looked for interaction with socioeconomic status and cigarette consumption, and found no evidence to suggest a greater effect of the intervention in the less deprived or lighter smokers suggesting that these results are not simply due to the chance differences at baseline.

Although self-reported smoking status ascertained by questionnaire has been shown to be accurate¹⁷, we were concerned that those in the intervention group may have been more likely to report success at quitting. Although we attempted to validate abstinence by collecting a saliva sample from participants who were abstinent by self report at 6 months and a relatively high proportion agreed to this in principal, it proved difficult to make face-to-face contact with many individuals, as is typical in this type of study¹⁶⁶. Control group smokers who had received less contact with the research team, and were also more likely to be working, were less likely to provide samples and, as those who did not provide saliva samples were assumed to be smoking, this misclassification would tend to increase the apparent cessation rate in the intervention compared with control. Nevertheless, the results were consistent for both validated and non-validated measures of smoking cessation, with neither showing a significant difference.

Validated point abstinence from smoking at 6 months was selected rather than sustained abstinence over the 6 months, which might have been a better marker of lifetime abstinence, but point abstinence was the only feasible outcome in this community-based study. The use of cigarette consumption as an indicator of dependence is also a limitation of this study, and would have been better presented as Heaviness of Smoking Index (HSI) or Fagerström. The variables to calculate such values was not, however, available from the data collected.

Reporting bias may have contributed to the apparent increase in use of NHS stop smoking services in intervention compared to control groups, since those seeking help to quit in the intervention group were aware that we had booked them an appointment with the service. We do not know whether these individuals actually attended the appointment, since data collected by the NHS Stop Smoking Service is anonymised. There was an increase in service usage during the period of our study which would be consistent with our intervention being effective in increasing the number of smokers contacting the service, but we cannot be sure that the observed increase was due to our study. The increase may have been the result of a number of other factors, such as other initiatives or advertisements being run at a local level or a reflection of increased service uptake at a national level.

A high proportion (almost 22%) of those in control groups had received advice from any health professional, which is higher than would have been anticipated from data published elsewhere⁴⁴, possibly reflecting a tendency for participating practices to have a special interest in promoting smoking cessation to patients. It is also possible that the control practices used the data we collected to provide smoking cessation advice to those who wanted it, which would have contributed to the null effect. However, practices were blinded to whether they were in the intervention or control groups, and were informed that patients in both treatment groups would receive intervention eventually, so that this is unlikely to have played a major role in our findings.

4.4.4 Conclusions

It appears that a proactive approach is successful in reaching smokers who want support to quit through primary care, and providing information about and referral to NHS SSS appears to increase smokers' receipt of smoking cessation

interventions, their propensity to start quit attempts and their chances of quitting, but this approach translates into at best only a modest and in this case non-significant increase in smoking cessation in the population. However, there was evidence of a significant effect of the intervention in smokers who expressed an interest in receiving smoking cessation advice.

***CHAPTER 5: UNPLANNED QUIT ATTEMPTS – INCIDENCE,
TRIGGERS AND USE OF SUPPORT***

5.1 INTRODUCTION

In the UK, smoking cessation services such as the one detailed in Chapter 4 have been developed to provide all smokers wishing to attempt to quit smoking with behavioural and pharmacological support⁵⁹ and are currently being used by more than 600,000 smokers each year⁶. The use of behavioural support and pharmacotherapy substantially increases the likelihood of success in any attempt to quit smoking⁵⁶ but their use in practice generally requires some degree of advance planning.

Since there was an emerging evidence base suggesting that a large proportion of quit attempts appeared to be unplanned^{140 142}, the study described in this chapter was designed to identify the characteristics of those who make unplanned attempts and the extent to which they use cessation support, to determine whether and how services need to adapt to meet their needs. This study was designed to investigate the occurrence and determinants of unplanned and planned quit attempts, and the sources of support used in these attempts, among a group of current and recent ex-smokers who reported making a quit attempt within the last six months.

5.2 METHODS

In 2008, self-completion questionnaires (Appendix VI) were sent to 3512 smokers and recent ex-smokers aged between 21 and 89, all of whom had been smokers in 2005 and, at that time, registered with 24 general practices in Nottinghamshire that participated in the cluster randomised controlled trial described in Chapter 4. Although there was a potential risk of response fatigue from this group as they had already completed two questionnaires, the logistics of recruiting a new group of smokers in accordance with the methods previously described meant that this was not possible within the timeframe available. Questionnaires were accompanied by a standard letter (Appendix VII) explaining that the study was exploring attempts at quitting smoking and the factors which helped or hindered these. We asked for responses from both current and ex-smokers, and from current smokers whether or not they were currently attempting to quit. Respondents were also asked whether they agreed to being contacted at a later date to discuss further their experiences of trying to quit smoking. All were offered a £5 gift voucher for completion and return of the questionnaire. A reminder letter was sent to non-responders after three weeks.

The questionnaire asked about socio-demographic factors and smoking history and behaviour, including recent smoking cessation behaviour. The questionnaire asked *"Have you made a serious attempt to stop smoking in the last 12 months? By serious attempt we mean you decided that you would try to make sure you never smoked another cigarette. Please include any attempt you are currently making"*. Respondents who had made at least one 'serious' quit attempt were then asked for details about their last three quit attempts in accordance with West's Smoking Toolkit¹⁶⁷ (or less depending on actual number), including: i) when the attempt occurred, ii) whether they planned the quit attempt, iii) factors

triggering quit attempts and iv) the types of support used to help with cessation.

5.2.1 Primary Outcomes

Primary outcomes were proportion of attempts to quit smoking that were planned or unplanned, the most common triggers for planned and unplanned quit attempts and the common sources of support used in planned and the most unplanned quit attempts.

5.2.2 Proportion of planned and unplanned quit attempts

The following question (taken from West's Smoking Toolkit¹⁶⁷) was used to characterise each quit attempt as planned or unplanned: "*Which of these statements best describes how your attempt to stop smoking started*".

Respondents were given the following options:

- I did not plan the quit attempt in advance; I just did it
- I planned the quit attempt for later the same day
- I planned the quit attempt the day beforehand
- I planned the quit attempt a few days beforehand
- I planned the quit attempt more than a week beforehand

The most recent quit attempt was defined as unplanned if respondents selected the option, "I did not plan the quit attempt in advance; I just did it". Any other response was considered to be a planned attempt, in line with previous research¹⁴² to allow comparability between studies.

5.2.3 Triggers for quit attempts

Respondents were asked to select as many responses that applied to factors which had triggered their quit attempt from the list below:

- Advice from a GP/health professional
- TV advert for an NRT product
- Government radio/tv/press advert
- Hearing about a new stop smoking product
- A decision that smoking was too expensive
- Being faced with restrictions as a result of the smoking ban
- I knew someone else that was stopping smoking
- Seeing a health warning on a cigarette packet
- Being contacted by my local NHS SSS
- Health problems I had at the time
- Preventing passive smoking to family/friends
- Pressure from family/friends
- Health problems from a family member/friend
- Pregnancy
- Something else (please state)
- Nothing in particular
- Cannot remember

5.2.4 Support used in quit attempts

Respondents were asked to select as many responses that applied to support used in their quit attempt from the list below:

- Nicotine replacement product (e.g. patches/gum/inhaler) without a prescription

- Nicotine replacement product on prescription or given to you by a health professional
- Zyban (bupropion)
- Champix (Varenicline)
- Attended an NHS Stop Smoking Service group
- Attended an NHS Stop Smoking Service one to one counselling session
- Smoking helplines such as NHS smoking helpline or Quitline etc
- Something else (please write in)
- None of these
- Cannot remember

5.2.5 Data analysis

Questionnaire data were entered into SPSS Version 16. Townsend scores based on patients' postcodes were calculated from the 2001 census¹⁵⁵ and were categorised into quintiles for analysis as previously described. To minimise recall bias, whilst also ensuring sufficient numbers for analysis, only those recent quit attempts which were made in the last six months were analysed. In this group, those who reported making planned and unplanned attempts were compared in terms of age, sex, Townsend score, cigarette consumption reported at baseline (Chapter 3), triggers for the quit attempt and sources of support used using crosstabulation and chi-squared tests for univariate and logistic regression for multivariate analysis. To explore the appropriateness of using only data on attempts reported within the previous six months, an identical analysis was conducted for data on quit attempts recalled within the previous three and 12 months and compared findings with those using six months recall data. The Leicestershire, Northamptonshire & Rutland Research Ethics Committee approved this study.

5.3 RESULTS

5.3.1 Response to questionnaire

1805 completed questionnaires were returned (51.4%). A further 19 were returned as 'addressee deceased' and 142 returned as no longer at the registered address. Those who responded to the questionnaire were slightly less likely to be male but were otherwise similar to those who did not respond (Table 13).

Table 13: Socio-demographic characteristics of those individuals sent and responding to the questionnaire

	Questionnaires sent (n=3512)	Respondents (n=1805)	Made quit attempt in last 6 months (n=394)
% male	51.4	45.7	50.9
Median age (IQR)	47 (36 - 58)	51 (40.75 - 61)	52 (40.5 - 62)
Median Townsend score (IQR)	1.33 (-1.30 - 4.62)	1.32 (-1.45 - 4.54)	1.29 (-1.34 - 4.34)
Cigarette consumption			
>10	35.8%	36.8%	32.5%
11-20	41.5%	40.7%	43.9%
21-30	14.6%	13.8%	17.5%
31+	4.3%	4.3%	5.3%
Missing	3.8%	4.5%	0.8%

Of respondents, 327 (18.1%) had been abstinent from smoking for more than 12 months and 639 (35.4%) had made a serious quit attempt in the last year. Of these 639 people, 394 had made their most recent quit attempt in the last six months. The characteristics of this group are shown in Table 13, and did not differ substantially from those of all respondents. At the time of the survey, 26.1% (n=103) of this group reported that they were abstinent from smoking, and 36.6% of current smokers at the time of completing the questionnaire reported having made a quit attempt in the last year.

5.3.2 Quit attempts made in the last six months

Of the 394 quit attempts made in the last six months, 147 (37%) were unplanned. Fifteen individuals did not answer the question relating to planning their quit attempt, and were excluded from further analyses. Females were significantly less likely to make unplanned quit attempts than males (adjusted OR 0.63, 95% CI 0.41-0.97) (Table 14). There were less marked effects of other socio-demographic characteristics. Recent quit attempts made by smokers in the oldest age category were more likely to be unplanned than those in other categories (50.9% of recent attempts in those aged over 64 being made with no pre-planning), though there was no statistically significant trend with increasing age.

Unplanned quit attempts were least common in quintile 1 of Townsend score (least disadvantaged) (30.3%) and highest in quintile 4 (48.7%), but there was no significant trend across quintiles of deprivation. Although unplanned quit attempts were reported more frequently by heavier smokers, this finding was not statistically significant. A similar pattern was seen if recent quit attempts in the last three or 12 months were analysed, though the tendency for unplanned attempts to be lowest in the least deprived and highest in 4th quartile of Townsend score was more apparent for attempts made more recently (Table 15 and Table 16 respectively).

Table 14: Characteristics of those making quit attempts in the last 6 months

	Total n	UNPLANNED		ADJUSTED OR (95% CI)	P VALUE
		N	%		
GENDER					
MALE	172	77	44.8	1	0.03
FEMALE	207	70	33.8	0.63 (0.41 – 0.97)	
AGE					
<38	80	29	36.2	1	0.27
39-48	92	36	39.1	1.04 (0.54 – 1.99)	
49-57	74	29	39.2	1.09 (0.55 – 2.17)	
58-64	76	24	31.6	0.81 (0.40 – 1.61)	
>64	57	29	50.9	1.85 (0.90 – 3.78)	
TOWNSEND					
<= -1.808 (least deprived)	76	23	30.3	1	0.28
-1.808 – 0.164	68	27	39.7	1.63 (0.80 – 3.32)	
0.164 – 2.542	77	30	39	1.45 (0.73 – 2.89)	
2.542 – 4.900	76	37	48.7	2.17 (1.09 – 4.32)	
4.900+ (most deprived)	79	30	38	1.39 (0.70 – 2.75)	
CIGS SMOKED					
0-10	124	50	40.3	1	0.84
11-20	168	59	35.1	0.82 (0.50 – 1.35)	
21-30	64	26	40.6	1.02 (0.54 – 1.94)	
31+	20	9	45	1.02 (0.37 – 2.82)	

*Adjusted for gender, age, Townsend index and cigarette consumption

**Townsend scores and cigarette consumption information for 3 individuals were not available, and included as a separate missing value category for analysis.

Table 15: Characteristics of those making quit attempts in the last 3 months

	Total n	UNPLANNED		ADJUSTED OR (95% CI)	P VALUE
		N	%		
GENDER					
MALE	118	55	46.6	1	0.10
FEMALE	151	53	35.1	0.64 (0.38 – 1.08)	
AGE					
<38	57	20	35.1	1	0.11
39-48	64	24	37.5	0.94 (0.43 – 2.06)	
49-57	55	23	41.8	1.22 (0.54 – 2.74)	
58-64	48	16	33.3	0.96 (0.41 – 2.22)	
>64	45	25	55.6	2.60 (1.12 – 6.03)	
TOWNSEND					
<= -1.808 (least deprived)	53	16	30.2	1	0.22
-1.808 – 0.164	47	19	40.4	1.66 (0.70 – 3.93)	
0.164 – 2.542	59	24	40.7	1.56 (0.69 – 3.52)	
2.542 – 4.900	51	27	52.9	2.78 (1.19 – 6.51)	
4.900+ (least deprived)	57	22	38.6	1.45 (0.64 – 3.31)	
CIGS SMOKED					
0-10	87	34	39.1	1	0.58
11-20	123	45	36.6	1.00 (0.55 – 1.81)	
21-30	41	17	41.5	1.24 (0.56 – 2.75)	
31+	15	9	60.0	2.18 (0.65 – 7.30)	

*Adjusted for gender, age, Townsend index and cigarette consumption

**Townsend scores and cigarette consumption information for 2 and 3 individuals respectively were not available, and included as a separate missing value category for analysis.

Table 16: Characteristics of those making quit attempts in the last 12 months

	Total n	UNPLANNED		ADJUSTED OR (95% CI)	P VALUE
		N	%		
GENDER					
MALE	281	130	46.3	1	<0.01
FEMALE	321	108	33.6	0.60 (0.42 – 0.84)	
AGE					
<38	137	52	38.0	1	0.50
39-48	140	54	38.6	0.96 (0.58 – 1.58)	
49-57	112	38	33.9	0.79 (0.46 – 1.36)	
58-64	115	48	41.7	1.05 (0.62 – 1.78)	
>64	98	46	46.9	1.35 (0.78 – 2.33)	
TOWNSEND					
<= -1.808 (least deprived)	114	44	38.6	1	0.69
-1.808 – 0.164	119	46	38.7	1.15 (0.67 – 1.99)	
0.164 – 2.542	118	44	37.3	0.98 (0.57 – 1.70)	
2.542 – 4.900	118	53	44.9	1.41 (0.82 – 2.43)	
4.900+ (most deprived)	128	51	39.8	1.11 (0.65 – 1.89)	
CIGS SMOKED					
0-10	197	89	45.2	1	0.12
11-20	276	93	33.7	0.63 (0.43 – 0.92)	
21-30	98	40	40.8	0.82 (0.49 – 1.36)	
31+	26	11	42.3	0.87 (0.37 – 2.07)	

*Adjusted for gender, age, Townsend index and cigarette consumption

**Townsend scores and cigarette consumption information for 5 individuals were not available, and included as a separate missing value category for analysis.

5.3.3 Triggers for quit attempts

Respondents indicated which one or more of a prompted list of possible triggers had led to their recent quit attempt. In unplanned quit attempts, the most common trigger reported was *"advice from a GP/health professional"* (occurring in 27.9% of all unplanned recent quit attempts), followed by *"health problems I had at the time"* (24.5%), *"a decision that smoking was too expensive"* (17.7%), *"nothing in particular"* (17%) and *"pressure from family/friends"* (Figure 3). A similar pattern was evident for unplanned quit attempts made within the last three months and 12 months (Figure 4 and Figure 5 respectively), although the proportion reporting receiving advice from a GP/health professional is lower in the 12 month data. The pattern of specific triggers was somewhat different to that seen for planned quit attempts, in which the most common trigger reported was *"a decision that smoking was too expensive"* (30.6%), followed by *"health problems I had at the time"* (27.6%), *"advice from a GP/health professional"* (25.4%), *"pressure from family/friends"* (16.8%) and *"preventing passive smoking to family/friends"* (14.7%) (Figure 6). Again, a similar pattern was evident for planned quit attempts made within the last three months and 12 months (Figure 7 and Figure 8 respectively). Over twice as many respondents indicated that *"nothing in particular"* triggered their quit attempt in the 6 month unplanned group as compared to the planned group (17% and 8.2% respectively). Differences in triggers for planned and unplanned quit attempts were only significant in the factors of *"a decision that smoking was too expensive"* ($\chi^2 = 7.88$, $p < 0.01$) and *"nothing in particular"* ($\chi^2 = 6.82$, $p = 0.01$).

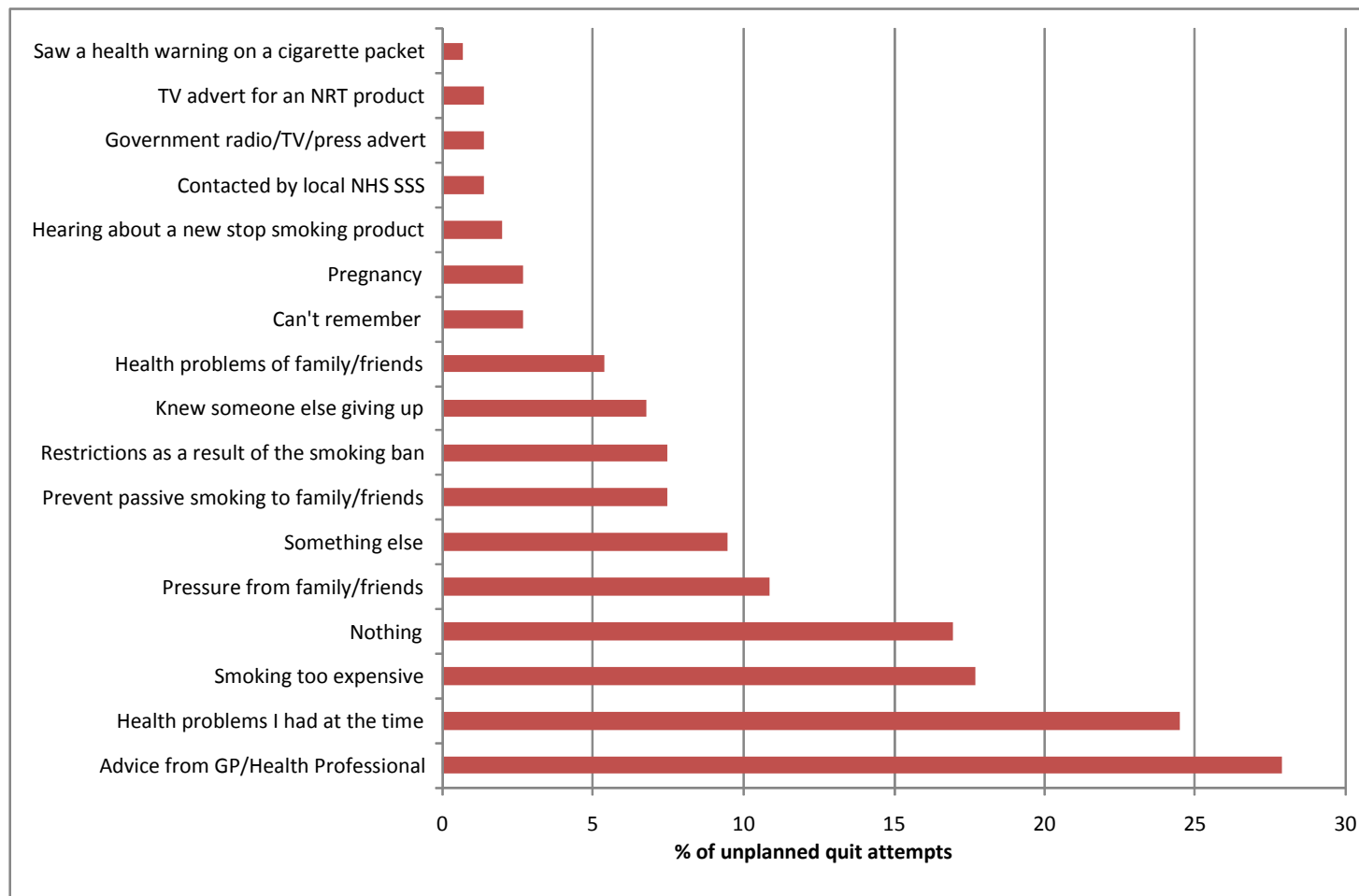


Figure 3: Triggers for unplanned quit attempts made within the last six months

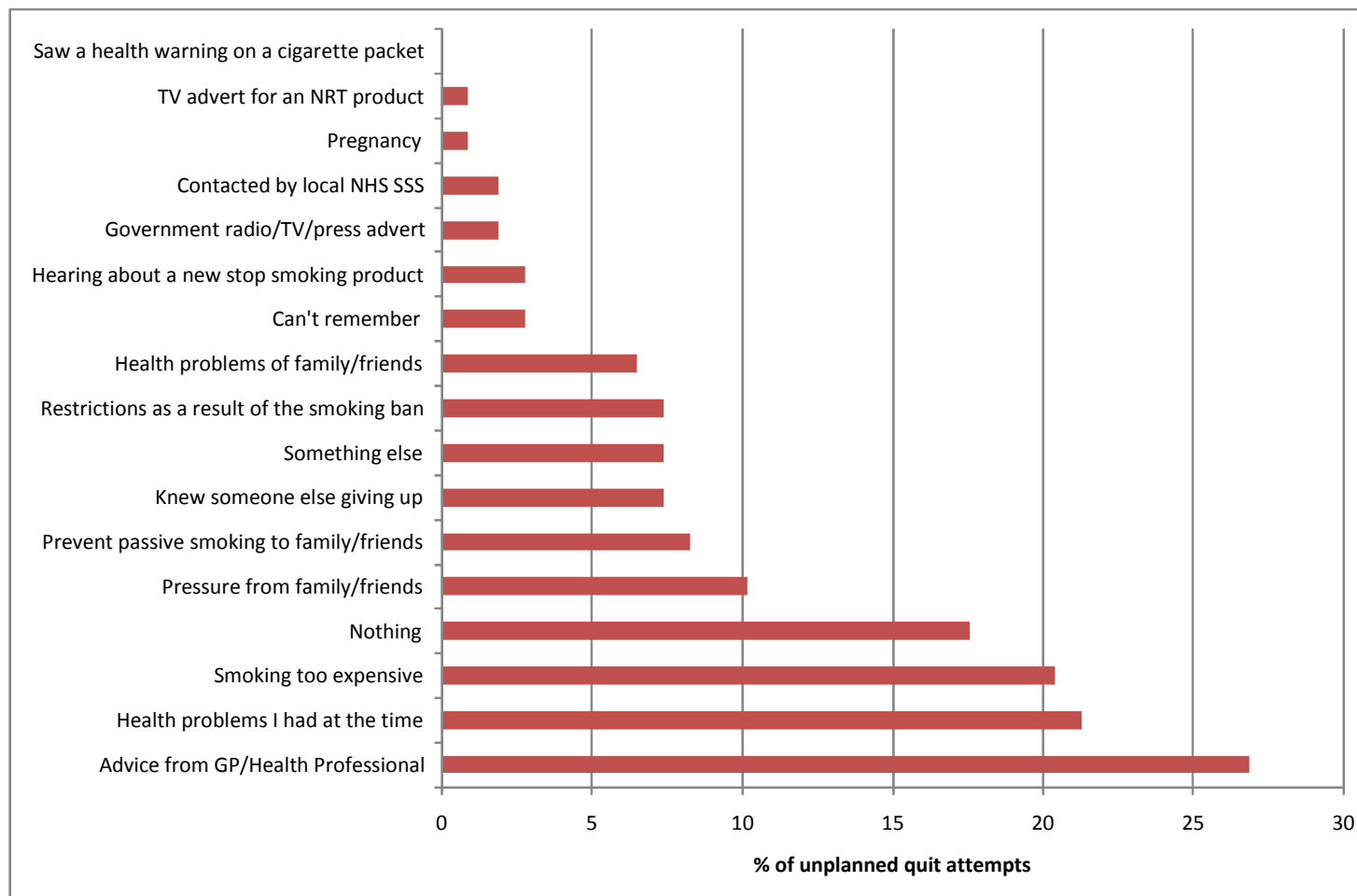


Figure 4: Triggers for unplanned quit attempts made within the last three months

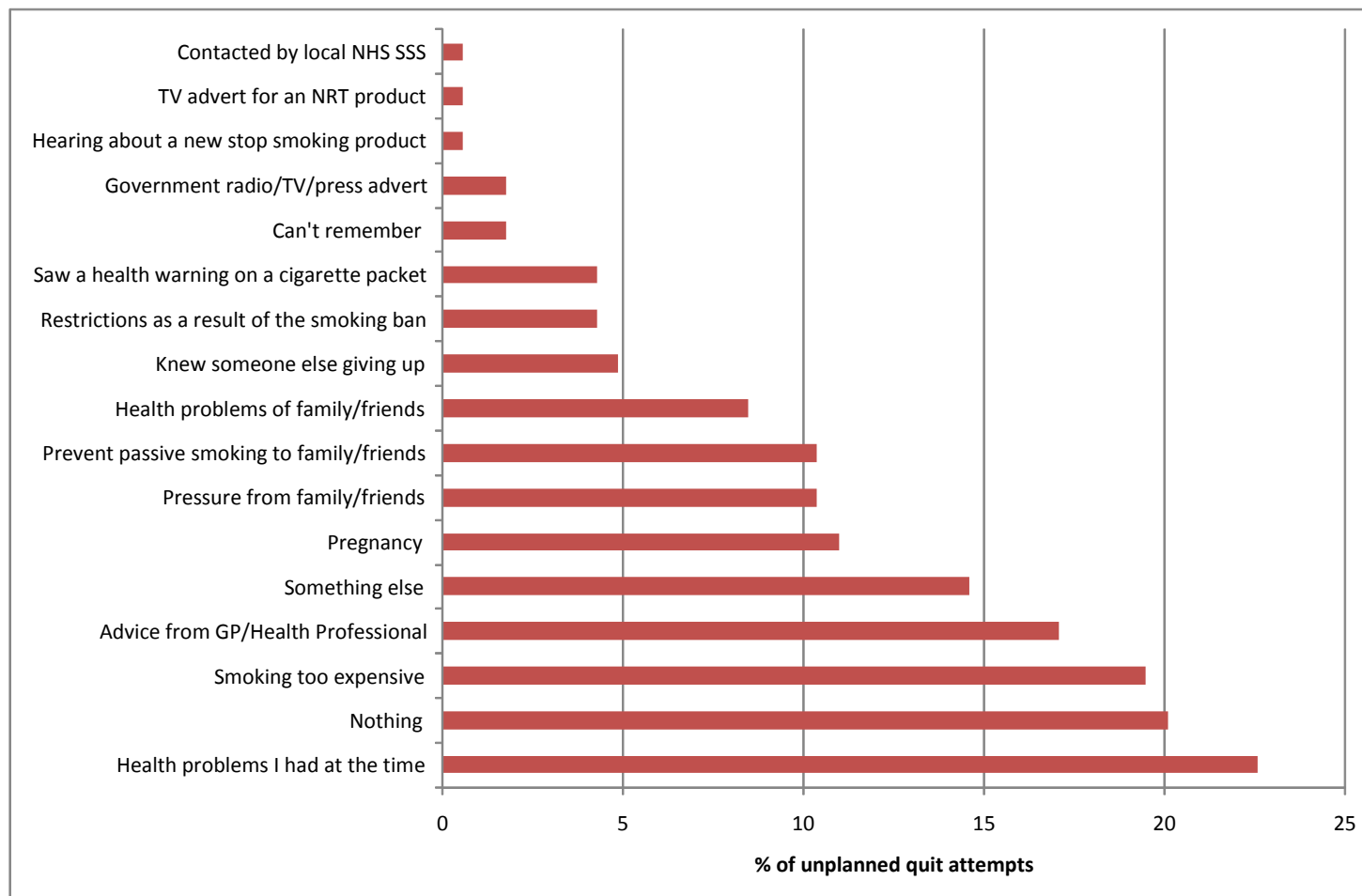


Figure 5: Triggers for unplanned quit attempts made within the last 12 months

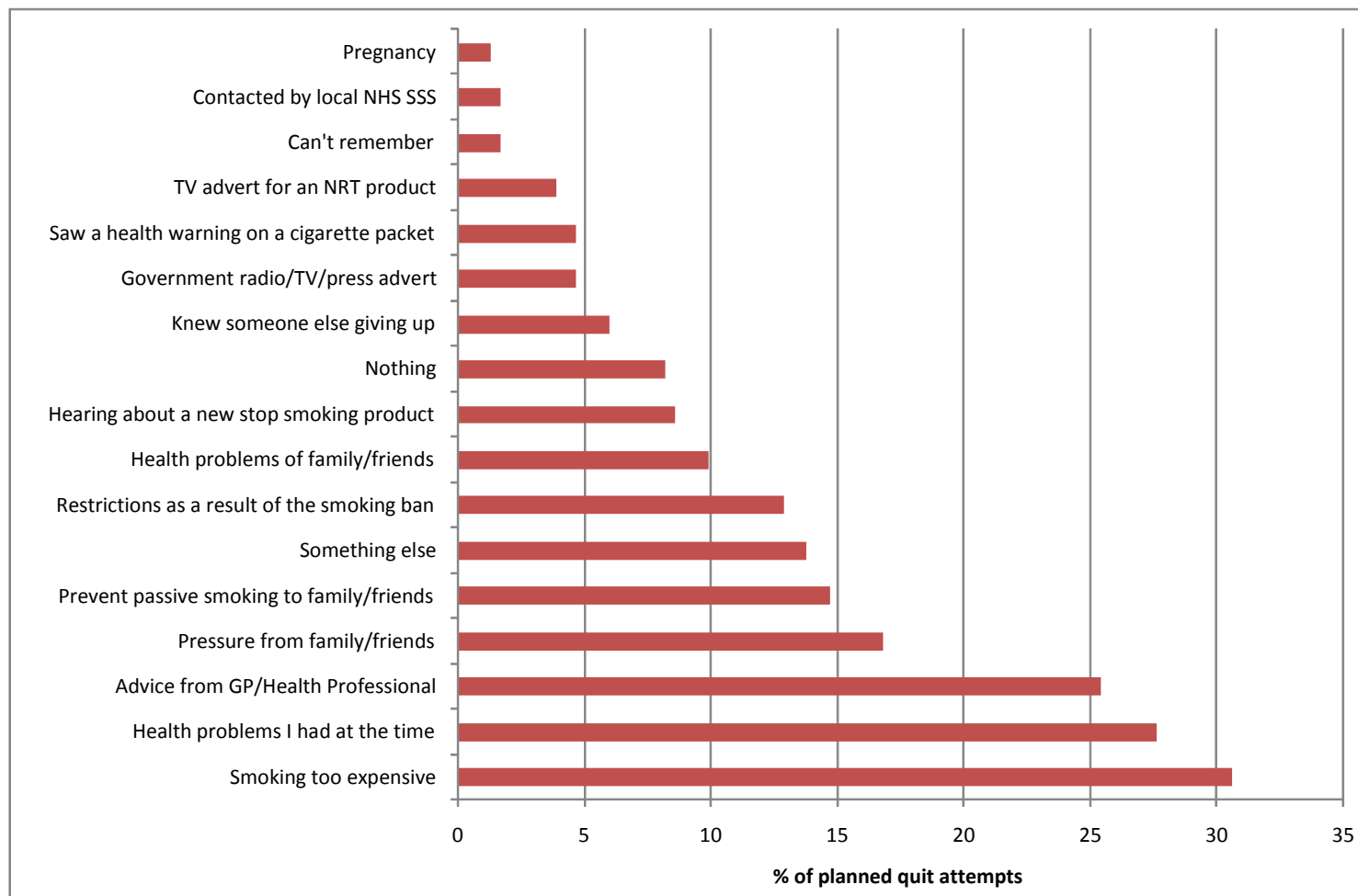


Figure 6: Triggers for planned quit attempts made within the last six months

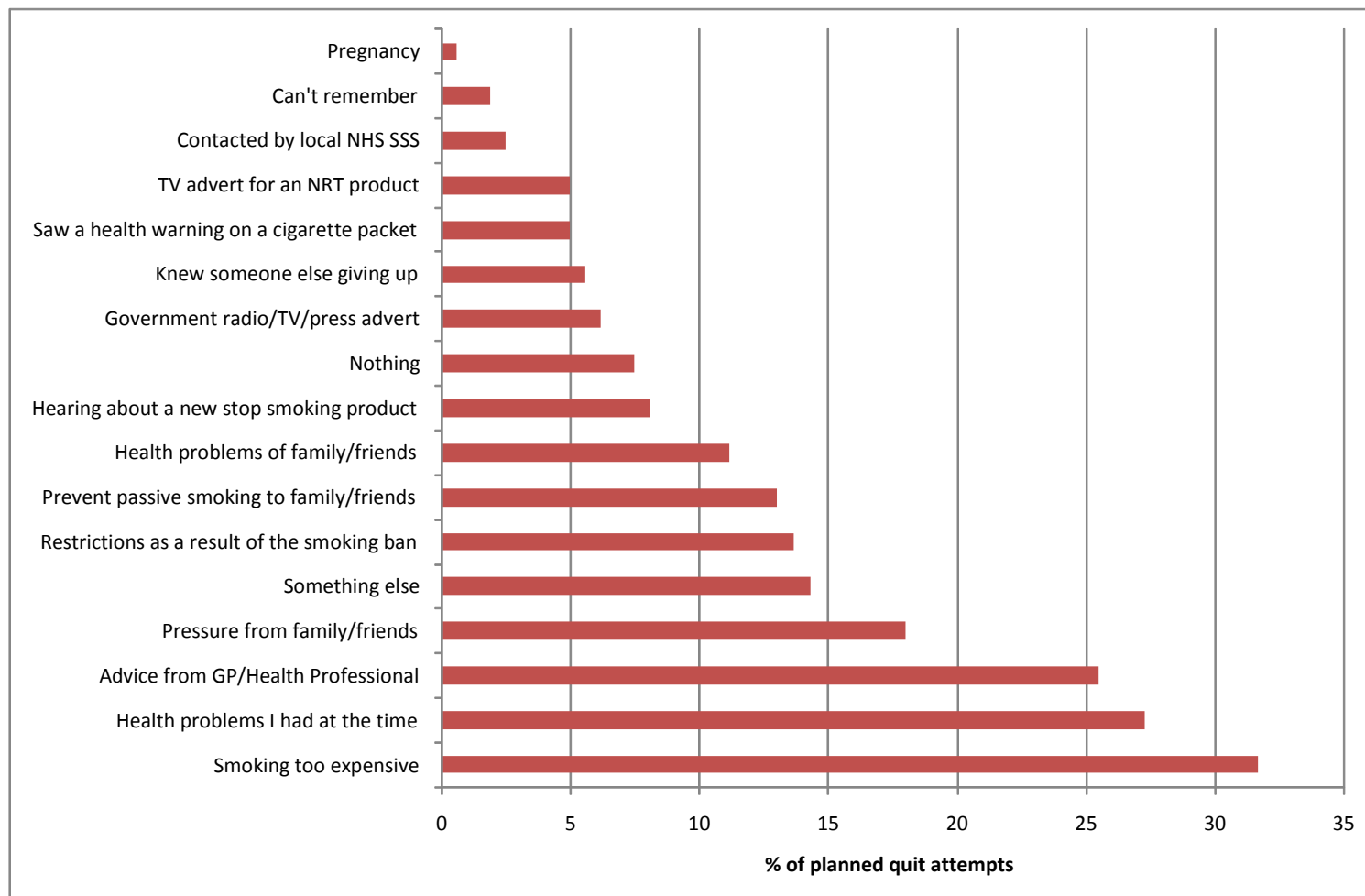


Figure 7: Triggers for planned quit attempts made within the last three months

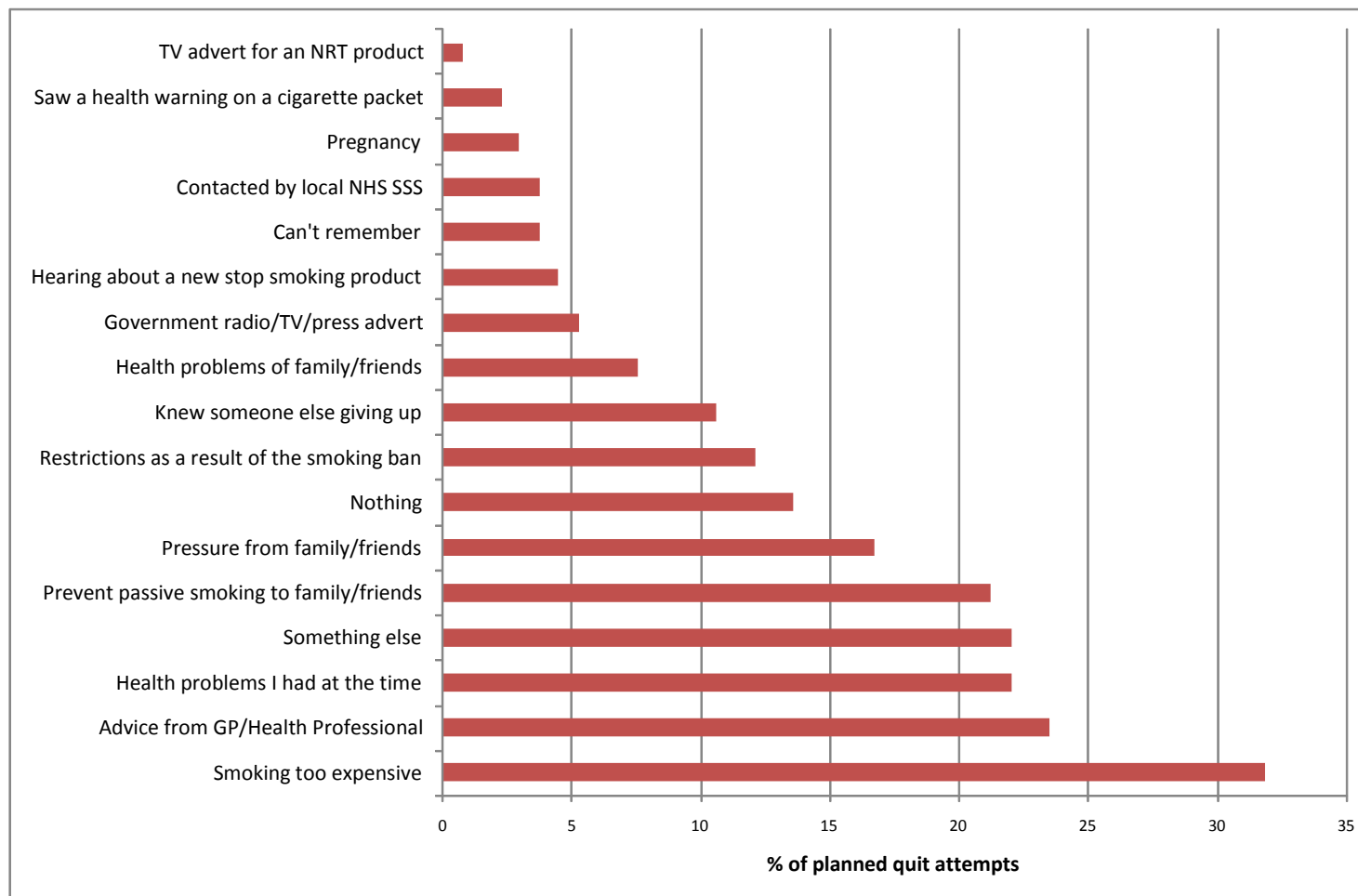


Figure 8: Triggers for planned quit attempts made within the last 12 months

5.3.4 Sources of support for quit attempts

Respondents indicated which one or more of a prompted list of possible sources of support they had used on their most recent quit attempt. Most reported that unplanned quit attempts were made without the use of any support (51.7%). The most common source of support reported to be used in unplanned quit attempts was NRT obtained without prescription (25.9%), followed by NRT obtained on prescription (16.3%), use of an NHS SSS one to one counselling session (5.4%), 'something else' (5.4%) and use of an NHS SSS group (4.1%) (Figure 9). A similar pattern was evident for unplanned quit attempts made within the last 3 months and 12 months (Figure 10 and Figure 11 respectively). In contrast, amongst those reporting planned quit attempts, only 25.9% were reported to be unsupported. Planned quit attempts were supported by NRT obtained without prescription (38.4%), NRT obtained on prescription (19.8%), use of an NHS stop smoking service 1-1 (12.5%) and an NHS stop smoking service group (9.1%) (Figure 12). Again, a similar pattern was evident for planned quit attempts made within the last three months and 12 months (Figure 13 and Figure 14 respectively).

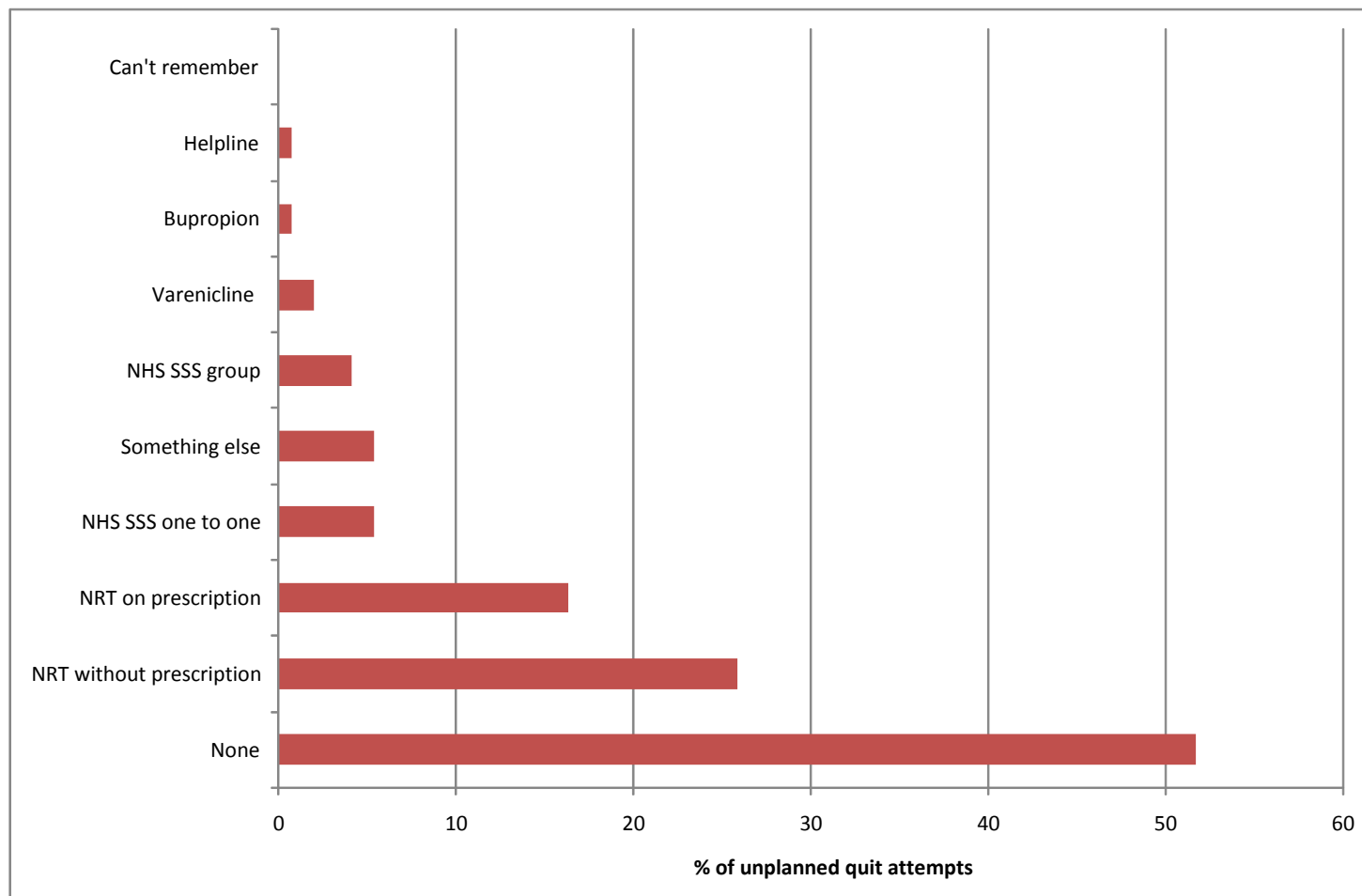


Figure 9: Sources of support used in unplanned quit attempts made within the last six months

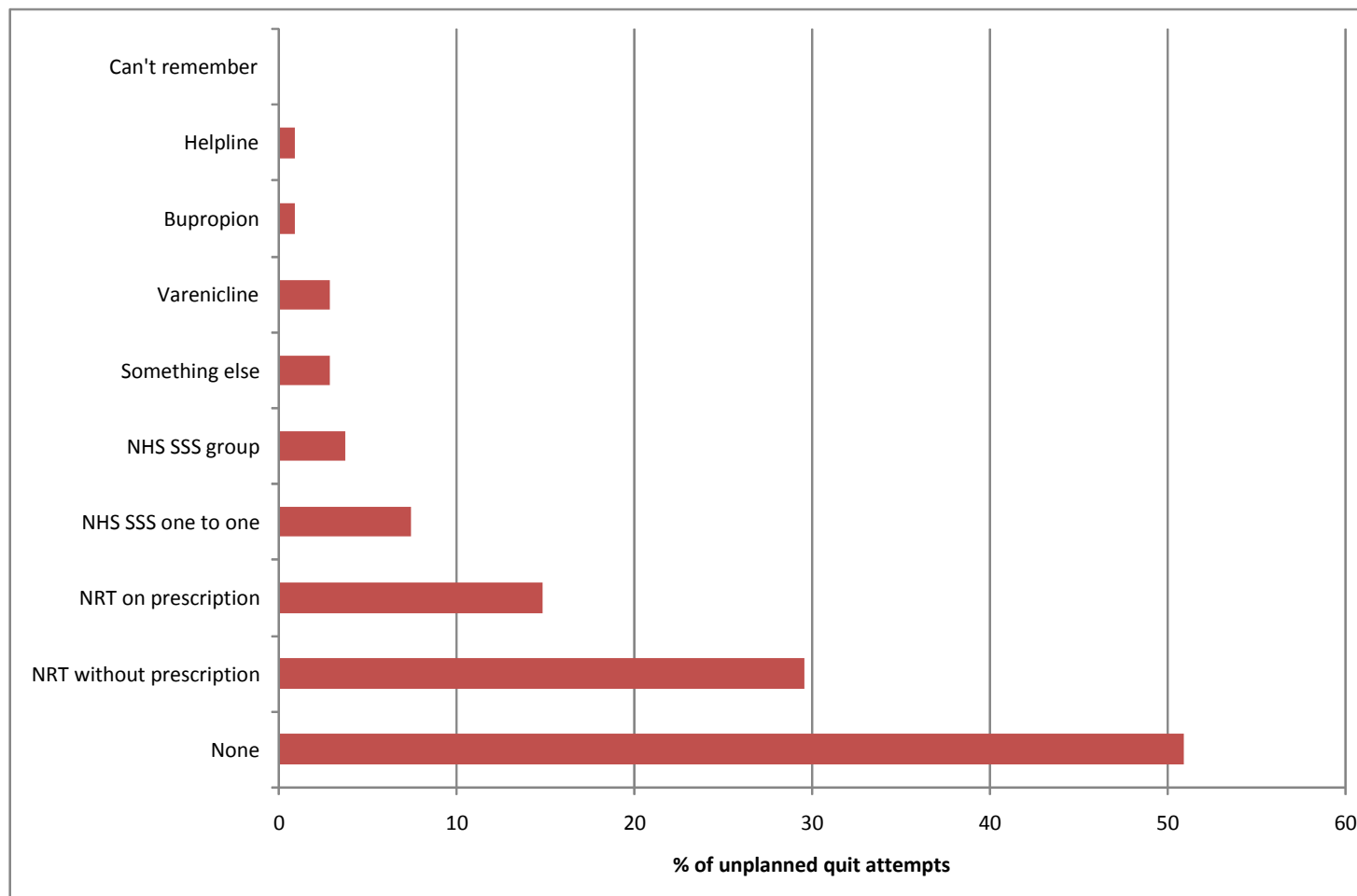


Figure 10: Sources of support used in unplanned quit attempts made within the last three months

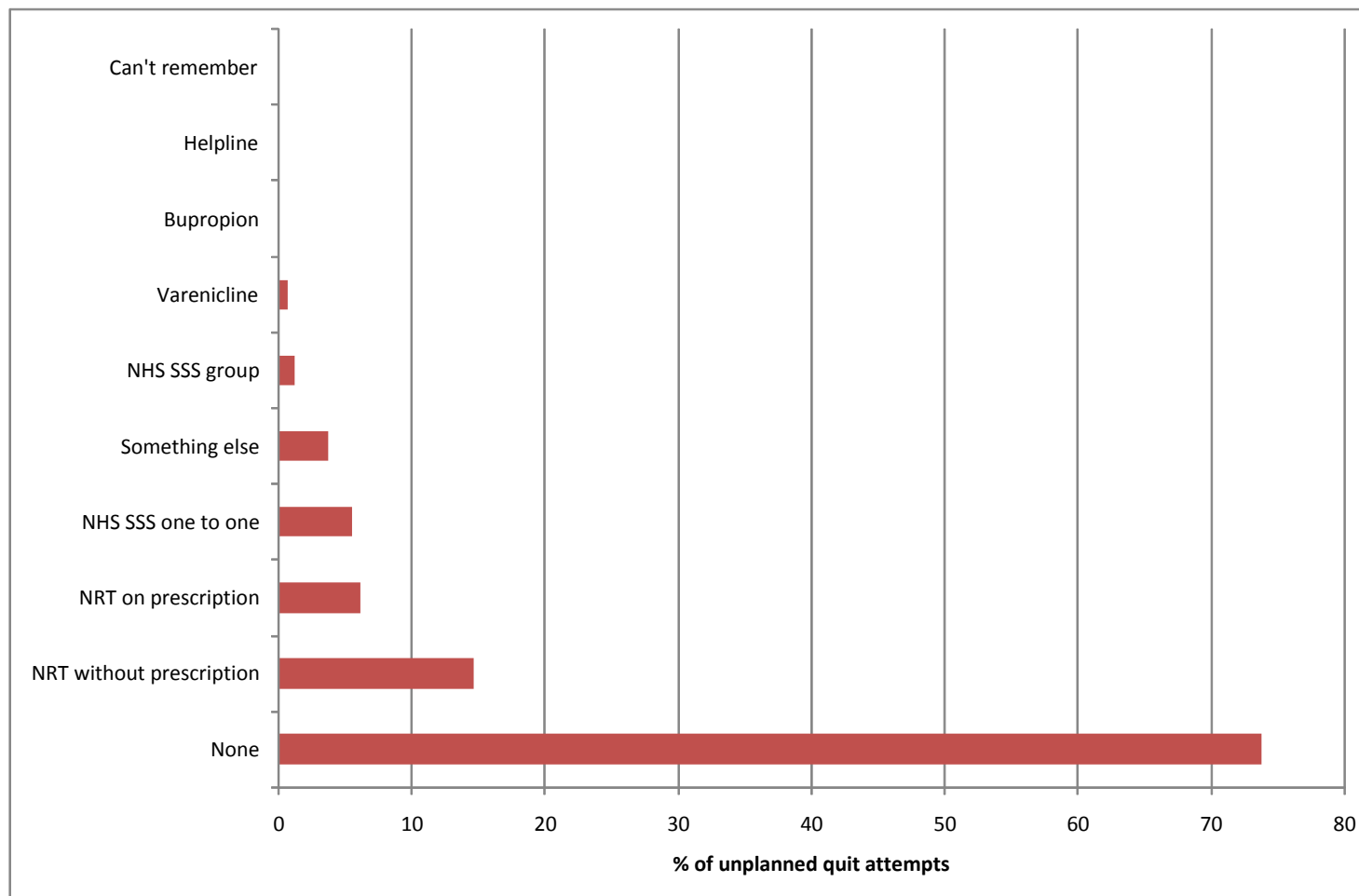


Figure 11: Sources of support used in unplanned quit attempts made within the last 12 months

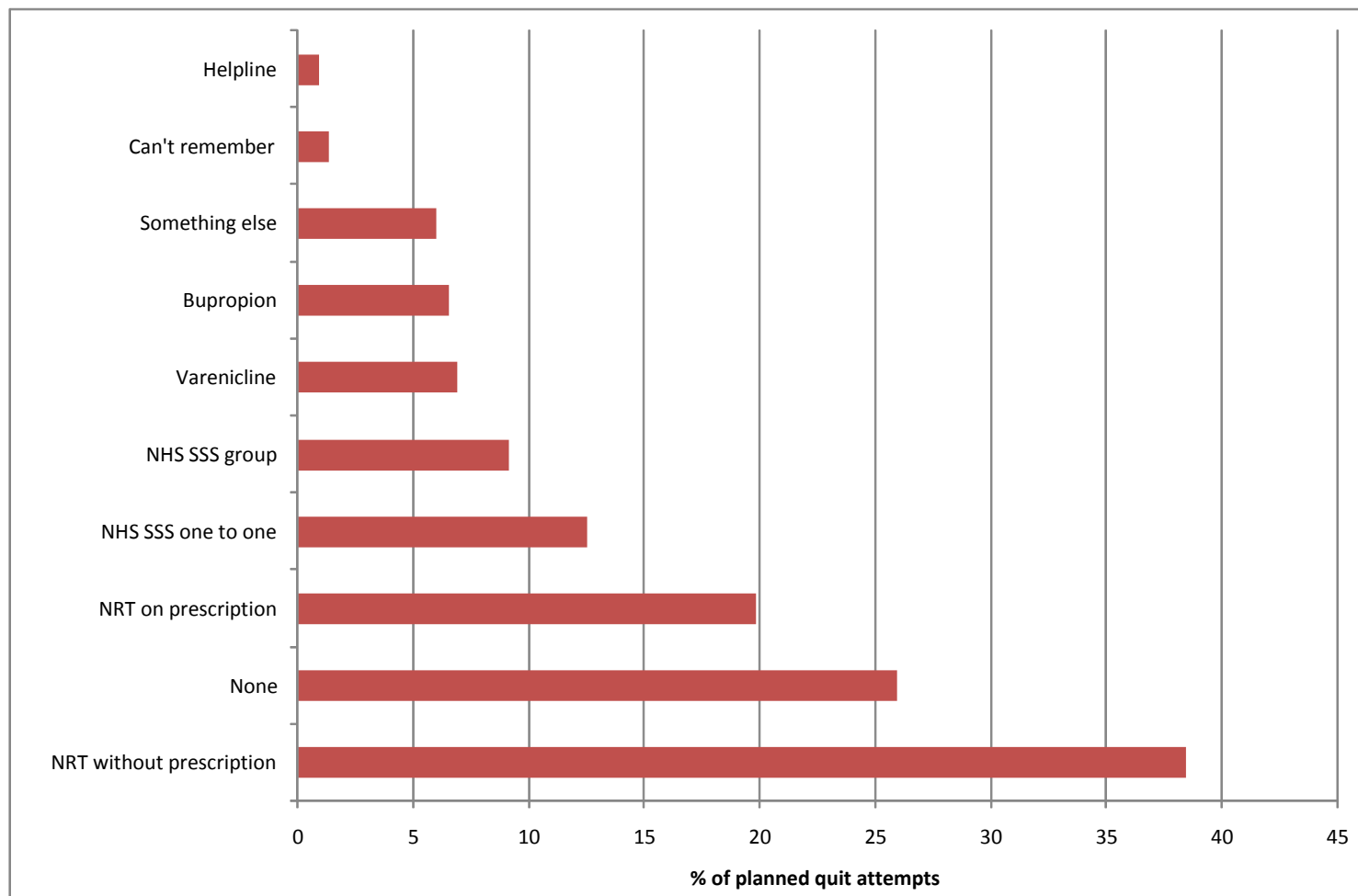


Figure 12: Sources of support used in planned quit attempts made within the last six months

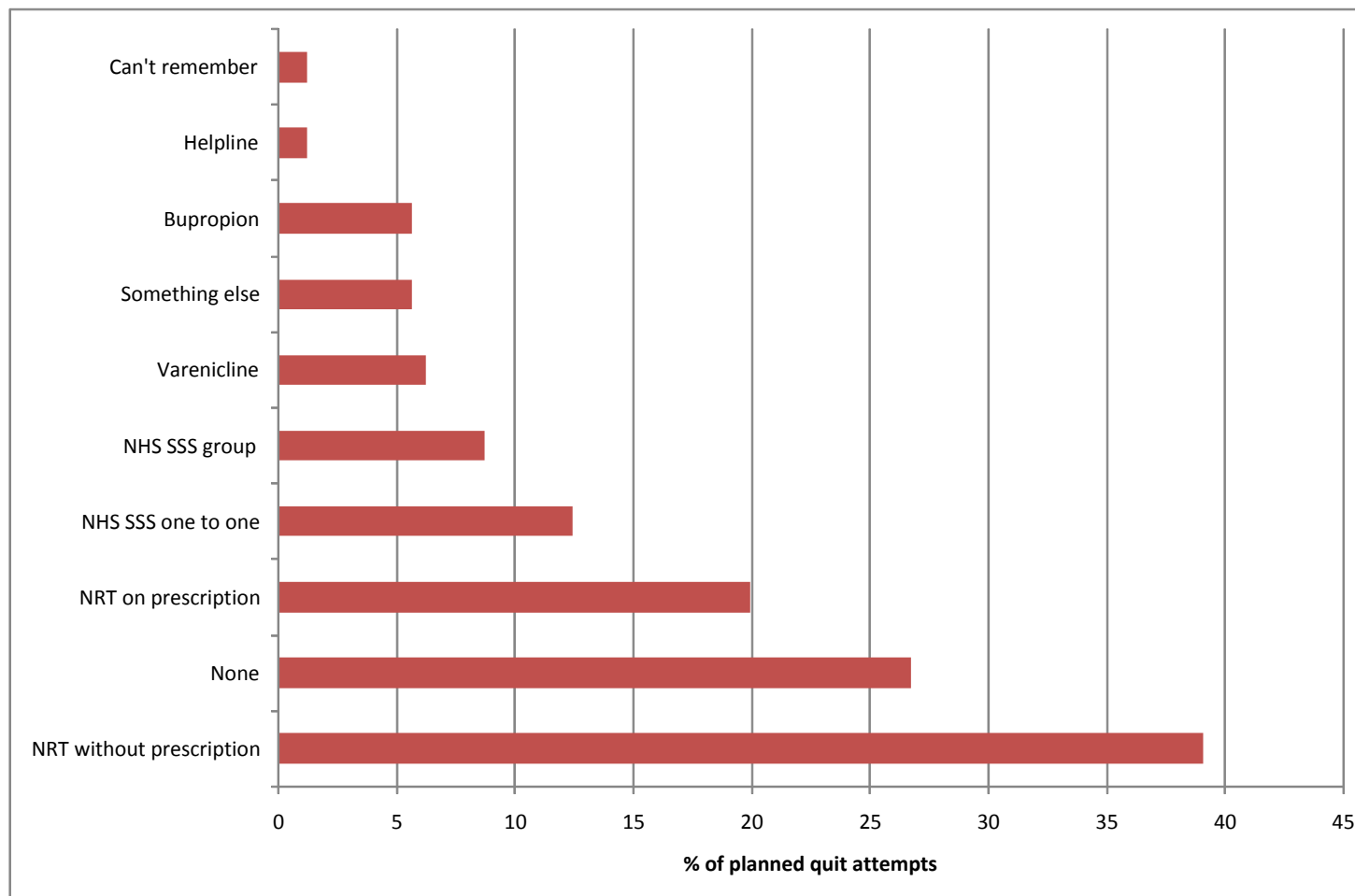


Figure 13: Sources of support used in planned quit attempts made within the last three months

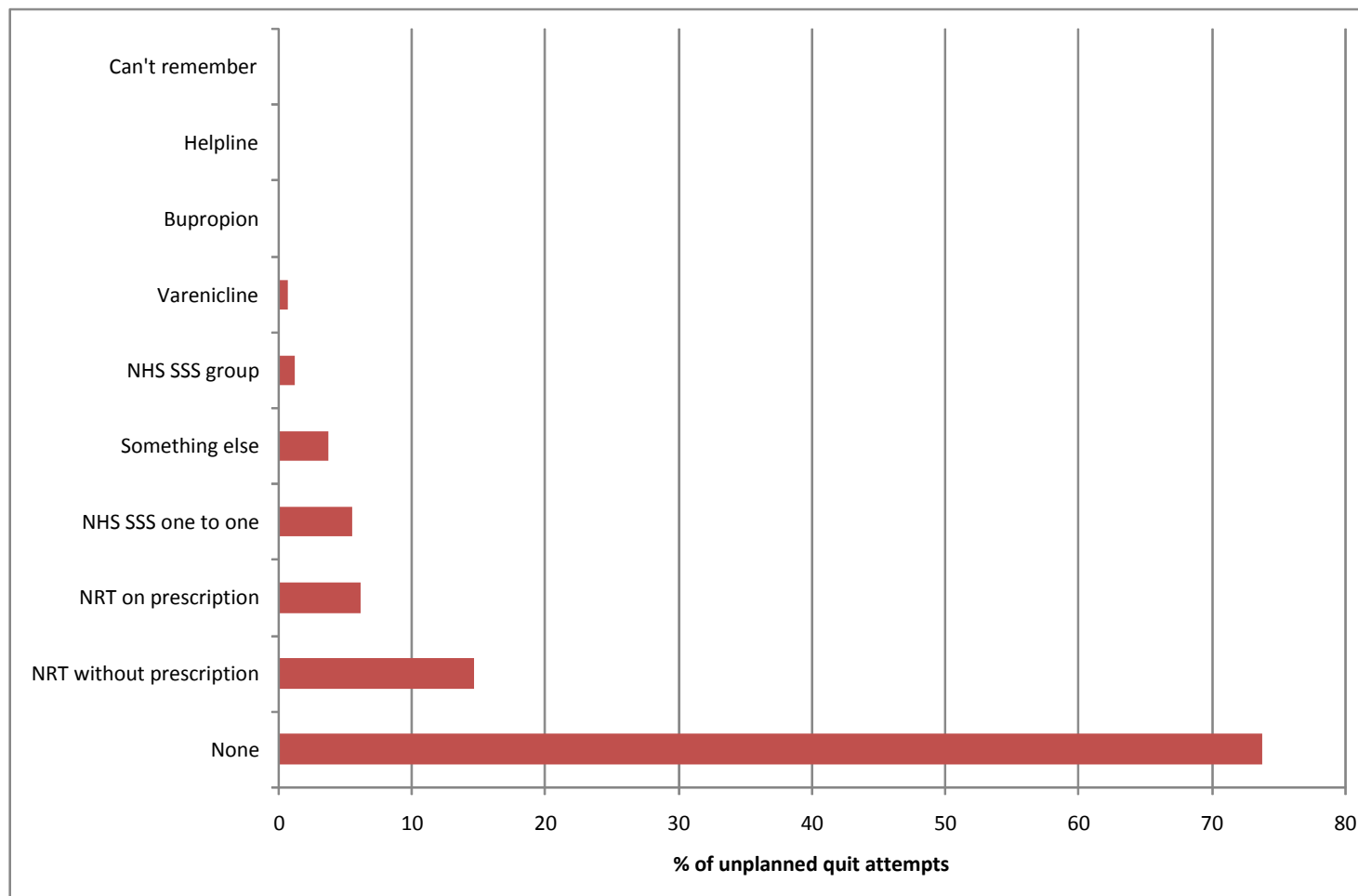


Figure 14: Sources of support used in planned quit attempts made within the last 12 months

5.3.5 Success of quit attempts made within the last six months

Of all respondents who reported making quit attempts in the previous six months, 34% of those who had not planned these reported still being abstinent at the time of responding to the questionnaire, compared to 22.4% of those who reported planning their quit attempt. The higher reported abstinence in those who did not plan their quit attempts was independent of gender, age, Townsend score and cigarette consumption (adjusted OR 2.01, 95% CI 1.23 to 3.27 $p < 0.01$). There was little difference in the success of planned and unplanned quit attempts according to how long ago the attempt had been made (Table 17). The association between absence of planning and successful abstinence was most marked among those whose most recent quit attempt was made three to six months ago.

Table 17: Current abstinence in those making a planned or unplanned quit attempt in the last 6 months, overall, and stratified by how long ago the attempt was made.

		Total	Currently abstinent		Adjusted OR (95% CI)
			N	%	
Quit attempt in the last 6 months	Planned	232	52	22	1
	Unplanned	147	50	34	2.01 (1.23 to 3.27)
How long ago quit attempt was made					
Up to 1 month	Planned	66	15	22.7	1
	Unplanned	41	11	26.8	1.37 (0.49 to 3.84)
1-3 months	Planned	95	19	20	1
	Unplanned	67	18	26.9	1.46 (0.64 to 3.31)
3-6 months	Planned	71	18	25.4	1
	Unplanned	39	21	53.8	4.63 (1.80 to 11.94)

5.4 DISCUSSION

5.4.1 Main findings

This study demonstrates that smokers who make unplanned attempts to stop smoking make less use of evidence-based cessation support than those who do plan, that the main trigger for the unplanned quit attempt is advice from a doctor or health professional, and that unplanned attempts appear more likely to succeed than those that are planned. Unplanned attempts were more common among men but were not significantly related to socioeconomic status or amount smoked.

5.4.2 Strengths and limitations

This is the first study to investigate the triggers for and use of support in unplanned attempts to quit smoking.

This study has several limitations. As smokers are recalling events which may have been made up to six months previously, there is the possibility that recall bias may be playing a role in the reports of planning, support and triggers for their quit attempts. A study by Gilpin and Pierce¹⁶⁸ found that recall of quit attempts deteriorates over time with participants often forgetting the occurrence of attempts of a short duration. The authors concluded that recall of quit attempts lasting less than one week is probably reliable up to three to four months before an interview but not beyond this point. This suggestion was later supported by Shiffman and colleagues¹⁶⁹, who reported that participants in a study comparing real time versus retrospective smoking lapses were unable to accurately recall details of a potentially meaningful event after a period of a few months. Since it is possible that our study findings are distorted by biased recall of events associated with quit attempts which may have been made up to six

months previously, we repeated our analyses including quit attempts made within the last three or 12 months and found that the key findings remained the same, with the exception of the proportion of unplanned quit attempts reportedly being triggered by advice from a GP/health professional.

It is clear that there is a likelihood that quit attempts which reported the use of prescription medications or behavioural support required some element of planning, even though respondents reported that their quit attempt was unplanned. This is a limitation of the current study as the categorisation of planned or unplanned relies on self-report but raises an interesting question for future research as to what respondents mean when they define a quit attempt as 'unplanned'. The use of cigarette consumption data from 2005 is a limitation of the current study as consumption patterns may have changed in the following time period. This was the only means by which a comparison between all respondents could be made, however, as more recent cigarette consumption data was not available for those who had successfully quit smoking in 2008.

Despite the large initial sample size, only 394 smokers reported making a quit attempt in the last six months so it is possible that we failed to detect an effect of individual socio-demographic characteristics on making unplanned quit attempts as a result of the relatively small sample size. The participants in our study were originally part of a randomised intervention trial of a pro-active approach to provide smoking cessation support, but this is unlikely to have affected our findings since the intervention was completed in all practices prior to data collection for this study.

5.4.3 Comparison with previous research

The finding that 36.6% of current smokers reported having made a quit attempt in the last year is comparable with national data⁴⁴. The proportion of quit attempts reported to be unplanned in our study population is lower than reported previously^{140 142}, but consistent in finding higher reported success rates than in planned attempts. Although we attempted to determine whether unplanned attempts were more common among disadvantaged smokers, or those with lower levels of smoking, we found only that unplanned attempts were significantly more likely in men. This observation has not been previously reported, but may reflect differences in the way in which men and women go about quitting smoking¹⁷⁰, and complements the observation that women are more likely than men to use NHS stop smoking services in England⁶. Although limited research exists as to the degree to which men and women plan behaviour change, one study indicated that women have a greater potential for planning¹⁷¹ but this finding was not replicated in a later study¹⁷⁰. Additionally, a number of psychological and social factors have been identified which may affect smoking cessation in females, including a fear of weight gain, a need for social support and self-efficacy about quitting¹⁷². It is possible that these factors may lend themselves to more females planning their quit attempt to accommodate and attempt to overcome these issues. Our finding that unplanned quit attempts were more likely in the over 65s was consistent with West and Sohals' observation among older smokers¹⁴². Although research suggests that the least dependent smokers are the most likely to quit successfully³⁴, the results from this study do not indicate that lighter smokers are any more likely to make unplanned quit attempts than heavier smokers.

Collectively the three most common triggers and sources of support were the same for planned and unplanned quit attempts but the most common trigger, and source of support used, differed between planned and unplanned quit

attempts. As may be expected, advice from a GP or health professional was a key trigger for both planned and unplanned quit attempts and supports the guidelines recommending that health professionals provide brief opportunistic advice to smokers during routine consultations whether or not they are seeking help to stop⁵⁶. Previous research has indicated that a large proportion of smokers are interested in receiving smoking cessation advice and support if it is offered to them¹⁶², and the fact that this was the most common trigger in unplanned quit attempts suggests that such advice may potentially initiate a quit attempt in individuals who were not necessarily planning on trying to quit above any other factor. A decision that smoking was too expensive was the primary trigger for planned quit attempts and was a factor in nearly twice as many planned than unplanned attempts. It perhaps is to be expected that an increasing cost of smoking is likely to lead to smokers thinking about and planning to make a quit attempt. Health problems of respondents were the second most common trigger for both planned and unplanned quit attempts, which is in line with previous research reporting that health is a major motivation for wanting to quit¹⁷³. Of interest is the finding that 'nothing in particular' triggered the quit attempt for more than twice as many of those who didn't plan as those who did. This may support the suggestion of West and Sohal, that an alternative model to the stages of change approach based on "catastrophe theory"¹⁴³ may be applicable to smoking cessation¹⁴². This model proposes that beliefs, past experiences and the current situation create varying levels of motivational tension which can lead to an attempt to quit smoking with small triggers and it is possible that such small triggers have been forgotten by respondents to this survey.

We found that over half of all unplanned quit attempts were made without any form of support, twice as many as those which had been planned. Given the evidence from randomised studies that support increases the success rate of quit

attempts by up to four fold⁵⁶, that this is a missed opportunity even though unplanned quit attempts appear to have a greater likelihood of success. It is also noteworthy that over a quarter of those who made planned attempts did not use any support. The most common form of support used by both groups was NRT obtained without prescription, which indicates that the majority of smokers are not making use of NHS services and support available to help them to quit despite considerable government investment in these services. It is possible that this finding reflects a lack of awareness of NHS support available to help smokers to quit, and if this is the case then further emphasis needs to be placed on publicising and promoting these services to smokers. Two studies investigating reasons why smokers may not access stop smoking services have suggested that barriers may include factors such as fear of being judged, fear of failure and lack of knowledge, particularly in the case of smokers from lower socio-economic groups^{109 110}. It is also possible that other factors influenced the low reported use of prescription medications, such as a difficulty in obtaining an appointment with a GP to gain a prescription or the expense of prescription charges and these factors cannot be ruled out as explanations for our findings. However, our study provides further evidence that the prevailing model of smoking cessation services offered by health systems may not apply for a large proportion of smokers' quit attempts. For example, NHS SSS advise individuals to set a quit date and plan ahead. On the assumption that the success rate of spontaneous quit attempts could be increased still further if supported by behavioural and pharmacological interventions, our findings suggest that these services need to be more flexible and adaptable to smokers who make unplanned quit attempts.

A number of studies have been conducted looking at ways access to stop smoking services could be improved, and many of these findings may be applicable to those smokers who make unplanned attempts to quit smoking.

These include providing drop in sessions so that smokers do not have to book in advance^{118 119} and providing pharmacy based support that may be more immediately accessible to his group of potential quitters^{111 113 174}. Also, as doctors and health professionals can themselves trigger such unplanned quit attempts, systems should be in place to offer immediate support and/or referral to services when these are made. Few quit attempts involved the use of support from helplines and since these could be an immediate avenue of support and advice for those smokers making unplanned quit attempts, investigating why helplines are not used more frequently in such quit attempts could be useful. If lack of awareness about helplines explained their under-use, then raising awareness about their availability should, possibly, be a priority in tobacco control strategy. Similar issues may explain why few quitters reported use of internet-based cessation-support systems, though this could also have occurred because respondents had to record use of these as an open, free-text response and there was no dedicated category to record use of internet support on the study questionnaire.

5.4.4 Conclusions

It is clear that unplanned quit attempts are common amongst all socio-demographic groups and the majority of unplanned attempts are unsupported. It is widely accepted that a quit attempt which uses evidence-based cessation support is more likely to be successful, so it is important to find ways of offering and providing such support to smokers who don't plan cessation attempts in advance. Further research is needed in order to determine the best ways of doing this but our findings suggest that, as health professionals trigger many unplanned quit attempts, specific advice of how to obtain cessation support should be mandatory whenever a smoker who is receptive to the notion of attempting cessation, but has made no plans for this, is encountered.

**CHAPTER 6: A QUALITATIVE EXPLORATION OF THE USE OF
AND ATTITUDES TOWARDS SUPPORT IN A GROUP OF
SMOKERS AND EX-SMOKERS**

6.1 INTRODUCTION

Recent evidence from Canada¹⁴⁰, the UK¹⁴² and the US¹⁴¹ indicates that a substantial proportion of quit attempts are made without pre-planning, and this finding was replicated in chapter 5. Survey data reveal that smokers making unplanned quit attempts are less likely to use any form of evidence-based support to help them to stop^{141 175} but there has been no detailed exploration of how this group engage in quit attempts, why they may or may not choose to use support and their attitudes to the support currently available. Gaining a greater insight into these factors may result in the discovery of better ways to support those who make unplanned quit attempts, which ultimately could lead to higher numbers of these smokers using evidence-based cessation support, potentially increasing their likelihood of achieving abstinence. Consequently, this study was designed to learn more about and gain a greater understanding of unplanned attempts to quit smoking.

6.2 METHODS

6.2.1 Study design and participants

This was a qualitative study using semi-structured interviews. The study was approved by the Leicestershire, Northamptonshire and Rutland ethics committee. Potential interviewees were selected from smokers who had participated in a Nottingham general practice-based, cluster-randomised controlled trial (as described in Chapter 2), with all reporting themselves to be smokers at the end of this study in 2006. Potential interviewees responded to a questionnaire, sent in 2008, asking them about their smoking status and quitting behaviour, and whether they would be willing to discuss their quit attempts (as described in Chapter 5). We were interested to interview a selection of those who reported that their most recent quit attempt had been unplanned. In order to determine

whether a quit attempt was unplanned, we used the following question taken from the Smoking Toolkit Survey¹⁶⁷: “Which of these statements best describes how your attempt to stop smoking started?”. Potential responses were:

- **I did not plan the quit attempt in advance; I just did it**
- I planned the quit attempt for later the same day
- I planned the quit attempt the day beforehand
- I planned the quit attempt a few days beforehand
- I planned the quit attempt more than a week beforehand

Unplanned quit attempts were considered to be those for which the first option above was chosen; “I did not plan the quit attempt in advance; I just did it”. Any other response was considered to be a planned attempt. Where respondents agreed to discuss their quit attempt, purposive sampling was used to identify interviewees with varied ages, gender, socio-economic status and smoking status, and these people were invited for interview (socio-demographic data was collected at the time of completing the questionnaire). Of 297 individuals who gave consent to be contacted to discuss their experiences of quitting smoking, 180 smokers and ex-smokers were selected and sent a letter over a three month period inviting them to participate in an interview (Appendix VIII) and an accompanying information sheet providing further details on the study (Appendix IX). The term ‘one-to-one discussion’ was used in participant contact so as not to make potential participants feel intimidated at the thought of an interview.

6.2.2 Primary outcomes

The overall aim of the interviews was to gain a greater knowledge and understanding of the use of support, attitudes to support, reasons for success

and opinions on ways of better supporting smokers who make unplanned attempts to quit smoking.

6.2.3 Interviews

A semi-structured interview was used as it allowed the interviewer to ensure that essential topics were covered and to ensure continuity between interviews¹⁷⁶. A semi-structured interview guide (Appendix X) was developed from responses to the questionnaire detailed in Chapter 5 and previous literature on quitting smoking, with careful reference to that dealing with unplanned/spontaneous cessation. The guide covered interviewees' views on the following topics:

- Background to smoking behaviour
- Experiences of the quit attempt
- Support used
- Attitudes to support available
- Factors contributing to ease of quitting
- Ways in which attempts may be better supported

One idea that the interviewer specifically sought to explore with interviewees was the potential for a new way of providing a comprehensive package of pharmacological, behavioural and self-help support options and information to smokers who may try to quit, which for the purposes of the interview was referred to as a 'quit pack'. Such a resource is not currently available to smokers but may present a feasible means of giving smokers the opportunity to make an informed decision about the use of support. When asking interviewees their views on how they could have been better supported in quit attempts and

after they had finished stating their spontaneous thoughts on this topic, the interviewer specifically sought their views on the provision of such a resource.

Written informed consent to take part in the study was obtained from all participants who were informed that the interviews were confidential and that they could withdraw from the study at any point without penalty. Interviews were conducted in a quiet room at Nottingham City Hospital by the lead researcher (RM), either face to face or by telephone where this was not possible. Interviews lasted for approximately 30 minutes and were tape recorded for transcription.

6.2.4 Data analysis

Interviews were transcribed verbatim during the course of the interview process. The completeness of transcripts was checked and any missing data were checked against the original audio file and the transcripts amended where possible. The interviewer familiarised herself with the raw data by listening to interview tapes and reading transcripts in an iterative process to identify themes and subthemes and then indexed the data accordingly. Subsequent data analysis strategies are illustrated in Box 1. To facilitate a systematic inspection of text coded under each category, all transcripts were coded using the definitions agreed during early analysis (Appendix XI) and imported into NVivo 8, a qualitative data analysis package (QSR International Ltd, Melbourne, Australia). After coding all data, text relating to themes and categories relating to the study aims were collated and findings summarised. To assist interpretation of data, text relating to several issues of potential importance were 'charted', as per the Framework approach¹⁷⁷, to enable relationships between views held and interviewees with different characteristics to be explored. In line with the aims of this research, specific factors charted were

triggers, the nature of the quit attempt, self-reported nicotine dependence, the use of support, attitudes to support available, perceived reasons for success of quit attempts and ways of better supporting smokers who try and quit (Appendix XII). Trustworthiness was established through constant comparison. Findings are illustrated with appropriate, anonymised quotations in the subsequent results section, with identification by gender, success or failure of quit attempt and the nature of any support used.

Box 1: Data analysis strategies

A sub-sample of five transcripts were randomly selected and repetitively read by RM to identify the most important themes and categories arising from the interviews. Concepts and themes for this analysis were based on concepts emerging from the data with minimal imposition from RM. RM met with TC, SL and AM to discuss emergent themes, develop provisional definitions of these themes and identify areas for charting. RM then developed a coding framework and returned to the transcripts to develop definitions of each theme and category.

RM read the remaining transcripts to further develop sub-themes and categories, then met with TC, SL and AM to finalise definitions of themes and categories. All data relevant to each category were identified and coded by RM using constant comparison. RM completed a draft of the major findings, which was shared with TC, SL and AM. Areas of interest for charting were identified to allow the relationship between views held and interviewee characteristics to be compared. RM charted the data for further analysis and met with TC, AL and AM to discuss findings. RM then completed a second draft of the major findings, which was read by TC, AL and AM. Each transcript was then read by TC, SL or AM to increase reliability of observations.

6.3 RESULTS

6.3.1 Response and characteristics of interviewees

Of the 180 smokers and ex-smokers contacted and invited for interview, 59 (33%) responded and 32 (18%) agreed to participate, with 20 being interviewed and of these, 15 had been abstinent from smoking at the time of completing the questionnaire and were also abstinent at the time of interview. 55% of interviews were conducted face to face, 45% over the telephone. Of interviewees, 55% were male, the median age was 46.5 years (range 27-67 years) and median Townsend score 1.41, indicating a slightly greater level of material deprivation than average (IQR=7.49).

6.3.2 Triggers for quit attempts

A number of factors were reported as being important in triggering quit attempts. Commonly reported triggers included health concerns for themselves or a family member, a change in home or work situations, the introduction of smoke free legislation and knowing someone else who had quit. Less commonly reported triggers included some degree of 'aversive smoking' where smokers had smoked so much they didn't want to smoke any more, financial considerations, a lack of enjoyment of smoking, pregnancy, advertisements/seeing NHS stop smoking services and running out of cigarettes.

I think you certainly appreciate your health much more as you get older, and obviously you hear far more stories about people with problems like cancer, lung cancer, emphysema, and I was hearing more stories about that about people around my age group, so I thought it really is time to let go now, and I think that played quite a bit part of it to be honest.

Female, 59, successful, unsupported, spontaneous

I had a heart attack in February that prompted me to try again

Male, 38, unsuccessful, supported, delayed

I think I just sort of woke up, and it was the beginning of the 6 weeks holiday, and I didn't used to smoke much in the holidays anyway, because I probably wasn't so stressed,.....and I think I just decided, probably about the first or second day of the holidays, I thought 'well there's no point in thinking I'll have a break and start again because I won't be going back to that job' even though I was going back to work at the end of the 6 weeks holiday, so didn't, I just stopped.

Female, 59, successful, unsupported, spontaneous

There was the smoking ban, and I thought, what's the point of going out and, you can't have a cig you can't go in restaurants and have a cig, so I thought, pack it in.

Female, 41, successful, supported, delayed

I think what did influence me as well, my ex-husband, he packed in, and I thought, if he can do it, and my other friend, she packed in, I think just before I did, a few months she'd been packed in, and I thought, if Clare can do it, and she's younger, I think she's about 17 years younger than me, then I thought, if they can do it then I'm going to do it.

Female, 60, successful, supported, delayed

6.3.3 The nature of quit attempts: spontaneous vs delayed

Although all interviewees had reported that their quit attempt had been unplanned, there was a great deal of heterogeneity in what this meant in practice. One notable difference was that the amount of time which passed

between making the decision to quit and putting the decision into action varied between individuals. There were two distinct groups of interviewees who reported unplanned quit attempts who could be categorised by the amount of delay made; 'spontaneous' i.e. those who decided to quit and did so immediately and 'delayed' i.e. those who didn't stop immediately after deciding to quit. Those in the spontaneous group often reported stopping 'first thing in the morning' on the day that they had made their decision whereas the delayed group would often postpone initiating the attempt for up to a few days. One apparent difference between these two groups was the self-reported level of nicotine dependence of the interviewee whilst they were a smoker. All interviewees who reported that they were less or non-dependent on smoking had made a spontaneous quit attempt whereas more of those who were dependent on smoking delayed initiating their attempt after having made their decision to quit. A number of interviewees reported having cut down in the time leading up to the initiation of their quit attempt suggesting that the quit attempt when it happened was the end point of a long process, but this did not appear to differ between spontaneous and delayed attempts.

I went to somebody's birthday do in January and woke up with a hangover the next day, and I just did not fancy a cig one bit and I don't know what it was, I just had this feeling that came over me that said I'm never going to have one again

Male, 41, successful, supported, spontaneous

It was one afternoon at work, I thought, 'do you know what, I can't be doing with this anymore, I'm getting really fed up with it

So when you made that decision then at that point, did you smoke after that, when you thought you couldn't be bothered with it?

Yeah

For about how long?

About five days

Female, 46, unsuccessful, supported, delayed

About how long did you spend cutting down?

Um, 1 timed myself on hours. I did every three hours or sometimes I went over cos I forgot others I went before cos I was absolutely dying for a fag you know

Female, 43, unsuccessful, supported, delayed

I was a bit of an erratic smoker I suppose, but mainly a social smoker if I went to the pub with my friends you know, go out with about 20 and come back with about 2, so I'm thinking of in the pub, not that I used to go very often you understand.

Female, 38, successful, unsupported, spontaneous

In the time immediately before you quit, how dependent would you say you were?

Oh very, very.....oh dear, it was the hardest time of my life

Female, 60, successful, supported, delayed

6.3.4 Support used in 'true spontaneous' and 'delayed' unplanned quitters

Charting, as per the Framework method, was used to investigate differences in the reported use of support between interviewees making spontaneous and delayed quit attempts and revealed substantial differences. Support could be pharmacotherapy, behavioural support or alternative therapy. A minority (3/10) of spontaneous quit attempts were made with the use of support, whereas in contrast, the majority (9/10) of delayed quit attempts involved some form of support being accessed by the smoker. In some instances, it appeared that the time taken to seek support to quit may have been the reason for the time delay in implementing the decision to make a quit attempt.

I can't remember the exact time scale, although we did go to New Leaf together at the doctors.....it must have been a couple of days

Male, 27, successful, supported, delayed

Okay, so when you quit in August, can you remember did you plan it, did you set a date for it?

No, I was at a party with some friends who were heavy smokers, and I suddenly twigged at this party that they weren't smoking. I was so astonished I asked them why not and how, and they said they'd been hypnotized.... I think I got in within a matter of days if I recall (hypnotist).

Female, 41, successful, supported, delayed

6.3.5 Reasons for not using support

Some of the respondents indicated why they may choose not to use any support in their quit attempt and opinions on this were offered regardless of whether attempts were successful or unsuccessful, supported or unsupported and spontaneous or delayed. The main reasons expressed for this decision were a lack of time to access support, a dislike of taking medications, a thought that they could do it themselves, not approaching the GP as they were perceived to be too busy, NRT is too expensive to buy, they didn't want to attend group counselling sessions and were not able to access traditional services.

.....suppose I'd needed something, I probably wouldn't have got it. Me being me, I'm busy all the time and it would have been easier to just have a cigarette than go to the GP or try and get an inhalator or go to New Leaf when I've got no time to go to the things.

Female, 59, successful, unsupported, spontaneous

I don't particularly like taking pills, or potions, so no I didn't take anything

Male, 58, successful, unsupported, spontaneous

To be honest, I knew I could get these things, and that, but it never bothered me, I just thought I could do it on my own.

Male, 44, successful, unsupported, delayed

Ok, and have you ever consulted your GP about giving up smoking, or New Leaf?

No, not at all. You just associate them with being incredibly busy people and the last thing you want to do is go and chat in their surgery, god knows it is quite difficult to get an emergency appointment when you're dying, so you're not really going to go and visit them, do you see what I mean? That's the feeling I've always kind of had, so they are the last person I would go to to be honest.

Female, 38, successful, unsupported, spontaneous

6.3.6 Support for smokers who want to quit

The majority of participants thought that there was enough support and encouragement available to smokers who may try to quit smoking, regardless of whether their unplanned quit attempt was successful or unsuccessful, spontaneous or delayed or whether they used support or not. However, it sometimes appeared that although interviewees were aware of services available, they were not entirely sure of what that support entailed.

They've done quite a lot already haven't they.....they are doing all the advertising they can, you see hundreds of adverts, if you want to quit ring this number, so no, it is there, if you want it you've only got to pick up the phone, and you are sort of like in the system

Male, 38, unsuccessful, supported, delayed

I think there is a lot to offer, I see leaflets and poster all over my surgery about New Leaf, and in the chemists. There's also lots of products, and I've seen them on check-out in shops, in Wilkinson's, did all the bits and pieces, I think there is plenty there

Female, 38, successful, unsupported, spontaneous

Well, I mean we've got it all at work cos I work for the council so we've got New Leaf and everything there so it was all there if I'd wanted it it's just never really.... I don't know whether it's just got to be the right time to pack up and that was it

Male, 39, successful, unsupported, spontaneous

New Leaf? [local NHS SSS]. I remember seeing a stall there saying we could go and see a counsellor, have I got that wrong? That you could go and make an appointment or something, but I always thought it was a bit unclear about it all.

Female, 54, successful, unsupported, spontaneous

6.3.7 Perceptions of why quit attempts are successful

No differences were observed in opinions about the factors which might influence the success of quit attempts between smokers making spontaneous and delayed quit attempts. For both, a common emergent theme was that it needed to be the 'right time' for the smoker to quit and smokers needed to want to stop and make this decision for themselves, and this was irrespective of the amount of support available or any other factors which may have influenced the quit attempt. Once a quit attempt had been initiated, almost all interviewees identified having the right frame of mind and desire to quit as being a key factor for a quit attempt being successful. A number of interviewees reported that a change in situational factors had contributed to their quit attempt being successful and a minority of interviewees believed that 'significant others' (e.g. children or dependent partners) were particularly important external factors in influencing success at quitting smoking.

...I think each individual has got to, you can't push them into doing it, you can't make them, I think it is an individual choice in the end, but I think the help is there if anybody needed it

Female, 46, successful, supported, delayed

....you have got to want to stop, it's no good saying ooh well I'll try it if in your own mind you're not ready.....I mean it's like you can take a horse to water but you can't make it drink

Female, 67, unsuccessful, supported, spontaneous

I think, you've got to get your mind right, you've got to get it in your mind that you're not going to do it, and the replacement things help the cravings. If you haven't got it in your head that you're not going to stop, then you're not going to stop.

Male, 59, successful, supported, spontaneous

If you don't want to stop, you don't and it doesn't matter what people say or do to you, or no matter what the government, what campaign they start, you know, I think it is all totally irrelevant, and it is all down to the individuals mind.

Male, 41, successful, supported, spontaneous

I just made that decision, the decision was made, I knew I was going to do it, and I did it....I don't know, like I said I'd just got it firmly fixed, in my brain, I wanted to stop....there was just something in my mind that said now is the time, and that time was right for me.

Female, 60, successful, supported, delayed

I think it's mainly because everything has changed about, the environment I'm in, the situation, you know the family situation that I'm in so we moved to somewhere we didn't know anyone, um, got pregnant and then got pregnant again and um, we've developed new friends. We don't go to the pub any more, we hardly drink because we've got kids and, you know, we're just too tired to go out [laughs]haven't got any money to sort of go and live it up so um, i would say that that was instrumental really

Female, 35, successful, supported, delayed

I think it was probably because of my son, I mean it's just the one thing that you look at and think no, I'm not having him....no, once you think about it it's like you put to the back of your mind what damage you can do to yourself.....But when you think about what damage it can do to him it's....it just puts you off completely

Male, 39, successful, unsupported, spontaneous

6.3.8 Better supporting smokers

A small number of interviewees felt that whilst there was plenty of support available, there should be more emphasis on educating and raising the awareness of smokers as to what was available to help them quit. Some reported that they weren't really sure about what support was available. A number of interviewees reported that whilst there was enough support available, they thought the provision of support may be better provided if things were done somewhat differently. A broad spectrum of suggestions were made as to how to improve or change existing support provision, including differences in the way in which NRT was offered, more targeting of younger smokers, constant reinforcement of information to smokers and a different focus in media campaigns to better emphasise the day-to-day effects of smoking rather than just presenting a 'worst case scenario'.

I think if they [patches] were sold alongside cigarettes, they would seriously make people think, and if they were sold individually alongside cigarettes, it would be much better

Male, 59, successful, supported, spontaneous

I think they do enough with like the physical things, you know the sprays and patches and promoting and things like that.....But I think for younger ones they need something different.

Female, 59, successful, unsupported, spontaneous

But it is that reinforcement of information, you know, reminding them, and it has got to be fairly constant, because people will take it at different points in their lives, so it's got to be fairly regularly targeted I guess, rather than one offs here and there, it's always got to be around sort of thing. You might think, oh that was then, but maybe they're not doing it now because I've not heard about it for a while.

Female, 54, successful, unsupported, spontaneous

.....because I mean I know they do all the advertising on the cigarette packs and all that but they always go for the worst case scenario like these can cause heart disease and all this lot but they don't focus on the things well it just stinks and all that. If you tell somebody that they smell because they smoke I think that's more likely than saying ooh you might get cancer-well I might not.....But whatever, you will smell you will have bad teeth and you your house wants decorating every year or so 'cos you mess it up with nicotine and all that lot and that, I think that sort of thing gets to people more than saying ooh you might die because, well we all might die and I think that's the blase attitude people have

Male, 39, successful, unsupported, spontaneous

Several interviewees suggested ways in which access to and provision of existing services could be improved. Most commonly reported was the need for service provision to fit in better with their existing lifestyle, for example providing telephone support if they were not able to access traditional services (interviewees were not aware this was possible in some cases), a means of having access to NRT if they are not able to attend weekly meetings or having support available on a longer-term basis. When asked if smokers, including themselves, could be better supported in quit attempts, the majority of participants responded favourably to the specific suggestion of an alternative means of providing and accessing support, and these opinions did not differ between those making spontaneous and delayed quit attempts. Many of the participants were also supportive of the idea of stop smoking services being available in alternative, arguably more accessible, locations than currently

offered. One participant had made his quit attempt as a result of seeing a SSS stall in Nottingham city centre, whilst others felt that having stop smoking services in 'alternative' locations would increase the number of smokers who were aware of and had access to such support and would break down barriers to smokers making an initial contact with stop smoking services.

Yeah I couldn't er do [go to NHS SSS meeting]

Yeah ok. So if it was possible for you to have got support by telephone would that have appealed to you at all or is that not something for you?

Um, because I've never heard of it I don't know but maybe perhaps it would have done yeah

Would you be willing to try it possibly in the future if it....

Oh yes definitely

Female, 58, unsuccessful, supported, delayed

I went a week where I couldn't get any lozenges on prescription, where I was locked in meetings, and I couldn't get out. I've actually run out, so I have started smoking again. If people are willing to help you and give you, say, a week up front of advice and whether you need to help you stop smoking, then if you've got a week where you can't get out and get what you need, you've already got it there so you're not going to slip back to your old ways.

Female, 43, unsuccessful, supported, delayed

I just um I just think personally myself like I said before they don't give you long enough um and you know I think maybe 3 or 4 weeks my experience and you know or maybe a bit longer than that I can't quite remember and then they expect you to finish you know

Female, 58, unsuccessful, supported, delayed

I was walking through the market square and there was a marquee set up about stopping smoking, and so I went there and signed on there and then as I walked through the market square..... it was just convenient.....that they were there. I didn't know they were there, I just happened to be passing and I had a bit of spare time, and I thought 'Oh,

yeah', because up to then I had been thinking about it and kept postponing it sort of thing, I must make an appointment to go to the doctors, and the new leaf counsellor

Male, 59, successful, supported, spontaneous

6.3.9 Quit packs

When the suggestion of that some kind of 'quit pack' offering a range of pharmacological and behavioural support ideas was suggested to interviewees almost all participants were supportive of this, with the main reasons for support being that it would make the 'first move' towards quitting for the smoker and provide an opportunity to try different forms of NRT without the associated cost.

I think it is a good idea, because I believe human beings are quite lazy people basically, I think if you've got to go out and find it for yourself, unless they really, really want to do it, they are not going to look, whereas if someone is toying with the idea but really can't be bothered, if it is given to them I think they will be more likely to consider it, because they haven't got to do all the leg work themselves.

Female, 38, successful, unsupported, spontaneous

I think that would be a good thing because someone else is taking the first move rather than just leaving it up to them. You're giving them a choice aren't you in a way.....if they had in their hands, it would have been like me with the inhalator wouldn't it, if I'd had it. I mean, suppose I'd needed it, suppose I'd needed something, I probably wouldn't have got it. me being me, I'm busy all the time and it would have been easier to just have a cigarette than to go to the GP or try and get an inhalator or go to new leaf when I've got no time to go to the things.

Female, 59, successful, unsupported, spontaneous

Yes, it would be a reasonable idea, because that way you avoid having to fork out £10/15 for each of the things only to find that you can't stand the taste or smell or whatever.

Male, 58, successful, unsupported, spontaneous

6.4 DISCUSSION

6.4.1 Main findings

This study demonstrates that many quit attempts which are reported in surveys as 'unplanned' may actually involve substantial planning. Smokers making cessation attempts which they believe are 'unplanned' often delay initiating these and in some cases this delay is used to obtain available support to increase smokers' chances of achieving abstinence. However, most quit attempts which were truly 'spontaneous' and involved no delay in initiation, were made without support. Attitudes to the provision of support to assist quit attempts were generally positive, though, and most interviewees, whether making spontaneous or delayed cessation attempts reported that they would have been receptive to using support if it had been easily accessible and available.

6.4.2 Strengths and limitations

This is the first detailed qualitative research to investigate, with smokers and ex-smokers, triggers for unplanned quit attempts and the use of, and attitudes towards, support in these attempts. Purposive selection of interviewees as detailed earlier was made to ensure that individuals from both genders and a range of age and socio-economic groups were included in the study. The sample size was small, despite a large number of people being contacted to take part and it is possible that those who did not agree to participate in interviews may have held different views to those who volunteered. It is also possible that if a larger number of unsuccessful unplanned quit attempters were interviewed then stronger differences may have been found in opinions between these and successful quitters. A thorough description of the views of interviewees, however, has been reported from a range of age and socio-economic groups and a number of common themes identified.

Steps to ensure both the trustworthiness and generalisability of these results were taken at all stages of the research. The semi-structured interview allowed respondents the opportunity to express their views freely on topics covered and so allowed themes to emerge without constraint by the views of the interviewer, whilst the one-to-one nature of the interviews ensured that participants did not feel intimidated by the presence of others and thus would feel freer to express their own views. Given the factors just described it is, therefore, of minimal likelihood that these interviewees misrepresented their opinions. The emergence of a number of common themes increases the likelihood that as complete a picture as possible was gained from this group of interviewees on the principal issues covered in the interviews. Data analysis was conducted in as objective, rigorous and systematic approach as possible, both in the development of themes and categories used and their application to interview transcripts.

6.4.3 Comparison with previous research

This study has illustrated that when smokers talk about making 'unplanned' quit attempts these can often include substantial preparation. The decision to quit may be unplanned but a delay is often incurred before the attempt is implemented and this delay may or may not be a result of the time taken to seek support. No studies to date have looked specifically at how a smoker defines an 'unplanned' quit attempt; our finding that unplanned quit attempts may be spontaneous or delayed is a novel one. Four previous studies have reported that unplanned quit attempts are common and more likely to be successful than planned attempts^{140-142 175}. Although one of these studies had a clear definition of an 'unplanned' quit attempt (defined as a sudden decision not to smoke any more cigarettes, including those that might be remaining in the current pack)¹⁴⁰, the other three studies asked the same question and defined an

'unplanned' quit attempt as one which has the response of 'I did not plan the quit attempt in advance; I just did it'^{141 142 175}. This study has illustrated the need for a clearer, agreed definition of what constitutes an 'unplanned' quit attempt so that comparisons can be made between studies on this topic. Research into how to provide support to 'unplanned' quitters also relies on being able to accurately identify this group with any new definition.

The finding that unplanned (spontaneous) quit attempts appeared to have been more common in less dependent smokers is in line with the quantitative data presented by Ferguson and colleagues on this topic¹⁴¹. No research to date appears to have examined whether unplanned quit attempters have cut down their cigarette consumption in the time period leading up to the unplanned attempt, although the findings from this study do not suggest any difference between spontaneous and delayed quitters.

Differences were apparent in the support which interviewees reported using in true 'spontaneous' and 'delayed' quit attempts. The majority of spontaneous quit attempts were made without the use of support, whereas in contrast, the majority of delayed quit attempts were made with support which suggests that some people may have delayed or postponed their quit attempt in order to seek this out. Much research has focused on smokers' use of cessation support, but until this study no research had investigated how this differs between those who perceive that they plan their quit attempts and those who do not. Factors such as a perceived failure of NRT to control cravings and to help with the behavioural and psychological aspects of smoking, concern about the safety of NRT, a fear of becoming addicted to NRT, NRT use being a sign of being weak-willed and the cost of NRT have all been identified as reasons for smokers choosing not to use NRT in a quit attempt in the wider context of smoking cessation^{110 178-183}. Despite being available on prescription, many smokers perceive NRT to be

relatively inaccessible and this may in part explain the finding that NRT was not widely used reported in this study. Previous research has reported that some smokers chose not to get a prescription for NRT as they feared the time delay involved in making an appointment with their GP will delay their quit attempt¹⁷⁸ and this may in part explain why spontaneous quitters for the most part used no support in their quit attempt whereas the majority of quit attempts using support were delayed. Whilst this study examines whether unplanned quit attempts were made with or without the use of support, the reasons for smokers making this decision have not been fully explored. Although some insight was gained into possible reasons why smokers may not use support in their quit attempt, further research is warranted to see whether there are further underlying factors which should be addressed to increase smokers' use of effective cessation support.

Whilst it has been shown that pharmacological support may help to quit smoking, willpower has been reported to be the key factor which determines long term abstinence¹⁰³ and willpower is unaffected by medications¹⁷⁸. Another study has reported that some smokers may perceive a greater sense of achievement gained by quitting through willpower alone and this is the only way to achieve effective cessation¹⁸³, potentially limiting the utility of smoking cessation medications for a number of smokers unless beliefs and attitudes can be changed. It has been suggested that those smokers who choose to use stop smoking medications are likely to have a lower self-efficacy to stop smoking¹⁷⁸¹⁸⁴, and thus potentially are less likely to quit successfully from the outset. Willpower was identified by a majority of interviewees as being important for a quit attempt to be successful, regardless of whether their quit attempt had been successful or not. Whilst this suggestion potentially offers a partial explanation for the finding that more of the true 'spontaneous' quitters were successful and chose to not use support, further research is certainly required in this area to

determine if there are any other factors related to a smokers choice to use or not use support, and if this is related to the success of the quit attempt.

In particular, it would be of interest and importance to further explore the issues already discussed in relation to PRIME theory⁵⁰. PRIME theory (plans, responses, impulses/inhibitory forces, motives and evaluations) proposes that higher elements influence each other, i.e. plans influence evaluations which subsequently influence motives which act through impulses or inhibitory forces to directly influence behaviour. The human motivational system is suggested to be highly influenced by the moment, thus explaining why 'spontaneous' attempts to quit smoking may be initiated. According to PRIME theory, the one factor which provides the motivational system with some stability is the concept of 'identity' and the labels we give ourselves. For example, West suggests that an image of being an 'ex-smoker' is an important factor in resisting a temptation to smoke after a quit attempt has been initiated. Whilst the current study did find a suggestion that the smoker had to be in the right frame of mind for the attempt to be successful, it did not specifically examine how smokers identified themselves once the quit attempt had been initiated and this is an interesting avenue for future research.

Although the majority of smokers reported that they thought there was enough support available to smokers who wanted to quit, it is possible that smokers are not fully aware of the full range of support that is available to them and thus are basing their opinions on the level and suitability of support available on their own knowledge rather than actual fact. There is a lack of published research investigating smokers knowledge and views of smoking cessation support available and whilst we did not explore this possibility in any depth in these interviews, it remains an interesting avenue for future research to address this issue more fully. Smokers who have made unplanned quit attempts were

generally receptive to the idea of support being provided in a more accessible and rapid way and these opinions did not differ between those making spontaneous and delayed quit attempts or those who had used or not used support. Very few participants in this study had made a conscious decision to not use any support in their quit attempt. A number of previous studies have been conducted looking at ways access to stop smoking services could be improved, and many of these findings may be applicable to smokers who make unplanned attempts to quit smoking. These include providing a service which utilizes a drop in system so that smokers do not need to pre-book appointments^{118 119} and providing community based support, e.g. in pharmacies that may be more immediately accessible to this group of potential quitters^{111 113 174}. As previously discussed, a delay in the access to NRT and/or behavioural support may well be a factor which discourages smokers from using support and so overcoming this potential barrier may increase the use of NRT and/or behavioural support. Expense is another factor which has previously been suggested as a reason for not using NRT¹⁷⁸, and this would become a more pertinent issue for those more disadvantaged smokers who choose not to obtain prescription NRT. Indeed, cost was acknowledged by some interviewees in this study as a reason for not using NRT. Engaging smokers in using support at an appropriate time, without the need to delay their quit attempt in order to achieve this, may be a potential means of increasing smokers' uptake of effective cessation support and subsequently quit rates.

Previous research suggested that the most immediate forms of support available, i.e. telephone and internet support, were not largely used by potential quitters¹⁷⁵, although this may have been due to a lack of awareness of the availability of such services. In addition to promoting immediately accessible telephone and internet support, it seems likely that providing pharmacological and/or behavioural support in a quick and acceptable manner to those making

unplanned quit attempts would increase uptake and potentially increase quit rates. Further research is needed to determine why potential quitters may not choose to access these particular forms of support. It is possible that publicity and education about these services may be an important area for future development in order to better support unplanned quitters who would have a greater need for immediate support.

6.4.4 Conclusions

This is the first research to show that smokers' reports of 'unplanned' quit attempts may indeed involve elements of planning and delay, often in order to gain access to cessation support. Further research is needed to delineate what smokers mean by an 'unplanned' quit attempt before inferences can be made about their occurrence and success relative to 'planned' attempts. The fact that 'unplanned' quitters may actually delay the initiation of their quit attempt provides an opportunity for health services to offer cessation support to a group of quitters who may be considered 'unreachable' due to the perceived way in which they make their quit attempt, i.e. generally in a very short space of time and without an interest in using support services. The majority of smokers and ex-smokers interviewed were receptive to the idea of support being immediately available whether or not their quit attempt involved support or not, thus these findings have clear implications for future research and policy implementation. In order to specifically support those smokers who make their quit attempt spontaneously, investigation is needed into ways in which smoking cessation support can be made available to potential quitters within a much shorter timescale, and the type of support they would be most likely to use. However, future research should also address the question of why unplanned, and often unsupported quit attempts appear more likely to be successful than those which

are planned. Further investigation of factors influencing smokers' choice to use or not use evidence-based cessation support and their knowledge of the range of support available is important to determine how to better support all smokers, regardless of whether their quit attempt is planned or not.

***CHAPTER 7: SUMMARY CONCLUSIONS AND
FUTURE DIRECTIONS***

The overall aim of this thesis was to investigate smokers' use of effective smoking cessation support, and explore novel approaches to providing support. This thesis has shown clearly that opportunities to support smokers who want to quit smoking are being missed.

The main trial detailed in this thesis was to investigate whether a proactive approach to identifying smokers and offering evidence-based support to help them quit smoking was a feasible approach, which would not only increase smoking quit rates but also increase access to NHS stop smoking services. Smokers were identified from their electronic primary care medical record and contacted by the GP who offered smoking cessation support and thus the first step to testing this approach was to assess whether primary care records were sufficiently complete and accurate to allow identification of smokers in this way.

Well established clinical guidelines recommend that systematic ascertainment of smoking status and intervention to promote cessation in all smokers should be a fundamental component of all health care provision. Being able to identify smokers from primary records is clearly a vital first step in providing any primary care based intervention aimed at targeting and supporting smokers. The findings presented in chapter 3, however, indicate that systematic failure to ascertain smoking behaviour in primary care continued after the introduction of the 2004 GP contract with over 20% of recorded data being inaccurate. Consequently, major opportunities to promote smoking cessation were probably still being missed as GPs can't intervene against smoking unless the patients smoking status is actually recorded. It was also found that over 1 in 10 (13%) of smokers in primary care are interested in talking to smoking cessation advisors about receiving support to help them quit smoking when questioned. This emphasises the importance of being able to accurately identify smokers

from medical records in order to facilitate cessation support being offered to primary care patients who are likely to accept it.

Since chapter 3 found that there was clearly a demand for smoking cessation support if offered to smokers and, although not perfect, primary care records offered a tool for identifying the large majority of smokers within a general practice, the study proposed in chapter 4 appeared to offer a feasible and promising method of increasing smokers use of effective cessation support and quit rates. This found a proactive approach was effective in increasing the number of smokers attending the local NHS SSS and the number of smokers reporting making quit attempts. At a population level, however, the intervention had no significant impact on quit rates although validated quit rates were significantly higher in the intervention group when post-hoc analyses were restricted to those smokers who had initially requested contact with a stop smoking advisor for advice on quitting, and thus a proactive approach may be more effective in smokers who are more motivated to want to try and quit.

Whilst this intervention had a limited effect at a population level, even a small effect has the potential to make a significant impact on national smoking prevalence. A replication of the study in a larger population would be justified given the positive findings among those wanting help. It is possible that the follow up period was too short and more time would be needed for smokers to achieve cessation and so future research should be conducted over a longer time period to see if this has any effect on outcomes. The significant effect among those originally requesting advice from a stop smoking advisor indicates that the approach is successful if smokers motivated to help are able to be identified easily. Given the method employed to identify smokers in this study was time and resource intensive, future research should look at alternative means of

identifying this group of smokers in a more cost effective manner, for example via a promotion at a community event or location.

The finding that a significant effect was seen in smokers who were more motivated to quit adds to the importance of maintaining up-to-date smoking records within primary care and the recommendation that GPs should offer brief smoking cessation advice and establish a smoker's desire to receive smoking cessation support in primary care consultations. The challenge for the UK NHS is to find ways of engaging these smokers', capitalise on their interest in receiving cessation advice and potentially translate this interest into higher quit rates. As the study was effective in increasing smokers' access to NHS stop smoking services, another possibility is that the service, for whatever reason, did not effectively respond to the needs of the individual smokers attending appointments. Further research with smokers who have used services but not achieved abstinence, particularly of a qualitative nature, may be useful in delineating reasons for the findings of this study and identifying areas in which services may need to adjust their working practice to better meet the needs of clients.

Whilst proving to have some effectiveness, the intervention detailed in chapter 4 required a large amount of advance planning; from contacting smokers and establishing their interest in attending stop smoking clinics to booking their appointments which in some cases may have been days or even weeks after the initial telephone contact was made. Alternative ways of proactively identifying smokers should be explored.

As recent evidence suggests that not all quit attempts are planned^{140 142}, the study in chapter 5 was designed to investigate the occurrence and determinants of both planned and unplanned attempts, and the sources of support that may or

may not be used in these attempts among a group of current and ex-smokers. It also aimed to determine whether existing NHS stop smoking services need to adapt to meet the needs of 'unplanned' quitters. The results of this study showed that over a third of all quit attempts analysed were made without any pre-planning, were most commonly initiated by advice to quit from a GP or health professional and that these attempts were less likely to involve the use of any evidence-based support to help them quit. Although more common in men than women, unplanned quit attempts were equally employed across both socio-economic and age groups.

The finding that advice from a GP or health professional was the most commonly reported trigger for a smoker making an unplanned quit attempt in chapter 5 is yet another illustration of the importance of accurate and complete recording of smoking status in primary care medical records and the potential benefits which may be gained from GPs offering brief smoking cessation advice in all consultations with smokers. Further research should focus on ways of encouraging and improving the delivery of smoking cessation advice in primary care and referral to support systems that are accessible to smokers.

Those who chose to make their quit attempt without any pre-planning may be considered 'unreachable' or 'unsuitable' for the type of proactive intervention detailed previously. This group of smokers are likely to be keen to initiate their quit attempt as soon as the decision is made and thus may not be willing to experience the inevitable time delay involved from the point of making the initial contact with the smoker to the booking of and ultimate attendance at an NHS SSS. However, as evidence from randomised studies suggests that support increases the success rate of quit attempts by up to four fold⁵⁶, it is important to find ways of offering and providing such support to smokers who don't plan cessation attempts in advance immediately and effectively, as they appear to

represent a significant minority of smokers who make a quit attempt. In order to successfully do this, it is necessary to gain a greater understanding of how and why smokers go about unplanned quit attempts. The qualitative research in Chapter 6 enabled an exploration of unplanned attempts to quit smoking in a group of current and ex-smokers.

Perhaps the most interesting and important finding reported in chapter 6 was that many quit attempts which are reported in surveys as 'unplanned' may actually involve substantial planning. Smokers making cessation attempts which they believe are 'unplanned' often delay initiating these and in some cases this delay is used to obtain available support to increase smokers' chances of achieving abstinence. Further research should build on these findings to attempt to find alternative terminology to describe better the substantial number of smokers who report making 'unplanned' quit attempts so that they can be appropriately categorised and supported. Although not all chose to use support in their quit attempt, the majority of smokers and ex-smokers interviewed were receptive to the idea of using support if it had been accessible and readily available. Further exploration of why smokers' choose to use or not use evidence-based cessation support would be helpful. Further research to explore ways of ensuring that smokers are fully aware of all the various types of support available to them would also appear helpful as this appeared to be a potential issue for some interviewees.

The finding that interviewees were generally receptive to the idea of using support, combined with the finding that many 'unplanned' quitters actually delay making their quit attempts, suggests that this group of smokers may not be as 'unreachable' in terms of support provision as may have been previously assumed and has clear implications for future research and policy implementation. In order to specifically support those smokers who make their

quit attempt spontaneously, investigation is needed into ways in which smoking cessation support can be made available to potential quitters within a much shorter timescale. If the idea of some kind of 'quit pack' was to be developed further, exploration of both the content and the ways in which such a product should be marketed and made available to smokers to ensure optimum uptake and effectiveness are also an important avenue for future research and should be a priority in the tobacco control field.

Whilst this thesis has highlighted that recording of smoking status and provision of brief cessation advice in primary care may provide an avenue to cessation, it is important to continue exploring the processes of attempts to quit smoking with potential quitters. It is very clear that there are many different ways in which smokers make their quit attempts which may have varying requirements for support. Further research is needed in order to determine the best ways of supporting different groups of smokers who want to, or are trying to quit, rather than assuming a 'one size fits all' model will be an effective strategy to reduce smoking prevalence and smoking related mortality and morbidity in the UK or worldwide.

APPENDICES

APPENDIX I: Initial questionnaire



--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



The University of
Nottingham



Please fill in the questionnaire as shown. For letters or numbers please complete as follows:

ABC or 0123

For most questions just cross the relevant box like this ☒

First Name

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Last Name

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Date of birth

		/			/				
--	--	---	--	--	---	--	--	--	--

Sex

Male

☐

Female

☐

Please provide details of your smoking:

(1) Have you smoked any cigarettes or tobacco in the last year?

YES

☐

NO

☐

If you answered 'Yes', please continue to Question 2 below. If you answered 'No', you have finished and may post the questionnaire back.

(2) How often do you usually smoke cigarettes?

Every day

☐

Most days

☐

Occasionally

☐

Never

☐

If you answered 'Every day' or 'Most days', please continue to Question 3 below. If you have answered 'Occasionally' or 'Never' then please continue over the page.

(3) On average, how many cigarettes do you smoke each day?

10 or less

☐

11 to 20

☐

21 to 30

☐

31 to 40

☐

41 or more

☐

PLEASE TURN OVER



510

(1)





Consent

I consent to have the information on this questionnaire shared with the University of Nottingham. I understand that I may be asked to fill in another questionnaire at a later date.

Signed: _____

Date

		/			/				
--	--	---	--	--	---	--	--	--	--

Would you like advice or support to stop smoking?

A specialist smoking cessation adviser can contact you to provide advice or support to stop smoking, and to tell you what services are available to help you stop smoking. Please note that, as the study will be continuing over a number of months, you may not be contacted immediately.

Would you like to talk to a smoking cessation adviser?

YES ☐

NO ☐

If YES continue below, if NO you have finished and may post the questionnaire back

Please could you give us a telephone number to contact you on, and put a cross in the boxes to tell us the best times to contact you.

		Morning 10am-12pm	Afternoon 1-4pm	Evening 5-7pm										
Home Telephone	<table border="1"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>											<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work Telephone	<table border="1"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>											<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mobile Telephone	<table border="1"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>											<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please put a cross here, if you don't have a phone and we will send further information by post ☐

THANK YOU FOR YOUR TIME. PLEASE RETURN THIS QUESTIONNAIRE TO THE PRACTICE IN THE ENVELOPE PROVIDED



510

(2)



APPENDIX II: Initial letter

Dear Patient,

We are currently checking the information that we have on our practice records on whether or not you smoke. To update our records we would like you to complete and return the enclosed questionnaire.

In addition, with your agreement, we would like to share this information with researchers from the University of Nottingham who are carrying out a research study to try out a new way of providing help and advice to smokers who want to stop. This research is funded by the British Heart Foundation.

If you agree to share this information with the researchers please sign the consent form on the questionnaire. The research team may ask you to fill in another short questionnaire at a later date. If you smoke, and would like support to stop smoking please tick the relevant box on the questionnaire and the research team can arrange for someone to contact you. Your answers will be totally confidential and seen only by researchers at the University of Nottingham. You are under no obligation to take part and can withdraw at any time without this affecting your care from the practice in any way.

For further information about the research study you may contact Rachael Murray at the Division of Respiratory Medicine, Clinical Sciences Building, Nottingham City Hospital, Nottingham NG5 1PB. Tel 0115 840 4759.

Many thanks for your help,

Rachael Murray

APPENDIX III: Telephone script

Hello, my name is Rachael and I am calling from the University of Nottingham. You recently returned a form to your GP at thepractice to say that you would like advice on stopping smoking?

The fact that you are considering giving up is excellent and we would like to provide you with any help and assistance that you may need.

Have you tried giving up before?

How are you feeling about giving up now?

Have you heard about or used the New Leaf (or Fresh Start) service before?

If no: Free weekly support service for 6-8 weeks (less or more if you need)

Run district wide sessions and you have a choice of where to attend

If you are entitled to free prescriptions you can receive up to 8 weeks of NRT vouchers and upto 4 weeks from your GP after that. If not, you can receive NRT and/or zyban cheaper on prescription from your doctor.

If yes: how would you feel about going again?

Do you know anything about NRT or zyban?

They can be used to help manage your withdrawal symptoms. NRT is available in several forms and zyban is a tablet that reduces your desire to smoke, although it is not suitable for everyone. The New Leaf advisor can tell you more about these and discuss which is best for you.

We can make an appointment for you to see a New Leaf advisor who can prepare a smoking cessation plan based on your individual needs if you would like?

If no: would you like me to send you some information in the post so you can think about it in your own time?

If yes: where would be the best place for you to attend a session with New Leaf? I can book that for you and call back to confirm.

Potential questions:

Will I have to pay?

The New Leaf service is free. The medications will be charged at prescription prices unless you are exempt from payment in which case they are free.

How long do I have to see an advisor for?

This is entirely up to you but we would suggest 8 weekly sessions as this has been shown to provide the best chance of quitting. Whilst we would encourage you to attend you are under no obligation. The service is there to support you in your quit attempt but not put you under any pressure.

Can I choose whether to use NRT products or zyban?

Zyban is not suitable for everyone but once you have received advice on the various products available the advisor will support you in your decision of whichever options are available to you. Research has shown that using the right medication in combination with advice and support from cessation advisors can significantly increase your chances of quitting.

APPENDIX IV: Follow up questionnaire



Please fill in the questionnaire as shown
For letters or numbers please complete as follows:

A	B	C
---	---	---

 or

0	1	2	3
---	---	---	---



The University of
Nottingham



For most questions just cross the relevant box like this ☒

First Name _____ Last Name _____

(1) Please provide your postcode

--	--	--	--	--	--	--

(2) Have you smoked any cigarettes or tobacco in the last 7 days?

Yes ☐ No ☐

If you answered 'Yes', please continue to question 3. If you answered 'No' go to question 7.

(3) How often do you usually smoke cigarettes?

Every day ☐
Most days ☐
Occasionally ☐
Never ☐

If you answered 'Every day' or 'Most days' please continue to question 4. If you answered 'Occasionally' or 'Never' please go to question 7.

(4) On average, how many cigarettes do you smoke each day?

10 or less <input type="checkbox"/>	31 to 40 <input type="checkbox"/>
11 to 20 <input type="checkbox"/>	41 or more <input type="checkbox"/>
21 to 30 <input type="checkbox"/>	

(5) Would you like to give up smoking?

Yes ☐ No ☐

(6) In the last 6 MONTHS have you tried to give up smoking?

Yes ☐ No ☐

If 'YES', how many of these tries at giving up have lasted longer than 24 hours?

None ☐ One ☐ Two ☐ Three or more ☐

PLEASE TURN OVER



505

University of Nottingham

(1)



1

(7) How long is it since you smoked your last cigarette?

Within the last 7 days ☐ Between 3 months and 6 months ☐

Between 8 days and 1 month ☐ Longer than 6 months ☐

Between 1 month and 3 months ☐

(8) In the last 6 months, have you been given advice on smoking by any health professional?

Yes ☐ No ☐

If 'YES', who gave you advice? *Please put a cross in all the boxes that apply*

One of the research study team	<input type="checkbox"/>	Pharmacist	<input type="checkbox"/>
Specialist smoking cessation adviser	<input type="checkbox"/>	GP/Family doctor	<input type="checkbox"/>
Consultant/hospital doctor	<input type="checkbox"/>	Other health professional	<input type="checkbox"/>

please specify _____

(9) **Have you seen a smoking cessation adviser from New Leaf, the local NHS Stop Smoking Service, in the last 6 months?**

Yes ☐ No ☐ I tried but was unable to make an appointment ☐

(10) Are you happy for us to share the information on this questionnaire with your GP?

Yes ☐ No ☐

(11) If you have stopped smoking, are you happy for us to contact you to take a saliva (spit) sample to confirm this?

Yes ☐ No ☐

If you answered 'Yes' to the last question please could you provide a telephone number for us to contact you on and mark with a cross the best time to contact you. If you answered 'No' you have finished and may post the questionnaire back.

[illegible]

Please put a cross here if you do not have a phone and we will contact you by post

THANK YOU FOR YOUR TIME. PLEASE RETURN THIS QUESTIONNAIRE IN THE ENVELOPE PROVIDED

11

APPENDIX V: Follow up letter

Dear

You may remember completing a questionnaire about 6 months ago asking whether you smoke. Thank you very much! This was part of a research study to identify smokers in general practices in Nottingham, and to try a new way of providing advice and support to people who want to stop smoking. This research is funded by the British Heart Foundation.

In this second and final questionnaire we want to ask you a few further questions about your smoking, and would be grateful if you could return the questionnaire to us in the FREEPOST envelope provided.

When you answered the first questionnaire you may have requested support to help you stop smoking. If you have not yet been contacted and would like help to stop smoking you will be contacted very soon.

Many thanks for your help,
Best wishes,

Rachael Murray
Division of Respiratory Medicine,
University of Nottingham,
Clinical Sciences Building,
Nottingham,
NG5 1PB.
Tel 0115 8231932

APPENDIX VI: Final questionnaire

[illegible][illegible]



10. Apart from you, does anyone you live with smoke/use tobacco products at home?

- | | |
|---|---|
| <input type="checkbox"/> No – Go to Q12 | <input type="checkbox"/> Yes-1 person |
| <input type="checkbox"/> Yes-2 people | <input type="checkbox"/> Yes-3 people + |

11. If yes, who? (Choose **all that apply**)

- | | |
|----------------------------------|---------------------------------|
| <input type="checkbox"/> Partner | <input type="checkbox"/> Parent |
| <input type="checkbox"/> Child | <input type="checkbox"/> Other |

12. In your home, is there any restriction on smoking?

- | | | |
|-------------------------------|---|--|
| <input type="checkbox"/> None | <input type="checkbox"/> Forbidden in certain areas | <input type="checkbox"/> Forbidden in all indoor areas |
|-------------------------------|---|--|

ATTEMPTS TO QUIT – PLEASE COMPLETE THIS SECTION EVEN IF YOU ARE NOT CURRENTLY SMOKING

13. Have you made a serious attempt to stop smoking in the past 12 months? By serious attempt we mean you decided that you would try to make sure you never smoked another cigarette. Please include any attempt you are currently making.

- | | | |
|--|--|---|
| <input type="checkbox"/> Yes - Go to Q14 | <input type="checkbox"/> Have not smoked in over 12 months – Go to Q17 | <input type="checkbox"/> No - Go to Q22 |
|--|--|---|

14. How many serious attempts to stop smoking have you made in the last 12 months (Choose **one** option only)

- | | |
|-------------------------------------|---|
| <input type="checkbox"/> 1 attempt | <input type="checkbox"/> 2 attempts |
| <input type="checkbox"/> 3 attempts | <input type="checkbox"/> More than 3 attempts |
| <input type="checkbox"/> Don't know | |

15. How long ago did your attempt to stop smoking start? (Choose **one** from the list for each of your quit attempts in the last 12 months)

	Most recent quit attempt	Next most recent quit attempt	Third most recent quit attempt
In the last week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than a week and up to a month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 1 month and up to 2 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 2 months and up to 3 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 3 months and up to 6 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 6 months and up to 1 year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't remember	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



16. How long did your attempt to stop smoking last before you went back to smoking? (choose **one** from the list for each of your quit attempts)

	Most recent quit attempt	Next most recent quit attempt	Third most recent quit attempt
Still not smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Less than a day	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Less than a week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than a week up to a month	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 1 month and up to 2 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 2 months and up to 3 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 3 months and up to 6 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More than 6 months and up to 1 year	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't remember	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. In your recent quit attempts, did you set a date for stopping smoking? (If you have not smoked for over 12 months, please comment only on your current attempt which started 12 months ago or more)

	Most recent quit attempt	Next most recent quit attempt	Third most recent quit attempt
Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cannot remember	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Did you cut down the amount you smoked before trying to stop completely?
(Choose **one** response for each quit attempt)

	Most recent quit attempt	Next most recent quit attempt	Third most recent quit attempt
Cut down first	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stopped without cutting down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cannot remember	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Which, if any, of the following did you try to help you **stop** smoking? (Choose **all that apply** for each quit attempt)

	Most recent quit attempt	Next most recent quit attempt	Third most recent quit attempt
Nicotine replacement product (e.g. patches/gum/inhaler) without a prescription	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nicotine replacement product on prescription or given to you by a health professional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zyban (bupropion)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chamipix (varenicline)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attended an NHS Stop Smoking Service group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attended an NHS Stop Smoking Service one to one counselling session	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoking helplines such as NHS smoking helpline or Quitline etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Something else: please write in	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None of these	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can't remember	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Which of these statements best describes how your attempt to stop smoking started? (Choose **one** response for each quit attempt)

	Most recent quit attempt	Next most recent quit attempt	Third most recent quit attempt
I did not plan the quit attempt in advance; I just did it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I planned the quit attempt for later the same day	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I planned the quit attempt the day beforehand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I planned the quit attempt a few days beforehand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I planned the quit attempt more than a week beforehand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. What **finally** triggered your attempt to stop smoking? (Choose **all that apply** for each quit attempt)

	Most recent quit attempt	Next most recent quit attempt	Third most recent quit attempt
Advice from a GP/health professional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TV advert for an NRT product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government radio/tv/press advert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hearing about a new stop smoking product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A decision that smoking was too expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being faced with smoking restrictions as a result of the smoking ban	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I knew someone else that was stopping smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seeing a health warning on a cigarette packet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being contacted by my local NHS stop smoking service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health problems I had at the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preventing passive smoking to family/friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pressure from family/friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health problems of family member/friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pregnancy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Something else-please state	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nothing in particular	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cannot remember	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CUTTING DOWN

22. Have you cut down the amount you smoke in the last 12 months?

- ☐ Yes – Go to Q23
 ☐ No – Go to Q24
 ☐ Have not smoked in the last 12 months – Go to Q25

23. Which if any of the following are you currently using/have you used in the last 12 months to help you **cut down** the amount you smoke? (Choose **any** that apply)

- | | |
|--|---|
| <input type="checkbox"/> Nicotine replacement gum | <input type="checkbox"/> Nicotine replacement nasal spray |
| <input type="checkbox"/> Nicotine replacement lozenges/tablets | <input type="checkbox"/> Nicotine patch |
| <input type="checkbox"/> Nicotine replacement inhaler | <input type="checkbox"/> None of these |



24. If you have not tried to stop smoking, why is this? (Choose **all that apply**)

- | | |
|---|--|
| <input type="checkbox"/> I enjoy smoking too much | <input type="checkbox"/> I don't want to stop |
| <input type="checkbox"/> I don't want to put on weight | <input type="checkbox"/> I don't think I can do it |
| <input type="checkbox"/> I don't want to go through withdrawal symptoms | <input type="checkbox"/> Smoking is a big part of my social activities |
| <input type="checkbox"/> I need to smoke to handle stress | <input type="checkbox"/> Other (please specify) _____ |

ABOUT YOU

25. What is your marital status?

- | | |
|---|----------------------------------|
| <input type="checkbox"/> Married or living with a partner | <input type="checkbox"/> Single |
| <input type="checkbox"/> Divorced or separated | <input type="checkbox"/> Widowed |

26. What is your ethnic group?

- | | |
|---|--|
| <input type="checkbox"/> White / Caucasian | <input type="checkbox"/> Mixed |
| <input type="checkbox"/> Asian / Asian British | <input type="checkbox"/> Black / Black British |
| <input type="checkbox"/> Other (please specify) _____ | |

27. What is your employment status?

- | | |
|---|---|
| <input type="checkbox"/> Employed / self employed full time | <input type="checkbox"/> Employed / self employed part time |
| <input type="checkbox"/> Unemployed | <input type="checkbox"/> Retired |
| <input type="checkbox"/> Student | |

28. What is the highest level of education you have completed?

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> Secondary or high school | <input type="checkbox"/> College |
| <input type="checkbox"/> Undergraduate | <input type="checkbox"/> Postgraduate |

29. What is your current housing status?

- | | |
|---|---|
| <input type="checkbox"/> Owner | <input type="checkbox"/> Privately renting |
| <input type="checkbox"/> Council / housing association rental | <input type="checkbox"/> Living with friends / family |
| <input type="checkbox"/> Other | |

30. How many adults and children aged under 18 currently live in your household?

adults

children under 18



31. On how many days per week do you take more than 30 minutes of exercise?

- ☐ None ☐ 1-2
☐ 3-4 ☐ 5+

32. Do you currently, or have you ever suffered from any of the following conditions?

- ☐ Heart disease ☐ Respiratory illness, e.g. COPD and asthma
☐ Cancer ☐ Depression / mental illness

33. We would like to contact some people at a later date to discuss further their experiences of attempting to quit smoking. Would you be willing for us to contact you?

- ☐ Yes ☐ No

34. We may wish to re-contact people at a later date for further research. Would you be willing for us to contact you?

- ☐ Yes ☐ No

35. Your General Practice may wish to update your medical record with your current smoking status. Do you consent for us to provide them with this information? If you do not want your GP informed of this information, your participation in this study and future medical care will not be affected.

- ☐ Yes ☐ No

If you have recently changed your address, please provide your new contact details below.

Address 1:

Address 2:

City:

Postcode:

Thank you for taking part in this survey. Please return the questionnaire in the freepost envelope provided.

APPENDIX VII: Final letter

Date
ID



The University of
Nottingham

Dear

A questionnaire survey into spontaneous smoking cessation

In 2005, you provided information on smoking to your GP. You kindly gave consent for that information to be passed on to researchers from the University of Nottingham and responded to a follow-up questionnaire from us in 2006. Thank you very much for your contribution to this point.

This information was extremely useful in helping us to understand the sources of advice and support many smokers use to help them quit. We would now like to ask you some further questions to find out more about your smoking, and especially about any attempts you have made to stop smoking and the things that have helped or hindered you in trying to quit.

We would be very grateful if you would complete this questionnaire **whether or not you are currently smoking**, and **whether or not you are trying to quit**. Completion of the questionnaire is entirely voluntary, and should take no more than 10 minutes of your time.

Please return the questionnaire to us in the FREEPOST envelope provided. As a thank you for your time, we will be sending a £5 gift voucher to all those people who return their completed questionnaire to us.

Also, if you would be willing to be contacted at a later date to further discuss your experiences of trying to quit smoking, please indicate this in the box provided.

If you have any questions about the study please contact Rachael Murray (details below).

Yours sincerely,

Rachael Murray
Cancer Research UK Graduate Training Fellow
Division of Epidemiology and Public Health,
Clinical Science Building,
Nottingham City Hospital,
FREEPOST NG4809,
Nottingham NG5 1BR.
Phone 0115 823 1932
Email: rachael.murray@nottingham.ac.uk

APPENDIX VIII: Invitation to interview

Dear

A study to explore spontaneous smoking cessation

You recently completed a questionnaire on your smoking habits and attempts to quit smoking. Thank you very much. This is part of a research study funded by Cancer Research UK to try and find ways to help smokers who want to stop smoking. You indicated on the questionnaire that you would be willing to further discuss your experiences of attempting to quit smoking and we would like to invite you to participate in a one-to-one discussion, at your convenience, to share your experiences with us. We would like to collect as much information as possible about people's experiences of quitting smoking and your involvement is very important to us.

If you would be willing to participate in a discussion, then please complete the enclosed contact details sheet and return it in the freepost envelope provided. We will then be in touch with you shortly to arrange a convenient time and location for the discussion. If you do not wish to participate in a discussion then please indicate this and we will not bother you again.

An information sheet telling you more about the study and what would be involved is enclosed. Please do not hesitate to contact me if you have any further questions, my details can be found at the end of the information sheet.

Best wishes,

Rachael Murray
Cancer Research UK Graduate Training Fellow

APPENDIX IX: Interview information sheet



A study to explore spontaneous smoking cessation: an invitation to participate in a one-to-one discussion about your experiences of trying to quit smoking

You are being invited to take part in a one-to-one discussion of your experiences of quitting smoking. Before you decide to take part it is important for you to understand why the research is being done and what it involves. Please take time to read the following information and ask us if you have any questions.

What is the purpose of the study?

Many people who quit smoking do so spontaneously (without planning in advance). This study aims to explore spontaneous smoking cessation, identify factors which may help or hinder such quit attempts and to try and find ways of supporting smokers who make spontaneous quit attempts.

Why have I been chosen?

You indicated on a questionnaire concerning your attempts to quit smoking which you recently completed and returned to us that you would be willing to participate in further research to discuss your experiences of trying to quit. We are interested in people's experiences of quitting smoking and would therefore like to ask you some further questions to help us find the best way of supporting people who try to quit.

Do I have to take part?

It is up to you whether or not to participate in the one-to-one discussion. If you decide to take part you are still free to withdraw at any time without giving a reason without this affecting your legal rights.

What will I have to do?

If you decide to take part in a one-to-one discussion then please complete the enclosed contact details sheet and consent form and post this back to us in the freepost envelope provided. We will then contact you to arrange a convenient time for the one-to-one discussion. The one-to-one discussion will either be conducted over the telephone, or at the Clinical Sciences Building at Nottingham City Hospital. If you decide not to take part, please could you let us know by crossing the relevant box on the contact details sheet? This will stop us from asking you again. Your contact details will be kept confidential and will be destroyed at the end of the study, which will be in approximately 2 years unless you have indicated that you would be happy for us to contact you at a later date for further research.

What will we do?

1. If you agree to participate in a one-to-one discussion, we will discuss your experiences of trying to quit smoking, what you found helpful or not in your attempt, and what you think may have been useful to you at this time. We will use the information you provide to investigate people's experiences of stopping smoking and aim to find a new way of supporting smokers who want to quit.

What are the possible benefits or disadvantages of taking part in this part of the study? There are no direct benefits to you from participating in a discussion. However, the results are important for the study to gain as much information as possible to help people stop smoking. A disadvantage is that participation in a discussion may take between 30 and 60 minutes.

Will my participation in the study be kept confidential?

Yes. The discussion will be conducted in confidentiality between you and the researcher. To allow us to analyse the information you provide, the discussion will be tape recorded and typed up. The typed up comments will not include your name, and only the researcher you have spoken to will know the code used to anonymise your comments. The transcripts may be analysed by up to three researchers. All data and tapes will be kept in a secure location at the University of Nottingham and only the researcher and her academic supervisors will have access to it.

Who is organising and funding the research?

This research is sponsored by the University of Nottingham and funded by Cancer Research UK.

What if something goes wrong?

Please remember that you are not required to participate in this part of the research project. You can withdraw your participation at any time by contacting the principal investigator, Rachael Murray. If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please initially contact the principal investigator, Rachael Murray. If you feel your complaint was not handled adequately than please contact the University of Nottingham, University Park, Nottingham, NG7 2RD.

What will happen to the results of the research study?

The results of the research will be integrated into the thesis of the researcher who is conducting the study in pursuit of a doctoral degree. The results will also be published in a medical journal. You will not be identified in any report or other publication; all information will be kept anonymous. All data which are collected will be stored for a period of at least 7 years as required by University of Nottingham Research Code of Conduct

Who has reviewed the study?

The Nottinghamshire Research Ethics Committee is a group of people who read and check research projects. A Local Research Ethics Committee is made up of people chosen by a Strategic Health Authority. Some work in health care and some have other jobs. It is the job of the Local Research Ethics Committee to allow research projects to happen. They only do this when they believe that the research will do more good than harm. If there are concerns about the research project, they are considered very carefully before making a decision. Research cannot happen unless the Local Research Ethics Committee has said it can.

Contact for further information

Rachael Murray
Cancer Research UK Graduate Training Fellow
Division of Epidemiology and Public Health,
Clinical Science Building,
Nottingham City Hospital
Phone 0115 823 1932
Email: rachael.murray@nottingham.ac.uk

APPENDIX X: Interview schedule

INTRODUCTIONS

- Thanks for agreeing to take part
- Background to the purpose of the interview
- Confidentiality, right to withdraw and recording of the interview

BACKGROUND/OVERVIEW (confirm details provided on questionnaire)

- How much did you/do you smoke
- How long did you/have you smoked for
- How dependent do you think you are/were (time to first cig, feelings in non-smoking areas etc)
- Is there much smoking around them-family, friends, work colleagues etc
- How many times have they seriously tried to quit smoking? In last 12 months?

EXPERIENCES OF THE SPONTANEOUS QUIT ATTEMPT

- How long did you manage to quit for?
- Did you set a date/plan in advance to quit smoking?
- Did you cut down before trying to quit?
- What factors influenced your desire to try and quit smoking? What was the most important factor?
- What time of day did you make the decision to quit/initiate the quit attempt?
- Can you remember anything about the situation you were in at the time? (environmental factors, any life changing events etc)
- IF THE ATTEMPT WAS UNSUCCESSFUL: Thinking about unsuccessful attempts-why do you think it was unsuccessful? Was there a trigger back to smoking? Is there anything you can think of that would have been beneficial during the attempt?
- IF THE ATTEMPT WAS SUCCESSFUL: Thinking about the successful attempt-why do you think it was successful? Did it feel different to other attempts? If so, how/why? Does anything stand out in your mind as being particularly helpful in the attempt?

SUPPORT THEY USED

- What did you use to help them stop smoking? (Nothing/NRT/behavioural therapy/alternative therapy)
- How did you hear about this type of help?
- If you didn't use NRT, would you have used it if it was available?
- If not, why not?
- Did they consult their GP/New Leaf? Were they helpful? Why?

INTRODUCE POSSIBILITY OF QUIT PACK

- Introduce idea of a quit pack containing NRT samples, contact info etc.
- What do they think it should include?
- Do they think they would have found it helpful?
- Who should deliver it-GP/pharmacy/city centre etc
- Would an associated quit line/drop in session be helpful?

AVAILABLE SUPPORT

- Did you have support from family/friends when you tried to quit?
- Do you think the NHS offer sufficient support to help people quit smoking?
- Is there anything not offered that you think would be beneficial?
- Would having New Leaf/other support stalls in city centre, supermarket etc be helpful?

OTHER

- Why do you think some smokers apparently find it so easy to quit?

APPENDIX XI: Coding table

THEMES	CATEGORIES	DEFINITIONS
TRIGGERS	Internal factors External factors	Factors which triggered the participants' quit attempt Internal factors triggered the quit attempt External factors triggered the quit attempt
NATURE OF THE QUIT ATTEMPT	Spontaneous Delayed Cut down No cut down Dependent Less/non-dependent	How the quit attempt was made The attempt was initiated as soon as the decision to quit was made The attempt was initiated some time after the decision to quit was made The individual reduced their smoking prior to the quit attempt The individual did not reduce their smoking prior to the quit attempt The individual was dependent on smoking (by self report) The individual was less or non-dependent on smoking (by self report)
SUPPORT USED	Pharmacological Behavioural Alternative Nothing	Support participants used in the quit attempt Pharmacological support was used in the quit attempt Behavioural support was used in the quit attempt Alternative therapy was used in the quit attempt No support was used in the quit attempt
REASONS FOR NOT USING SUPPORT	Access Importance of the individual Personal preference	Factors which meant participants may not use support in their quit attempt Access to NRT products/services was a reason for not using support Individuals thought they could successfully quit without support Individuals would prefer not to use existing support and medications

SUPPORT AVAILABLE	<p>Individual</p> <p>Enough</p> <p>Education and awareness</p> <p>Different</p>	<p>Participants views on the support available to help smokers quit</p> <p>The importance of the individual in successful quitting</p> <p>Enough support is available to help smokers quit</p> <p>More education/awareness of the support available is needed</p> <p>Support should be offered in a different way</p>
FACTORS INFLUENCING SUCCESS	<p>Right time</p> <p>Mindset</p> <p>Significant others</p>	<p>Factors participants feel are important for an attempt to be successful</p> <p>It has to be the right time for the individual to make the quit attempt</p> <p>The mindset of the individual is an important factor for success</p> <p>Significant others are an important factor for success</p>
BETTER SUPPORTING SMOKERS	<p>Provision</p> <p>Location</p>	<p>Ways in which participants feel smokers could be better supported in quit attempts</p> <p>Provision of smoking cessation support as a way of better supporting smokers</p> <p>Location of smoking cessation support as a way of better supporting smokers</p>

APPENDIX XII: Coding framework

[illegible]

APPENDIX XIII: Publications and presentations arising

PUBLICATIONS ARISING

Murray RL, Lewis, S.A., Coleman, T., Britton, J., McNeill, A. Unplanned attempts to quit smoking: missed opportunities for health promotion? *Addiction* 2009; In Press.

Murray RL, Coleman T, Antoniak M, Stocks J, Fergus A, Britton J, et al. The effect of proactively identifying smokers and offering smoking cessation support in primary care populations: a cluster-randomized trial. *Addiction* 2008;103(6):998-1006; discussion 1007-8.

Murray RL, Coleman T, Antoniak M, Fergus A, Britton J, Lewis SA. The potential to improve ascertainment and intervention to reduce smoking in Primary Care: a cross sectional survey. *BMC Health Services Research* 2008;8(1):6.

PRESENTATIONS/ABSTRACTS

Murray RL, (2009). Spontaneous smoking cessation. Invited plenary speaker, UKNSCC June 2009

Murray RL, McNeill, A, Coleman, T, Britton, J, Lewis SA. Unplanned quit attempts: incidence and use of support. SRNT Europe, October 2008. *Oral Presentation*

Murray RL, Coleman T, Britton J, Antoniak M, Fergus A, Lewis S. Cluster-randomised controlled trial of pro-actively identifying smokers & offering support from NHS stop smoking services. UKNSCC, Birmingham, July 2008. *Oral Presentation*

Murray, RL, Coleman, T, Antoniak, M, Fergus, A, Britton, J, Lewis SA. (2007). Promoting Smoking Cessation in Primary Care: A Cluster-Randomized Controlled Intervention Trial of a Pro-Actively Identifying Smokers and offering Evidence-Based Support to Stop Smoking. American Thoracic Society, April 2007. *Poster-discussion*

Research article

Open Access

The potential to improve ascertainment and intervention to reduce smoking in Primary Care: a cross sectional survey

Rachael L Murray^{*1}, Tim Coleman², Marilyn Antoniak¹, Alexia Fergus¹, John Britton¹ and Sarah A Lewis¹

Address: ¹Division of Epidemiology & Public Health, University of Nottingham, Nottingham, UK and ²Division of Primary Care, University of Nottingham, Nottingham, UK

Email: Rachael L Murray^{*} - rachael.murray@nottingham.ac.uk; Tim Coleman - tim.coleman@nottingham.ac.uk; Marilyn Antoniak - marilyn.antoniak@nottingham.ac.uk; Alexia Fergus - alexia.fergus@nhs.net; John Britton - j.britton@virgin.net; Sarah A Lewis - sarah.lewis@nottingham.ac.uk

^{*} Corresponding author

Published: 11 January 2008

Received: 19 March 2007

BMC Health Services Research 2008, 8:6 doi:10.1186/1472-6963-8-6

Accepted: 11 January 2008

This article is available from: <http://www.biomedcentral.com/1472-6963/8/6>

© 2008 Murray et al; licensee BioMed Central Ltd.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/2.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Background: Well established clinical guidelines recommend that systematic ascertainment of smoking status and intervention to promote cessation in all smokers should be a fundamental component of all health care provision. This study aims to establish the completeness and accuracy of smoking status recording in patients' primary care medical records and the level of interest in receiving smoking cessation support amongst primary care patients in an inner city UK population.

Methods: Postal questionnaires were sent to all patients aged over 18 from 24 general practices in Nottingham UK who were registered as smokers or had no smoking status recorded in their medical notes.

Results: The proportion of patients with a smoking status recorded varied between practices from 42.4% to 100% (median 90%). Of the recorded smokers who responded to our questionnaire (35.5% of the total), a median of 20.3% reported that they had not smoked cigarettes or tobacco in the last 12 months. Of respondents with no recorded smoking status, 29.8% reported themselves to be current smokers. Of the 6856 responding individuals thus identified as current smokers, 41.4% indicated that they would like to speak to a specialist smoking adviser to help them stop smoking. This proportion increased with socioeconomic disadvantage (measured by the Townsend Index) from 39.1% in the least deprived to 44.6% in the most deprived quintile.

Conclusion: Whilst in many practices the ascertainment of smoking status is incomplete and/or inaccurate, failure to intervene appropriately on known status still remains the biggest challenge.

Trial registration: Current Controlled Trials ISRCTN71514078.

Background

The UK suffers a huge burden of premature mortality and morbidity as a direct result of tobacco use. The prevalence of cigarette smoking in 2005 was estimated at 24% of

those aged over 16 in the UK [1]. Well established clinical guidelines in both the USA [2] and UK [3] recommend that systematic recording of smoking status and intervention to promote cessation in all smokers is highly cost-

effective and should be a fundamental component of all health care provision. Previous studies indicate, however, that the recording of smoking status in primary care medical records is often inaccurate [4,5] and that it is probably updated infrequently [4,5]. This limits the utility of smoking status recorded in patients' medical records for either clinical practice or for determining smoking prevalence within practices [4,5]. Recently however, a new contract was introduced for UK general practitioners (GPs – family physicians) which remunerates them for recording the smoking status of patients in their medical records. As this contract has increased the frequency with which GPs ascertain patients' smoking status [6], the completeness and accuracy of smoking status data in such records may have improved.

Once smokers have been identified and brief advice to quit delivered, smokers who are interested in receiving further help with smoking cessation should be referred to trained smoking cessation advisors who provide effective support [7] and who, in the UK, are available through the National Health Service [8]. UK national survey data indicate, however, that in 2005 only 41% of smokers reported having received cessation advice in the previous 5 years, and although 72% of smokers reported that they wanted to quit smoking, only 8% had been referred to an NHS stop smoking service in the previous year [9]. This discrepancy suggests that only a small proportion of smokers may be receiving appropriate interventions in primary care.

In this paper, we compare smoking status recorded within primary care medical records with survey findings to provide a contemporary assessment of the completeness and accuracy of smoking status recorded in primary care medical records. We also estimate the level of interest in receiving support with stopping smoking amongst smokers who are general practice patients and determine how this varies with their socio-demographic characteristics.

Methods

Data were collected from patients who were registered with 24 general practices in Nottinghamshire which participated in a cluster randomised controlled trial of a new approach to provision of smoking cessation services (ISRCTN71514078). In 2005, all 90 practices within three of the four Nottingham Primary Care Trusts with list sizes of 10,000 or less were contacted to request their participation in the study. 27 practices agreed, and 24 were randomly selected to participate in the trial to meet the requirements of our power calculation. However, two practices withdrew during the study and were replaced by two of the three unused practices (from the original 27), selected at random. Practices provided details of the number of registered patients aged 18 and over and

searched computerised medical records for Read Codes indicating patients' smoking status. The Nottingham Ethics Committee approved the study.

Patients aged 18 or over whose medical record indicated either that they were i) a current smoker or ii) contained no record of smoking status were sent a short, self-completion questionnaire with a standard letter on headed paper from participating practices. The letter explained that questionnaire responses would be used to update patients' medical records and also sought written consent for these to be used by the University of Nottingham research team in a study aimed at helping smokers to quit. The questionnaire confirmed current smoking status by asking respondents about smoking in the last 12 months, frequency of smoking (every day, most days, occasionally or never), and amount smoked per day (≤ 10 , 11–20, 21–30, 31–40, 41+). The questions asked have been used in previous primary care studies, having been administered by postal and personally delivered self-completion questionnaires [10–12]. The questionnaire also asked current smokers whether they would like to speak to a smoking cessation advisor to receive help or advice to quit smoking. A reminder letter was sent out to non-responders after three weeks, completed questionnaires were returned to practices and, with appropriate consent, these were collected by the research team.

Questionnaire data were entered into SPSS Version 14. We defined current smokers as those who smoked occasionally or more frequently. Townsend scores based on patient's postcodes were calculated from the 2001 census [13]. Townsend scores are based on unemployment, car ownership, overcrowding and tenure, and this measure of deprivation has been found to explain variations in health measures and adhere closely to the concept of material disadvantage [14]. The proportion with a smoking status recorded, the proportions of recorded smokers who were not smoking (i.e. misclassified as smokers) and of self-reported smokers with no record of this in their medical records, and the proportion wanting to speak to an advisor, were calculated at the practice level, and presented as the median and range because the distributions of some of these data were skewed. Spearman correlation analysis was used to assess the correlation between the proportion with a smoking status and the proportion of patients misclassified as smokers. The effect of individual characteristics such as age, sex and Townsend Index on whether individuals responded to the questionnaire, were misclassified as smokers, and whether smokers wanted help to quit, was analysed at the individual level using logistic regression, and robust standard errors to allow for clustering by practice using STATA release 9.0; STATA Corp., College Station, TX.

Results

Response to questionnaire and recording of smoking status

Within the 24 participating general practices there were 87,861 patients aged 18 or over, of whom 23,044 were recorded as smokers, 52,629 as non-smokers and 12,188 had no record of smoking status in their medical records. Of 35232 questionnaires dispatched, the proportion of patients returning the questionnaire and giving signed consent for their information to be shared with the research team, varied between practices from 13.9% to 41.1% (median 33.2%). Respondents recorded as smokers in their medical records were more likely to respond than those with no smoking status recorded [35.5% (8176/23044) and 24.2% (2951/12188) respectively], and males and younger patients were less likely to respond to the questionnaire (Table 1).

The proportion of patients with smoking status recorded varied between practices from 42.4% to 100% (median 90.0%, see Figure 1). The proportion of responding patients recorded as smokers who denied tobacco use in the previous 12 months varied between 6.3% and 58.1% across practices (median 20.3%). There was no correlation between the proportion of patients with a smoking status recorded and the proportion of patients who were recorded as smokers but denied tobacco use in the previous 12 months (Spearman's $r = -0.14$). The proportion of patients with no record of smoking status who were in fact self reported current smokers varied from 5.7% to 60.2% across practices (median 29.8%).

The proportion of patients misclassified as smokers in their medical record was unrelated to gender, but did vary with age. In those aged 30 or below, 13.1%, of patients recorded as smokers in their medical record reported not

smoking in the past year on questionnaires and this increased to 31.7% in those aged over 61.

Smokers' interest in support with stopping smoking

Of the 6856 respondents who were current smokers, 2840 (41.4%) indicated that they would like to speak to a specialist smoking cessation advisor to help them stop smoking (Table 2). This varied between practices from 30.6% and 51.8% (median 39.8%). Individuals who were previously recorded as smokers tended to be more likely to want to speak to a cessation adviser than those who previously had no smoking status recorded (42.7% and 33.4% respectively).

Interest in discussion of support did not vary with gender (40.7% and 42.2%, for men and women respectively) but did vary with age and economic disadvantage. Those aged between 31 and 50 were most likely to want to speak to an advisor and the oldest and youngest age groups were least likely to desire this (33.4% and 34.1% respectively). Smokers' reported desire to talk with smoking cessation advisors increased linearly with economic disadvantage (measured by Townsend index) such that demand for support was highest (44.6%) from the most disadvantaged and lowest (39.1%) from the least socially disadvantaged groups.

Discussion

Our study demonstrates that, in 2005, practices in our study had a recording of smoking status in the primary care medical record for, on average, 90% of registered patients, but this was probably not accurate in about 20% of cases. Additionally, amongst smokers who responded to questionnaires sent from their general practitioners, over 41% were interested in talking to a smoking cessation advisor to obtain support with stopping smoking and

Table 1: Questionnaire response rates and numbers of self reported smokers

	NUMBER SENT	NUMBER (%) RETURNED	NUMBER OF SELF-REPORTED CURRENT SMOKERS
TOTAL	35232	11127(31.6)	6856
Practice median (range)	1312 (432–2985)	33.2% (13.9–41.4%)	258 (52–766)
SMOKER	23044	8176 (35.5)	5943
NO STATUS	12188	2951 (24.2)	913
MALE	20040	5839 (29.1)	3515
FEMALE	15192	5288 (34.8)	3340
AGE			
<= 30	9965	2161 (21.7)	1344
31–40	8176	2187 (26.7)	1430
41–50	6635	2205 (33.2)	1440
51–60	5007	2052 (41.0)	1305
61 +	5449	2522 (46.3)	1337

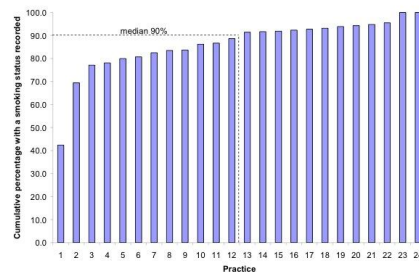


Figure 1
Cumulative distribution of the percentage of patients in a practice with a smoking status recorded.

interest was highest amongst the most economically deprived smokers.

Smoking is still the biggest avoidable cause of death and disability in the UK and intervening to help smokers quit is highly cost-effective. Authoritative clinical guidelines recommend that the ascertainment of smoking status and delivery of brief advice to stop with further support for smokers interested in quitting should be a routine and systematic component of all medical consultations

[3,15,16]. The findings of this study indicate that, although the ascertainment of smoking status in primary care is apparently high, these data are relatively inaccurate and more regular updating of smoking status records might increase the numbers of opportunities which health professionals use to intervene and promote smoking cessation.

To our knowledge, this study is the first to systematically contact large numbers of smokers living in a large, relatively-deprived urban area and ascertain their interest in engaging with smoking cessation support. This systematic approach within a defined population allows estimates of smokers' desire for support with smoking cessation to be made. The limitations of the study include the fact that participation was relatively low, which is likely to be partly attributable to inaccuracies in addresses on practices' registers, and that ethical constraints dictated that the research team obtained signed consent from questionnaire respondents before their data could be used for research purposes. As not all respondents gave their consent for their information to be used in this way, this will have lowered the response rate. We have assumed that the smoking status reported by questionnaire respondents was reliable, since questionnaire data obtained by similar means in previous studies [4,5] have been found to be accurate [17], and informing recipients that their responses would be used to update their medical records should, if anything, have improved the validity of

Table 2: Number of current smokers who would like support to quit smoking

	Number of smokers who responded	Number who wanted help to quit	%	Adjusted odds ratios (95% CI)
Total	6856	2840	41.4	
Males	3516	1430	40.7	1
Females	3340	1410	42.2	1.07 (.97–1.17)
AGE				
<= 30	1344	447	33.4	1
31–40	1430	674	47.1	1.82 (1.55–2.13)
41–50	1440	680	47.2	1.83 (1.45–2.31)
51–60	1305	583	44.7	1.63 (1.34–1.99)
61 +	1337	456	34.1	1.05 (.89–1.25)
Townsend quintile 1	1373	537	39.1	1
Townsend quintile 2	1343	530	39.5	1.00 (.81–1.23)
Townsend quintile 3	1335	552	41.3	1.09 (.93–1.29)
Townsend quintile 4	1362	576	42.3	1.12 (.89–1.40)
Townsend quintile 5	1354	604	44.6	1.26 (1.01–1.56)

*Townsend quintile 1 = <= -1.60

*Townsend quintile 2 = -1.60 to -0.49

*Townsend quintile 3 = -0.49 to 3.03

*Townsend quintile 4 = 3.03 to 5.09

*Townsend quintile 5 = 5.09 +

**Townsend data for 84 consenting smokers was unavailable

responses. It is also possible that there may have been selection bias in the practices that took part, for example, they may have had a greater interest in smoking cessation than others.

Although 41% of smokers who responded to the questionnaire reported that they would like to speak to a smoking cessation advisor, this figure is almost certainly an overestimate of the true proportion. If we conservatively presume that all those who wanted help to quit responded, then the true denominator would be all current smokers who were sent a questionnaire, which we estimate, based on the accuracy of smoking status recording found in our study, to be 20,521, reducing the proportion wanting to speak to an adviser to 13.8%. Nevertheless, between April 2004 and March 2005, just over 500,000 smokers set quit dates using English NHS stop smoking services [18] and, as this represents less than 5% of English smokers, our findings suggest that there is considerable interest in speaking to cessation advisors, and potentially, receiving cessation support amongst smokers that is not currently translated into their use of NHS stop smoking services. The challenge for the UK National Health Service is to find ways of engaging smokers who are interested in talking to smoking cessation advisors and receiving support with stopping smoking and encouraging them to access such support. In particular, our results throw into question the reluctance of many GPs to raise the topic of smoking due to concern of negative responses from their patients [19], and suggests that this attitude results in missed opportunities to provide help and advice to smokers who would welcome this. Study findings suggest that the most economically disadvantaged smokers who suffer from the greatest smoking-related morbidity [20] are also the most interested in receiving support. It is important to ensure that this group is appropriately assisted, possibly by using novel methods of 'marketing' NHS stop smoking services to this group.

The proportion of primary care patients in our inner city practices whose records included a note of smoking status (median 90%) was higher than in previous studies (73.4% and 76%) [4,5] and this more comprehensive recording could be due to the introduction of the 2004 general practice contract which has increased rates of smoking status ascertainment [6].

However, we have no data from study practices during the period before the contract was introduced to compare our findings with and recording rates may be higher for other reasons. Higher rates of smoking status recording amongst women and older people have been observed previously [5], and are probably influenced by these patients' higher general practice consultation rates [21].

Nevertheless, across practices, an average of 20% of individuals recorded in their medical records as smokers were not currently smoking; whilst this may be an overestimate of the true figure for our study population if smokers who had successfully quit were more likely to return the questionnaire, it is also possible that offering support to stop smoking may have encouraged more current smokers to return the questionnaire. This level of accuracy of recorded smoking status is no better than that found in earlier studies. In the late 1990s, Wilson *et al.* [5] found that around 18% of patients recorded as smokers in general practice medical records reported in postal questionnaires that they were not. Our rate is very similar, and moreover, we found a large variation between practices in the proportion of smokers who were misclassified such that in one practice this reached 58.1%. We also observed that the proportion misclassified as smokers increases with age, suggesting that once patients' smoking status has been ascertained, it is not routinely updated, so that the accuracy of this information reduces as time passes. A previous study found that although 99% of GPs record smoking status when patients first join their practices, only 57% claim to routinely update this information [3] and our findings may reflect this. Nevertheless, we found no correlation between the level of recording and misclassification suggesting that high ascertainment of smoking status among practices in our sample was not necessarily at the expense of accuracy, and that both may be achieved.

At the time of our study, the general practice contract rewarded GPs for any record of smoking status that patients' records contained, irrespective of when this was obtained, but revisions to this (introduced in 2007) will result in GP's only being paid for ascertainment of smoking status that has occurred within the previous 15 months and this could generate more frequent updating of primary care smoking status records, enhancing their validity. A potential avenue for future research could ascertain whether these measures are effective in improving validity of this data.

Conclusion

We have found that data on smoking status recorded in patients' primary care medical records contains inaccuracies which render it inappropriate for either effective health planning or research purposes. However, failure to intervene appropriately on known status still remains the biggest challenge.

Recent changes in general practitioners' contractual arrangements may improve the validity of these data and further monitoring of data validity after these are introduced is warranted. More importantly, a significant minority of smokers are interested in talking to smoking cessation advisors about receiving support and help with

stopping smoking, but only a fraction of these actually try to stop smoking with the support of NHS stop smoking services. Engaging more of these 'interested' smokers in attempts to achieve smoking cessation is an important task which, if successful, could promote significant health gain by impacting on smoking rates in the UK.

Competing interests

The author(s) declare that they have no competing interests.

Authors' contributions

RLM collected and analysed data, and drafted the manuscript. SAL, TC and JB designed the study, supervised data collection and analysis, and commented on the manuscript. AF and MA collected the data and commented on the manuscript. All authors read and approved the final version of the manuscript. RLM is guarantor.

Funding: British Heart Foundation. The study was designed, conducted, analysed and interpreted independently of all funding sources.

Acknowledgements

This research was funded by the British Heart Foundation. Thanks to all participating general practices and participants.

References

- Goddard E: **Smoking and drinking among adults, 2005**. In *General Household Survey* London: Office for National Statistics; 2005.
- Fiore MC, Bailey WC, Cohen SJ, Dorfman SF, Fox BJ, Goldstein MG, Grizz ER, Hasselblad V, Heyman RB, Jaen CR, Jorenby D, Kottke TE, Lando HA, Mecklenburg RE, Mullen PD, Nett L, Piper M, Robinson L, Stitzer M, Tommasello A, Welsch S, Villejo L, Wewers ME, Baker TB: **A clinical practice guideline for treating tobacco use and dependence - A US Public Health Service report**. *Jama-Journal of the American Medical Association* 2000, **283**:3244-54.
- West R, McNeill A, Raw M: **Smoking cessation guidelines for health professionals: an update**. *Thorax* 2000, **55**:987-99.
- Mant J, Murphy M, Rose P, Vessey M: **The accuracy of general practitioner records of smoking and alcohol use: comparison with patient questionnaires**. *Journal of Public Health Medicine* 2000, **22**:198-201.
- Wilson A, Manku-Scott T, Shepherd D, Jones B: **A comparison of individual and population smoking data from a postal survey and general practice records**. *British Journal of General Practice* 2000, **50**:465-8.
- Coleman T, Lewis S, Hubbard R, Smith C: **Impact of contractual financial incentives on the ascertainment and management of smoking in primary care**. *Addiction* 2007, **102**(5):803-808.
- Ferguson J, Bauld L, Chesterman J, Judge K: **The English smoking treatment services: one-year outcomes**. *Addiction* 2005, **100**:59-69.
- Raw M, McNeill A, Coleman T: **Lessons from the English smoking treatment services**. *Addiction* 2005, **100**:84-91.
- Taylor T, Lader D, Bryant A, Keyse L, Joloza MT: **Smoking-related Behaviour and Attitudes, 2005**. London: Office for National Statistics; 2005.
- Coleman T: **Anti-smoking advice in general practice consultations: a description of factors influencing provisions of advice and the development of a method for describing smokers' responses [MD thesis]**. University of Leicester; 1998.
- Coleman T, Wilson A: **Factors associated with the provision of anti-smoking advice by general practitioners**. *British Journal of General Practice* 1999, **49**:557-8.
- Coleman T, Wynn AT, Barrett S, Wilson A, Adams S: **Intervention study to evaluate pilot health promotion payment aimed at increasing general practitioners' antismoking advice to smokers**. *British Medical Journal* 2001, **323**:435-6.
- ONS. 2001 Census, UK National Statistics website Crown copyright 2004. Crown copyright material is reproduced with the permission of the Controller of Her Majesty's Stationery Office (HMSO) 2006 [http://www.statistics.gov.uk/census/].
- Morris R, Carstairs V: **Which Deprivation - A Comparison of Selected Deprivation Indexes**. *Journal of Public Health Medicine* 1991, **13**:318-26.
- Fiore MC, Bailey WC, Cohen SJ, Dorfman SF, Goldstein MG, Grizz ER, Heyman RB, Jaen CR, Kottke TE, Lando HA, Mecklenburg RE, Mullen PD, Nett LM, Robinson L, Stitzer ML, Tommasello AC, Villejo L, Wewers ME: **Treating Tobacco Use and Dependence. Clinical Practice Guideline**. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service; 2000.
- Parrott S, Godfrey C, Raw M, West R, McNeill A: **Guidance for commissioners on the cost effectiveness of smoking cessation interventions**. Health Educational Authority. *Thorax* 1998, **53** Suppl 5 Pt 2:S1-S38.
- Petitti DB, Friedman GD, Kahn W: **Accuracy of Information on Smoking-Habits Provided on Self-Administered Research Questionnaires**. *American Journal of Public Health* 1981, **71**:308-11.
- Department of Health: **Statistics on NHS Stop Smoking Services in England, April 2004 to March 2005**. 4115294. Health and Social Care Information Centre 2005.
- Coleman T, Murphy E, Cheater F: **Factors influencing discussion of smoking between general practitioners and patients who smoke: a qualitative study**. *Br J Gen Pract* 2000, **50**(452):207-210.
- Chesterman J, Judge K, Bauld L, Ferguson J: **How effective are the English smoking treatment services in reaching disadvantaged smokers?** *Addiction* 2005, **100**:36-45.
- McCormick A, Fleming D, Charlton J: **Morbidity Statistics from General Practice. Fourth national study 1991-1992**. London, HMSO; 1995.

Pre-publication history

The pre-publication history for this paper can be accessed here:

<http://www.biomedcentral.com/1472-6963/8/6/prepub>

Publish with **BioMed Central** and every scientist can read your work free of charge

"BioMed Central will be the most significant development for disseminating the results of biomedical research in our lifetime."

Sir Paul Nurse, Cancer Research UK

Your research papers will be:

- available free of charge to the entire biomedical community
- peer reviewed and published immediately upon acceptance
- cited in PubMed and archived on PubMed Central
- yours — you keep the copyright

Submit your manuscript here:
http://www.biomedcentral.com/info/publishing_adv.asp



The effect of proactively identifying smokers and offering smoking cessation support in primary care populations: a cluster-randomized trial

Rachael L. Murray¹, Timothy Coleman², Marilyn Antoniak¹, Joanne Stocks¹, Alexia Fergus¹, John Britton¹ & Sarah A. Lewis¹

Division of Epidemiology and Public Health, University of Nottingham, Nottingham, UK¹ and Division of Primary Care, University of Nottingham, Nottingham, UK²

ABSTRACT

Aims To establish whether proactively identifying all smokers in primary care populations and offering smoking cessation support is effective in increasing long-term abstinence from smoking. **Design** Cluster randomized controlled trial. **Setting** Twenty-four general practices in Nottinghamshire, randomized by practice to active or control intervention. **Participants** All adult patients registered with the practices who returned a questionnaire confirming that they were current smokers ($n = 6856$). **Intervention** Participants were offered smoking cessation support by letter and those interested in receiving it were contacted and referred into National Health Service (NHS) stop smoking services if required. **Measurements** Validated abstinence from smoking, use of smoking cessation services and number of quit attempts in continuing smokers at 6 months. **Findings** Smokers in the intervention group were more likely than controls to report that they had used local cessation services during the study period [16.6% and 8.9%, respectively, adjusted odds ratio (OR) 2.09, 95% confidence interval (CI) 1.57–2.78], and continuing smokers (in the intervention group) were more likely to have made a quit attempt in the last 6 months (37.4% and 33.3%, respectively, adjusted OR 1.23, 95% CI 1.01–1.51). Validated point prevalence abstinence from smoking at 6 months was higher in the intervention than the control groups (3.5% and 2.5%, respectively) but the difference was not statistically significant (adjusted OR controlling for covariates: 1.64, 95% CI 0.92–2.89). **Conclusions** Proactively identifying smokers who want to quit in primary care populations, and referring them to a cessation service, increased contacts with cessation services and the number of quit attempts. We were unable to detect a significant effect on long-term cessation rates, but the study was not powered to detect the kind of difference that might be expected.

Keywords Adult smokers, behavioural support, long-term abstinence, primary care, proactive identification, quit attempts, smoking cessation.

Correspondence to: Rachael Murray, Division of Epidemiology and Public Health, Clinical Sciences Building, Nottingham City Hospital, Nottingham NG3 6DE, UK. E-mail: rachael.murray@nottingham.ac.uk

Submitted 31 August 2007; initial review completed 19 November 2007; final version accepted 12 February 2008

INTRODUCTION

Tobacco smoking is the largest avoidable cause of premature death and disability in the world [1]. Among men, smoking is responsible for over half the excess risk of premature death between the highest and lowest socioeconomic groups [2]. Helping smokers to quit smoking is one of the most cost-effective medical interventions [3], and in recent years the UK National Health Service (NHS) has established a national network of cessation services to provide behavioural support and pharmacotherapy for

all smokers who want to quit. However, although increasing uptake of these services by smokers is still low [4], as only about 10% of smokers in the United Kingdom used a cessation service in 2005 [5]. It is therefore important to develop strategies to encourage smokers to use the cessation services that are now available to them.

One simple option is to identify individual smokers proactively, and inform them about available cessation services. Previous studies of proactive approaches to promote smoking cessation have demonstrated, at most, only modest effects from provision of self-help materials

[6] or telephone counselling [7], but a study from the United States, combining a proactive approach to primary care patients with an intervention that informed smokers about a local intensive smoking cessation programme, found a marked increase in recruitment into smoking cessation programmes [8]. We have found previously that many smokers were unaware of the smoking cessation services available to them, but believed that a personal invitation to, and information about, these services would make them more likely to use them [9].

We have therefore carried out a cluster randomized controlled trial to determine whether identifying all smokers in a primary care population, followed by personal contact giving advice and information about local cessation services, is effective in promoting biochemically validated smoking cessation.

METHODS

Study design

We designed a cluster-randomized trial to randomize smokers from 24 primary care practices to receive either an active intervention or usual care. In 2005, we wrote to all 90 practices with up to 10 000 patients in three Nottingham Primary Care Trust areas to request their participation, and 27 practices expressed interest. We selected randomly 24 practices and allocated these to either intervention or control groups by simple randomization; two practices withdrew at an early stage and were replaced with two of the remaining consenting practices (again selected at random). In both groups, we used practice records to identify all patients aged 18 years or over who were either recorded as smokers, or had no smoking status recorded. These patients were sent a short self-completion questionnaire from the participating practice, with a covering letter explaining that the practice was using the questionnaire to update medical records and for a research study aimed at helping smokers to quit. In accordance with the approval for the study given by the Nottingham Ethics Committee, respondents were asked to provide written consent for the information provided on the questionnaire to be seen by the research team.

The contents of the letters and questionnaires to patients in the intervention and control practices were identical to try to ensure that the initial contact with, and response from, participants was comparable between the two groups. The questionnaire confirmed current smoking status by asking respondents whether they had smoked any cigarettes or tobacco in the last 12 months, the frequency of smoking (every day, most days or occasionally) and number of cigarettes smoked per day (≤ 10 , 11–20, 21–30, 31–40, 41+). The questionnaire also asked current smokers whether they would like to speak

to a smoking cessation adviser to receive help or advice to quit smoking and, if so, to provide telephone contact details so that a smoking cessation adviser could contact them. Respondents were given an option to receive postal information if they were not contactable by telephone. All subjects were told that this contact might happen after a short delay, as was the case for those in the control group.

Letters to patients in each practice were posted over a period of a few days for each practice, and in random order of practices over a 6-month period. The date of distribution of the initial letter was defined as baseline for each practice. Completed questionnaires were returned to the practice, and a reminder was sent to non-responders 3 weeks after baseline.

Study participants were identified as all current smokers (those reporting that they smoke every day, most days or occasionally) at baseline in intervention or control practices who had provided consent for their details to be seen by the research team.

Intervention group

All smokers in the intervention group who indicated they would like help or advice to quit smoking were contacted by the research team. All members of the research team undertook the same basic training as that of NHS stop smoking advisers and all calls followed a similar format. Patients were asked if they were still interested in stopping smoking and if so, were given brief advice on smoking cessation in accordance with evidence-based guidelines [10], and information about their local NHS stop smoking service (SSS) and the benefits this could offer. If desired, an appointment with the NHS SSS was booked by the research team on their behalf, and if not smokers were sent an information pack about the local service. The information pack included an information leaflet from the service, encouragement to the smoker to use the service, and contact details for the research team and the local NHS SSS for further information or to book an appointment. Smokers who were not contactable by telephone were sent the postal information pack detailed above. These contacts were all made within 8 weeks of baseline for each practice.

Smokers who attended the local NHS SSS received an initial consultation with a trained adviser who offered the standard range of evidence-based smoking cessation interventions offered by services throughout England [11], including the option of one-to-one or group behavioural support lasting an average of 8 weeks, and nicotine replacement or bupropion therapy, depending on the preferences and needs of the smoker. At the initial consultation, smokers were asked to provide their age, sex, ethnicity, postcode and employment status. They were

also asked a series of questions about their smoking behaviour, including amount smoked, reasons for smoking, number of previous quit attempts and motivation to quit. The SSS advisers also recorded whether the smoker set a quit date while using the local NHS SSS, and smoking status at 4 weeks after the quit date. These data, which are collected routinely by the NHS SSS, were provided to the research team in an anonymized form for clients who used the service in the period of the study and for the same period of the previous year (June–December) to determine whether the intervention had altered the characteristics of service attendees.

Control group

For 6 months from baseline, smokers in the control practices received no further intervention other than that provided by usual care. Previous studies suggest that, in most cases, little or no advice or support would have been given [12].

Follow-up

Seven months after baseline, and an average of 6 months after the research team contacted smokers from each intervention practice, a follow-up questionnaire was sent to all current smokers at baseline who gave consent for their information to be provided to the research team. This questionnaire repeated the questions asked at baseline, plus questions about current desire to quit, the number of quit attempts made and the number of attempts that had lasted more than 24 hours, receipt of smoking cessation advice and any use of any smoking cessation service over the previous 6 months. Respondents who indicated that they were abstinent at 6 months were asked to consent to further contact with the research team to provide a sample of saliva for cotinine estimation, or exhaled air for carbon monoxide measurement in those who reported they were still using nicotine replacement therapy to validate smoking status. Those consenting to provide samples were given the option of a visit from the research team at home or work, or attending Nottingham City Hospital for sample collection. We made up to six attempts to contact these individuals at different times of the day. Saliva cotinine concentrations were measured by enzyme-linked immunosorbent assay (ELISA) (Salimetrics, PA, USA). Non-smokers were defined as those with a salivary cotinine level below 15 ng/ml [13] or, if using nicotine replacement therapy (NRT), an exhaled carbon monoxide level below 10 parts per million (p.p.m.) [14].

After the follow-up measurements were complete, smokers in the control group who indicated that they

would like help or advice to stop smoking were themselves contacted by the local NHS SSS to offer specialist cessation support.

Data analysis

Because smoking status in primary care records is incomplete and can be inaccurate [15], we estimated the number of true current smokers in intervention and control practices at baseline using the responses to the baseline questionnaire (details below), and used these estimates in turn as the denominators to estimate the response rates in our study. We estimated the number of true current smokers in each practice by calculating the proportion of those documented to be smokers in medical records, and of those with no recorded smoking status, who confirmed in the baseline questionnaire that they were current smokers, and applying these proportions to the total number of documented smokers and those with no smoking status in each practice. The estimated number of true current smokers therefore uses questionnaire responses as a 'gold standard' for current smoking status and corrects for the fact that smoking status recorded in medical records becomes inaccurate with time elapsing after this is ascertained as some smokers tend to stop smoking as they age.

Our primary outcome was 7-day validated point prevalence abstinence from smoking at the 6-month follow-up. We assumed that all non-responders, and those who did not provide a validation sample at 6 months, were still smoking. Secondary outcomes included self-reported abstinence for the past 7 days at 6 months, calculated for all those smoking at baseline, the proportion of smokers who reported using the local NHS SSS or receiving smoking cessation advice, calculated for those who responded at 6 months, and the proportion of people who reported a desire to quit and had made at least one quit attempt lasting more than 24 hours, calculated for those who were still smoking at 6 months. In those who were still smoking, a lower category of cigarette consumption at follow-up was taken as representing reduced cigarette consumption. Townsend scores based on patients' postcodes were calculated from 2001 census data, which have been shown to explain most of the variation in health measures and adhere most closely to the concept of material disadvantage [16], were used to adjust for socio-economic status.

For each primary and secondary outcome, we calculated the percentage of positive responses for each practice and compared the means of these percentages between intervention and control practices by an independent samples *t*-test, having first checked the normality of the distribution of percentages. To obtain odds ratios and to adjust for apparent baseline differences

Table 1 Characteristics of the intervention and control practices and participants at baseline.

	Intervention		Control	
	Individual (%)	Mean per practice (range)	Individual (%)	Mean per practice (range)
Estimated number of eligible individuals (smokers aged 18 or over)	10 177	848 (307–1834)	11 783	982 (312–2070)
Number of participants	3 051 (30.0)	254 (52 529)	3 805 (32.3)	317 (53 766)
Age (years)				
18–39	1 082 (35.5)	36.6	1 510 (39.7)	39.7
40–59	1 276 (41.8)	41.5	1 536 (40.4)	40.3
60+	693 (22.7)	21.9	759 (19.9)	20.1
Mean age	46.6	46.1 (39.2–49.4)	45.0	44.9 (39.2–48.8)
Gender				
Male	1 584 (51.9)	54.9 (43.5–69.2)	1 932 (50.8)	51.5 (47.1–58.5)
Female	1 467 (48.1)		1 873 (49.2)	
Townsend score				
≤−1.6	430 (14.3)		943 (25.0)	
−1.599–0.497	451 (15.0)		892 (23.7)	
0.498–3.037	550 (18.3)		785 (20.8)	
3.038–5.098	752 (25.1)		610 (16.2)	
≥5.099	816 (27.2)		538 (14.3)	
Missing	52		37	
Mean Townsend score	2.71 (3.39)	2.73 (−0.42–5.14)	1.05 (3.35)	1.43 (−1.24–5.49)
Cigarettes/day				
<10	944 (30.9)		1 382 (36.3)	
11–20	1 357 (44.5)		1 507 (39.6)	
21–30	422 (13.8)		545 (14.3)	
31–40	98 (3.2)		125 (3.3)	
41+	33 (1.1)		26 (0.7)	
No response	197 (6.5)		220 (5.8)	

between practices, we used logistic regression in MLwiN version 2.02 [17]. We used a two-level hierarchical model with subjects nested within practices, a random effect of practice, intervention fitted at the practice level, and age, sex, Townsend score and amount smoked per day at the subject level. With 12 practices in each treatment group, and expecting to recruit 500 smokers per practice and assuming an intracluster correlation coefficient of not more than 0.007 [18], the study was designed to have 80% power to detect a change from a quit rate of 2.5% in the control group to 4% in the intervention group (an OR of 1.625). Characteristics of service attendees between the period of the study and the same months in the previous year were compared by an independent samples *t*-test, Mann–Whitney *U*-test for non-normally distributed data, or χ^2 test for categorical data. We carried out a *post hoc* subgroup analysis of validated and self-reported abstinence at 6-month follow-up in those who responded to the initial questionnaire that they wanted help or advice from a smoking cessation adviser.

RESULTS

In intervention and control practices, there were 10 402 and 12 642 patients, respectively, aged 18 years or over recorded as smokers, and 6523 and 5665 with no record of smoking status in their medical records. We estimate the total number of true current smokers in intervention and control practices at baseline to have been 10 177 and 11,783, respectively, of whom 3051 (30%) and 3805 (32%), respectively (total 6856) participated in our study (Table 1).

The distribution of gender and age was similar for participants in intervention and control practices (Table 1). Townsend scores were slightly higher (implying greater relative deprivation), and cigarette consumption also higher, for participants in intervention practices. A similar proportion of smokers in intervention and control practices requested help with quitting smoking [mean 40.6% (range 30.6–51.8) and 41.6% (range 36.4–50.2), respectively]. Of those requesting

Table 2 Effect of intervention versus control on main outcomes in all smokers responding at baseline.

<i>Of all smokers participating at baseline</i>	<i>Intervention mean % per practice (range)</i>	<i>Control mean % per practice (range)</i>	<i>Unadjusted OR (95% CI)</i>	<i>Adjusted OR* (95% CI)</i>
Self-reported smoking abstinence (last 7 days) at 6 months†	8.6 (5–14.4)	7.4 (2.3–12.1)	1.20 (0.86–1.69)	1.23 (0.90–1.67)
Validated smoking abstinence at 6 months†	3.5 (1.9–6.4)	2.5 (0–5.4)	1.60 (0.89–2.87)	1.64 (0.92–2.89)

*Adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline. †Those who did not respond at 6 months presumed to be continuing to smoke. CI: confidence interval; OR: odds ratio.

Table 3 Effect of intervention versus control on main outcomes in all responders at 6 months.

<i>Of all those responding at 6 months</i>	<i>Intervention % per practice mean 125, range 15–277</i>	<i>Control % per practice mean 167, range 26–415</i>	<i>Unadjusted OR (95% CI)</i>	<i>Adjusted OR* (95% CI)</i>
Used local smoking cessation service	16.6 (11.6–22.4)	8.9 (4.9–13.8)	2.11 (1.61–2.76)	2.09 (1.57–2.78)
Given advice on quitting from any source	29.3 (13.3–38.6)	21.8 (15.3–38.5)	1.72 (1.38–2.16)	1.68 (1.36–2.07)

*Adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline. CI: confidence interval; OR: odds ratio.

help from intervention practices, 67% received telephone contact from the research team. The remaining 33% were sent postal information, either at their request (12%) or because they were uncontactable by telephone (21%).

Of the 6856 participants at baseline, 3512 provided follow-up questionnaire data at 6 months. This proportion was similar in intervention and control practices, the mean response being 47.9% (range 28.8–55.6) and 53.7% (range 39.6–63.3), respectively. Of those smokers who reported that they had quit smoking, the proportion consenting for further contact for validation was similar between intervention and control groups (58.3% and 56.2%, respectively), but a higher proportion of these individuals in control practices (73.5%) than in the intervention group (56.7%) proved either to be not contactable or else refused subsequently to provide a sample.

There was no significant difference in self-reported point abstinence from smoking at 6 months in intervention and control groups (8.6% and 7.4%, respectively), either before or after adjusting for age, sex, Townsend score and amount smoked at baseline (Table 2). Of those who had quit by self-report 41.0% and 30.6% were, respectively, confirmed as non-smokers by salivary cotinine or exhaled carbon monoxide validation. The prevalence of validated point abstinence from smoking at 6 months was 3.5% and 2.5% in the intervention and

control groups, respectively, and the difference between them was not statistically significantly different, either before or after adjustment for age, sex, Townsend score and amount smoked (adjusted OR 1.64, 95% CI 0.92, 2.89). There was no evidence of interaction between the effect of the intervention and Townsend score or cigarette consumption at baseline.

A significantly higher percentage of participants in the intervention group than in the control group reported that they had used the local smoking cessation service during the period of the study (16.6% and 8.9%, respectively), or had received advice on quitting from any source (29.3% and 21.8%, respectively). Some respondents indicated that they had tried to see an adviser from the local NHS SSS but were unable to make an appointment. An average of 17.9% of those in the intervention practices and 10.5% of those in the control practices either used, or tried to make an appointment with, the local NHS SSS during the course of the study (Table 3).

Among continuing smokers at follow-up, those in the intervention group were slightly more likely to have made a quit attempt during the course of the study (adjusted OR 1.23, 95% CI 1.01–1.51), although these attempts were no more likely to have lasted more than 24 hours than those in the control practices. Smokers in intervention practices were no more likely to have reduced their cigarette consumption over the 6 months, and were less

Table 4 Effect of intervention versus control on main outcomes in continuing smokers at 6 months.

Of current smokers responding at 6 months	Intervention <i>n</i> per practice mean 102, range 12 210	Control <i>n</i> per practice mean 143, range 24 345	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
Reduced cigarette consumption†	14.3 (7.3–22.0)	13.9 (4.2–18.0)	1.12 (0.89–1.41)	1.10 (0.86–1.40)
Want to quit	62.7% (57.6–75.0)	67.3% (59.7–75.0)	0.83 (0.70–0.98)	0.80 (0.67–0.94)
Tried to quit in last 6 months	37.4% (26.8–47.5)	33.3% (25.0–41.2)	1.22 (1.01–1.50)	1.23 (1.01–1.51)
At least one attempt lasting 24 hours or more	28.2% (19.0–39.0)	27.4% (21.4–36.0)	1.12 (0.94–1.39)	1.14 (0.92–1.42)

*Adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline. †Adjusted for age, gender, quintiles of Townsend score only (for model convergence). CI: confidence interval; OR: odds ratio.

Table 5 Characteristics of service users during the study period, and for the same period in the preceding year.

	Year before study	Year of study	P-value
Number of users	3468	4148	
Mean age (years) (<i>n</i> = 7616)	43.1 (12–88)	41.9 (11–90)	<0.001
Mean Townsend score (<i>n</i> = 7141)	1.75 (–5.770–9.070)	1.69 (–6.510–9.070)	0.491
Gender % male (<i>n</i> = 7616)	41.2	43.0	0.122
Ethnicity % white Caucasian (<i>n</i> = 7423)	93.4	91.7	0.007
% Set quit date (<i>n</i> = 7616)	73.1	66.4	<0.001
% Quit at 4 weeks (<i>n</i> = 7616)*	41.8	40.9	0.442
Median (range) motivation to quit score (<i>n</i> = 5976)	9.0 (1–10)	9.0 (1–10)	0.096

*Clients lost to follow up assumed to be continuing to smoke at 4 weeks.

likely to want to quit at follow-up than their counterparts in the control practices (adjusted OR 0.80, 95% CI 0.67–0.94) (Table 4).

Characteristics of service users

More people attended the local NHS SSS during the period of the study than in the equivalent period of the previous year (Table 5). There was also a notable difference in the proportion of attendees who set a quit date, which at 66.4% in the study period was significantly lower than the 73.1% in the previous year (Table 5). There was a significant increase in the proportion of non-white Caucasian clients attending the local NHS SSS in the year of the study compared with the previous year, but no difference in socio-economic status.

Post-hoc analysis in the subgroup of smokers who wanted to speak to a smoking cessation adviser

In those smokers who indicated at baseline that they would like to speak to a smoking cessation adviser (*n* = 1289 and 1551 in the intervention and control practices, respectively), the response rate at 6-month follow-up was comparable with that for the complete study population. Validated quit rates were significantly

higher in the intervention group than control (4.0% and 2.2%, respectively), although the difference in self-reported abstinence was not statistically significant (Table 6).

DISCUSSION

This study aimed to identify proactively smokers in primary care and offer help or advice about smoking cessation which, for those who requested it, included information about and referral to a range of evidence-based cessation support available through the UK NHS stop smoking services. We found that the intervention increased the proportion of smokers reporting attendance at the local NHS SSS and had a modest effect on the number of quit attempts made, but at the population level had no significant impact on actual quit rates or reported cigarette consumption.

The response rate to the initial questionnaire was low at around 30% of the estimated number of current smokers in the practices but, importantly, it was comparable between intervention and control practices so that this is unlikely to have introduced bias, but may limit the generalizability of our results. Both self-reported and validated control group cessation rates were higher than

Table 6 Effect of intervention versus control on main outcomes in those smokers who indicated they would like speak to a smoking cessation adviser at baseline.

<i>Of all smokers who indicated they would like to speak to a smoking cessation adviser at baseline</i>	<i>Intervention mean % per practice (range)</i>	<i>Control mean % per practice (range)</i>	<i>Unadjusted OR (95% CI)</i>	<i>Adjusted OR* (95% CI)</i>
Self-reported smoking abstinence (last 7 days) at 6 months†	7.5 (2.3–13.0)	5.9 (2.5–9.5)	1.35 (0.97–1.87)	1.37 (0.99–1.90)
Validated smoking abstinence at 6 months†	4.0 (0–10.0)	2.2 (0–4.0)	1.96 (1.08–3.58)	2.05 (1.11–3.76)

*Adjusted for age, gender, quintiles of Townsend score and cigarette consumption at baseline. †Those who did not respond at 6 months presumed to be continuing to smoke. CI: confidence interval; OR: odds ratio.

anticipated spontaneous quit rates (approximately 2% annually) [10] after 6 months, and this is due probably to over-representation of motivated smokers among our participants. While this response rate is not unusual for a community-based study, smokers may also have been deterred by the two-stage process imposed by ethical considerations of returning the questionnaire to the general practice and providing signed consent for these data to be seen by researchers.

The response rate at follow-up was also relatively low and there was a small difference in response between intervention and control groups, with poorer response from intervention group smokers, possibly as a result of response fatigue as some of this group would have been contacted in the interim. We have assumed that non-responders at follow-up were still smoking, as is standard practice in clinical trials; to the extent that this may not have been true in some cases, smoking cessation rates in both groups would have been underestimated and the marginally poorer response for intervention practices would have tended to reduce the apparent size of effect. This seems unlikely to have had more than a minimal impact on our results, however. We used validated point abstinence smoking cessation at 6 months rather than sustained abstinence over the 6 months, which might have been a better marker of life-time abstinence, but point abstinence was the only feasible outcome in this community-based study. Finally, although many smokers agreed in principle to provide samples for smoking status validation, it proved difficult to make face-to-face contact with many individuals, as is typical in this type of study [19]. Control group smokers who had received less contact with the research team, and were also more likely to be working, were less likely to provide samples and, as those who did not provide saliva samples were assumed to be smoking, this misclassification would tend to increase the apparent cessation rate in the intervention compared with control. Nevertheless, the results were consistent for

both validated and non-validated measures of smoking cessation, with neither showing a significant difference.

We designed the study to detect a 1.5% point difference in cessation between active and control groups based on recruiting 500 smokers per practice. We did not achieve this sample size in a number of practices, and it remains possible that a true effect on cessation rates of this magnitude or smaller was missed. We observed a difference in quit rates attributable to the intervention of between 1 and 1.5% in all smokers, which although not statistically significant in this study is potentially important in public health terms. The magnitude of effect we found may also have been reduced by the fact that smokers in the intervention group were more deprived socio-economically and heavier smokers, and were therefore less likely to quit [20], although adjusting our findings for deprivation and cigarette consumption had little impact on the result. There was also no evidence of interaction between either deprivation or cigarette consumption and smoking cessation in our study, so these baseline chance differences are unlikely to explain our findings.

Smokers in the intervention group were more likely to have received advice on smoking cessation from any source during the period of study. It is surprising that this proportion for the intervention group is only 29%, as we provided advice by telephone or letter for the 40% who requested help or advice. This discrepancy is likely to be the result of poor recall of advice, or misunderstanding of what we meant by receiving advice from 'any source'. It is notable that smokers in the intervention group were less likely to want to quit at the end of the study than those in the control group, but this could be explained by their being more likely to have made a recent (unsuccessful) quit attempt.

Smokers in the intervention group reported a significantly higher use of NHS stop smoking services. However, as those seeking help to quit in the intervention group were aware that we had booked them an

appointment with the service they may have over-reported attendance. Attendance data collected by the NHS stop smoking service are anonymized and so we were unable to link these data and general practice data to determine if individuals actually attended the appointments booked for them. There was an increase in service usage during the period of our study, and while we cannot be sure that this increase was due to our study rather than other initiatives, it would be consistent with our intervention being effective in increasing the number of smokers contacting the service. When we compared the characteristics of those attending the local SSS during the course of our study with a similar time-period in the previous year, we found little evidence of a difference in socio-demographic characteristics, but service users in the period of our study were less motivated to quit and less likely to set a quit date than those attending in the previous year. It is possible that, by offering smoking cessation support proactively, we encouraged a group of smokers to access NHS SSS who were perhaps not as ready or motivated to quit as previous service users. Although our study was based in Nottinghamshire, a relatively deprived population, the local NHS SSS provides a standard range of evidence-based smoking cessation interventions with group or individual support at flexible times and locations which is typical of services available nationally [21], and as such our results are likely to be generalizable to deprived populations and NHS cessation services across the country.

In our primary analysis we compared smoking cessation at follow-up between all smokers in intervention and control practices, whether or not they asked for help or advice from a smoking cessation adviser. We took this approach to establish the public health impact of our intervention which encompassed a proactive approach to all smokers, but then targeted help to those who requested it. Although our study did not show a significant effect of the intervention on smoking cessation in the whole study population, there was *post hoc* evidence of a greater effect in the subgroup who requested help or advice from the smoking cessation adviser, with validated smoking status increased twofold in the intervention compared to the control group (adjusted OR 2.05, 95% CI 1.11, 3.76). This suggests that, while a proactive approach to smokers in general may have no more than a small and limited impact on cessation rates in the smoking population, an intervention which targets successfully smokers who want help to quit, with proactive provision of evidence-based smoking cessation support to these individuals, may be more effective.

The two previous UK studies which have adopted the approach of identifying and recruiting smokers from primary care [19,22] have found few or no significant effects of a range of proactive interventions offered to

smokers. However, none of these interventions referred smokers specifically to NHS stop smoking services, which at the time were still in an early stage of development. While a US study found that smokers were much more likely to attend a smoking cessation programme if they had first received detailed information about the programme and strong encouragement to attend, the study did not report smoking cessation rates, so the effect of contacting the service on cessation is unknown [8]. Our trial is the first to assess whether proactive contacting and referral into evidence-based cessation services [11,23] would not only encourage more smokers to use the service but also lead to increased cessation. Our findings suggest that a proactive approach is successful in smokers who want help to quit, but is not an effective means of increasing cessation in the population.

In conclusion, it appears that a proactive approach is successful in reaching smokers who want support to quit through primary care, and providing information about and referral to NHS SSS appears to increase smokers' receipt of smoking cessation interventions, their propensity to start quit attempts and their chances of quitting, but this approach translates into, at best, only a modest and in our case non-significant increase in smoking cessation in the population.

Acknowledgements

This study was funded by the British Heart Foundation. The study was designed, conducted, analysed and interpreted independently of all funding sources. Trial registration: Current Controlled Trials ISRCTN71514078.

References

1. Lowey H., Tocque K., Bellis M. A., Fullard B. Smoking cessation services are reducing inequalities. *J Epidemiol Commun Health* 2003; **57**: 579–80.
2. Jha P., Peto R., Zatonski W., Boreham J., Jarvis M. J., Lopez A. D. Social inequalities in male mortality, and in male mortality from smoking: indirect estimation from national death rates in England and Wales, Poland, and North America. *Lancet* 2006; **368**: 367–70.
3. Tengs T. O., Adams M. E., Pliskin J. S., Safran D. G., Siegel J. E., Weinstein M. C. *et al.* 500 lifesaving interventions and their cost-effectiveness. *Risk Anal* 1995; **15**: 369–90.
4. Pound E., Coleman T., Adams C., Bauld L., Ferguson J. Targeting smokers in priority groups: the influence of government targets and policy statements. *Addiction* 2005; **100**: 28–35.
5. Lader D. *Smoking-Related Behaviour and Attitudes*. 2006. London: Office for National Statistics; 2007.
6. Lancaster T., Stead L. F. Self-help interventions for smoking cessation. *Cochrane Database Syst Rev* 2005; **3**: CD001118.
7. Stead L., Perera R., Lancaster T. Telephone counselling for smoking cessation. *Cochrane Database Syst Rev* 2006; **3**: CD002850, CD002850.

8. Lichtenstein E., Hollis J. Patient referral to a smoking cessation program—who follows through. *J Fam Pract* 1992; **34**: 739–44.
9. Roddy E., Antoniak M., Britton J., Molyneux A., Lewis S. Barriers and motivators to gaining access to smoking cessation services amongst deprived smokers—a qualitative study. *BMC Health Serv Res* 2006; **6**: 147.
10. West R., McNeill A., Raw M. Smoking cessation guidelines for health professionals: an update. *Thorax* 2000; **55**: 987–99.
11. Judge K., Bauld L., Chesterman J., Ferguson J. The English smoking treatment services: short-term outcomes. *Addiction* 2005; **100**: 46–58.
12. McEwen A., West R. Smoking cessation activities by general practitioners and practice nurses. *Tob Control* 2001; **10**: 27–32.
13. Society for Research into Nicotine and Tobacco (SRNT) Subcommittee on Biochemical Verification. Biochemical verification of tobacco use and cessation. *Nicotine Tob Res* 2002; **4**: 149–59.
14. Jarvis M. J., Tunstallpedoe H., Feyerabend C., Vesey C., Saloojee Y. Comparison of tests used to distinguish smokers from nonsmokers. *Am J Public Health* 1987; **77**: 1435–8.
15. Murray R. L., Coleman T., Antoniak M., Fergus A., Britton J., Lewis S. A. The potential to improve ascertainment and intervention to reduce smoking in primary care: a cross sectional survey. *BMC Health Serv Res* 2008; **8**: 6.
16. Morris R., Carstairs V. Which deprivation—a comparison of selected deprivation indexes. *J Public Health Med* 1991; **13**: 318–26.
17. Rabash J., Steele F., Browne W. J., Prosser B. *A User's Guide to Mlwin 2.0*. Bristol: University of Bristol; 2005.
18. Adams G., Gulliford M. C., Ukoumunne O. C., Eldridge S., Chinn S., Campbell M. J. Patterns of intra-cluster correlation from primary care research to inform study design and analysis. *J Clin Epidemiol* 2004; **57**: 785–94.
19. Lennox A. S., Osman L. M., Reiter E., Robertson R., Friend J., McCann I. *et al.* Cost effectiveness of computer tailored and non-tailored smoking cessation letters in general practice: randomised controlled trial. *BMJ* 2001; **322**: 1396–400.
20. Royal College of Physicians. *Nicotine Addiction in Britain. A Report of the Tobacco Advisory Group of the Royal College of Physicians*. London: Royal College of Physicians; 2000.
21. McNeill A., Raw M., Whybrow J., Bailey P. A national strategy for smoking cessation treatment in England. *Addiction* 2005; **100**: 1–11.
22. Aveyard P., Griffin C., Lawrence T., Cheng K. K. A controlled trial of an expert system and self-help manual intervention based on the stages of change versus standard self-help materials in smoking cessation. *Addiction* 2003; **98**: 345–54.
23. Ferguson J., Bauld L., Chesterman J., Judge K. The English smoking treatment services: one-year outcomes. *Addiction* 2005; **100**: 59–69.

Unplanned attempts to quit smoking: missed opportunities for health promotion?

Rachael L. Murray¹, Sarah A. Lewis¹, Timothy Coleman², John Britton¹ & Ann McNeill¹

UK Centre for Tobacco Control Studies, Division of Epidemiology and Public Health¹ and Division of Primary Care², University of Nottingham, Nottingham, UK

ABSTRACT

Objectives To investigate the occurrence, determinants and reported success of unplanned and planned attempts to quit smoking, and sources of support used in these attempts. **Design** Cross-sectional questionnaire survey of 3512 current and ex-smokers. **Setting** Twenty-four general practices in Nottinghamshire, UK. **Participants** Individuals who reported making a quit attempt within the last 6 months. **Measurements** Occurrence, triggers for, support used and success of planned and unplanned quit attempts. **Results** A total of 1805 (51.4%) participants returned completed questionnaires, reporting 394 quit attempts made within the previous 6 months of which 37% were unplanned. Males were significantly more likely to make an unplanned quit attempt [adjusted odds ratio (OR) 1.60, 95% confidence interval (CI) 1.04–2.46], but the occurrence of unplanned quit attempts did not differ significantly by socio-economic group or amount smoked. The most common triggers for unplanned quit attempts were advice from a general practitioner or health professional (27.9%) and health problems (24.5%). 5.4% and 4.1% of unplanned quit attempts used National Health Service cessation services on a one to one and group basis, respectively, and more than half (51.7%) were made without any support. Nevertheless, unplanned attempts were more likely to be reported to be successful (adjusted OR 2.01, 95% CI 1.23–3.27, $P < 0.01$). **Conclusions** Unplanned quit attempts are common among smokers in all socio-demographic groups, are triggered commonly by advice from a health professional and are more likely to succeed; however, the majority of these unplanned attempts are unsupported. It is important to develop methods of providing behavioural and/or pharmacological support for these attempts, and determine whether these increase cessation rates still further.

Keywords Smoking cessation, support, triggers, unplanned.

Correspondence to: Rachael Murray, Division of Epidemiology and Public Health, Clinical Sciences Building, Nottingham City Hospital, Nottingham NG3 6DE. E-mail: rachael.murray@nottingham.ac.uk

Submitted 16 January 2009; initial review completed 31 March 2009; final version accepted 6 April 2009

INTRODUCTION

Using behavioural support and pharmacotherapy increases the likelihood of success substantially in any attempt to quit smoking [1], but their use in practice generally requires some degree of advance planning. However, recent evidence from Canada [2] and the United Kingdom [3] indicates that a substantial proportion of quit attempts are made spontaneously. It has also been reported that unplanned quit attempts may be up to three times more likely to be successful for 6 months or more than planned ones [3].

In the United Kingdom, smoking cessation services have been developed to provide all smokers wishing to attempt to quit smoking with behavioural

and pharmacological support [4]. These services are being used currently by more than 600 000 smokers each year [5], but are designed primarily to support planned quit attempts. Because a large proportion of quit attempts appear to be unplanned [2,3] it is important to determine the characteristics of those who make unplanned attempts, and the extent to which they use cessation support, to determine whether and how services need to adapt to meet their needs. This study was designed to investigate the occurrence and determinants of unplanned and planned quit attempts, and the sources of support used in these attempts, among a group of current and recent ex-smokers who reported making a quit attempt within the last 6 months.

METHODS

In 2008, self-completion questionnaires were sent to 3512 smokers and recent ex-smokers aged between 21 and 89 years, all of whom had been smokers in 2005 and, at that time, registered with 24 general practices in Nottinghamshire that participated in a cluster randomized controlled trial of a new approach to provision of smoking cessation services [6] (ISRCTN71514078). Questionnaires were accompanied by a standard letter explaining that the study was exploring attempts at quitting smoking and the factors which helped or hindered these. We asked for responses from both current and ex-smokers, and from current smokers whether or not they were currently attempting to quit. Respondents were also asked whether they agreed to being contacted at a later date to discuss further their experiences of trying to quit smoking. All were offered a £5 gift voucher for completion and return of the questionnaire. A reminder letter was sent to non-responders after 3 weeks. Further reminders were not sent after this point due to financial constraints.

The questionnaire asked about socio-demographic factors and smoking history and behaviour, including recent smoking cessation behaviour. We asked 'Have you made a serious attempt to stop smoking in the last 12 months? By serious attempt we mean you decided that you would try to make sure you never smoked another cigarette. Please include any attempt you are currently making'. Respondents who had made at least one 'serious' quit attempt were then asked for details about their last three quit attempts (or less depending on actual number) (in accordance with West's Smoking Toolkit [7]), including: (i) when the attempt occurred; (ii) whether they planned the quit attempt; (iii) factors triggering quit attempts; and (iv) the types of support used to help with cessation. The following question (taken from West's Smoking Toolkit [7]) was used to characterize each quit attempt as planned or unplanned: 'Which of these statements best describes how your attempt to stop smoking started'. Respondents were given the following options:

- 1 I did not plan the quit attempt in advance; I just did it
- 2 I planned the quit attempt for later the same day
- 3 I planned the quit attempt the day beforehand
- 4 I planned the quit attempt a few days beforehand
- 5 I planned the quit attempt more than a week beforehand

We defined the most recent quit attempt as unplanned if respondents selected the option, 'I did not plan the quit attempt in advance; I just did it' and any other response was taken to represent a planned quit attempt.

Data analysis

Questionnaire data were entered into SPSS version 16. Townsend scores based on patients' postcodes were calculated from the 2001 census [8] and were categorized into quintiles for analysis. This deprivation measure is based on unemployment, car ownership, overcrowding and housing tenure and has been found to explain variations in health measures and adhere closely to the concept of material disadvantage [9]. To minimize recall bias, while also ensuring sufficient numbers for analysis, we elected to analyse only those recent quit attempts which were made in the last 6 months. In this group, we compared those who reported making planned and unplanned attempts in terms of age, sex, Townsend score, cigarette consumption reported in 2005, triggers for the quit attempt and sources of support used using cross-tabulation and χ^2 tests for univariate and logistic regression for multivariate analysis. To explore the appropriateness of using only data on attempts reported within the previous 6 months, we also conducted an identical analysis for data on quit attempts recalled within the previous 3 and 12 months and compared findings with those using 6-month recall data. The Leicestershire, Northamptonshire and Rutland Research Ethics Committee approved this study.

RESULTS

Response to questionnaire

A total of 1805 completed questionnaires were returned (51.4%). A further 19 were returned as 'addressee deceased' and 142 returned as no longer at the registered address. Those who responded to the questionnaire were slightly less likely to be male but were otherwise similar to those who did not respond (Table 1).

Of respondents, 327 (18.1%) had been abstinent from smoking for more than 12 months and 639 (35.4%) had made a serious quit attempt in the last year. Of these 639 people, 394 had made their most recent quit attempt in the last 6 months. The characteristics of this group are shown in Table 1, and did not differ substantially from those of all respondents. At the time of the survey, 26.1% ($n = 103$) of this group reported that they were abstinent from smoking. At the time of completing the questionnaire 36.6% of current smokers reported having made a quit attempt in the last year.

Quit attempts made in the last 6 months

Of the 394 quit attempts made in the last 6 months, 147 (37%) were unplanned. Fifteen individuals did not answer the question relating to planning their quit attempt, and were excluded from further analyses. Males

Table 1 Socio-demographic characteristics of those individuals sent and responding to the questionnaire.

	Questionnaires sent (n = 3512)	Respondents (n = 1805)	Made quit attempt in last 6 months (n = 394)
% male	51.4	45.7	50.9
Median age (IQR)	47 (36–58)	51 (40.75–61)	52 (40.5–62)
Median Townsend score (IQR)	1.33 (–1.30 to 4.62)	1.32 (–1.45 to 4.54)	1.29 (–1.34 to 4.34)
Cigarette consumption			
>10	35.8%	36.8%	32.5%
11–20	41.5%	40.7%	43.9%
21–30	14.6%	13.8%	17.5%
31+	4.3%	4.3%	5.3%
Missing	3.8%	4.5%	0.8%

IQR: interquartile range.

Table 2 Characteristics of those making quit attempts in the last 6 months.

	Total n	Unplanned		Adjusted OR ^a (95% CI)	P-value
		n	%		
Gender					
Female	207	70	33.8	1	0.03
Male	172	77	44.8	1.60 (1.04–2.46)	
Age					
<38	80	29	36.2	1	0.27
39–48	92	36	39.1	1.04 (0.54–1.99)	
49–57	74	29	39.2	1.09 (0.55–2.17)	
58–64	76	24	31.6	0.81 (0.40–1.61)	
>64	57	29	50.9	1.85 (0.90–3.78)	
Townsend ^b					
= –1.808	76	23	30.3	1	0.28
–1.808 to 0.164	68	27	39.7	1.63 (0.80–3.32)	
0.164–2.542	77	30	39	1.45 (0.73–2.89)	
2.542–4.900	76	37	48.7	2.17 (1.09–4.32)	
4.900+	79	30	38	1.39 (0.70–2.75)	
Cigarettes smoked ^b					
0–10	124	50	40.3	1	0.84
11–20	168	59	35.1	0.82 (0.50–1.35)	
21–30	64	26	40.6	1.02 (0.54–1.94)	
31+	20	9	45	1.02 (0.37–2.82)	

^aAdjusted for gender, age, Townsend index and cigarette consumption. ^bTownsend scores and cigarette consumption information for 3 individuals were not available, and included as a separate missing value category for analysis.

were significantly more likely to make unplanned quit attempts than females [adjusted odds ratio (OR) 1.60, 95% confidence interval (CI) 1.04–2.46] (Table 2). There were less marked effects of other socio-demographic characteristics. Recent quit attempts made by smokers in the oldest age category were more likely to be unplanned than those in other categories (50.9% of recent attempts in those aged over 64 being made with no pre-planning), although there was no statistically significant trend with increasing age.

Unplanned quit attempts were least common in quintile 1 of Townsend score (least disadvantaged) (30.3%) and most common in quintile 4 (48.7%), but there was no significant trend across quintiles of deprivation. Although unplanned quit attempts were reported more frequently by heavier smokers, this finding was not statistically significant. A similar pattern was seen if recent quit attempts in the last 3 or 12 months were analysed, although the tendency for unplanned attempts to be lowest in the least deprived and highest in the 4th quintile

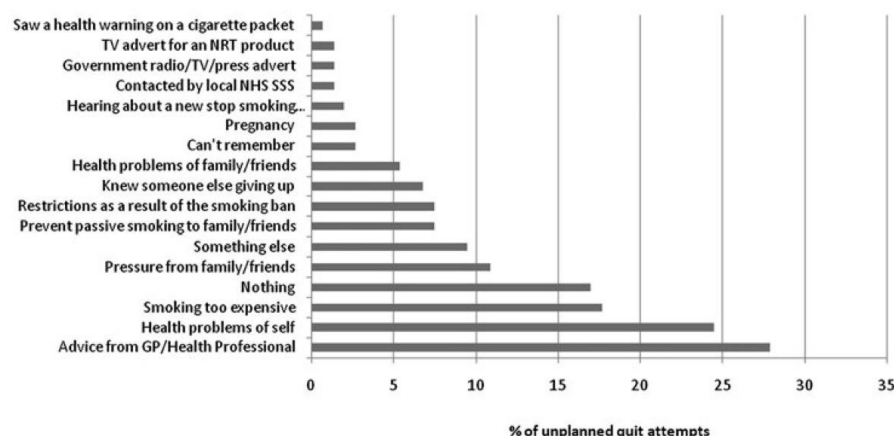


Figure 1 Triggers for unplanned quit attempts

of Townsend score was more apparent for attempts made more recently.

Triggers for quit attempts

Respondents indicated which one or more of a prompted list of possible triggers had led to their recent quit attempt. In unplanned quit attempts, the most common trigger reported was 'advice from a GP/health professional' (occurring in 27.9% of all unplanned recent quit attempts), followed by 'health problems I had at the time' (24.5%), 'a decision that smoking was too expensive' (17.7%), 'nothing in particular' (17%) and 'pressure from family/friends' (10.9%) (Fig. 1). A similar pattern was evident for unplanned quit attempts made within the last 3 and 12 months (data not presented). The pattern of specific triggers was somewhat different to that seen for planned quit attempts, in which the most common trigger reported was 'a decision that smoking was too expensive' (30.6%), followed by 'health problems I had at the time' (27.6%), 'advice from a GP/health professional' (25.4%), 'pressure from family/friends' (16.8%) and 'preventing passive smoking to family/friends' (14.7%) (Fig. 2). More than twice as many respondents indicated that 'nothing in particular' triggered their quit attempt in the unplanned group compared to the planned group (17% and 8.2%, respectively).

Sources of support for quit attempts

Respondents indicated which one or more of a prompted list of possible sources of support they had used on their most recent quit attempt. Most reported that unplanned

quit attempts were made without the use of any support (51.7%). The most common source of support reported to be used in unplanned quit attempts was nicotine replacement therapy (NRT) obtained without prescription (25.9%), followed by NRT obtained on prescription (16.3%), use of a National Health Service (NHS) stop smoking service one-to-one counselling session (5.4%), 'something else' (5.4%) and use of an NHS stop smoking services group (4.1%) (Fig. 3). A similar pattern was evident for unplanned quit attempts made within the last 3 and 12 months (data not presented).

In contrast, among those reporting planned quit attempts, only 25.9% were reported to be unsupported. Planned quit attempts were supported by NRT obtained without prescription (38.4%), NRT obtained on prescription (19.8%), use of an NHS stop smoking service one-to-one (12.5%) and an NHS stop smoking service group (9.1%) (Fig. 4).

Success of quit attempts made within the last 6 months

Of all respondents who reported making quit attempts in the previous 6 months, 34% of those who had not planned these reported still being abstinent at the time of responding to the questionnaire, compared to 22.4% of those who reported planning their quit attempt. The higher reported abstinence in those who did not plan their quit attempts was independent of gender, age, Townsend score and cigarette consumption (adjusted OR 2.01, 95% CI 1.23–3.27, $P < 0.01$). There was little difference in the success of planned and unplanned quit attempts according to how long ago the attempt had been

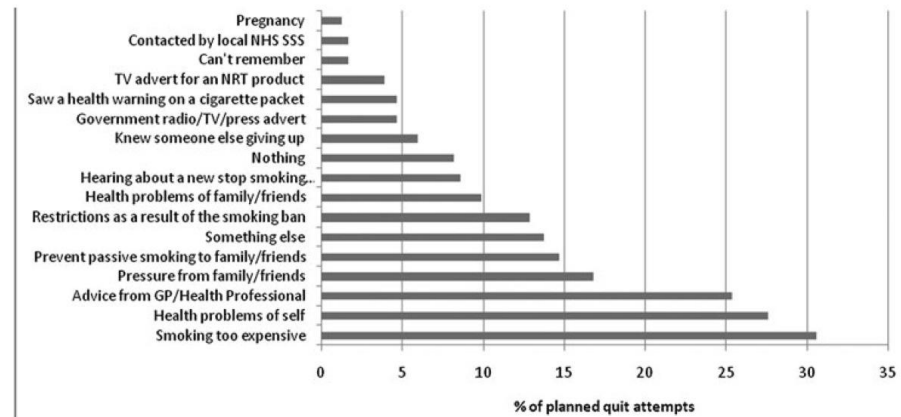


Figure 2 Triggers for planned quit attempts

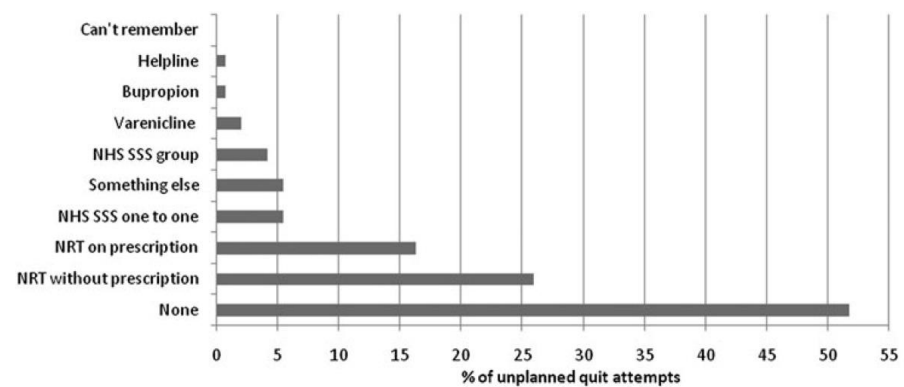


Figure 3 Sources of support used in unplanned quit attempts

made (Table 3). The association between absence of planning and successful abstinence was most marked among those whose most recent quit attempt was made 3–6 months ago.

DISCUSSION

This study demonstrates that smokers who make unplanned attempts to stop smoking make less use of evidence-based cessation support than those who do plan, that the main trigger for the unplanned quit attempt is advice from a doctor or health professional, and that unplanned attempts appear more likely to succeed than those that are planned. Unplanned

attempts were more common among men but were not related significantly to socio-economic status or amount smoked.

The participants in our study were originally part of a randomized intervention trial of a proactive approach to provide smoking cessation support, but this is unlikely to have affected our findings because the intervention was completed in all practices at least 2 years before data collection for this study. As it is possible that our study findings are distorted by biased recall of events associated with quit attempts which may have been made up to 6 months previously, we repeated our analyses including quit attempts made within the last 3 or 12 months and found that the key findings of the paper remained the

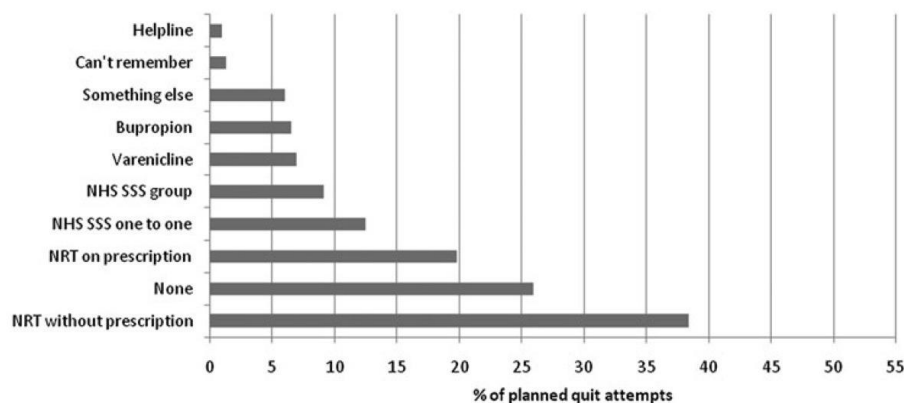


Figure 4 Sources of support used in planned quit attempts

Table 3 Current abstinence in those making a planned or unplanned quit attempt in the last 6 months, overall, and stratified by how long ago the attempt was made.

	Total	Currently abstinent		Adjusted OR (95% CI)
		n	%	
Quit attempt in the last 6 months				
Planned	232	52	22	1
Unplanned	147	50	34	2.01 (1.23–3.27)
How long ago quit attempt was made				
Up to 1 month				
Planned	66	15	22.7	1
Unplanned	41	11	26.8	1.37 (0.49–3.84)
1–3 months				
Planned	95	19	20	1
Unplanned	67	18	26.9	1.46 (0.64–3.31)
3–6 months				
Planned	71	18	25.4	1
Unplanned	39	21	53.8	4.63 (1.80–11.94)

OR: odds ratio; CI: confidence interval.

same. Despite the large initial sample size only 394 smokers reported making a quit attempt in the last 6 months, so it is possible that we failed to detect an effect of individual socio-demographic characteristics on making unplanned quit attempts as a result of the relatively small sample size. It is clear that there is a likelihood that quit attempts which reported the use of prescription medications or behavioural support required some element of planning, even though respondents reported that their quit attempt was unplanned. This is a limitation of the current study, as the categorization of planned or unplanned relies on self-report, but raises an interesting question for future research as to what respondents mean when they define a quit attempt as 'unplanned'. The use

of cigarette consumption data from 2005 is a limitation of the current study, as consumption patterns may have changed in the following time-period. This was the only means by which a comparison between all respondents could be made, however, as more recent cigarette consumption data were not available for those who had quit smoking successfully in 2008.

The finding that 36.6% of current smokers reported having made a quit attempt in the last year is comparable with national data [10]. The proportion of quit attempts reported to be unplanned in our study population is lower than reported previously [2,3], but consistent in finding higher reported success rates than in planned attempts. Although we attempted to determine whether unplanned

attempts were more common among disadvantaged smokers, or those with lower levels of smoking, we found only that unplanned attempts were significantly more likely in men. This observation has not been reported previously, but may reflect differences in the way in which men and women go about quitting smoking [11], and complements the observation that women are more likely than men to use NHS stop smoking services in England [5]. Although limited research exists as to the degree to which men and women plan behaviour change, one study indicated that women have a greater potential for planning [12], but this finding was not replicated in a later study [11]. Additionally, a number of psychological and social factors have been identified which may affect smoking cessation in females, including a fear of weight gain, a need for social support and self-efficacy about quitting [13]. It is possible that these factors may lend themselves to more females planning their quit attempt to accommodate and attempt to overcome these issues. Our finding that unplanned quit attempts were more likely in the over-65s was consistent with West & Sohals' observation among older smokers [3]. Although research suggests that the least dependent smokers are the most likely to quit successfully [14], the results from this study do not indicate that lighter smokers are any more likely to make unplanned quit attempts than heavier smokers.

Collectively, the three most common triggers and sources of support were the same for planned and unplanned quit attempts but the most common trigger, and source of support used, differed between planned and unplanned quit attempts. As may be expected, advice from a general practitioner (GP) or health professional was a key trigger for both planned and unplanned quit attempts, and supports the guidelines recommending that health professionals provide brief opportunistic advice to smokers during routine consultations whether or not they are seeking help to stop [1]. Previous research has indicated that a large proportion of smokers are interested in receiving smoking cessation advice and support if it is offered to them [6], and the fact that this was the most common trigger in unplanned quit attempts suggests that such advice may, potentially, initiate a quit attempt in individuals who were not necessarily planning on trying to quit above any other factor. A decision that smoking was too expensive was the primary trigger for planned quit attempts and was a factor in nearly twice as many planned than unplanned attempts. It perhaps is to be expected that an increasing cost of smoking is likely to lead to smokers thinking about and planning to make a quit attempt. Health problems of respondents were the second most common trigger for both planned and unplanned quit attempts, which is in line with previous research reporting that health is a major motivation for wanting to quit [15]. Of interest is the finding that

'nothing in particular' triggered the quit attempt for more than twice as many of those who did not plan as those who did. This may support the suggestion of West & Sohal, that an alternative model to the stages of change approach based on 'catastrophe theory' [16] may be applicable to smoking cessation [3]. This model proposes that beliefs, past experiences and the current situation create varying levels of motivational tension which can lead to an attempt to quit smoking with small triggers, and it is possible that such small triggers have been forgotten by respondents to this survey.

We found that more than half of all unplanned quit attempts were made without any form of support, twice as many as those which had been planned. Given the evidence from randomized studies that support increases the success rate of quit attempts by up to fourfold [1] we believe that this is a missed opportunity, even though unplanned quit attempts appear to have a greater likelihood of success. It is also noteworthy that more than a quarter of those who made planned attempts did not use any support. The most common form of support used by both groups was NRT obtained without prescription, which indicates that the majority of smokers are not making use of NHS services and support available to help them to quit, despite considerable government investment in these services. It is possible that this finding reflects a lack of awareness of NHS support available to help smokers to quit, and if this is the case then further emphasis needs to be placed on publicizing and promoting these services to smokers. Two studies investigating reasons why smokers may not access stop smoking services have suggested that barriers may include factors such as fear of being judged, fear of failure and lack of knowledge, particularly in the case of smokers from lower socio-economic groups [17,18]. It is also possible that other factors influenced the low reported use of prescription medications, such as difficulty in obtaining an appointment with a GP to gain a prescription or the expense of prescription charges, and these factors cannot be ruled out as explanations for our findings. However, our study provides further evidence that the prevailing model of smoking cessation services offered by health systems may not apply for a large proportion of smokers' quit attempts. For example, NHS stop smoking services advise individuals to set a quit date and plan ahead. On the assumption that the success rate of spontaneous quit attempts could be increased still further if supported by behavioural and pharmacological interventions, our findings suggest that these services need to be more flexible and adaptable to smokers who make unplanned quit attempts. A number of studies have been conducted looking at ways in which access to stop smoking services could be improved, and many of these findings may be applicable to those smokers who make unplanned

attempts to quit smoking. These include providing drop-in sessions, so that smokers do not have to book in advance [19,20], and providing pharmacy-based support that may be more immediately accessible to this group of potential quitters [21–23]. Also, as doctors and health professionals can themselves trigger such unplanned quit attempts, systems should be in place to offer immediate support and/or referral to services when these are made.

Few quit attempts involved the use of support from helplines, and as these could be an immediate avenue of support and advice for those smokers making unplanned quit attempts, investigating why helplines are not used more frequently in such quit attempts could be useful. If lack of awareness about helplines explained their under-use, then raising awareness about their availability should, perhaps, be a priority in tobacco control strategy. Similar issues may explain why few quitters reported use of internet-based cessation-support systems, although this could also have occurred because respondents had to record use of these as an open, freetext response and there was no dedicated category to record use of internet support on the study questionnaire.

To our knowledge, this is the first paper to compare the socio-demographic characteristics of smokers who plan and do not plan quit attempts and to investigate differences in triggers, sources of support used and success in attempts. It is clear that unplanned quit attempts are common among all socio-demographic groups and the majority of unplanned attempts are unsupported. It is accepted widely that a quit attempt which uses evidence-based cessation support is more likely to be successful, so it is important to find ways of offering and providing such support to smokers who do not plan cessation attempts in advance. Further research is needed in order to determine the best ways of doing this, but our findings suggest that, as health professionals trigger many unplanned quit attempts, specific advice of how to obtain cessation support should be mandatory whenever a smoker who is receptive to the notion of attempting cessation, but has made no plans for this, is encountered.

Declaration of interest

None.

Acknowledgements

This study was funded by Cancer Research UK. The study was designed, conducted, analysed and interpreted independently of all funding sources. All authors are members of the UK Centre for Tobacco Control Studies, a UKCRC Public Health Research Centre of Excellence. Funding from the Economic and Research Council, British Heart Foundation, Cancer Research UK, the Department of Health and the Medical Research Council

under the auspices of the UK Clinical Research Collaboration is gratefully acknowledged.

References

1. West R., McNeill A., Raw M. Smoking cessation guidelines for health professionals: an update. *Thorax* 2000; **55**: 987–99.
2. Larabie L. C. To what extent do smokers plan quit attempts? *Tob Control* 2005; **14**: 425–8.
3. West R., Sohal T. 'Catastrophic' pathways to smoking cessation: findings from national survey. *BMJ* 2006; **332**: 458–60.
4. National Institute for Clinical Excellence. *Smoking Cessation Services in Primary Care, Pharmacies, Local Authorities and Workplaces, Particularly for Manual Working Groups, Pregnant Women and Hard to Reach Communities*. London: National Institute for Clinical Excellence; 2008.
5. The Information Centre. *Statistics on Smoking: England, 2008*. London: The Information Centre; 2008.
6. Murray R. L., Coleman T., Antoniak M., Fergus A., Britton J., Lewis S. A. The potential to improve ascertainment and intervention to reduce smoking in primary care: a cross sectional survey. *BMC Health Serv Res* 2008; **8**: 6.
7. West R. Smoking toolkit study: protocol and methods, 2006. Available from <http://www.smokinginengland.info/Ref/paper1.pdf> (accessed 6 July 2009).
8. 2001 Census. UK National Statistics website. Office for National Statistics, 2004. Available at: <http://www.statistics.gov.uk/census/> (accessed 22 November 2008).
9. Morris R., Carstairs V. Which deprivation—a comparison of selected deprivation indexes. *J Public Health Med* 1991; **13**: 318–26.
10. Lader D. *Smoking-related Behaviour and Attitudes, 2007*. London: Office for National Statistics; 2008.
11. O'Connor E. A., Carbonari J. P., DiClemente C. C. Gender and smoking cessation: a factor structure comparison of processes of change. *J Consult Clin Psychol* 1996; **64**: 130–8.
12. Grossman A. A., Di Clemente C. C., Prochaska J. O. Gender differences and smoking cessation: processes of change. 94th Annual Convention of the American Psychological Association, Washington, DC; August, 1986.
13. Gritz E. R., Nielsen I. R., Brooks L. A. Smoking cessation and gender: the influence of physiological, psychological, and behavioral factors. *J Am Med Womens Assoc* 1996; **51**: 35–42.
14. Chandola T., Head J., Bartley M. Socio-demographic predictors of quitting smoking: how important are household factors? *Addiction* 2004; **99**: 770–7.
15. McCaul K. D., Hockemeyer J. R., Johnson R. J., Zetoch K., Quinlan K., Glasgow R. E. Motivation to quit using cigarettes: a review. *Addict Behav* 2006; **31**: 42–56.
16. Brown C. *Chaos and Catastrophe Theories: Quantitative Applications in the Social Sciences*. London: Sage; 1995.
17. Roddy E., Antoniak M., Britton J., Molyneux A., Lewis S. Barriers and motivators to gaining access to smoking cessation services amongst deprived smokers—a qualitative study. *BMC Health Serv Res* 2006; **6**: 147.
18. Wiltshire S., Bancroft A., Parry O., Amos A. 'I came back here and started smoking again': perceptions and experiences of quitting among disadvantaged smokers. *Health Educ Res* 2003; **18**: 292–303.
19. Owens C., Springett J. The Roy Castle Fag Ends Stop

- Smoking Service: a successful client-led approach to smoking cessation. *J Smoking Cessation* 2006; **1**: 13–18.
20. Springett J. The challenge of combining lay knowledge with evidence-based practice in health promotion: Fag Ends smoking cessation service. *Crit Public Health* 2007; **17**: 243–56.
21. Bauld L., Chesterman J., Ferguson J., Judge K. A comparison of the effectiveness of group-based and pharmacy-led smoking cessation treatment in Glasgow. *Addiction* 2009; **104**: 308–16.
22. Blenkinsopp A., Anderson C., Armstrong M. Systematic review of the effectiveness of community pharmacy-based interventions to reduce risk behaviours and risk factors for coronary heart disease. *J Public Health Med* 2003; **25**: 144–53.
23. Doescher M. P., Whinston M. A., Goo A., Cummings D., Huntington J., Saver B. G. Pilot study of enhanced tobacco cessation services coverage for low-income smokers. *Nicotine Tob Res* 2002; **4**: S19–24.

APPENDIX XIV: Postgraduate training courses attended

COURSE TITLE	CREDIT VALUE
How to prepare an effective poster presentation	2
Getting going on your thesis and getting your work published	2
MS Excel functionality b	1
Exploiting the power of MS Word (a & b)	2
Introduction to library skills (advanced)	1
Using Nvivo® to analyse qualitative data	2
Interview workshop	1
Preparing your first year report and writing scientific abstracts	1
Advanced statistics 3	1
Building a bibliography (an online learning course)	1
Analysing interview transcripts	2
Critical analysis of scientific literature	1
Faculty postgraduate Research Forum	3
TOTAL	20

REFERENCES

1. Murray CJL, Lopez AD. Alternative projections of mortality and disability by cause 1990-2020: Global burden of disease study. *Lancet* 1997;349(9064):1498-1504.
2. Fagerstrom K. The epidemiology of smoking - Health consequences and benefits of cessation. *Drugs* 2002;62:1-9.
3. Beyond Smoking Kills: Protecting children, reducing inequalities: ASH, 2008.
4. Parrott S, Godfrey C. ABC of smoking cessation - Economics of smoking cessation. *British Medical Journal* 2004;328(7445):947-949.
5. Parrott S, Godfrey C, Raw M. Costs of employee smoking in the workplace in Scotland. *Tobacco Control* 2000;9(2):187-192.
6. Statistics on Smoking: England, 2008: The Information Centre, 2008.
7. Family Spending 2007 edition: National Statistics, 2006.
8. Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. *British Medical Journal* 2004;328(7455):1519.
9. Wald NJ, Hackshaw AK. Cigarette smoking: an epidemiological overview. *British Medical Bulletin* 1996;52(1):3-11.
10. Hanrahan JP, Sherman CB, Bresnitz EA, Emmons KM, Mannino DM. Cigarette smoking and health. *American Journal of Respiratory and Critical Care Medicine* 1996;153(2):861-865.
11. Nicotine Addiction in Britain A report of the Tobacco Advisory Group of the Royal College of Physicians London: Royal College of Physicians, 2000.
12. Quinn M, Babb P, Brock A, Kirby L, Jones J. *Cancer Trends in England and Wales 1950-1999*. London: Office for National Statistics, 2001.
13. Peto R, Lopez A, Boreham J, Thun M. *Mortality from smoking in developed countries*. Oxford Oxford University Press, 2006.
14. Doll R, Peto R, Wheatley K, Gray R, Sutherland I. Mortality in Relation to Smoking - 40 Years Observations on Male British Doctors. *British Medical Journal* 1994;309(6959):901-911.
15. Peto R, Darby S, Deo H, Silcocks P, Whitley E, Doll R. Smoking, smoking cessation, and lung cancer in the UK since 1950: combination of national statistics with two case-control studies. *British Medical Journal* 2000;321(7257):323-329.
16. Kerstjens HAM, Rijcken B, Schouten JP, Postma DS. Decline of FEV1 by age and smoking status: facts, figures, and fallacies. *Thorax* 1997;52(9):820-827.
17. Beck GJ, Doyle CA, Schachter EN. Smoking and Lung-Function. *American Review of Respiratory Disease* 1981;123(2):149-155.
18. Anthonisen NR, Connett JE, Kiley JP, Altose MD, Bailey WC, Buist AS, et al. Effects of Smoking Intervention and the Use of An Inhaled Anticholinergic Bronchodilator on the Rate of Decline of Fev(1) - the Lung Health Study. *Jama-Journal of the American Medical Association* 1994;272(19):1497-1505.
19. Marsh S, Aldington S, Shirtcliffe P, Weatherall M, Beasley R. Smoking and COPD: what really are the risks? *European Respiratory Journal* 2006;28(4):883-884.
20. Pauwels RA, Rabe KF. Burden and clinical features of chronic obstructive pulmonary disease (COPD). *Lancet* 2004;364(9434):613-620.
21. Twigg L, Moon G, Walker S. *The smoking epidemic in England*. London: Health Development Agency, 2004.
22. Mahonen MS, McElduff P, Dobson AJ, Kuulasmaa KA, Evans AE. Current smoking and the risk of non-fatal myocardial infarction in the WHO MONICA Project populations. *Tobacco Control* 2004;13(3):244-250.
23. Negri E, Lavecchia C, Nobili A, Davanzo B, Bechi S. Cigarette-Smoking and Acute Myocardial-Infarction - A Case-Control Study from the Gissi-2 Trial. *European Journal of Epidemiology* 1994;10(4):361-366.

24. McElduff P, Dobson A, Beaglehole R, Jackson R. Rapid reduction in coronary risk for those who quit cigarette smoking. *Australian and New Zealand Journal of Public Health* 1998;22(7):787-791.
25. Howard G, Wagenknecht LE, Burke GL, Diez-Roux A, Evans GW, McGovern P, et al. Cigarette smoking and progression of atherosclerosis - The atherosclerosis risk in communities (ARIC) study. *Jama-Journal of the American Medical Association* 1998;279(2):119-124.
26. Hankey GJ. Smoking and risk of stroke. *Journal of Cardiovascular Risk* 1999;6(4):207-211.
27. Curtis KM, Savitz DA, Arbuckle TE. Effects of cigarette smoking, caffeine consumption, and alcohol intake on fecundability. *American Journal of Epidemiology* 1997;146(1):32-41.
28. Sofikitis N, Takenaka M, Kanakas N, Papadopoulos H, Yamamoto Y, Drakakis P, et al. Effects of cotinine on sperm motility, membrane function, and fertilizing capacity in vitro. *Urological Research* 2000;28(6):370-375.
29. Kyrklund-Blomberg NB, Granath F, Cnattingius S. Maternal smoking and causes of very preterm birth. *Acta Obstetrica et Gynecologica Scandinavica* 2005;84(6):572-577.
30. Larsen LG, Clausen HV, Jonsson L. Stereologic examination of placentas from mothers who smoke during pregnancy. *American Journal of Obstetrics and Gynecology* 2002;186(3):531-537.
31. Cliver SP, Goldenberg RL, Cutter GR, Hoffman HJ, Davis RO, Nelson KG. The Effect of Cigarette-Smoking on Neonatal Anthropometric Measurements. *Obstetrics and Gynecology* 1995;85(4):625-630.
32. Acheson D. Independent Inquiry into Inequalities in Health Report: The Stationary Office 1998.
33. Chesterman J, Judge K, Bauld L, Ferguson J. How effective are the English smoking treatment services in reaching disadvantaged smokers? *Addiction* 2005;100:36-45.
34. Chandola T, Head J, Bartley M. Socio-demographic predictors of quitting smoking: how important are household factors? *Addiction* 2004;99(6):770-777.
35. Romer E, Baker A, Griffiths C. Mortality by deprivation and cause of death in England and Wales, 1999-2003. *Health Stat Q* 2006(32):19-34.
36. Jha P, Peto R, Zatonski W, Boreham J, Jarvis MJ, Lopez AD. Social inequalities in male mortality, and in male mortality from smoking: indirect estimation from national death rates in England and Wales, Poland, and North America. *Lancet* 2006;368(9533):367-370.
37. Robinson SG, E. Smoking and drinking among adults, 2007. *General Household Survey, 2007*. London: Office for National Statistics, 2009.
38. Graham H, Der G. Patterns and predictors of smoking cessation among British women. *Health Promotion International* 1999;14(3):231-239.
39. Jarvis MJ. ABC of smoking cessation - Why people smoke. *British Medical Journal* 2004;328(7434):277-279.
40. McNeill AD, Jarvis MJ, Stapleton JA, West RJ, Bryant A. Nicotine Intake in Young Smokers - Longitudinal-Study of Saliva Cotinine Concentrations. *American Journal of Public Health* 1989;79(2):172-175.
41. Wetter DW, Kenford SL, Smith SS, Fiore MC, Jorenby DE, Baker TB. Gender differences in smoking cessation. *J Consult Clin Psychol* 1999;67(4):555-62.
42. Bohadana A, Nilsson F, Rasmussen T, Martinet Y. Gender differences in quit rates following smoking cessation with combination nicotine therapy: influence of baseline smoking behavior. *Nicotine Tob Res* 2003;5(1):111-6.
43. Jarvis MJ. Gender differences in smoking cessation: real or myth? *Tobacco Control* 1994;3 324-328.

44. Lader D. *Smoking-related Behaviour and Attitudes, 2007*. London: Office for National Statistics, 2008.
45. Jefferis BJMH, Power C, Graham H, Manor O. Changing social gradients in cigarette smoking and cessation over two decades of adult follow-up in a British birth cohort. *Journal of Public Health* 2004;26(1):13-18.
46. Infant Feeding Survey 2005: Early Results: The Information Centre 2006.
47. Coulthard M, Farrell M, Singleton N, Meltzer H. *Tobacco, alcohol and drug use and mental health*. London: Office for National Statistics 2002.
48. Lasser K, Boyd JW, Woolhandler S, Himmelstein DU, McCormick D, Bor DH. Smoking and mental illness - A population-based prevalence study. *Jama-Journal of the American Medical Association* 2000;284(20):2606-2610.
49. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association, 2000:191-296.
50. West R. *Theory of Addiction*. London: Blackwell publishing, 2006.
51. West R. The PRIME Theory of motivation as a possible foundation for addiction treatment. In: Henningfield J, Santora, P. and Bickel, W. , editor. *Drug Addiction Treatment in the 21st Century: Science and Policy Issues*. Baltimore: John's Hopkins University Press, 2007.
52. Godfrey C, Parrott S, Coleman T, Pound E. The cost-effectiveness of the English smoking treatment services: evidence from practice. *Addiction* 2005;100(s2):70-83.
53. Lichtenstein E, Hollis JF, Severson HH, Stevens VJ, Vogt TM, Glasgow RE, et al. Tobacco cessation interventions in health care settings: Rationale, model, outcomes. *Addictive Behaviors* 1996;21(6):709-720.
54. Tengs TO, Adams ME, Pliskin JS, Safran DG, Siegel JE, Weinstein MC, et al. 500 Lifesaving Interventions and Their Cost-Effectiveness. *Risk Analysis* 1995;15(3):369-390.
55. Raw M, Anderson P, Batra A, Dubois G, Harrington P, Hirsch A, et al. WHO Europe evidence based recommendations on the treatment of tobacco dependence. *Tobacco Control* 2002;11(1):44-46.
56. West R, McNeill A, Raw M. Smoking cessation guidelines for health professionals: an update. *Thorax* 2000;55(12):987-999.
57. Judge K, Bauld L, Chesterman J, Ferguson J. The English smoking treatment services: short-term outcomes. *Addiction* 2005;100(s2):46-58.
58. McNeill A, Foulds J, Bates C. Regulation of nicotine replacement therapies (NRT): a critique of current practice. *Addiction* 2001;96(12):1757-1768.
59. Smoking cessation services in primary care, pharmacies, local authorities and workplaces, particularly for manual working groups, pregnant women and hard to reach communities. London: National Institute for Clinical Excellence 2008.
60. Molyneux AN. ABC of smoking cessation - Nicotine replacement therapy. *British Medical Journal* 2004;328(7437):454-456.
61. 'Medicines, ethics and practice guide' amendments (June 2008). *The Pharmaceutical Journal* 2008;280:702.
62. Fagerstrom KO, Schneider NG, Lunell E. Effectiveness of Nicotine Patch and Nicotine Gum As Individual Versus Combined Treatments for Tobacco Withdrawal Symptoms. *Psychopharmacology* 1993;111(3):271-277.
63. Stead LF, Perera R, Bullen C, Mant D, Lancaster T. Nicotine replacement therapy for smoking cessation. *Cochrane Database of Systematic Reviews* 2008(3):CD000146.
64. Haggstrom FM, Chatkin JM, Sussenbach-Vaz E, Cesari DH, Fam CF, Fritscher CC. A controlled trial of nortriptyline, sustained-release bupropion and placebo for smoking cessation: preliminary results. *Pulmonary Pharmacology & Therapeutics* 2006;19(3):205-209.
65. Roddy E. ABC of smoking cessation - Bupropion and other non-nicotine pharmacotherapies. *British Medical Journal* 2004;328(7438):509-511.

66. Jorenby DE, Hays JT, Rigotti NA, Azoulay S, Watsky EJ, Williams KE, et al. Efficacy of varenicline, an alpha 4 beta 2 nicotinic acetylcholine receptor partial agonist, vs placebo or sustained-release bupropion for smoking cessation - A randomized controlled trial. *Jama-Journal of the American Medical Association* 2006;296(1):56-63.
67. Hughes J, Stead L, Lancaster T. Antidepressants for smoking cessation. *Cochrane Database Syst.Rev.* 2006(3):CD000031.
68. McRobbie H, Lee M, Juniper Z. Non-nicotine pharmacotherapies for smoking cessation. *Respiratory Medicine* 2005;99(10):1203-1212.
69. Foulds J, Steinberg MB, Williams JM, Ziedonis DM. Developments in pharmacotherapy for tobacco dependence: past, present and future. *Drug and Alcohol Review* 2006;25(1):59-71.
70. Tonstad S, Tonnesen P, Hajek P, Williams KE, Billing CB, Reeves KR. Effect of maintenance therapy with varenicline on smoking cessation - A randomized controlled trial. *Jama-Journal of the American Medical Association* 2006;296(1):64-71.
71. Tapper AR, McKinney SL, Nashmi R, Schwarz J, Deshpande P, Labarca C, et al. Nicotine activation of alpha 4*receptors: Sufficient for reward, tolerance, and sensitization. *Science* 2004;306(5698):1029-1032.
72. Gonzales D, Rennard SI, Nides M, Oncken C, Azoulay S, Billing CB, et al. Varenicline, an alpha 4 beta 2 nicotinic acetylcholine receptor partial agonist, vs sustained-release bupropion and placebo for smoking cessation - A randomized controlled trial. *Jama-Journal of the American Medical Association* 2006;296(1):47-55.
73. Cahill K, Stead LF, Lancaster T. Nicotine receptor partial agonists for smoking cessation. *Cochrane Database of Systematic Reviews* 2009(3).
74. Coleman T. ABC of smoking cessation - Use of simple advice and behavioural support. *British Medical Journal* 2004;328(7436):397-399.
75. Brief interventions and referral for smoking cessation in primary care and other settings. London: National Institute for Clinical Excellence, 2006.
76. Parrott S, Godfrey C, Raw M, West R, McNeill A. Guidance for commissioners on the cost effectiveness of smoking cessation interventions. *Thorax* 1998;53 Supp 5 Pt 1:AS1-AS38.
77. Coleman T. ABC of smoking cessation - Cessation interventions in routine health care. *British Medical Journal* 2004;328(7440):631-633.
78. West R. ABC of smoking cessation - Assessment of dependence and motivation to stop smoking. *British Medical Journal* 2004;328(7435):338-339.
79. Jarvis MJ, Wardle J, Marmot M, Wilkinson RG. Social patterning of individual health behaviours: the case of cigarette smoking. *Social Determinants of Health (2nd Edition)*. Oxford: Oxford University Press, 2005.
80. Coleman T. Smoking cessation: integrating recent advances into clinical practice. *Thorax* 2001;56(7):579-582.
81. McEwen A, Akotia N, West R. General Practitioners' views on the English national smoking cessation guidelines. *Addiction* 2001;96(7):997-1000.
82. Senore C, Battista RN, Shapiro SH, Segnan N, Ponti A, Rosso S, et al. Predictors of smoking cessation following physicians' counseling. *Preventive Medicine* 1998;27(3):412-421.
83. Coleman T, Murphy E, Cheater F. Factors influencing discussion of smoking between general practitioners and patients who smoke: a qualitative study. *British Journal of General Practice* 2000;50(452):207-210.
84. Zwar NA, Richmond RL. Role of the general practitioner in smoking cessation. *Drug and Alcohol Review* 2006;25(1):21-26.
85. Lancaster T, Stead L. Physician advice for smoking cessation. *Cochrane Database of Systematic Reviews* 2004(4):CD000165.
86. Solomon LJ, Marcy TW, Howe KD, Skelly JM, Reinier K, Flynn BS. Does extended proactive telephone support increase smoking cessation among

- low-income women using nicotine patches? *Preventive Medicine* 2005;40(3):306-313.
87. Borland R, Segan CJ. The potential of quitlines to increase smoking cessation. *Drug and Alcohol Review* 2006;25(1):73-78.
 88. Stead L, Perera R, Lancaster T. Telephone counselling for smoking cessation. *Cochrane Database of Systematic Reviews* 2006;19(3):CD002850. CD002850.
 89. Swartz LH, Noell JW, Schroeder SW, Ary DV. A randomised control study of a fully automated internet based smoking cessation programme. *Tob Control* 2006;15(1):7-12.
 90. Graham AL, Cobb NK, Raymond L, Sill S, Young J. Effectiveness of an internet-based worksite smoking cessation intervention at 12 months. *J Occup Environ Med* 2007;49(8):821-8.
 91. Strecher VJ, Shiffman S, West R. Randomized controlled trial of a web-based computer-tailored smoking cessation program as a supplement to nicotine patch therapy. *Addiction* 2005;100(5):682-8.
 92. Raw M, McNeill A, West R. Smoking cessation: evidence based recommendations for the healthcare system. *British Medical Journal* 1999;318(7177):182-185.
 93. McNeill A, Raw M, Whybrow J, Bailey P. A national strategy for smoking cessation treatment in England. *Addiction* 2005;100(s2):1-11.
 94. Lancaster T, Stead LF. Individual behavioural counselling for smoking cessation. *Cochrane Database of Systematic Reviews* 2005(2):CD001292.
 95. Stead LF, Lancaster T. Group behaviour therapy programmes for smoking cessation. *Cochrane Database of Systematic Reviews* 2005(2):CD001007.
 96. Smoking Kills. A White Paper on Tobacco. London Department of Health, 1998.
 97. The NHS Cancer plan: a plan for investment, a plan for reform. London: Department of Health, 2000.
 98. Bauld L, Chesterman J, Judge K, Pound E, Coleman T. Impact of UK National Health Service smoking cessation services: variations in outcomes in England. *Tobacco Control* 2003;12(3):296-301.
 99. NHS Stop Smoking Services: Service and monitoring guidance-2007/08. London: Department of Health, 2007.
 100. Pound E, Coleman T, Adams C, Bauld L, Ferguson J. Targeting smokers in priority groups: the influence of government targets and policy statements. *Addiction* 2005;100(s2):28-35.
 101. Bauld L, Coleman T, Adams C, Pound E, Ferguson J. Delivering the English smoking treatment services. *Addiction* 2005;100(s2):19-27.
 102. Hart JT. Inverse Care Law. *Lancet* 1971;1(7696):405-8.
 103. Wiltshire S, Bancroft A, Amos A, Parry O. "They're doing people a service" - qualitative study of smoking, smuggling, and social deprivation. *British Medical Journal* 2001;323(7306):203-207.
 104. Statistics on NHS Stop Smoking Services: England, April 2007 to March 2008: The Information Centre, 2008.
 105. Investing in General Practice: The New General Medical Services Contract. London, 2004.
 106. Quality and Outcomes Framework: Guidance. London: Department of Health, 2004.
 107. Raw M, McNeill A, West R. Smoking cessation guidelines for health professionals - A guide to effective smoking cessation interventions for the health care system. *Thorax* 1998;53:S1-S19.
 108. Murray RL, Bauld L, Hackshaw LE, McNeill A. Improving access to smoking cessation services for disadvantaged groups: a systematic review. *J Public Health (Oxf)* 2009.
 109. Roddy E, Antoniak M, Britton J, Molyneux A, Lewis S. Barriers and motivators to gaining access to smoking cessation services amongst

- deprived smokers - a qualitative study. *BMC Health Services Research* 2006;6:147.
110. Wiltshire S, Bancroft A, Parry O, Amos A. 'I came back here and started smoking again': perceptions and experiences of quitting among disadvantaged smokers. *Health Educ Res* 2003;18(3):292-303.
 111. Blenkinsopp A, Anderson C, Armstrong M. Systematic review of the effectiveness of community pharmacy-based interventions to reduce risk behaviours and risk factors for coronary heart disease. *J Public Health Med* 2003;25(2):144-53.
 112. Bauld L, Ferguson, J, Lawson, L, Chesterman, J and Judge, K. Tackling Smoking in Glasgow: Final Report, Glasgow Centre for Population Health, Glasgow, 2006.
 113. Doescher MP, Whinston MA, Goo A, Cummings D, Huntington J, Saver BG. Pilot study of enhanced tobacco-cessation services coverage for low-income smokers. *Nicotine Tob Res* 2002;4 Suppl 1:S19-24.
 114. Needleman I, Warnakulasuriya S, Sutherland G, Bornstein MM, Casals E, Dietrich T, et al. Evaluation of tobacco use cessation (TUC) counselling in the dental office. *Oral Health Prev Dent* 2006;4(1):27-47.
 115. Carr AB, Ebbert JO. Interventions for tobacco cessation in the dental setting. *Cochrane Database Syst Rev* 2006(1):CD005084.
 116. Gordon JS, Lichtenstein E, Severson HH, Andrews JA. Tobacco cessation in dental settings: research findings and future directions. *Drug Alcohol Rev* 2006;25(1):27-37.
 117. Barbeau EM, Li Y, Calderon P, Hartman C, Quinn M, Markkanen P, et al. Results of a union-based smoking cessation intervention for apprentice iron workers (United States). *Cancer Causes Control* 2006;17(1):53-61.
 118. Owens C, Springett J. The Roy Castle Fag Ends Stop Smoking Service: A Successful Client-led approach to Smoking Cessation. *Journal of Smoking Cessation* 2006;1(1):13-18.
 119. Springett J. The challenge of combining lay knowledge with evidence-based practice in health promotion: Fag Ends smoking cessation service. *Critical Public Health* 2007;17(3):243-256.
 120. Ritchie D, Schulz S, Bryce A. One size fits all? A process evaluation--the turn of the 'story' in smoking cessation. *Public Health* 2007;121(5):341-8.
 121. Cahill K, Perera R. Competitions and incentives for smoking cessation. *Cochrane Database Syst Rev* 2008(3):CD004307.
 122. Coleman T, Lewis S, Hubbard R, Smith C. Impact of contractual financial incentives on the ascertainment and management of smoking in primary care. *Addiction* 2007;102(5):803.
 123. Bentz CJ, Bayley KB, Bonin KE, Fleming L, Hollis JF, McAfee T. The feasibility of connecting physician offices to a state-level tobacco quit line. *American journal of preventive medicine* 2006;30(1):31-7.
 124. Perry RJ, Keller PA, Fraser D, Fiore MC. Fax to quit: a model for delivery of tobacco cessation services to Wisconsin residents. *WMJ* 2005;104(4):37-40, 44.
 125. Milch CE, Edmunson JM, Beshansky JR, Griffith JL, Selker HP. Smoking cessation in primary care: a clinical effectiveness trial of two simple interventions. *Preventative Medicine* 2004;38(3):284-94.
 126. Prochaska JO, Velicer WF, Fava JL, Rossi JS, Tsoh JY. Evaluating a population-based recruitment approach and a stage-based expert system intervention for smoking cessation. *Addictive Behaviours* 2001;26(4):583-602.
 127. Tillgren P, Eriksson L, Guldbrandsson K, Spiik M. Impact of direct mail as a method to recruit smoking mothers into a "quit and win" contest. *Journal of Health Communication* 2000;5(4):293-303.

128. Copeland L, Robertson R, Elton R. What happens when GPs proactively prescribe NRT patches in a disadvantaged community. *Scott Med J* 2005;50(2):64-8.
129. Borland R, Balmford J, Hunt D. The effectiveness of personally tailored computer-generated advice letters for smoking cessation. *Addiction* 2004;99(3):369-377.
130. Velicer WF, Prochaska JO, Redding CA. Tailored communications for smoking cessation: past successes and future directions. *Drug and Alcohol Review* 2006;25(1):49-57.
131. Prochaska JO, Diclemente CC. Stages and Processes of Self-Change of Smoking - Toward An Integrative Model of Change. *Journal of Consulting and Clinical Psychology* 1983;51(3):390-395.
132. Prochaska JO, Diclemente CC, Norcross JC. In Search of How People Change - Applications to Addictive Behaviors. *American Psychologist* 1992;47(9):1102-1114.
133. Riemsma RP, Pattenden J, Bridle C, Sowden AJ, Mather L, Watt IS, et al. Systematic review of the effectiveness of stage based interventions to promote smoking cessation. *BMJ* 2003;326(7400):1175-7.
134. Herzog TA. Are the stages of change for smokers qualitatively distinct? An analysis using an adolescent sample. *Psychology of addictive behaviors* 2007;21(1):120-5.
135. Sutton S. Back to the drawing board? A review of applications of the transtheoretical model to substance use. *Addiction* 2001;96(1):175-86.
136. West R. Time for a change: putting the Transtheoretical (Stages of Change) Model to rest. *Addiction* 2005;100(8):1036-9.
137. Herzog TA. Analyzing the transtheoretical model using the framework of Weinstein, Rothman, and Sutton (1998): the example of smoking cessation. *Health Psychology* 2008;27(5):548-56.
138. Herzog TA, Blagg CO. Are most precontemplators contemplating smoking cessation? Assessing the validity of the stages of change. *Health Psychology* 2007;26(2):222-31.
139. Etter JF, Perneger TV. A comparison of two measures of stage of change for smoking cessation. *Addiction* 1999;94(12):1881-9.
140. Larabie LC. To what extent do smokers plan quit attempts? *Tobacco Control* 2005;14(6):425-428.
141. Ferguson SG, Shiffman S, Gitchell JG, Sembower MA, West R. Unplanned quit attempts--Results from a U.S. sample of smokers and ex-smokers. *Nicotine Tob Res* 2009.
142. West R, Sohal T. "Catastrophic" pathways to smoking cessation: findings from national survey. *British Medical Journal* 2006;332(7539):458-460.
143. Brown C. *Chaos and Catastrophe theories: Quantitative applications in the social sciences*. London: Sage Publications Inc, 1995.
144. Bland JM, Kerry SM. Statistics notes. Trials randomised in clusters. *BMJ* 1997;315(7108):600.
145. Kerry SM, Bland JM. Analysis of a trial randomised in clusters. *BMJ* 1998;316(7124):54.
146. Kerry SM, Bland JM. Sample size in cluster randomisation. *BMJ* 1998;316(7130):549.
147. Adams G, Gulliford MC, Ukoumunne OC, Eldridge S, Chinn S, Campbell MJ. Patterns of intra-cluster correlation from primary care research to inform study design and analysis. *Journal of Clinical Epidemiology* 2004;57(8):785-794.
148. Wilson A, Manku-Scott T, Shepherd D, Jones B. A comparison of individual and population smoking data from a postal survey and general practice records. *British Journal of General Practice* 2000;50(455):465-468.
149. McEwen A, West R. Smoking cessation activities by general practitioners and practice nurses. *Tobacco Control* 2001;10(1):27-32.

150. West R, Hajek P, Stead L, Stapleton J. Outcome criteria in smoking cessation trials: proposal for a common standard. *Addiction* 2005;100(3):299-303.
151. Binnie V, McHugh S, Macpherson L, Borland B, Moir K, Malik K. The validation of self-reported smoking status by analysing cotinine levels in stimulated and unstimulated saliva, serum and urine. *Oral Diseases* 2004;10(5):287-293.
152. Verification SfrNaTSSoB. Biochemical verification of tobacco use and cessation. *Nicotine and Tobacco Research* 2002;4(2):149-159.
153. Jarvis MJ, Tunstallpedoe H, Feyerabend C, Vesey C, Saloojee Y. Comparison of Tests Used to Distinguish Smokers from Nonsmokers. *American Journal of Public Health* 1987;77(11):1435-1438.
154. Townsend P, Phillmore, P., Beattie, A. *Health and Deprivation: inequality and the North*. London: Croon-Helm, 1988.
155. 2001 Census, UK National Statistics website:
<http://www.statistics.gov.uk/census/> Office for National Statistics, 2004.
156. Morris R, Carstairs V. Which Deprivation - A Comparison of Selected Deprivation Indexes. *Journal of Public Health Medicine* 1991;13(4):318-326.
157. Fiore MC, Bailey WC, Cohen SJ, Dorfman SF, Fox BJ, Goldstein MG, et al. A clinical practice guideline for treating tobacco use and dependence - A US Public Health Service report. *Jama-Journal of the American Medical Association* 2000;283(24):3244-3254.
158. Mant J, Murphy M, Rose P, Vessey M. The accuracy of general practitioner records of smoking and alcohol use: comparison with patient questionnaires. *Journal of Public Health Medicine* 2000;22(2):198-201.
159. Petitti DB, Friedman GD, Kahn W. Accuracy of Information on Smoking-Habits Provided on Self-Administered Research Questionnaires. *American Journal of Public Health* 1981;71(3):308-311.
160. Pierce JP, Gilpin E, Burns DM, Whalen E, Rosbrook B, Shopland D, et al. Does tobacco advertising target young people to start smoking? Evidence from California. *JAMA* 1991;266(22):3154-8.
161. McCormick A, Fleming D, Charlton J. Morbidity Statistics from General Practice. Fourth national study 1991-1992. London HMSO, 1995.
162. Murray RL, Coleman T, Antoniak M, Fergus A, Britton J, Lewis SA. The potential to improve ascertainment and intervention to reduce smoking in Primary Care: a cross sectional survey. *BMC Health Services Research* 2008;8(1):6.
163. Rabash J, Steele F, Browne WJ, Prosser B. *A user's guide to MLWin 2.0*: University of Bristol, 2005.
164. Lichtenstein E, Hollis J. Patient Referral to A Smoking Cessation Program - Who Follows Through. *Journal of Family Practice* 1992;34(6):739-744.
165. Ferguson J, Bauld L, Chesterman J, Judge K. The English smoking treatment services: one-year outcomes. *Addiction* 2005;100(s2):59-69.
166. Lennox AS, Osman LM, Reiter E, Robertson R, Friend J, McCann I, et al. Cost effectiveness of computer tailored and non-tailored smoking cessation letters in general practice: randomised controlled trial. *British Medical Journal* 2001;322(7299):1396-1400.
167. West R. Smoking toolkit study: protocol and methods, 2006.
168. Gilpin E, Pierce JP. Measuring smoking cessation: problems with recall in the 1990 California Tobacco Survey. *Cancer Epidemiol Biomarkers Prev* 1994;3(7):613-7.
169. Shiffman S, Hufford M, Hickcox M, Paty JA, Gnys M, Kassel JD. Remember that? A comparison of real-time versus retrospective recall of smoking lapses. *J Consult Clin Psychol* 1997;65(2):292-300.

170. O'Connor EA, Carbonari JP, DiClemente CC. Gender and smoking cessation: a factor structure comparison of processes of change. *Journal of consulting and clinical psychology* 1996;64(1):130-8.
171. Gender differences and smoking cessation: Processes of change. 94th Annual Convention of the American Psychological Association; August, 1986; Washington, DC.
172. Gritz ER, Nielsen IR, Brooks LA. Smoking cessation and gender: the influence of physiological, psychological, and behavioral factors. *Journal of the American Medical Women's Association* 1996;51(1-2):35-42.
173. McCaul KD, Hockemeyer JR, Johnson RJ, Zetocha K, Quinlan K, Glasgow RE. Motivation to quit using cigarettes: a review. *Addictive Behaviours* 2006;31(1):42-56.
174. Bauld L, Chesterman J, Ferguson J, Judge K. A comparison of the effectiveness of group-based and pharmacy-led smoking cessation treatment in Glasgow. *Addiction* 2009;104(2):308-16.
175. Murray RL, Lewis, S.A., Coleman, T., Britton, J., McNeill, A. Unplanned attempts to quit smoking: missed opportunities for health promotion? *Addiction* 2009;In Press.
176. Mathie A, Carnozzi, A. *Qualitative Research for Tobacco Control: A How-to Introductory Manual for Researchers and Development Practitioners*. Ottawa, Canada: IRTC, 2005.
177. Ritchie J, Spencer, L. Qualitative data analysis for applied policy research. In: Bryan A, Burgess, R., editor. *Analyzing qualitative data*. London: Routledge, 1994:173-194.
178. Vogt F, Hall S, Marteau TM. Understanding why smokers do not want to use nicotine dependence medications to stop smoking: qualitative and quantitative studies. *Nicotine Tob Res* 2008;10(8):1405-13.
179. Copeland L. An exploration of the problems faced by young women living in disadvantaged circumstances if they want to give up smoking: can more be done at general practice level? *Fam Pract* 2003;20(4):393-400.
180. Etter JF, Perneger TV. Attitudes toward nicotine replacement therapy in smokers and ex-smokers in the general public. *Clin Pharmacol Ther* 2001;69(3):175-83.
181. Hammond D, McDonald PW, Fong GT, Borland R. Do smokers know how to quit? Knowledge and perceived effectiveness of cessation assistance as predictors of cessation behaviour. *Addiction* 2004;99(8):1042-8.
182. Shiffman S, Ferguson SG, Rohay J, Gitchell JG. Perceived safety and efficacy of nicotine replacement therapies among US smokers and ex-smokers: relationship with use and compliance. *Addiction* 2008;103(8):1371-8.
183. Kishchuk N, Tremblay M, Lapierre J, Heneman B, O'Loughlin J. Qualitative investigation of young smokers' and ex-smokers' views on smoking cessation methods. *Nicotine Tob Res* 2004;6(3):491-500.
184. Van Der Rijt GA, Westerik H. Social and cognitive factors contributing to the intention to undergo a smoking cessation treatment. *Addict Behav* 2004;29(1):191-8.