

Understanding the influences on quit motivation and smoking cessation in older smokers from deprived backgrounds

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Thesis Summary

There is little evidence regarding the optimal smoking cessation intervention for older smokers from deprived backgrounds. An increased understanding of behavioural influences on quit motivation and smoking cessation is needed to adapt smoking cessation interventions for this population. Older smokers from deprived backgrounds are seldom-heard and have an increased risk of a number of health conditions, including lung cancer. These individuals are eligible for targeted lung cancer screening yet are least likely to take part and for whom lung screening could offer a teachable moment for smoking cessation.

Research was undertaken to identify factors influencing quit motivation and smoking cessation in the target population. PRIME was the main theory selected for use in the PhD. Findings from a systematic review demonstrated that there were limited data to identify the optimal form of behavioural smoking cessation intervention for the target population. However, intense multimodal behavioural counselling using incentives and peer facilitators, delivered in a community setting and tailored to individual needs indicated a positive impact on smoking outcomes. A cross-sectional population based survey showed that interventions are needed to increase self-efficacy for quitting, dispel risk-minimising beliefs and target elements of previous quit attempts that were associated with motivation to stop smoking. Qualitative interviews with smokers who declined smoking cessation support at the time of a lung cancer screening demonstrated that the wider determinants of smoking, including a lack of social support, pre-existing health conditions and intense social isolation, impact an individual's quit motivation.

Findings were used to develop a set of recommendations for adapting an existing smoking cessation intervention for the target population using the ADAPT guidance. Intensive behavioural support that incorporates referral to local health and wellbeing support could be implemented as a strategy to reduce the impact of the wider determinants of smoking in the target population and warrants further feasibility and pilot testing.

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List of abbreviations

CI-Confidence Interval

COPD-Chronic Obstructive Pulmonary Disease

CVA-Content Validity Analysis

EPPM-Extended Parallel Processing Model

FTND-Fagerström Test for Nicotine Dependence

HBM-Health Belief Model

KMO- Kaiser-Myer-Olkin

LDCT-Low-dose Computed Tomography

MTSS-Motivation to Stop Scale

NCSCCT- National Centre for Smoking Cessation and Training

NRT-Nicotine Replacement Therapy

ONS-Office for National Statistics

PAPM-Precaution Adoption Process Model

PCA-Principal Components Analysis

PPI- Patient and Public Involvement

RCT- Randomised Controlled Trials

SCI- Smoking Cessation Intervention

SCP-Smoking Cessation Practitioner

SCQ- Self-Administered Comorbidity Questionnaire

SCT-Social Cognitive Theory

SEM-Socio-ecological Model

SEQ-Smoking Self-efficacy Questionnaire

SOC- Stages of Change

SSS- Stop Smoking Services

TTM-The Transtheoretical Model

YESS study-Yorkshire Enhanced Stop Smoking

YLST-Yorkshire Lung Screening Trial

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Chapter 1

Introduction

Chapter overview

The overarching purpose of this PhD was to achieve an in-depth understanding of the determinants of quit motivation and smoking cessation for the target population using systematic review methods and quantitative and qualitative methods. This PhD focused on a population of older individuals from deprived backgrounds, due to the breadth of literature that indicates older age and lower socioeconomic group as key contributors to lung cancer incidence and mortality rates. The results were used to develop a set of recommendations for the adaptation of a pre-existing smoking cessation intervention (SCI) for a population that are seldom-heard.

The lung cancer screening environment represents a clinical setting that involves a receptive patient population who have alterable lung cancer risk and who may benefit from receiving smoking cessation support. The current chapter provides a rationale for the chosen population in this thesis along with an overview of the psychosocial barriers to smoking cessation for a population who are lung screening eligible. Background on the population of interest will be provided including the current understanding of quit motivation, smoking behaviour and smoking cessation for this population. Existing evidence that addresses the psychosocial determinants of smoking for this population will be reported, along with evidence of targeted lung cancer screening and integrated smoking cessation. Finally, the aims and objectives of the PhD will be presented.

1.1 Smoking and health outcomes

For the purpose of this PhD, smoking will be defined as smoked tobacco only, due to this being the subject of the largest volume of research and the most harmful form of tobacco use. In 2019 there were over one billion tobacco smokers globally (1), with 30% of men and 7% of women smoking (2). In the United Kingdom 14.1% of people, aged 18 years and older smoked cigarettes in 2019, equating to around 6.9 million people (3). These figures represent a statistically significant decrease of 6% since 2018 . In the UK, 15.9% of men smoked compared with 12.5% of women (3). Over the past 40 years, there has been a significant reduction in the prevalence of smokers in the UK (3). The results indicate that smoking prevalence for both men and women has halved and that the gender gap has almost disappeared.

Smoking is estimated to result in the premature death of approximately 6 million individuals worldwide and 96,000 within the UK per year (4). On average, premature deaths can result in 10 years of life years lost (5) and smokers who do not stop smoking also begin to suffer diseases of old age around 10 years earlier in comparison to non-smokers (6). Smoking is the leading cause of lung cancer and a well-established risk factor for health conditions including chronic obstructive pulmonary disease (COPD), stroke and peripheral vascular disease (5). Research has shown that after the age of 40, individuals who smoke more cigarettes have higher levels of disability and pain compared to non-smokers (5). Most deaths related to smoking arise from respiratory disease (primarily COPD), cardiovascular disease (primarily coronary heart disease) and cancers (primarily lung cancer) (4).

Smoking is the main risk factor for lung cancer incidence and mortality. Lung cancer mortality is around 15 times higher in those who currently smoke compared to never-smokers and has been shown to increase both with smoking amount and duration (7). Duration has been shown to have the largest effect upon lung cancer incidence and mortality, as smoking one packet of cigarettes each day for 40 years is more hazardous than smoking two packets each day for 20 years (8, 9). In comparison to never-smokers, lung cancer mortality is higher for those who smoke more cigarettes per day (8, 10, 11).

Worldwide, lung cancer is the most common form of cancer and the most common cause of cancer deaths over the past few decades (12). The estimated number of lung cancer incident cases worldwide, for both sexes and all ages, is second highest out of all cancer types (Figure 1.1) (13). Similarly, the estimated number of

lung cancer deaths for both sexes (ages 0-74 years) is highest out of all cancer types at 1,188,293 worldwide (Figure 1.1).

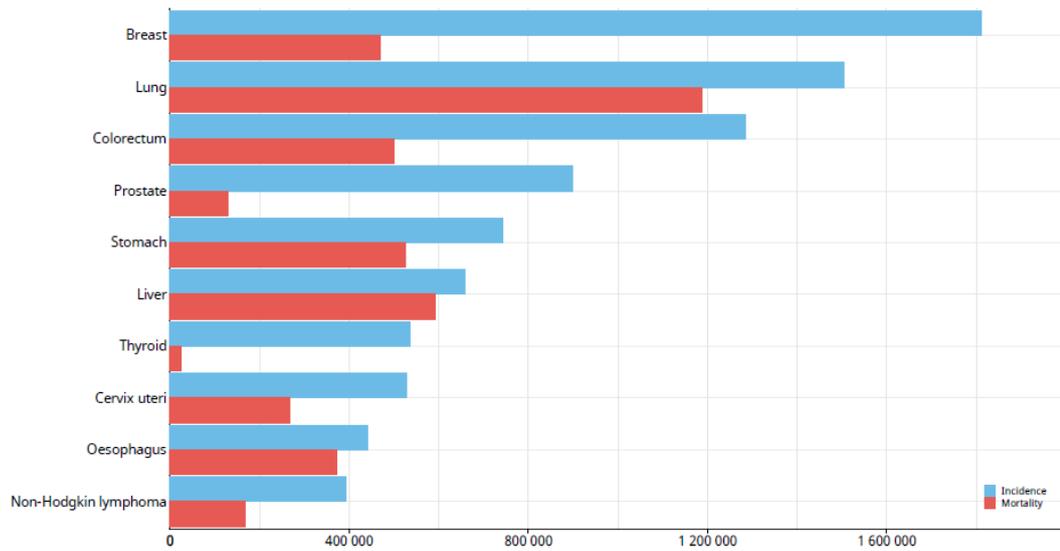


Figure 1.1 *Estimated number of cancer incident cases and deaths worldwide for both sexes, ages 0-74. (13)*

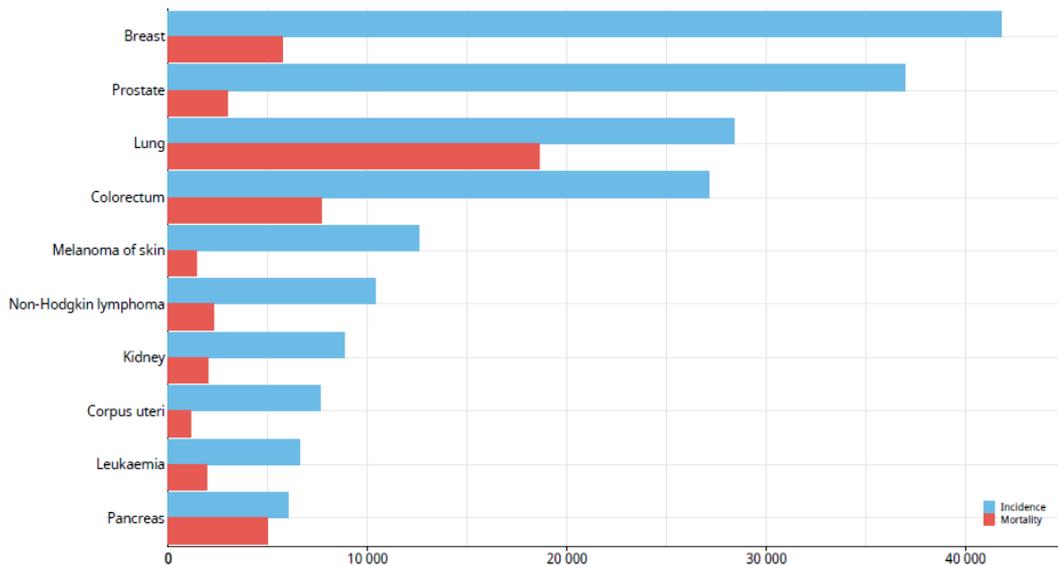


Figure 1.2 *Estimated number of cancer incident cases and deaths in the United Kingdom for both sexes, ages 0-74 (13).*

Lung cancer is reported as the most common cause of cancer death in the UK (13). Between 2015 and 2017, there were around 47,800 new lung cancer cases and 35,100 lung cancer deaths in the UK each year, equating to nearly 130 new cases every day and 96 deaths each day (9). Forty-four percent of lung cancer cases each year in the UK were diagnosed in people aged 75 years and over (9), with the chances of having a previous or current diagnosis of lung cancer increasing with age. Research has shown that in 2012, only six people per every 100,000 had lung cancer among those aged 31-40. This steadily rose to 23 per 100,000 in those aged 41-50, peaking at 631 per 100,000 for those aged 71-80 years of age (14).

1.2 Smoking prevalence in socioeconomically deprived and older populations

Although over recent years there has been a significant decline in smoking prevalence in the UK across all socioeconomic groups, the social gradient in smoking is still present (15). Smoking prevalence is higher in routine and manual occupations compared to managerial and professional occupations. Data from the most recent Office for National Statistics (ONS) survey demonstrate that in the United Kingdom, approximately 1 in 4 (25.5%) individuals in manual and routine occupations were smokers, compared to 1 in 10 (10.2%) in those from managerial and professional occupations (3) (Figure 1.3). Furthermore, the proportion of current smokers is significantly higher among those who are unemployed (26.8%) in comparison to those who are employed (14.5%) (3). Individuals with a degree had the lowest proportion of current smokers (7.3%), compared to 29.1% among those

who had no formal qualifications. The high rate of cigarette smoking in lower socioeconomic groups demonstrates the striking relationship between social context and health behaviour (16, 17).

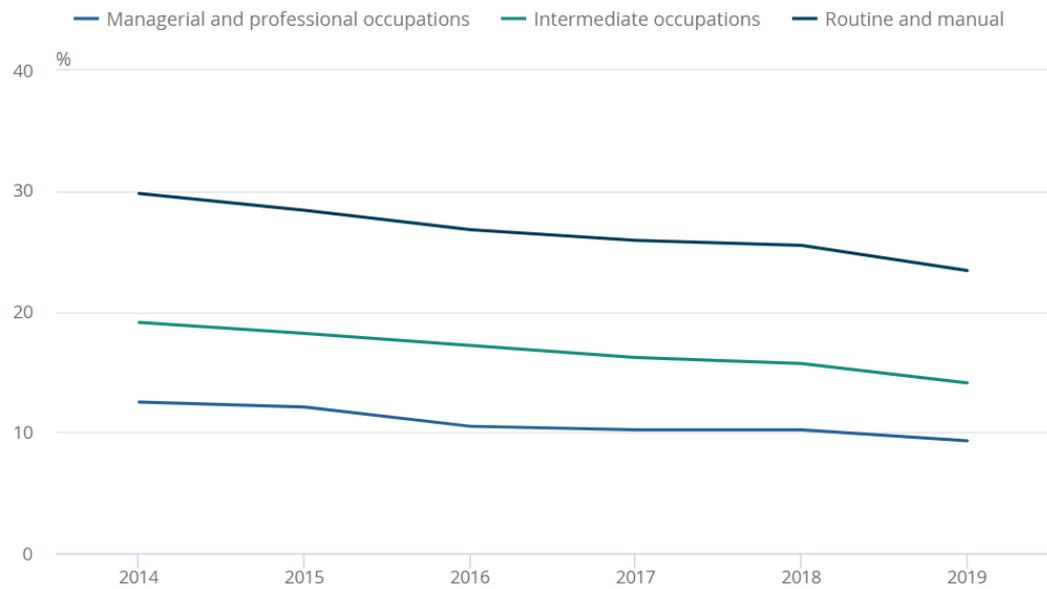


Figure 1.3 *Proportion of adults (aged 18 to 64 years) from the UK who were current smokers by socioeconomic status groups (2014-2019) (3)*

Furthermore, ONS data shows that in the UK, 13.9% of current smokers are aged between 55 and 64 years and 7.8% of the current smoking population are aged 65 years and more (see Figure 1.4).

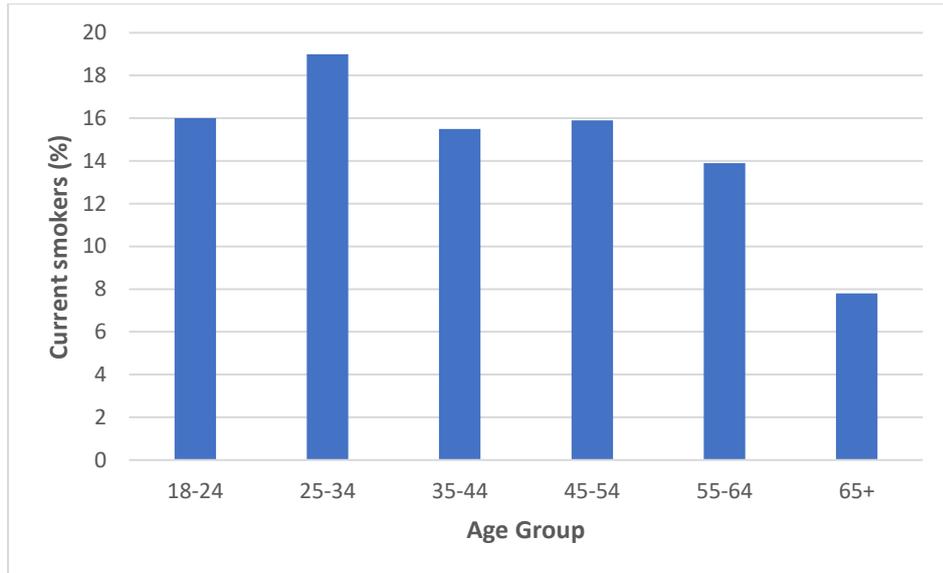


Figure 1.4 *Smoking prevalence in the UK by age group (3)*

Socioeconomic status has been associated with lung cancer outcomes in several studies, with higher incidence and greater morbidity/mortality in people from lower socioeconomic backgrounds (18-24). Evidence suggests that two further contributing factors to higher lung cancer rates in deprived areas are late diagnosis and wide geographical disparity within the UK, in regards to the proportion of individuals receiving potentially curative treatment (25).

1.3 Smoking cessation in socioeconomically deprived and older populations

Research suggests that smoking cessation can be beneficial to individuals at any age. Results from the National Health Interview survey study showed that for those who quit smoking prior to 40 years of age, risk of death associated with continued smoking was reduced by 90%. These benefits were not as great for older adults; however, there was a reduction in excess risk of death (26). Those who stopped smoking at 45-54 years of age gained 6 years of life in comparison to those who continued smoking (26). The Lung Health Study (27) demonstrated that smoking cessation at any age can reduce the risk of developing lung cancer and related mortality. Earlier studies from the UK have also addressed the effects of smoking cessation on lung cancer (28, 29) in regards to age of cessation. The majority of excess risk for lung cancer attributable to smoking was avoided in individuals who stopped smoking in middle age, and those who stopped prior to middle age were able to avoid more than 90% of excess risk (29).

A significant contributor to the existing disparities in smoking can be explained by socioeconomic variation in smoking cessation (30, 31). In general, smokers from low socioeconomic groups have higher rates of smoking uptake and lower rates of successfully quitting smoking (32, 33). It has been proposed that the recent decline in smoking prevalence could be due to a reduction in uptake rather than increased quitting, with quit rates declining among more deprived smokers (34, 35). A previous study of SSS in the UK examined the relationship between socioeconomic status and quitting and found that the main factor associated with an unsuccessful quit attempt, along with greater nicotine dependence and lack of support for quitting, was lack of adherence to treatment (i.e. nicotine replacement therapy and behavioural support) (36).

1.3.1 Uptake and effectiveness of UK smoking cessation services

The 'inverse care law' (37) suggests that most health services are more accessible to those from affluent groups, therefore the intention of the initial roll out of SSS was to prioritise supporting those who were less affluent to quit smoking. During 1999-2000 SSS were first established in England and were piloted specifically in areas of deprivation (32). The framework that was employed by the smoking cessation service was based on the Maudsley model (38), an evidence-based approach for treating dependent smokers (39, 40). The approach involves regular meetings (group or one-to-one sessions) with a trained smoking cessation practitioner using

structured behavioural therapy in combination with smoking cessation medication (e.g. nicotine replacement therapy, bupropion or varenicline).

A systematic review from Cancer Research UK (41) indicated that there is limited evidence regarding how inequalities could be addressed through specific interventions. Research has previously been conducted in order to assess the extent to which UK SSS were effective in deprived communities and has found that these services were successful in reaching deprived smokers (42, 43). However, findings demonstrate that it is more difficult to encourage this population to quit smoking compared to more affluent smokers (36). SCIs still appear to be less effective for smokers from low socioeconomic groups, which therefore results in lower quit rates and potentially exacerbates inequalities in the prevalence of smoking (44).

Behavioural support in SCIs often attempts to motivate, assist and maintain behavioural change in the individual; however, the effect of neighbourhood contact as well as other environmental factors is often neglected in such interventions. The type of smoking cessation service, its location and visibility are decided upon locally and may introduce barriers (45). For example, older smokers might be more reluctant to engage with and use telephone or online supporting, including text messaging (46). In the UK SSS are widely available and use techniques to target deprived smokers (42) and have made an important contribution to reductions in smoking prevalence. However, fewer smokers are using the services to quit and they are still not used equally across the different socioeconomic groups (41).

It is important to consider that older smokers might be at higher risk of having co-morbidity issues. While research suggests that evidence-based interventions work best for most smokers, it is important to note that certain novel methods might be required to specifically enhance cessation efficacy in those who have other existing comorbid conditions. A review by Rojewski and colleagues (47) demonstrated the importance of understanding mechanisms by which co-morbid conditions can influence smoking cessation and suggested that future research should aim to identify how SCIs can be best implemented in the context of multiple comorbid conditions. Comorbid conditions might affect motivation to quit as well as self-efficacy (48, 49). A traditional clinical approach for the “typical” smoker does not tend to take into consideration other potentially co-morbid conditions that may interact with a person’s smoking cessation efforts. Behavioural SCIs that are

tailored to and delivered at the individual level and recognise the wider context of older, socioeconomically disadvantaged smokers may prove more successful (50, 51).

1.3.2 Barriers and enablers to quit motivation and smoking cessation in older smokers from deprived backgrounds

In the context of smoking, the term motivation, can include an expressed desire or want to stop smoking, concerns surrounding the risks of not quitting, as well as behavioural reactions (52, 53). Evidence indicates that motivation plays a critical role in determining quit attempts, with some evidence that adults from low socioeconomic groups may have less motivation (34-36). Sufficient motivation to stop smoking has been identified as a central factor underlying smoking cessation (54).

Although quit motivation is an important factor in relation to smoking cessation, the improvement of motivation is not itself sufficient in ensuring that cessation is maintained (55). Motivation to stop smoking might be more of an important impetus for making an immediate quit attempt rather than a way of achieving long-term abstinence (56). In regard to the target population for the current PhD, those from low socioeconomic backgrounds are less likely to possess a “desire” to stop smoking or to intend to stop smoking (57). Motivation to stop smoking, although a predictor of quitting, was previously not found to be an important element in socioeconomic difference in long-term quit rates in a study of National Health Service SSS (36).

There is evidence to suggest that smokers from lower socioeconomic groups have different reasons for quitting than smokers from more affluent backgrounds (58). For example, Vangeli and West (59) demonstrated that the former were more likely to report cost and their current health problems as triggers to quitting. Research has also found that deprived smokers have the highest odds of reporting psychological distress (60). Additionally, difficult living conditions for those from a low socioeconomic background, a pro-smoking social context and isolation from wider social norms appear to undermine cessation (61-63).

Smokers from deprived backgrounds are more likely to be concerned with proximal health concerns compared to distal health concerns; this has been defined as increased “delay discounting” or a reduced “temporal horizon” (64). Therefore concerns about current issues, such as financial concerns and current health

problems, are a common motivator for a quit attempt among smokers from low socioeconomic groups (58, 59); whereas concerns surrounding future health issues are lower in this group of smokers (65). This research demonstrates that concerns about long-term health effects of tobacco smoking can be a strong motivator for quitting (66), however this does not apply to smokers from low socioeconomic groups (65, 67).

Older smokers from deprived backgrounds face multiple barriers to smoking cessation which may also impact their motivation to stop smoking. It is likely that this population will have pre-existing physical or mental health issues, for example studies have examined the prevalence of comorbid conditions according to socioeconomic group and have found that comorbidity is most prevalent in the older population from these groups (Macleod et al., 2004; McLean et al., 2014).

Quit attempts in this population are less likely to be successful in part due to higher levels of nicotine dependence and/or a lack of self-efficacy to quit (68, 69). Self-exempting beliefs are beliefs that may be adopted as a mechanism to help rationalise or justify continued smoking despite the well-known harms. These beliefs have also been shown to influence continued smoking among individuals from lower socioeconomic groups (70). Older smokers may also hold negative beliefs surrounding quitting. Research has shown that older smokers may perceive themselves as '*survivors*' or think that '*the damage is done*', resulting in a reluctance to engage with smoking cessation services or recognise the overall benefits of quitting smoking (71). Due to having smoked for a long period of time and survived, many older smokers could lack motivation to stop smoking and be resistant to quitting. For example, Wakefield et al (72) reported that smokers aged 60 and over were less convinced of the overall negative health effects of smoking, more likely to perceive that they were not personally at risk as a result of smoking, believe that their smoking had not affected their health so far, and that there was a safe level of daily cigarette consumption.

Jordan et al (73) found that those aged 75 years and more were less interested in quitting and less likely to be offered support. These findings could be a reflection of a reduction in motivation and being less likely to initiate discussions around smoking as a topic in a consultation with their General Practitioner. Previous research has demonstrated that older smokers who have low motivation to quit may believe that quit attempts are unlikely to be a success due to a lifetime of smoking, or that the harms of smoking are in fact exaggerated or do not apply to them (74-76). However,

transitional periods of older age, such as retirement, have previously been associated with successful smoking cessation (77). Trigger events such as periods of ill health and prompts from family members and health professionals have also been shown to lead to smoking abstinence and/or quit attempts in older smokers (71).

Research has examined smoking patterns and attitudes among older smokers and has found that the majority of smokers intend to quit within the next year and that 42% make a 24-hour quit attempt each year (78). Research has demonstrated that in comparison to younger smokers, older smokers are more likely to be successful if they attempt to quit smoking (79) and are also more likely to use smoking cessation assistance such as nicotine replacement therapy (NRT) and behavioural support (80). For example, a study by Joyce et al. (81) indicated that in a sample of smokers aged 65 years or older who were provided with a quit line number and low-cost NRT, 19% were able to quit smoking and remain abstinent at 12-month follow-up.

A further factor that may hinder smoking cessation and motivation to stop smoking attempts in adults from deprived backgrounds is a lack of social support. Smokers from lower socioeconomic groups may have had negative experiences when trying to quit including a lack of support during previous quit attempts (58, 82). Research has indicated that smokers from deprived backgrounds find quitting more difficult due to having less social support specific to smoking when making a quit attempt (83, 84).

1.4 Targeted Lung Screening

1.4.1 Lung screening eligibility criteria

Effective early detection strategies are essential for individuals who are at high risk of developing lung cancer due to their age and smoking history. Low-dose CT (LDCT) lung screening has become the standard of care in the United States (85) based on evidence from the National Lung Screening Trial which found a 20% decrease in mortality from lung cancer in the LDCT group compared with a radiography group (86). One measure of screening acceptability is enrolment of the eligible population who are most likely to benefit from taking part (87). In contrast to routine population-based screening for other UK national screening programmes (i.e. bowel and cervical cancer), targeted lung screening is only available to high-risk individuals, including older adults with long smoking histories (Table 1.1).

The target population that are the focus of this thesis are likely to form part of a lung screening eligible population. However, enrolment to lung screening trials appears to be biased toward former smokers and those from higher socioeconomic groups (88, 89). Approximately half of lung cancer screening patients are smokers (90-94) and despite their high risk of developing lung cancer, smokers from low socioeconomic groups are less likely to engage with the offer of screening, a finding that has been observed across other screening programmes (95-97). Furthermore, older age has been associated with non-uptake of lung cancer screening with individuals feeling they are “too old” to take part in lung cancer screening (98).

Targeted screening in the form of lung health checks offers a real-world setting in which older smokers from deprived backgrounds will be offered smoking cessation support. Older smokers from deprived backgrounds are the target population in this PhD thesis due to the fact that they are at high-risk of getting lung cancer and other smoking related diseases. However, little is known about the optimal form of SCI (both in and out of a screening setting) for older smokers from deprived backgrounds who will likely form part of the lung screening-eligible population.

Table 1.1: Recruitment criteria- pilot trials for low-dose CT lung cancer screening in US and Europe

Randomised controlled trials	Recruitment period	Recruitment criteria	Screening methods
NLST	2002-04	Age 55–75 years, ≥30 PY smoker, quit smoking <15 years earlier	Annual low-dose CT vs chest x-ray for 3 years
MILD	2005-11	Age >49 years, ≥20 PY smoker, quit smoking <10 years earlier, no cancers within past 5 years	Three groups: no screen, annual screen, and biennial low-dose CT for 5 years
ITALUNG	2004-06	Age 55–69 years, ≥20 PY smoker	Annual low-dose CT for 4 years vs no screen
DANTE	2001-06	Age 60–75 years, ≥20 PY smoker, quit smoking <10 years earlier, male	Annual low-dose CT for 4 years vs no screen
DLCST	2004-06	Age 50–70 years, ≥20 PY smoker, quit smoking <10 years earlier, FEV1 ratio >30%, able to climb two flights of stairs without pausing	Annual low-dose CT vs usual care for 5 years
NELSON	2003-06	Age 50–75 years, smoker or quit smoking ≤10 years earlier, >15 cigarettes per day for >25 years or >ten cigarettes per day for >30 years	Low-dose CT in year 1, year 2, year 4, and year 6.5 vs no screen
LUSI	2007-11	Age 50–69 years, heavy smoking history	Annual low-dose CT and smoking cessation for 5 years vs smoking cessation alone

UKLS	2011-14	Age 50–75 years, $\geq 5\%$ of 5-year lung cancer risk as calculated by LLPv2 scores	Wald single low-dose CT screen design vs no screen
Other studies			
I-ELCAP	1993-2006	Age >60 years, ≥ 10 PY smoker	Annual low-dose CT and chest x-ray for 5 years
Mayo LDCT trial	1999	Age >50 years, 20 PY smoker, quit smoking <10 years earlier	Annual low-dose CT for 5 years
PANCAN	2008-2011	Age 50–75 years, $\geq 2\%$ of 3-year lung cancer risk as calculated by PLCO score	Low-dose CT in year 1, year 2, and year 4
COSMOS	2000-01	Age >50 years, ≥ 20 PY smoker	Annual low-dose CT for 10 years

PY=pack-year. FEV=forced respiration volume. LLPv2=Liverpool Lung Project risk model, version 2. PLCO=Prostate, Lung, Colorectal, and Ovarian trial risk model. **NLST**=National Lung Screening Trial, **MILD**= Multicentric Italian Lung Detection, **ITALUNG**= Italian Lung Cancer Screening Trial, **DANTE**= Detection and Screening of Early Lung Cancer by Novel Imaging Technology and Molecular Essays, **DLCST**= Danish Lung Cancer Screening Trial, **NELSON**= Nederlands–Leuvens Longkanker Screenings Onderzoek, **LUSI**= German Lung cancer Screening Intervention, **UKLS**= UK Lung Cancer Screening Trial, I-ELCAP= International Early Lung Cancer Action Program, **PANCAN**= Pan-Canadian Early Detection of Lung Cancer, **COSMOS**= Continuous Observation of Smoking Subject

1.4.2 Barriers to participation in lung cancer screening

There is a lack of evidence regarding factors affecting screening participation in individuals who are eligible for lung cancer screening in a real-world clinical context. For the most part research has focused on individuals who have participated in a lung cancer screening trial (99, 100) or are studies of individuals that have been recruited through a primary care setting or from the general public (101-105). Research has been conducted to specifically investigate the attitudes of individuals declining participation in screening that was offered in a trial context. Non-participants who responded to a follow-up survey as part of the NELSON trial were found to perceive screening as being too much effort or an unnecessary procedure due to a lack of respiratory symptoms (100). Furthermore, in the UK Lung Screening Trial, a survey of non-respondents demonstrated that smokers reported emotional barriers relating to fear and anxiety around lung cancer as reasons for not participating in screening. However, practical barriers such as travel, comorbidities and care responsibilities were more commonly cited in this research (98).

Findings from the National Lung Screening Trial revealed that former heavy smokers had lower risk perceptions than current heavy smokers, highlighting the importance of understanding the perceptions and attitudes of former smokers who remain at high risk of lung cancer (106, 107). In a recent effort to help inform participation in lung cancer screening, pilot lung health checks that target socioeconomically deprived area of the UK have been conducted. These pilot screenings have taken place in Liverpool, Manchester, Leeds, Nottingham and London (32-36). It is not unexpected that low rates of uptake for lung cancer screening are observed among those from socioeconomically deprived groups (25). These findings echo previous work in the field of smoking cessation (26,27) as well as the social gradient in the uptake of population screening programmes for other screening types (10).

1.4.3 Integrated smoking cessation support

It is clear from much evidence that Europe should prepare for the implementation of CT lung cancer screening imminently. However, the European position on lung cancer screening demonstrates that there are still some focal areas that will require development and consideration, including the integration of smoking cessation into a lung cancer screening programme (108). Nine recommendations have been developed in order to help guide the future implementation of lung cancer screening in Europe. One of the recommendations put forward is "*Smoking cessation advice should be*

offered to all active smokers" (108). There is a need to understand how this can be done optimally for the population who are high-risk due to age, smoking status and deprivation but, paradoxically, least likely to take part in lung cancer screening.

Lung cancer screening may offer a 'teachable moment' for smoking cessation, a brief moment in which motivation to stop smoking could be enhanced (109). This setting may increase an individual's perceived risk of continued smoking, increase emotional reaction to smoking and challenge the self-concept of a smoker (110). The successful integration of evidence-based smoking cessation support with lung cancer screening could be a wise use of limited healthcare resources and translate into health benefits for a variety of smoking-related diseases.

There are however considerable challenges in implementing lung cancer screening programmes, including the identification and development of SCIs that are acceptable and effective in the lung screening-eligible population. Despite the evidence for important health gains, there is currently limited evidence on how best to integrate effective smoking cessation services in lung cancer screening. Clinical practice guidelines such as the National Comprehensive Cancer Network guideline for lung cancer screening recommend that all current smokers are advised to quit smoking and that former smokers are advised to remain abstinent (111).

The degree to which lung cancer screening programmes advise patients around smoking cessation can range widely. However, at minimum individuals should be provided with a verbal recommendation, given printed materials or a quit-line phone number (112). Identifying the most effective approaches to SCIs in the context of LDCT screening has been acknowledged as a high priority by the National Institute of Health, the Society for Research on Nicotine and Tobacco (113) and the American Thoracic Society (114, 115). Several RCTs have evaluated smoking interventions in a lung screening setting using various interventions of different intensities (116-120) (see Table 1.2). However, there is currently a lack of high-quality data to demonstrate support for one specific approach to smoking cessation in a lung screening setting for a lung screening-eligible population. The current lack of research focusing on older smokers from deprived backgrounds could be due to the fact they are a seldom-heard group. In research terms 'seldom-heard groups' often refers to under-represented individuals who are difficult to involve in research and whose voices therefore frequently go unheard and their needs unmet.

Smoking cessation support should be integrated in lung cancer screening trials, with data demonstrating that a combination of screening and smoking cessation decreases lung cancer specific and overall mortality more than each component individually (105, 121-123). However, currently there is limited data on the effects of specific SCIs integrated in lung screening trials. It does appear that more intensive interventions are more effective in the limited studies that are available (Table 1.2) (124). For example, studies that have combined clinician-delivered behavioural counselling with pharmacotherapy treatment have shown smoking cessation rates up to 57% within the first six months (125-128). Internet-based interventions that are of low-intensity such as computer-tailored cessation advice or a list of online resources have not demonstrated any significant benefit over standard written information resources (116, 120).

There is currently ongoing research to assess the feasibility and effectiveness of SCIs in LDCT screening (129). The strategies being tested in these studies aim to evaluate methods of counselling patients to quit smoking, such as the framing of smoking cessation messages, the intensity of counselling and the platforms on which these messages are delivered. There is a need for more participation-centred research that focuses on understanding what SCI works best for a lung-screening eligible population as well as how to improve motivation in these individuals.

Table 1.2 Smoking cessation interventions in a lung screening setting- research trials

Study	Study type	Intervention	Comparison	Measure of abstinence	Summary of findings
Clark et al (116)	RCT ¹	Internet-based resources – patients provided 10 links to different smoking cessation websites	Written self-help materials	Self-report and CO ² reading	No significant difference in 12 month quit rates or change in readiness to quit. Increased number of quit attempts in intervention group (P = 0.011)
Aalst et al (120)	RCT	Computer-generated, tailored self-help material based on individual smoking behaviours and history	Standard brochure with smoking cessation information for different stages of readiness to quit	Self-report	No significant difference in point prevalence, quit attempts, or prolonged smoking abstinence at 24 months follow-up.
Ferketich et al (117)	RCT	Smoking cessation counselling with a medical oncologist occurring before LDCT performed followed by 12-week tobacco dependence protocol.	Smoking cessation counselling with a medical oncologist occurring after LDCT performed followed by 12-week tobacco dependence protocol.	CO reading	No difference in 7-day point prevalence at 4 and 6 months
Marshall et al (118)	RCT	Single face to face tailored counselling session (thoracic physician) with take-home audio education materials, printed materials, and telephone helpline referral.	Nontailored printed smoking cessation materials and telephone helpline referral.	Self-report and CO reading	No significant difference in quit rates at 12 months for patients receiving counselling intervention compared to the control group.

Taylor et al (119)	RCT	Resources list and 6 weekly, proactive counselling calls	Resource list: Booklet, website, contact information for local resources, text messaging link	Self-report, CO reading and saliva test	Higher 7-day point prevalence cessation at 3-months in patients who received telephone counselling
Park et al (130)	Case-control	Patients who quit smoking after receiving provider-delivered (primary care provider) cessation counselling using the 5As.	Continued smokers who received provider-delivered cessation counselling using the 5As	Self-report	Assist and arrange were associated with a significant increase in the odds of quitting at 12 months
Bade et al (131)	Observational	Attendance to smoking cessation counselling offered at time of LDCT screening; performed by trained psychologists based on readiness to quit smoking.	Non-attendance to smoking cessation counselling that was offered at time of LDCT screening.	Self-report	Higher rates of smoking cessation in patients who attended smoking cessation counselling compared to those who did not attend at 1 and 2 years follow-up
Luh et al (132)	Quasi-experimental	Clinician-provided (MD and nurse) counselling tailored to willingness to stop smoking and degree of smoking addiction.	Smoking cessation leaflet given to patients at time of screening. Second comparison group did not receive any smoking cessation advice.	Self-report	Significant advancement in patients' readiness to quit smoking in those receiving clinician-provided counselling.
Zeliadt et al (133)	Observational	Telephone counselling provided prior to receiving LDCT screening results, using motivational interview and tailored counselling approach	LDCT screening letters providing information for quitline and tobacco treatment services	Self-report	Significantly higher use of behavioural cessation support. No significant difference in 7-day abstinence 4 weeks after intervention

¹ Randomised Control Trial

² Carbon monoxide

1.5 Wider social determinants of smoking cessation

Deprived communities have long been studied as areas that have strong social ties, similar exposures and access to resources, suggesting that social networks and support might influence smoking cessation (134, 135). The social determinants of health refer to the socioeconomic and environmental conditions in which people are born, grow, live, work and age. The Dahlgren-Whitehead 'rainbow model' (Figure 1.5) maps the relationship between an individual, their surrounding environment and their health (136). Individuals are at the centre of the model and are surrounded by various layers of influence on health, including lifestyle factors, community influences, working and living conditions and finally, more general social conditions. This model suggests that there are broader socioeconomic, cultural and environmental conditions that limit the resources available to people who live in socioeconomically deprived areas. The following section of this chapter will discuss the '*social and community networks*' level of the model (Figure 1.5) in relation to smoking and smoking cessation for the target population of older smokers from deprived backgrounds.



Figure 1.5 *The Dahlgren-Whitehead 'rainbow model' (136).*

1.5.1 Social networks and support when quitting

Social support for quitting is considered a key factor in smoking cessation and is particularly important within the initiation process. For example, smokers who perceive themselves as having more support are more likely to make a quit attempt and to remain abstinent after 3 months (137). Due to the emotional and practical benefits that social support can offer, encouraging people to seek support for quitting is frequently an active component of behavioural SCIs (138, 139). Such

interventions aim to help smokers quit and prevent relapse by providing recommendations about how best to cope with the psychosocial and/or physical difficulties that are associated with quitting.

Individuals from deprived backgrounds may lack the necessary positive social support needed for a successful quit attempt. For example, a systematic review demonstrated that smokers who are making an attempt to quit are most likely to benefit from continuing, non-directive social support that is often difficult to find due to smoking being more common and acceptable within deprived communities (44). Furthermore, research has demonstrated that social support for quitting smoking is less available to smokers in lower rather than higher socioeconomic groups (58, 140). Receiving support for quitting smoking has been associated with stronger intentions to quit, self-efficacy and quit success (140-143).

Adults from lower socioeconomic groups are less likely to be successful in quitting if their social networks contain a higher proportion of smokers (36, 144). The factors that contribute to high smoking rates in low socioeconomic groups might therefore be related to being part of a social network with more smokers. Social networks are defined as a set of network members who are tied by one or more types of relationship (145) and can include kinship or types of frequently defined role relations (e.g. friends). Social networks can be beneficial but also detrimental for certain health behaviours, depending on the context (146).

Social networks may act as models of smoking behaviour, sometimes initiating a process of smoking contagion that may explain why smokers often begin smoking and have difficulty quitting (147). Research has primarily focused on the number of smokers among households and neighbourhoods to understand smoking cessation or relapse (148-151). For example, Blok et al (148) found that smoking cessation is more likely in neighbourhoods that have a high prevalence of non-smokers. Similarly, Moore et al (151) found that smoking relapse is more likely to occur in households with a high number of smokers. More recent research has explored social networks such as household members and friends and found that they are strongly associated with smoking cessation and smoking relapse, further supporting the spread of smoking within social networks (152).

1.6 Aims and objectives of this PhD

To date, the role of psychosocial barriers to smoking cessation and improved quit motivation among older smokers from deprived backgrounds has not yet been examined. Evidence is needed on how best to improve motivation to quit in an older, deprived population who are likely to form part of a lung screening eligible population. Therefore the present PhD research aims to examine beliefs that could help to characterise older smokers from deprived backgrounds and determine which factors may relate to quit motivation and smoking cessation. The aims of the thesis are to understand the psychosocial determinants of older smokers from deprived backgrounds with a view to adapting a targeted SCI. Specific objectives are to:

- (1) undertake a systematic literature review to inform the development of effective behavioural SCIs in the target population;
- (2) identify relevant theory for quit motivation and smoking cessation among older smokers from deprived backgrounds
- (3) examine determinants of quit motivation in a population sample of older smokers from deprived backgrounds using survey methods;
- (4) understand the influences on smoking and smoking cessation using qualitative interviews with smokers who declined participation in a smoking cessation trial nested within lung cancer screening;
- (5) create a set of recommendations for the adaptation of an existing SCI for older smokers from deprived backgrounds.

The evidence from these PhD studies will contribute to understanding the influences on quit motivation and smoking cessation and identifying the optimal form of SCI for the target population of older deprived smokers who are eligible for lung cancer screening. The research will also generate knowledge regarding methods of engaging high-risk, seldom-heard groups in efforts to improve of quit motivation and prompt smoking cessation.

Chapter 2

Systematic review of smoking cessation interventions for older smokers from deprived backgrounds

2.1 Chapter overview

As outlined in Chapter 1 of this thesis, there is a gap in understanding of the most suitable behavioural SCIs for older smokers from socioeconomically deprived backgrounds. This chapter presents a systematic review of the existing literature relating to SCIs for the target population. The most effective components of behavioural SCIs were identified in this review along with an examination of how moderating variables (e.g. nicotine dependence, quit motivation, self-efficacy, social support and social influences) influence the effectiveness of SCIs. A narrative synthesis of studies that included individuals from low socioeconomic groups and were approximately 50 years or older was undertaken. Studies included in the review were critically appraised in order to evaluate the strength of evidence regarding which elements of behavioural SCIs in the target population are most effective in improving smoking abstinence and the role of modifying psychosocial variables (153).

2.2 Introduction

The associations between smoking prevalence, socioeconomic group and a range of chronic disease outcomes including lung cancer are well established (154-156). As described in Chapter 1, LDCT lung cancer screening has the potential to prompt a smoking cessation attempt in lung-screening eligible participants. Evidence for integrated smoking cessation support is growing with research demonstrating promising results for quit rates when using a combined approach of smoking cessation support in a lung screening setting (90, 109, 157, 158).

A review by Iaccharino (159) attempted to identify the best approach for delivering SCIs in a lung cancer screening setting and concluded that the optimal strategy continues to be unclear due to insufficient data. There is a need to identify gaps in the evidence regarding optimal models for integrated smoking cessation in a lung cancer screening setting, focusing specifically on a disadvantaged lung screening eligible population, as well as gain a better understanding of what form of SCI may work best for this population in the UK. Further research is needed to understand specific characteristics of behavioural SCIs such as mode of delivery, setting,

intensity and duration that could be suitable for older smokers from deprived backgrounds.

To date there has been no review of the effectiveness of SCIs for lung cancer screening-eligible individuals from a low socioeconomic background. The findings from the current systematic review will contribute to knowledge on the most effective forms of SCIs for a lung screening eligible population living in deprived communities.

2.2.1 Aims of the present review

The aims of this systematic review were to identify the behavioural aspects of SCIs for older smokers from deprived backgrounds who are eligible (or approaching eligibility) for lung cancer screening, examine which elements of the interventions were most effective in promoting smoking abstinence and investigate the role of modifying psychosocial variables.

2.2.2 Systematic review methods

Systematic review methods were considered most appropriate for the current review due to the high number of published studies of SCIs. Systematic reviewing involves using a well-defined, prospectively developed research question along with explicit methods that are implemented at each stage of the search, study selection, critical appraisal of studies and data analysis (160). Each stage of a systematic review is double checked by an independent coder in order to minimise potential bias that may arise in the process of study selection, critical appraisal and data analysis. It is for this reason that systematic reviews are regarded as the highest level of evidence because of the measures that are undertaken to reduce bias and the explicit, transparent methods that are utilised (160).

Systematic reviews differ from other types of review methods, for example a scoping review lacks the requirements that the researcher should carry out quality assessments of studies and utilise an independent coder to double check each stage of the methodology. The research question for a systematic review remains fixed and should be registered on a systematic review protocol register.

2.3. Method

The current review followed the PRISMA guidelines for conducting a systematic review (161), (2009). The protocol was registered on an international prospective register for systematic review protocols, PROSPERO (CRD42018088956).

Throughout all stages of the search, data extraction and quality appraisal, 10% of

the studies were independently checked for consistency by another member of the team and all discrepancies were resolved through discussion.

2.3.1 Search Strategy

The literature was searched from 1990 to November 2018 on electronic databases Medline, EMBASE, PsychInfo and CINAHL. Search terms relating to smoking cessation, SCIs and socioeconomic status were used (Table 2.1). The de-duplication function was used on OVID and CINAHL, and further duplicates were removed through a command on EndNote and manually prior to reviewing abstracts. To limit restricting the search in relation to age, papers were manually screened to identify studies that used a relevant sample. No grey literature was searched due to the high number of peer reviewed articles that were available.

The Cochrane Handbook for Systematic Reviews of Interventions specifies the use of PICO as a model for the development of a review question to ensure that the relevant components of the question are well defined (162). The PICO tool (163) was adapted and used to retrieve relevant studies (Table 2.1). The 'comparison' element was not factored into the search terms but was used during the screening of papers to identify studies that had a control group or a pre/post intervention analysis.

Databases were searched using terms relating to smoking cessation, interventions and socioeconomic status. Terms relating to age were not included in the database search in order to avoid restricting the results, and papers were manually screened in order to identify the studies that used a relevant sample i.e. adults aged 50 years or more from a low socioeconomic background. This sample will be at or approaching the age at which they will be invited to lung cancer screening when potentially implemented in the UK. The primary outcome was smoking abstinence and was defined as "*a period of being quit, i.e. stopping the use of cigarettes or other tobacco products*" (164). Secondary outcomes (i.e. moderating psychosocial variables) were defined as variables that have an impact on smoking abstinence including self-efficacy and nicotine dependence (as described in Chapter 1).

Table 2.1: PICO Tool

PICO	Description	Search terms and connectors
Population	Individuals from socioeconomically deprived groups, defined through either individual or area level indicators	(Depriv* or disadvantage* or inequit* or socioeconomic or socio-economic or sociodemographic or socio-demographic or social class or deprivation group or poverty or low income or social welfare).tw.
Intervention	A range of interventions including individual and group counselling, self-help materials, pharmacological interventions (e.g. NRT), social and environmental support, comprehensive programmes and incentives	Smoking Cessation/ and (intervention* or initiative* or strategy* or program* or scheme* or outcome* or approach*).tw.
Comparison	All study types with a pre/post intervention and/or a control group	-
Outcome	Primary outcome: smoking abstinence Secondary outcome: moderating variables (e.g. nicotine dependence, quit motivation, self-efficacy, social support and influences)	((nicotine or tobacco or smok* or cigarette) adj (quit* or stop* or cess* or cease* or cut down or "giv* up" or reduc*)).tw.

2.3.2 Inclusion criteria

There were no restrictions on date of publication or study methodology and all searches were restricted to high-income countries (165). Included publications reported data on the following domains:

- '*Socioeconomically deprived groups*': studies that defined their sample through either individual level deprivation indicators (e.g. educational level, income) or area level deprivation indicators (e.g. postcode);
- '*Older adults*': adults age 50 years or more (or when the majority of the sample is age 50+) in order to represent those who are most likely to be at risk of developing lung cancer;
- '*Smoking cessation intervention*': RCTs and observational cohorts that examined the effectiveness of SCIs (including e-cigarettes) on smoking abstinence. All intervention types were included in the review, including individual and group counselling, self-help materials, pharmacological interventions, social and environment support, comprehensive programmes and incentives;
- '*Moderating factors*': studies investigating the effectiveness of SCIs on psychological moderating factors, including quit motivation, nicotine dependence and social norms.

2.3.3 Low socioeconomic group: a definition

A low socioeconomic group can be defined as individuals within a group or a collective group of individuals, who are socially and economically disadvantaged in comparison to others (166). Deprivation, in regards to socioeconomic group, can be measured using individual level indicators (e.g. household income, educational attainment and occupation) where lower levels of these indicators are defined as representing low socioeconomic groups. Group level indicators (i.e. postcode data) can be used to suggest area level deprivation and are often used to measure socioeconomic group. There are both strengths and limitations attached to the use of group and individual level indicators. Individual level indicators aim to capture the assets of an individual and are relatively easy to measure (167). However, there are some individual level indicators that are age relevant (e.g. educational attainment and occupation) where levels can vary with different birth cohorts, making socioeconomic group classification difficult. Additionally, individual level indicators when measured in isolation might not accurately represent an individual's present social circumstances (167) and it is therefore important to use multiple individual level indications to overcome such limitations. In regards to group level indicators, a deprivation score that is assigned to an individual within a certain area may not fully represent their social circumstances: they may live in an area defined as deprived but are not experiencing social or economic hardship. A combination of individual

and group level indicators is needed to help overcome some of these issues and ensure a more complete indication of socioeconomic group.

The relationship between smoking and an individual's socioeconomic group is complex and is likely to reflect a complicated interaction between the individual and their environment. The focus of this PhD will be to understand the influences on quit motivation and smoking cessation among a deprived population of older smokers. For the purpose of the present study and thesis, those from a low socioeconomic background will be defined as deprived.

Studies included were either targeted interventions aimed at individuals from low socioeconomic groups or population-based interventions in which a sub-group analysis of deprivation had been reported. Where measured and reported, associations between the constructs of interest and socioeconomic variables were described and the relevant statistics were extracted.

2.3.4 Age of Sample

Further analysis was undertaken in order to identify eligible studies that either targeted individuals aged approximately 50 years or older or included a sub-group analysis in which the breakdown of age consisted of those aged approximately 50 years or more. An extensive manual search was carried out in order to identify studies that included adult smokers of all ages as a way to then screen for the subset of participants that fit the age criteria.

2.3.5 Exclusion criteria

Studies that were not related to smoking or did not measure smoking-related outcomes were excluded. Studies that did not include those aged 50 years or older or did not have a subgroup analysis of age were excluded. Studies that were not written in English, review papers or conference abstracts were also excluded. Studies from low/middle income countries were excluded due to the expected difference in smoking behaviour and policies in these countries (Figure 2.1).

2.3.6 Data extraction and synthesis

Study outcomes and selected study features were extracted from all of the included studies. Data were extracted onto a template using the following headings: study design, sample, measure of smoking abstinence, intervention characteristics (i.e. setting, provider, mode of delivery, duration/intensity, behavioural components) and statistical associations between variables of interest. A meta-analysis was

precluded due to the heterogeneity of included studies. Instead, a narrative synthesis was performed using guidance outlined by Popay et al (168). Narrative synthesis is a common approach used to synthesise data in systematic reviews and enables the investigation of differences and similarities between the included studies. This approach allows the exploration of relationships within the data as well as the assessment of evidence strength (168). A narrative synthesis approach enabled a summary of knowledge related to the specific questions set out for this review.

Data were organised under relevant behavioural intervention elements (Appendix 2.1). Data from the narrative of qualitative studies and data from quantitative studies were extracted and then entered onto an Excel spreadsheet. Where reported, statistical associations between the variables of interest in quantitative studies were inserted into the spreadsheet. This spreadsheet was then used to examine relationships within and between the studies as a way to identify similar and disparate themes (168).

2.3.7 Critical Appraisal

The methodological quality of all of the included studies was assessed using the relevant Critical Appraisal Skills Programme tool (169). Study quality was assessed according to domains including rationale of study, methodology used, study design and recruitment, data collection and analysis, ethical issues, reporting of findings and contribution to research. The tool was adapted as a way to address contribution of research to the specific research question and quality assessment regarding methods of identifying smoking abstinence, intervention type and socioeconomic and age variation within the sample. Overall quality of the included studies was categorised as high, medium and low.

2.4 Results

The search returned a total of 3,825 studies after duplicates had been removed. A total of 3,673 studies were excluded based on title and abstract, leaving 74 studies to be read in full. After screening, a total of 11 studies met the inclusion criteria (Figure 2.1). As shown in Table 2.2, nine of the 11 included studies were quantitative (130, 131, 170-176) and two were mixed-methods (177, 178). Three of the 11 studies were RCTs four were observational cohort studies and the remaining studies were a matched case control, a pilot evaluation, a quasi-experimental study and a retrospective cohort study (see Table 2.2). Two studies (130, 131) were conducted in a lung cancer screening context.

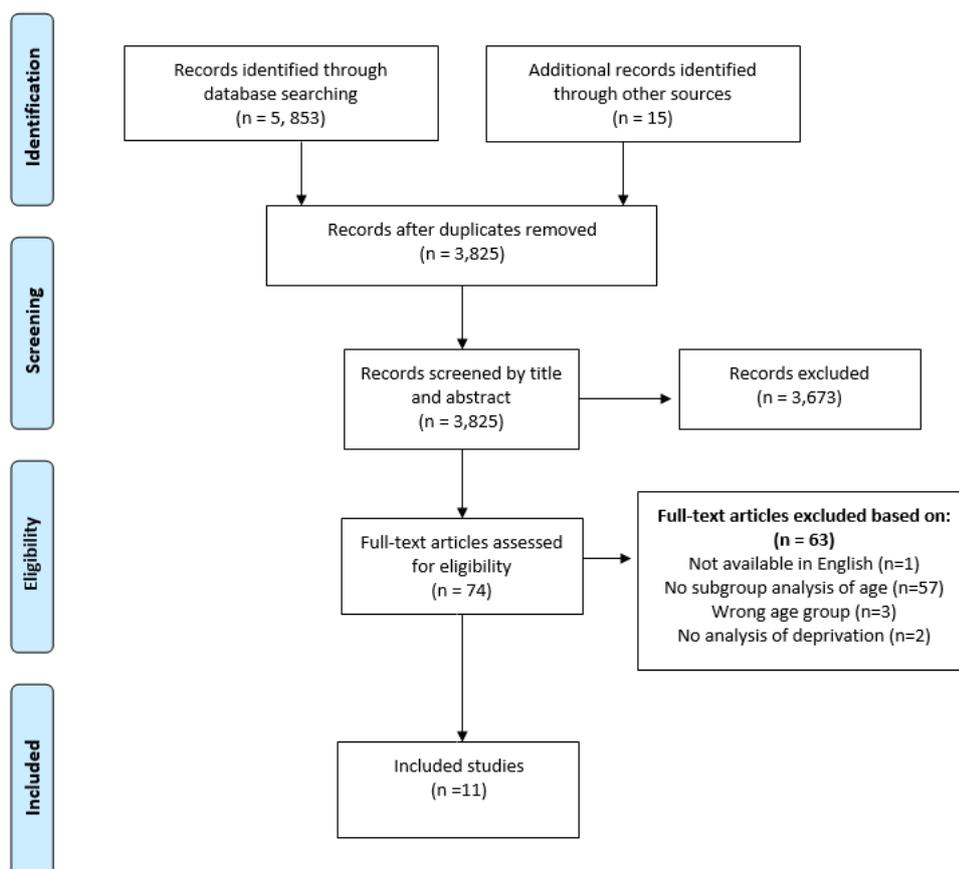


Figure 2.1 PRISMA flow chart

Nine studies used a combination of NRT and behavioural counselling (130, 131, 170, 171, 173-177). One study used only NRT (172) and one used behavioural counselling without NRT (178). Studies that used behavioural counselling involved education and motivational techniques including support and encouragement (see Table 2.2). Results are presented in relation to behavioural counselling elements including the content, setting, mode of delivery and intervention provider.

2.4.1. Behavioural intervention content

Ten studies focused on meeting the individual participant's needs using education and motivational techniques including support and encouragement (130, 131, 170, 171, 173-178). All of the studies used motivational techniques of varying intensity (see Table 2.2). Park and colleagues (130) tested the effectiveness of delivering a brief cessation intervention based on the 5As (ask, advise, assess, assist and arrange follow-up) in a lung cancer screening setting. The 'assist' and 'arrange follow-up' elements significantly increased the odds of smoking abstinence (see Table 2.2). 'Assist' was associated with a 40% increase in smoking abstinence and

arrange was associated with a 46% increase in smoking abstinence. Higher educational level was significantly associated with smoking abstinence after delivery of each of the 5As. Lower nicotine dependence and higher quit motivation were also associated with smoking abstinence after delivery of each of the 5As.

Three studies used financial incentives as part of their intervention (173, 176, 177). An RCT conducted by Lasser and colleagues (173) offered participants \$750 for abstinence at 12-months follow-up. This element of the intervention was combined with patient navigation in which trained navigators were able to identify and discuss salient social contextual factors using motivational interviewing. This form of intervention was found to be particularly beneficial for older participants as well as those with the lowest income. Intervention arm participants aged 51-74 years had higher abstinence rates compared to those aged 21-50 years. Furthermore, participants with a household yearly income of <\$20,000 had higher abstinence rates compared to those with income >\$20,000. Study findings also demonstrated that the intervention was most beneficial for smokers who were in the contemplation stage of smoking cessation (Table 2.2).

Ormston (177) targeted a highly deprived sample and gave financial incentives to intervention participants upon biochemically verified cessation. Abstinence rates for the intervention group were significantly higher compared to other SSS (see Table 2.2). Interviews and focus groups were conducted with some of the participants post intervention in order to explore their experience of the intervention and quitting experiences. Results from this research demonstrated that 71% of participants felt the incentive component was either 'very' or 'quite useful' in helping them quit, with these participants expressing that the money was a 'bonus' or 'reward' to keep them going. Although some individuals identified specific intervention components that were most helpful for them, the overall view was that 'the whole package' of the intervention aided their quit attempt.

2.4.2 Intervention setting

Two studies took place in a lung screening setting (130, 131). Park et al. (130) offered a brief screening intervention delivered by a primary care clinician and Bade et al. (131) using a more intensive intervention delivered by a psychologist who was trained in tobacco treatment. The latter study used an RCT design with a large sample size (131) (see Table 2.2). Five studies were delivered in a variety of easily accessible community settings such as community pharmacies (170, 174, 177) and community venues including centres and churches (170, 176-178) (Table 2.2).

Three studies took place at medical facilities such as local medical/health centres (172, 173, 175) and two studies took place in hospitals (171, 174). One study delivered the intervention in both community and primary care settings (174).

All studies that used community settings utilised sessions in easily accessible community centres that were familiar to participants. For example, Ormston et al. (177) used a community-based intervention and found that those who attended community pharmacies or cessation groups demonstrated significantly higher abstinence rates compared to other SSS (see Table 2.2).

Bauld et al. (170) found that specialist-led group-based services in a community setting have higher abstinence rates compared to one-to-one services in a pharmacy setting. Abstinence rates for pharmacy-based clients increased sharply with age. In both the pharmacy led and one-to-one services, more deprived smokers had lower smoking abstinence rates (see Table 2.2). Additionally, Sheikhattari (176) compared the difference between community-based and clinic-based interventions using community-based participatory research and found more successful abstinence rates for the community-based intervention in comparison to the clinic-based intervention (see Table 2.2). The settings used for the community-based research included venues such as churches, schools and other community organisations.

2.4.3 Mode and duration

One study (170) showed that participants accessing group-based services were almost twice as likely as those who used pharmacy-based support to have demonstrated smoking abstinence at a 4-weeks follow-up. Similar support for a group-based intervention was demonstrated by Celestin (171) who showed that attendees of group behavioural counselling had significantly higher long-term quit rates (18%, $p < 0.001$) compared to non-attendees (12%). Sheikhattari et al (176) used a 6-week group counselling module that was followed by a 6-week relapse prevention module. Higher odds of smoking abstinence were associated when individual counselling was delivered.

Lasser and colleagues (173) delivered their intervention over 6 months in-person or via telephone calls with a goal of four hours of behavioural support per participant and compared this to enhanced traditional care. Results demonstrated that 12% of the intervention group had quit smoking in comparison to 4% from the control (See Table 2.2). Bade (131) also employed behavioural counselling in-person, before or after lung cancer screening, with at least one subsequent telephone call for those

who had specified a quit date. Participants were offered four telephone calls that each or in total lasted around 20 minutes in duration. Findings demonstrated a limited effect of smoking cessation counselling on smoking behaviour. Independent of the smoking cessation counselling, a small decline of the proportion of smokers among those screened was observed (see Table 2.2).

Qualitative research by Ormston (177) attempted to understand the views and experiences of the intervention users and what modes of delivery were most acceptable to them. Participants who attended the group sessions felt they were able to share their quitting experiences with fellow quitters and were able to get advice from group leaders and other members. This was considered helpful and motivating. The model used in this intervention used 'rolling' groups which meant that participants started at different stages of quitting and could share experiences and advice.

2.4.4 Intervention provider

Intervention providers varied between studies. Seven of the included studies used providers who can be defined as 'healthcare or allied professionals' (130, 131, 171, 172, 174, 175, 178) such as general practitioners, primary care practice nurses, psychologists and pharmacists. Smoking abstinence outcomes varied depending on SCI provider (Table 2.2). A small-scale observational study by Copeland et al (31) examined the use of NRT and a brief GP consultation. Results showed that older smokers were more likely to have stopped smoking (Table 2.2).

Two studies employed trained peer facilitators to deliver the intervention. Sheikhattari (176) involved former smokers who were trained to deliver behavioural sessions, and Lasser (173) used trained patient navigators who delivered the intervention after receiving ten hours of training in motivational interviewing techniques and experience of working in community settings. Findings from Lasser et al (173) demonstrated that older participants and those with a lower household yearly income had higher quit rates (Table 2). Findings from this study also demonstrated that subsequent phases of the intervention (delivered by trained patient navigators) were associated with higher odds of smoking abstinence compared to the first phase where intervention delivery was conducted by a doctor, nurse or social worker (173) (see Table 2.2).

Qualitative data from a study using a small sample of female participants (178) demonstrated that participants viewed peer facilitators as helping to clarify their cessation efforts, and they were able to share and learn from each other's

experiences. Results from this study demonstrated that only four out of 44 participants reported sustained cessation (Table 2.2).

2.4.5 Moderating variables

Seven studies included moderating variables in their respective analyses (130, 131, 170, 173, 175, 176, 178). Lasser et al. (173) demonstrated that lower nicotine dependence and higher quit motivation were significantly associated with quitting after delivery of each of the 5As. In Parks et al. (130), higher education, lower nicotine dependence and higher quit motivation were significantly associated with quitting after delivery of each of the 5As. Three RCTs demonstrated that intervention participants who had a lower Fagerstrom score (176), were in the contemplation stage (173) and had reported high readiness to quit (131) were more likely to have abstained from smoking post-intervention (see Table 2.2). One study (178) reported qualitative data on psychosocial variables including self-efficacy, social support and isolation. Results from this research indicated a decrease in temptation to smoke and positive changes in women's smoking behaviour. With regards to smoking self-efficacy, it was found that participants thought the education they gained increased their awareness of their smoking habits, reasons why they smoked and the importance of quitting. Participants also reported an increase in the number of available support sources (e.g. parents, spouse and friends) along with a significant increase in perceived social support.

Table 2.2 Study Characteristics

Study (Country)	Study design	Sample	Intervention	Measure of smoking abstinence	Summary of findings	Quality appraisal
Bade et al (131) (Germany)	Randomised control trial	4052 participants from the German lung cancer screening intervention trial. 1535 (62%) male, 950 (38%) female. 1737 (70%) aged 50-59 years, 748 (30%) 60-69 years old. 1823 (73%) 'low' in education and 1594 (65%) 'low' in vocational training.	Low-dose multislice CT screening and smoking cessation counselling (SCC) delivered by a psychologist in a radiology department. Twenty minute counselling followed by at least one telephone call.	Self-report at 12 and 24 months	Proportion of current smokers decreased among screenees (3.4%, $p < 0.0001$), controls (4.5%, $p < 0.0001$), and entire cohort (4.0%, $p < 0.0001$). The magnitude of decrease in smoking rate was larger in SSC participants (screenees 9.6%, $p < 0.0001$; controls 10.4%, $p < 0.0001$) compared to non-SSC participants (screenees 0.8%, $p = 0.30$; controls 1.6%, $p = 0.03$).	High
Bauld et al (170) (United Kingdom)	Observational study	1785 pharmacy service users. 762 (56%) in the Starting Fresh (SF) group and 311 (76%) in the Smoking Concerns (SC) group were aged 41 years or older. 796 (58%) from SF were in the lowest deprivation quintile, 187 (46%) from SC were in the lowest quintile.	Behavioural support delivered by a trained adviser in a group-based community setting (SC) up to 12 weeks or individually in a pharmacy setting (SF) up to 12	Biochemical validation at 1 month	146 (36%) quit rate in SC versus 255 (19%) in SF ($OR^1 = 1.98$; 95% CI^2 1.90 to 3.08). SC and SF deprived smokers had lower cessation rates ($OR = 0.677$; $p = 0.015$). Cessation rate for pharmacy clients increased sharply with age from 13.4% for age 16–40 to 30.7% for age 61 and over ($p < 0.001$). The increase for group-based clients (SC) was statistically insignificant ($p < 0.25$). Determination to quit was not	Medium

¹ Odds ratio

² Confidence interval

			weeks, with access to NRT.		statistically significant: $P = 0.072$ (SF) and $P = 0.092$ (SC).	
Celestin Jr et al (171) (United States)	Retrospective cohort study	8, 549 tobacco users in Louisiana's public hospital facility. 1531 (68%) in the intervention group were aged 45 years and over. 1,196 (57%) were from the lowest 'financial class'.	Standard care plus group behavioural counselling in a hospital classroom. 4 one-hour sessions, once a week within a 1-month period.	Self-report at 12 months	Intervention participants had greater odds of sustained abstinence than non-attendees (aOR ³ =1.52; 95% CI 1.21 to 1.90). Higher 12-month quit rate in patients over age 60 (22%) compared to 18-30 year olds (11%) (aOR 2.36; 95% CI 1.58 to 3.52). There was a statistically significant effect of COPD status on quit rate (from UOR 1.01 CI 0.86 to 1.19, to AOR 0.75 CI 0.63 to 0.90).	Low
Copeland et al (172) (United Kingdom)	Observational cohort study	101 patients from a disadvantaged area of Edinburgh. Mean age for males was 47 years and for females was 44 years.	GP consultation and subsequent prescription of NRT.	Self-report at 3 months	Post intervention 35 (35%) smoked the same, 46 (45%) were smoking less and 20 (20%) had stopped smoking. Older participants were more likely to have stopped or to be smoking less ($p < 0.00$).	Low

³ Adjusted odds ratio

Lasser et al (173) (United States)	Prospective randomised trial	352 participants randomised (177 intervention, 175 control). 197 (56%) aged 51-74. 193 (55%) with a household yearly income <\$20,000.	Patient navigation and financial incentive (intervention) versus enhanced traditional care (control). Intervention received 4 hours of support over 6 months. Delivered by patient navigators over the phone or in-person.	Biochemical validation at 12 months	21 (12%) intervention participants quit smoking compared to 4 (2%) control participants (OR=5.8, 95% CI 1.9 to 17.1, p<0.00). In the intervention arm (n=177), participants aged 51-74 had higher quit rates compared to those aged 21-50 (19 [19.8%] vs 2 [2.0%]; p< 0.00). Household yearly income of <\$20,000 had higher quit rates compared to >\$20,000 (15 [15.5%] vs 4 [8%]; p= 0.00).	Medium
Neumann et al (174) (Denmark)	Observational prospective cohort study	20,588 disadvantaged patients (low level of education and receiving unemployment benefits). 15,244 (74%) aged 40 years or over.	6-week manualised Gold Standard Programme in hospitals and primary care facilities (e.g. pharmacies). Delivered in 5 meetings over 6 weeks by a certified staff member. Both group and individual counselling was offered.	Self-reported continuous abstinence at 6 months	34% of responders reported 6 months of continuous abstinence. Continuous abstinence was significantly lower in those with less education (30%) versus more education (35%) (p<0.00). For participants with a lower educational level, individual counselling was a predictor of success in smoking cessation (OR=1.31, 95% CI 1.05 to 1.63).	Medium

Ormston et al (177) (United Kingdom)	Mixed-methods, quasi-experimental study	2042 smokers living in deprived areas of Dundee. 70 (54%) aged 45 years and over. 119 (92%) from the two most deprived areas.	Financial incentive and behavioural support based on Scottish national guidelines, with pharmacotherapy (Quit4u Scheme) delivered in group (practice nurses) and one-to-one settings (community pharmacists) for up to 12 weeks.	Biochemical validation at 1, 3 and 12 months	Intervention was responsible for 36% of all quit attempts in the three most deprived areas. 12 month quit rate (9.3%) was significantly higher than other Scottish stop smoking services (6.5%) (relative difference 1.443, 95% CI 1.132 to 1.839, p=0.00).	Medium
Park et al (130) (United States)	Matched case control study	3336 National Lung Screening Trial participants. Aged 55 to 74 years old. No report of deprivation at baseline. Subgroup analysis performed for education.	SCI delivered by a primary care clinician using the 5As.	Self-report at 12 months	Assist was associated with a 40% increase in quitting (OR=1.40, 95% CI 1.21 to 1.63). Arrange was associated with a 46% increase in quitting (OR=1.46, 95% CI 1.19 to 1.79). Higher educational level was significantly associated with quitting after delivery of each of the 5As (ORs=1.14 to 1.26 for college degree or higher versus high school education). Lower nicotine dependence (OR= 0.94, 95% CI 0.91-0.98), and higher quit motivation (OR=1.28, 95% CI 1.21-1.35) were significantly associated with quitting after delivery of each of the 5As	Medium

Sheffer et al (175) (United States)	Observational study	7267 participants in telephone treatment: 30% aged >50 years, 35% aged 36-49 years. In-person participants: 38% aged >50 years, 38% aged 36-49 years. No report of deprivation at baseline. Subgroup analysis performed for deprivation.	Behavioural counselling-manual driven sessions delivered weekly in-person (healthcare settings) or over the telephone, with free nicotine patches for 6 weeks. Delivered by a health care provider trained in brief evidence-based tobacco dependence interventions.	Self-report at 3 and 6 months	Abstinence rates were higher for in-person counselling (37.7%) versus telephone counselling (30.8%) ($p<0.00$). No significant difference at 3 months ($p=0.73$) and 6 months ($p=0.27$) between in-person (28.2%; 27.2%) and telephone (28.7%; 28.7%). The highest socioeconomic (SES) group was more likely to be abstinent with telephone treatment (SES3: $P=0.03$; OR = 1.45; 95% CI = 1.04, 2.01). No significant differences between the in-person and telephone for the two lower SES groups (SES1: OR=1.02, 95% CI 0.88 to 1.18, $p=0.82$; SES2: OR=0.91, 95% CI 0.72 to 1.15, $p=0.41$).	Low
Sheikhhattari et al (176) (United States)	Randomised control trial	409 (52%) were aged 48 years and over. Recruited in targeted communities where more than 40% of the households earn less than \$25,000. 531 (72%) were unemployed.	Peer-led community-based intervention over three phases. Phase 1 ($n=404$) – the American Cancer Society’s 4-week Fresh Start smoking cessation curriculum expanded to 12 weeks at health centres and delivered by a	Self-report and biochemical validation at 3 and 6 months	Delivery of services in community settings was a predictor of quitting (OR=2.6, 95% CI 1.7 to 4.2). Smoking cessation increased from 38 (9.4%) in Phase 1 to 84 (21.1%) in Phase 2, and 49 (30.1%) in Phase 3. Phases 2 and 3 were associated with higher odds compared to Phase 1, with adjusted ORs of 2.1 (95% CI 1.3 to 3.5) and 3.7 (95%CI 2.1 to 6.3) respectively. Older age (>48 years versus <48 years) was associated with higher quit rate (13.3% vs 19.1%, $p=0.028$).	High

			doctor, nurse or social worker. Phase 2 (n=398) and Phase 3 (n=163) – tailored group counselling in community venues, delivered by trained peer motivators.			
Stewart et al (178) (Canada)	Pilot evaluation of a before and after study	44 women, aged 25-69, living on low income in urban areas of Western Canada. 23 (52%) aged 40 years or older. 18 (39%) participants unemployed, 26 (62%) on welfare/income support.	Facilitated group support supplemented with one-to-one support from a mentor. Once a week, duration of 12 weeks minimum. Groups facilitated by professionals and former smokers with the option of one-to-one from peers in community centres.	Self-report at 3 months	The mean number of cigarettes smoked daily decreased from pre to post-test ($p<0.01$). Among women completing all data collection (n=22), the mean number of cigarettes consumed daily decreased from 0.95 pre-intervention to 0.32 immediately after the intervention, then increased to 0.64 at 3 months post-intervention. Four women reported sustained cessation.	Low

2.5 Discussion

There is a lack of evidence regarding the optimal SCIs for older smokers from deprived backgrounds and it is therefore difficult to assume that standard SCIs are appropriate for this population. The systematic review was conducted in November 2018 and a recent search demonstrated that no relevant publications that fit the inclusion criteria have emerged since the publication of the data presented in this thesis Chapter (153). To my knowledge, the current systematic review was the first to explore the influence of behavioural SCIs for individuals specifically at high risk of developing lung cancer (i.e. older smokers from deprived backgrounds) (159). The review features two early feasibility and pilot trials (130, 131) that give useful early indicators into the most appropriate SCIs to implement in a screening setting. However, there is limited evidence regarding SCIs that are equally or more effective for older deprived individuals, or how inequalities could be addressed.

The eleven studies included in the review were heterogeneous in design, SCI modality, sample size, intervention timing and the methods of measuring smoking abstinence outcomes. The current review found that the majority of the included studies used a combination of pharmacotherapy with a form of behavioural counselling, supporting previous research that a combined approach is the most effective (179). However, there were some encouraging findings relating to the content of behavioural counselling that can be extracted from this review. Results demonstrated that more intense, tailored, multimodal behavioural counselling which utilises incentives and peer facilitators, and is delivered in a community setting can have a positive impact on smoking outcomes for the target population.

A previous review (180) found that there are some promising behavioural interventions used in an effort to support low socioeconomic smokers in a quit attempt, including tailored advice dependant on literacy levels. Behavioural interventions identified in the current review used a range of approaches and although none of them explicitly described their intervention as "tailored", many used a form of behavioural counselling that was implicitly flexible according to the needs of the individual. Interventions were implemented in locations that addressed barriers to access, such as local community centres, and intervention content was driven by the individual's psychological needs (170, 177, 178). A key finding from the review regarding a promising behavioural intervention component for the target population was offering an intervention that is easily accessible to the individual. Older smokers from deprived backgrounds are likely to have complex and often

difficult lives that they need to navigate, therefore making SCIs easily accessible and friendly for older smokers from deprived backgrounds is imperative. For example, Stewart et al (178) demonstrated the use of an intervention that is community-based and takes place at convenient times for the individual.

Tailoring support to meet the needs of the individual could be useful for encouraging smoking cessation in the context of the target population. It may be that older smokers from deprived backgrounds require different approaches to cessation and an approach that aims to enhance a variety of psychosocial factors related to smoking cessation may be beneficial. For example, Sheikhattari et al (176) adopted a tailored approach regarding behavioural counselling content with the use of a 'tool box' that enabled peer motivators to tailor the group content in order to meet the needs of the individuals and their readiness to quit.

Many of the studies included in the current review were conducted in a community setting as a way to address social barriers. Previous research suggests that in order for people to access SSS, the appointments should be flexible and accessible (181). Although many smoking cessation services have shown improvement in individuals accessing services, this does not necessarily result in improved levels of cessation. Smith et al. (180) found that although smokers from deprived backgrounds were more likely to access a smoking cessation service, they were less likely to be successful in their quit attempt due to barriers such as higher levels of nicotine dependence, social norms and difficult life circumstances.

2.5.1 Strengths and limitations of the included studies

Similarly to findings from Pineiro's review (124), the studies presented in this review demonstrated inconsistent use of biochemical verification of smoking cessation, with the majority of the studies relying on self-reported smoking cessation (Table 2.2). Using self-reported abstinence has been thought to potentially introduce a socially desirable response that might bias results and this could be the case particularly for smokers who often feel stigmatised and judged due to engaging in a behaviour that is perceived as socially unacceptable, irresponsible or immoral (182). Conversely, the use of biochemical verification has been previously challenged in lung cancer screening studies that have shown lower rates of misreporting smoking status (183-185).

Various design aspects of the included studies were limited, with many using non-randomised methods. Additionally, only two of the studies included qualitative data

and were therefore limited in elucidating why certain interventions were more or less likely to have a positive effect on smoking outcomes. This also meant that it is difficult to isolate which elements of these complex behavioural change interventions work, suggesting a need for more mixed methods research to understand the active ingredients' of effective SCIs. These findings highlight the importance of embedding process evaluations in RCTs as a way to identify intervention components that could be causing a change in smoking behaviour (186) . Evidence also suggests that smokers from disadvantaged backgrounds have specific obstacles to quitting successfully (44) and future research is warranted to understand exactly why some forms of support are more able to lessen these barriers.

The way in which socioeconomic group was measured in the included studies varied. The most common indicator used was educational level (Table 2.2); however, the way in which this was measured was not consistent. Some studies defined education level in terms of school years and others used qualifications as a marker of education level. Inconsistency in measurement of socioeconomic group was also observed in the current review. For example, two studies (170, 177) used area-level indicators to measure socioeconomic group. One of these studies used the Scottish Index of Multiple Deprivation (177) and the other used a Scottish deprivation quintile along with individual level indicators such as education, employment status and eligibility for free prescription. Furthermore, one of the included studies did not use a specific measure of socioeconomic group (172) and instead recruited on the assumption that participants were being enrolled onto the study from a GP practice surgery that was located in an area with markers of socioeconomic deprivation, including high unemployment. Researchers therefore assumed that the individuals using the practice would be representative of the target recruitment sample.

2.5.2 Strengths and limitations of the review

The results of this review are based on the available information from the identified studies; and should therefore be regarded as providing a preliminary understanding within the methodological limitations of included studies. The inclusion of low quality studies in this review may have impacted the validity of results presented. In order to combat this issue the evidence from medium/high quality studies could have been given more weighting when synthesising findings. For example, one study reported statistically significant results regarding smoking abstinence based on

small numbers and wide CIs indicating potential issues around sampling (173). Although the presence of lower quality studies is considered a weakness of the current review, their inclusion was based on the fact that data from these studies offered an understanding into the feasibility and acceptability of SCIs which is relevant to the context of this PhD. However, this limits the extent to which their effectiveness can be judged and larger RCTs are required.

Potentially relevant studies were excluded due to demographic characteristics and may have provided some useful insight into the integration of smoking cessation support in a lung screening setting (118, 187, 188). Furthermore some studies were excluded due to a lack of subgroup analysis or for not meeting the inclusion criteria for age but did focus on interventions for those from deprived communities. These may have added to the existing knowledge of effective interventions for the target sample. For example, research has shown that telephone-based counselling for smokers undergoing lung cancer screening, involving messages about risks of smoking in the context of lung screening results, can improve self-efficacy for quitting and the likelihood of a successful quit attempt (133). Additionally, research is currently underway in the United States aimed at understanding how best to pair research on smoking cessation treatment and LDCT screening (129). Due to the focused inclusion criteria, the current review failed to identify ongoing research aiming to assess the feasibility and effectiveness of SCIs in LDCT screening (e.g. The Smoking Cessation at Lung Examination (SCALE) Collaboration (129)) and it is important that findings from these ongoing trials are considered when identifying suitable interventions for the target population.

2.5.3 Implications for policy, practice and future research

The current review demonstrated a clear lack in research studies regarding SCIs for older smokers from deprived backgrounds. The research revealed the important need for more controlled trials of smoking cessation for older smokers in order to better understand the most effective form of behavioural intervention for this population. This finding echoes results from a previous review by Chen and Wu (189). Furthermore, under-reporting of demographic data (i.e. a breakdown of age and socioeconomic background) during the screening stage of this review limited the number of studies that were able to be included. As such, it is highly important that smoking cessation studies collect and report these demographics in order to improve the quality of results in future systematic reviews.

Finally, none of the studies included in the review incorporated e-cigarettes into their interventions. There is growing evidence that e-cigarettes are an effective tool for smoking cessation (190-193). Research to date has demonstrated that e-cigarettes are less harmful than tobacco smoking (194, 195) and can be a useful quitting aid for some smokers, including those who have tried and failed to quit using other methods. A study by Jackson et al. showed that adults using e-cigarettes were 95% more likely to quit compared to those not using e-cigarettes (196). It is therefore important that future research aims to examine how the target population of older smokers from deprived backgrounds are using e-cigarettes in order to understand this potentially beneficial aid within SCIs for the target population.

With a clear lack of evidence for the most effective behavioural SCI for the target population, healthcare professionals including smoking cessation practitioners are faced with the challenge of offering an intervention without evidence-based guidance of how best to do so. Results from this review demonstrate that a tailored, multimodal intervention that is embedded within local disadvantaged communities could be beneficial for the target population. It is important that future research aims to further understand psychosocial variables that could be targeted in SCIs for the target population in order to treat the psychological impact of addiction. Furthermore, the data produced from this review offers knowledge that could be transferred to other cancer screening settings and contribute to a better understanding of what SCIs may be best placed when integrated within these contexts.

2.5.4 Conclusion

Further rigorous, high quality research is needed in order to ascertain the effectiveness of SCIs for older smokers from deprived backgrounds. The current systematic review examines SCIs for the target population and demonstrates the potential for an intensive, tailored, multimodal intervention that can be embedded within disadvantaged communities. With the prospect of lung cancer screening being implemented in the UK and Europe in the near future, the current research adds to the evidence base regarding suitable SCIs for high-risk disadvantaged populations who will benefit most from lung screening and integrated smoking cessation support.

The next chapter of this PhD will report relevant theories and models that have previously been utilised when improving quit motivation and smoking cessation in

the target population. Following this, psychosocial determinants of quit motivation will be examined in order to understand potential modifiable variables factors that can be targeted in a SCI for older smokers from deprived backgrounds.

Chapter 3

Critical evaluation of behavioural theories and models relevant to smoking and smoking cessation among older smokers from deprived backgrounds

3.1 Chapter overview

Tobacco use as a behaviour is a complex phenomenon and it can be argued that no single theory has the ability to cover all aspects of it. For the purpose of this chapter a range of health psychology models and theories will be reviewed. Behavioural and sociological models and theories that were considered to be most relevant to quit motivation and smoking behaviour among older individuals from deprived backgrounds were selected and will be described and critically evaluated in this chapter. The most relevant theories or models to the behaviour and desired behaviour change will then be selected for the subsequent studies in this PhD project.

3.2 Introduction

As discussed in Chapter 1, this PhD focuses on understanding the influences on quit motivation and smoking cessation in older smokers from deprived backgrounds to generate evidence to inform the adaptation of a SCI for the target population. It is important to identify a variety of relevant theories and evidence-based behaviour change methods for improving quit motivation and smoking cessation in order to select and adapt an appropriate SCI for the target population. The identification of relevant theory will offer an insight into the likely processes that are underlying the behaviour prior to adapting an intervention, so that the intervention content can be designed to specifically address the processes. This will also help in identifying the most suitable measures for evaluating intervention efficacy.

It is useful to understand the differences between theories and models as these terms are often used interchangeably. Theories can be defined as explanatory and predictive, helping to direct the selection of appropriate methods needed for conducting research, and predicting behaviour to guide development of interventions (197). On the other hand, models are generally quite descriptive and show a more simplified cause and effect of the key aspects of behaviour, frequently as a simplified version of theories (197).

Among the behavioural theoretical frameworks, those most widely applied to smoking research include The Transtheoretical Model (TTM; (198)), Social

Cognitive Theory (SCT;(199)) and the Health Belief Model (HBM; (200)). More recently, Extended Parallel Processing Model (EPPM) and PRIME theory (201) have been applied in this field of research.

3.3 Relevant theories and models of smoking behaviour

3.3.1 Social Cognitive Theory

SCT is an extension of social learning theory (202) and suggests that people learn from one another via observations, instructions or modelling (199). It expands further on behaviourism through explaining behaviour as an outcome of reciprocal interactions between cognitive, behavioural and environmental influences (203, 204).

An important component of the SCT is self-efficacy, also known as the belief or expectation held by an individual that they are able to successfully perform a task. This theoretical construct was first described as a cognitive mechanism that underlies behavioural change (204) and has been defined as “*people’s judgments of their capabilities to organise and execute causes of action required to attain designated types of performances*” (204). The construct suggests that an individual’s efficacy expectations will determine whether the behaviour, such as quitting smoking, will be initiated and how long efforts will be maintained in order to face obstacles. Previous work has shown that many social learning theorists have adopted the concept of self-efficacy in their development of complex models for the process of behavioural change (205).

Self-efficacy has been used in health promotion for a variety of health conditions, including changing behaviour related to tobacco use cessation (206, 207). Many studies have demonstrated that self-efficacy plays an important role as a mediator in cognitive behavioural change among smokers who are attempting to quit (208). SCT attempts to explain how an individual initiates and maintains a given behaviour, for example quitting smoking, through emphasising the role of interactions between a variety of cognitive, environmental and behavioural factors.

Research has demonstrated that individuals who successfully quit smoking by themselves have higher self-efficacy compared to those who are not willing to quit or who relapsed (209-211). Self-efficacy has also been found to have a significant relationship with stopping smoking and the prevention of relapse (212-214).

However, contrary to some research, a meta-analysis conducted by Gwaltney et al (215) found surprisingly weak effects of self-efficacy on tobacco cessation when efficacy was measured *prior* to individuals quitting smoking. Self-efficacy was shown to predict successful smoking cessation when measured *after* smokers quit (215). Similarly, other research has demonstrated that self-efficacy had no independent effect on attempts to stop smoking or on smoking cessation prior to individuals quitting smoking (216, 217).

Self-efficacy has frequently been defined as the ability to resist smoking in more tempting situations, and therefore intentions are often framed in terms of motivation or readiness to quit smoking (218, 219). SCT offers a theoretical framework that is useful to examine smoking behaviour, however there is a lack of literature regarding SCT-based studies relevant to the target population.

In the context of smoking, SCT posits that expectations surrounding outcomes can be operationalised into benefits and harms of smoking, and intentions as readiness or motivation to quit. The benefits of smoking encompass the perceptions of the advantages of smoking such as stress reduction, and the harms refer to the disadvantages of smoking such as higher risk of developing a smoking related disease. Research has demonstrated that smokers' perception of the pros and cons of smoking and quitting smoking affect their quitting behaviour (218, 220-222). Smokers who report relatively few advantages of smoking along with many benefits of quitting are more likely to successfully achieve smoking cessation.

There are limitations to SCT that should be considered. Firstly the theory can be critiqued for being too broad and it attempts to explain all aspects of behaviour but lacks explanation of how each construct relates to each other. While SCT does consider a variety of factors outside of an individual, it can be criticised for not adequately explaining external factors that contribute to changing a behaviour. For example, for the target population of older smokers from deprived backgrounds, SCT does not sufficiently explain the wider social and contextual factors in disadvantaged communities that will influence smoking cessation and quit motivation.

3.3.2 The Health Belief Model

The Health Belief Model (HBM) was initially developed by social psychologist Rosenstock (223) in order to explain risk-related health behaviours. The HBM suggests that behaviour is ultimately determined by perceptions of the disease or

health threat and the strategies that are available to guide health behaviours (223). Assumptions of the model include that when an individual is faced with a health threat they will take into account their perceptions of susceptibility to a health threat, the severity of the threat at hand, perceived barriers and the perceived benefits of behavioural performance (224). The model focuses on individual beliefs and is based on the fact that health behaviours are determined by personal beliefs related to health issues (222). For example, deprived smokers tend to hold self-exempting beliefs and perceive fewer health risks of tobacco smoking in comparison with non-smokers (70, 225).

The model suggests that these four constructs are influenced by a variety of demographic variables such as gender, age and socioeconomic status as well as variables including knowledge and self-efficacy. Additionally, cues to action are included in the HBM as important influences on behaviour. Cues to action include factors such as social cues, for example advice from family or friends that prompts an individual to quit smoking or seek medical help. Cues to action may also act at a system level, such as stop smoking messages or campaigns in the media (Figure 3.1).

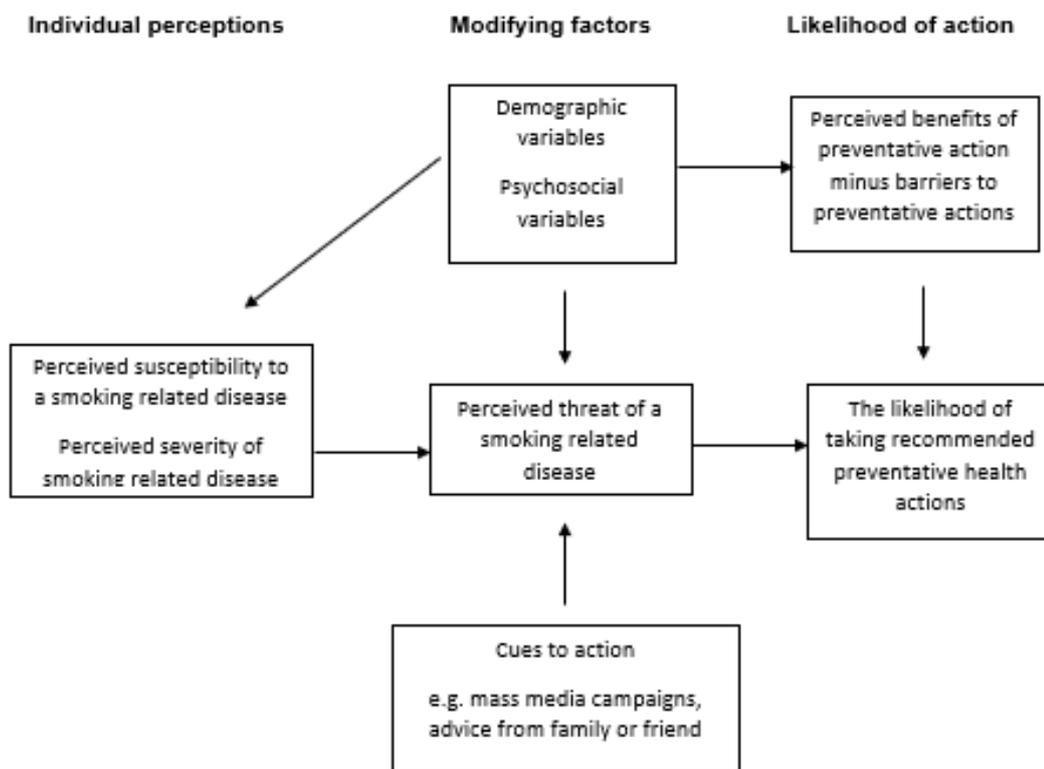


Figure 3.1 *The Health Belief Model, adapted from Stretcher and Rosenstock (224)*

The HBM is based on the premise that an individual will engage in a health-related action if they perceive that a health threat (e.g. a smoking related disease, such as lung cancer) can be avoided, have a positive expectation that if they take the recommended action they will avoid the health threat, and believe that they can successfully engage in the recommended health action (i.e. quitting smoking). The HBM was subsequently extended to include self-efficacy (224).

The HBM can be used to study aspects of smoking behaviour. For example Aho (226) found that ex-smokers, non-smokers and smokers can each be differentiated in terms of 'perceived severity' of smoking as a health problem. Perceptions of severity of illness, such a smoking related disease, are often based on a person's medical knowledge and beliefs that an individual has formed regarding the health threat. Beliefs surrounding disease severity include the perceptions of what impact a diagnosis might have on a person's daily life, and these are often formed from other members of their community. For example, lung cancer rates are higher in areas of socioeconomic deprivation (9), therefore a smoker from a deprived background may know someone who has a smoking related disease that has little effect on their daily life. Conversely, they may know someone who has had a

diagnosis of a lung cancer which has had a more negative effect on their daily life. Based on these experiences, a smoker would perceive a smoking related disease and smoking as more serious in the latter example compared to the first.

Perceived susceptibility refers to a person's perception of their own risk associated with acquiring a disease. Research has demonstrated that smokers often underestimate their own personal smoking-related risk, in comparison with the risk they may estimate for other smokers and also compared with their real risk (227). Having greater perceived susceptibility is thought to motivate the individual to engage in a behaviour that would minimise the risk. In the context of smoking, perceptions of high risk of developing a smoking related disease might influence motivation to stop smoking. An individual who perceives themselves to be at high risk may be more likely to give up smoking in comparison to someone who does not perceive their risk to be high.

Perceived risk has also been theoretically defined as a person's belief in the likelihood that they will develop a smoking related disease, such as lung cancer (99, 104, 228). Risk perception is an important predictor of smoking cessation and unrealistic optimism in regard to smoking-related health risks may serve as a strategy to continue smoking rather than stop for older smokers from deprived backgrounds (66). The more a smoker underestimates their health-related risks of smoking, then the less likely they are to stop smoking.

Perceived benefits has been defined as the belief in the efficacy of a course of action that could reduce risk (229). In the context of smoking, perceived benefits are a person's beliefs regarding the positive outcomes that are associated with smoking cessation. On the other hand, perceived barriers are defined as a person's belief about the costs of the advised course of action (229). In the context of smoking cessation, perceived barriers are an individual's estimation of the amount of challenge associated with giving up smoking (99, 104, 228). Older smokers from deprived backgrounds are likely to face more barriers to giving up smoking and therefore may perceive smoking cessation to be too challenging.

Evidence suggests that elements of the HBM that are useful in the context of smoking and smoking cessation in older smokers from deprived backgrounds. For example, smokers from low socioeconomic backgrounds are likely to experience smoking in their surrounding social circle (230) which may act as a cue to action (i.e. smoking). Furthermore, deprived smokers are more likely to underestimate the

health hazards of smoking (231, 232) and the HBM can help to explain this as a potential barrier to smoking cessation for the target population. However, the limitations of applying this model to quit motivation and smoking cessation in the target population should be acknowledged. Previous research has demonstrated that attempts to stop smoking are less well predicted by the HBM compared to other models (233). Firstly, the HBM does not include emotions such as stress and worry that are particularly salient in the context of giving up smoking and have been reported as reasons for smokers not wanting to quit (234). Secondly, contextual or environmental factors are not included in the HBM and are likely to be important in the context of socioeconomic deprivation. One of the main assumptions underlying the HBM is that all individuals value their own health and therefore will want to engage in a health-related behaviour and that 'cues to action' are common (235).

3.3.3 The Stages of Change Model

The Transtheoretical Model (TTM) of behaviour change was originally coined by Prochaska and DiClemente (236) as a way to synthesise 18 different therapies describing the processes that are involved in eliciting and maintaining a behaviour change. The TTM suggests that the process of recovery from addictive behaviours, such as smoking, involves transitioning through six stages. The TTM, also known as the Stages of Change (SOC), attempts to describe the processes that an individual will go through when trying to overcome an addiction such as smoking (198, 237, 238).

The SOC presents six stages which include pre-contemplation (no intention to make any changes to the behaviour), contemplation (the individual is considering making changes), preparation (making small changes to behaviour), action (actively engaging in the desired, new behaviour), maintenance (sustaining the behaviour change over time) and termination. The 'termination' stage is a recent addition to the model and refers to when the individual has permanently adopted the desired behaviour pattern, for example smoking cessation. It is important to note that the SOC describes behaviour change as a dynamic rather than a linear process. For example, an individual may move to the preparation stage and then go back to the contemplation stage frequently before progressing on to the action stage. This model also attempts to demonstrate how the individual weighs up the costs and benefits of a behaviour, referred to as decisional balance.

Prochaska (239) demonstrated that interventions developed for those who are ready to change their behaviour ultimately have lower efficacy for those who are not ready for action. Post intervention quit rates among smokers in the precontemplation, contemplation and preparation stage were 20%, 38% and 67% respectively. Due to the fact that intention to quit and intervention success will differ depending on the stage of change, it is plausible that intervention effectiveness could be improved by developing stage specific interventions, aimed at each of the five stages of change.

It is thought that pre-contemplators are likely to anticipate more disadvantages to giving up smoking than advantages, whereas the pros and cons are more in balance during the contemplation stage. During the action stage, the perceived advantages outweigh the disadvantages of engaging in the target behaviour. Additionally, this model posits that those in the later stages (i.e. action and maintenance) have higher levels of self-efficacy than those in the precontemplation stage (240, 241).

Criticisms of this model include concerns regarding the concept of the 'stage' being expressed (242-244). For example, an individual planning to stop smoking is characterised as being in the preparation stage if this is within 30 days but only in the contemplation stage if this is within the next 31 days (245). It could therefore be argued that boundaries between 'stages' are simply arbitrary lines that have little useful meaning. Similarly to the SOC, the Precaution Adoption Process Model (PAPM) is a stage model of health behaviour change which, unlike the SOC, is not time bound (246). However, only a small number of studies have applied the PAPM to smoking and the psychological and behavioural characteristics of each stage have not been developed (247, 248).

The SOC model fails to acknowledge strong situational determinants of behaviours. For example, in regards to smoking, the SOC model assumes that smokers typically make coherent and fixed plans regarding quitting when in fact intentions about change often appear to be less clearly formulated. Larabie (249) demonstrated that more than half of quit attempts reported involved having not planned or prepared at all. These findings were further confirmed by West and Sohal (250) in a large representative sample of smokers and Hughes (251) who found considerable instability in individuals' intentions to stop smoking over short periods.

Stage-based methods are frequently used by practitioner and policy-makers in the field of smoking cessation, however the use of this model with the target population presents limitations. For example, the SOC model ignores important influences such as the local culture of disadvantaged smokers that play a role in the maintenance of smoking.

3.3.4 Extended Parallel Processing Model

Similarly to the HBM, EPPM suggests that a threat will be appraised by an individual based on perceived susceptibility (how likely they are to be affected by the health threat) and the severity of the threat (how serious they perceive the health threat to be) (Figure 3.2). The model suggests that the degree to which an individual feels threatened by a health issue will determine their motivation to act, while their confidence to effectively reduce or prevent the threat determines the action itself.

If a health threat is perceived to be moderate or high, then fear may be elicited and an individual may re-appraise the health threat based on perceptions of self-efficacy (i.e. ability to respond to the health threat) and response efficacy (i.e. likelihood that their response will be effective). The EPPM assumes that if perceived efficacy and perceived threat are high then a fear-inducing message is likely to be accepted and an individual would be motivated to change their behaviour in order to avoid the threat. This is known as 'adaptive changes'. On the other hand, if perceived efficacy is low and perceived threat is high then an individual may adopt fear-reducing strategies such as denial, in order to cope with fear. This is known as 'maladaptive changes' (252).

In order to further understand risk perception in relation to smoking related diseases, the EPPM (252) will be described. This model applies a mixture of HBM and SCT constructs and offers a more focused approach to applying perceived threat/efficacy beliefs to smoking cessation in the target population. The EPPM was initially developed from Protection Motivation Theory (253), and describes how rational considerations, such as efficacy beliefs, and emotional reactions, such as fear of a health threat, are combined to determine behavioural outcomes.

Previous research in the area of smoking cessation and prevention has adopted the EPPM as a model to guide education intervention development. Gharlipour et al (254) demonstrated that educational interventions based on the EPPM can increase preventive behaviours of cigarette smoking among students. Additionally, Pechmann et al (255) reported that message themes regarding smoking increased

health-risk severity perceptions; however, they were undermined by low perceived vulnerability.

In the context of smoking cessation, a fearful response to a smoking related disease is likely to result in an adaptive response (quitting smoking) if the individual perceives themselves to have the ability to effectively quit smoking (high levels of self-efficacy). In addition, beliefs surrounding the benefits of quitting (response efficacy) are likely to promote an adaptive response. However, for an individual who responds to a smoking related disease such as lung cancer with fear, and does not perceive themselves to have the ability to cope with the threat (low self-efficacy) or believes that giving up smoking will not impact their health positively (response efficacy) then smoking cessation is unlikely to occur. The latter situation may be more common among those from a deprived background where smoking rates are higher and fearful and fatalistic beliefs regarding smoking related diseases are more common (256). Perceptions of response- and self-efficacy are likely to be important when deciding whether to make a quit attempt and could explain an individual's motivation to stop smoking.

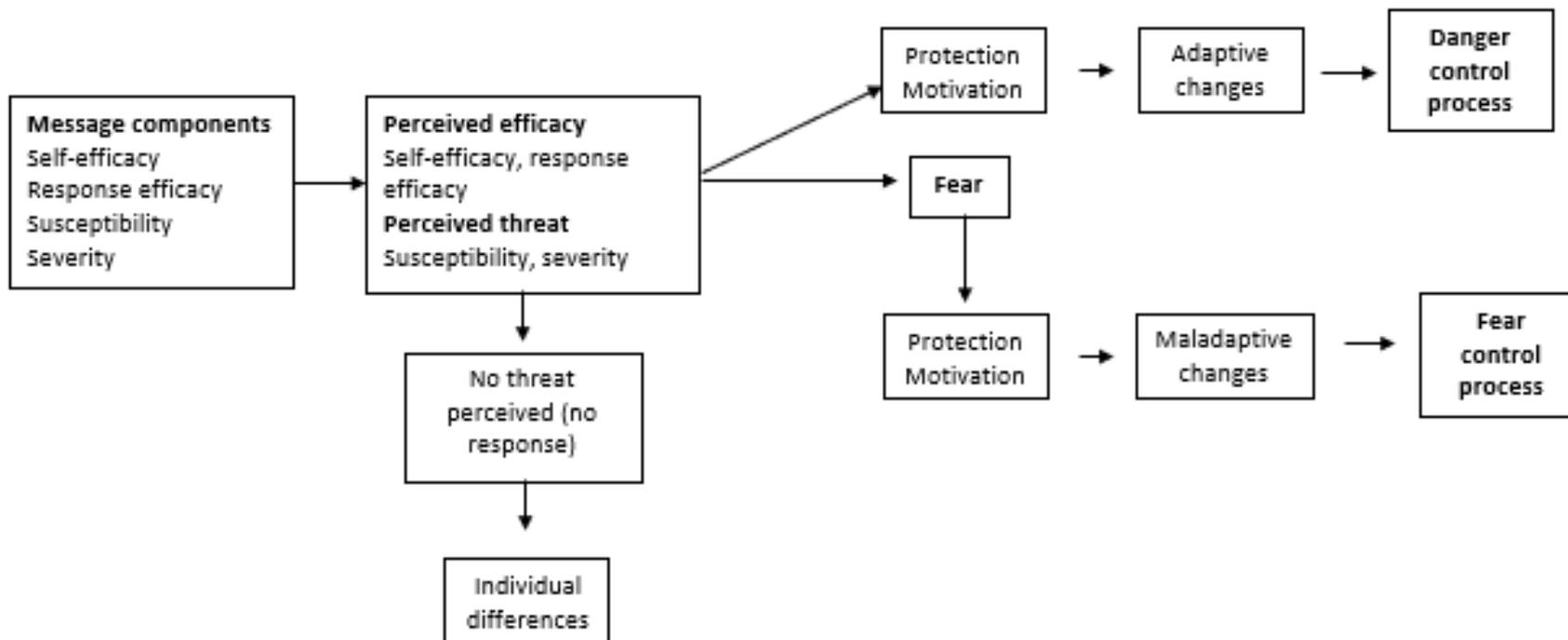


Figure 3.2. *The Extended Parallel Processing Model (252)*

3.3.5 The PRIME theory

The PRIME (Plans, Responses, Impulses, Motives, Evaluation) theory of motivation is an integrated model of the motivation system as a whole and was developed by West (52, 53). The theory suggests that other theoretical approaches, such as the TTM and HBM, only address part of the problem and that is important to understand behaviour as part of a full system in which motivation is another part.

Key propositions from PRIME theory include an understanding that at every moment an individual will act in pursuit of what they most desire (want or need) at that moment. These wants and needs involve an imagined future with associated feelings of anticipated pleasure (wants) or a relief from physical or mental discomfort (needs) (52, 53). Additionally, the PRIME theory states that beliefs will only influence actions if they create desires that have enough strength to overwhelm those arising from other sources, for example drives and emotions or impulses and inhibitions that arise automatically.

PRIME proposes that plans offer an overarching structure to an individual's actions. In order to direct the behaviour they must be recalled and then generate desires at certain moments that are sufficiently strong enough to overcome competing desires and impulses from other sources. Processes that lead to changes in dispositions include associative learning, direct imitation, habituation, analysis and inference (52, 53).

PRIME theory also suggests that our mental representations of ourselves and the feeling we attach to these representations (i.e. our identity) is a vital source of desires and provides an element of stability to an individual's behaviour through labels that are applied (e.g. ex-smoker) and the rules that govern the behaviour (e.g. no longer smoking). The theory proposes that a deliberate behaviour change can be sustained when the desires arising from a new identity are stronger in comparison to the desires arising from other sources to return to the previous behaviour pattern (52, 53). Strong emotional attachments will result in more powerful desires when required and also help to suppress countervailing desires in order to have a lasting outcome on the behaviour change.

The PRIME theory has often been used to understand cigarette addiction as well as the process of smoking cessation (257). It proposes that cigarette addiction, like other addictions, requires an understanding that there are several mechanisms that underlie it. PRIME views human motivation as having five different levels: plans, responses, impulses/inhibitions, motives and evaluations (see Figure 3.3). 'Plans'

includes mental representations of any future actions and the degree of commitment to them. For example, in regard to smoking, a one-off plan could be '*I will stop smoking tomorrow*' or '*I will not smoke*'. Plans are self-conscious intentions to behave in a certain way in the future. These plans are formed when a positive evaluation of an action outweighs a negative evaluation.

'Responses' refer to the starting, stopping and modifying of actions, for example lighting a cigarette, taking a puff on a cigarette or saying no to the offer of a cigarette. 'Responses' are generated by the strongest of impulses and inhibitions that are competing. Impulses/inhibitions are consciously experienced as urges and are patterns of activation in the central nervous system pathways that impel or block specific actions. For example, in regard to smoking an impulse could be defined as the impulse to light up a cigarette.

PRIME describes motives as being consciously experienced as desire, attraction or repulsion in relation to something that is being imagined and can be generated by memories of emotional states. 'Motives' can be defined as anticipated satisfaction or pleasure ('want') or an anticipated relief from either mental or physical discomfort ('need'). 'Motives' can be generated by memories of emotional states. Examples of motives in the context of smoking are the want to smoke, the need to have a cigarette and the want to stop smoking.

'Evaluations' involves evaluative beliefs (internalised statements) that something is good or bad and is formed through acceptance of communication or when a stimulus triggers recall of plans, wants and needs. This component of human motivation must generate motive (a want or need) to influence and individuals' behaviour. For example, an internalised belief for an older smoker from a deprived background could be that 'smoking is harming my health and impacting my finances'.

Smokers often form beliefs about the benefits of smoking and in particular they believe that it will help control their stress levels (258). It is highly likely that these beliefs are a result of repeated experience that smoking is effective at helping to relieve withdrawal symptoms that have resulted from abstinence. As a result, many smokers tend to over-generalise and believe that smoking is an effective relieving tool from these symptoms even when the source is not nicotine withdrawal. Such beliefs will in turn lead the smoker to want or need to smoke at a time when circumstances make them more relevant (e.g. during a time of stress). Older smokers from deprived backgrounds are likely to have stressful and complex lives

due to limited material and social resources and will therefore want or need to smoke (259). Such beliefs can persist for a long period of time after having stopped smoking and at times the self-imposed rule of smoking cessation may not be sufficient to prevent the behaviour.

'Plans' and self-control also play an important role in stopping smoking. Ceasing smoking requires the exercise of self-control. The various sources of motivation to smoke can be mitigated through medication and a variety of behaviour change techniques (260, 261). However, there are some occasions where an urge, want or need to smoke must be countered by a want or need to not smoke. Having plans, a self-imposed rule that smoking is not acceptable, along with a change in identity are important sources of a desire to not smoke and maintain a motivational balance that is in favour of the changed, preferable behaviour.

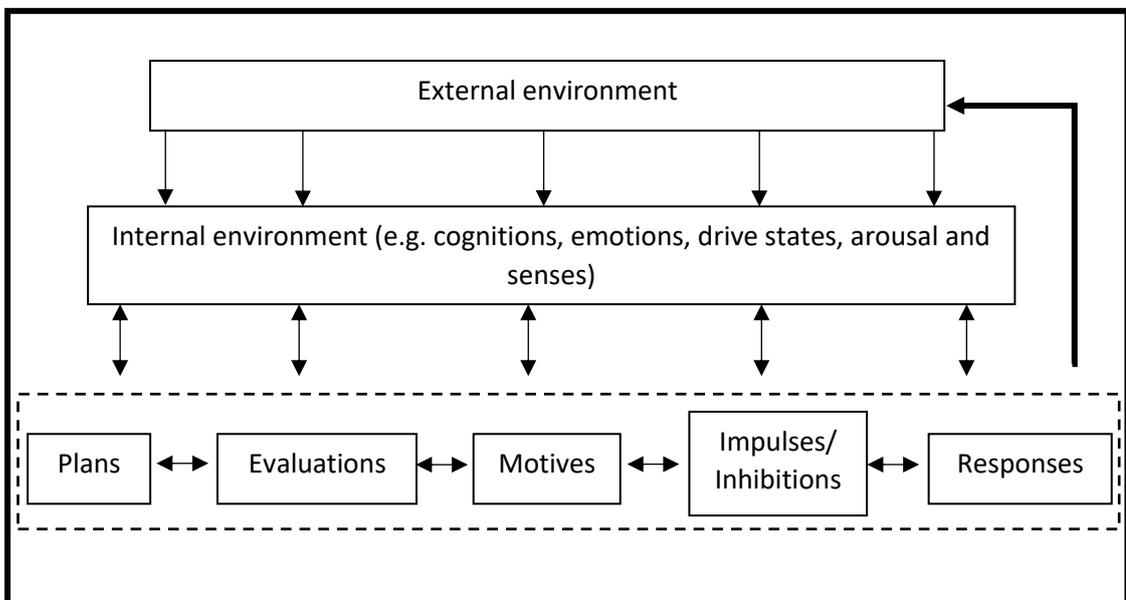


Figure 3.3 *PRIME theory diagram (52, 53)*

The PRIME Theory is useful in helping us to understand a variety of ways in which a behaviour, such as smoking, can become addictive and what is needed to overcome or mitigate such an addiction. There are multiple definitions of addiction. However, at the core of these definitions is the concept of powerful motivation to engage repeatedly in an activity that is harmful and is frequently accompanied by a reduction in capacity to exercise self-control (257). The motivation could arise from several sources at a variety of levels of the motivation system.

In terms of PRIME Theory, the smoking cessation process involves forming a personal rule not to smoke and then a self-conscious implementation of this rule during the face of impulses, wants and needs to smoke.

The process of smoking cessation can be summarised in a 4-state model in which transitions between each state can occur suddenly depending on the balance of wants and needs (257) (Figure 3.4). A quit attempt is a rule whereby smokers define themselves as attempting to not smoke or not smoke. Smokers plan a quit attempt when the desire for them to stop smoking at a future date exceeds the desire to continue smoking. Smokers make a quit attempt when the desire to stop smoking then exceeds the desire to continue smoking. Smokers lapse when the desire to smoke at a given moment exceeds the desire for them to remain abstinent. Finally, a smoker will relapse when the desire to give up on the quit attempt exceeds the desire to continue the quit attempt.

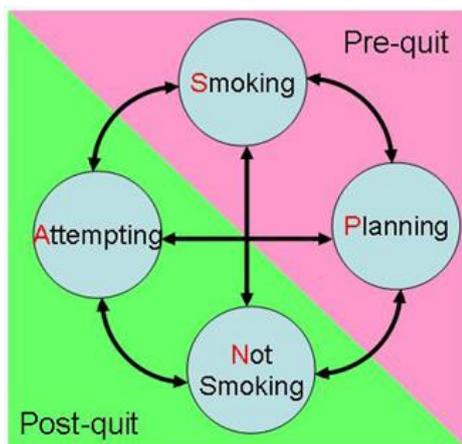


Figure 3.4: *The SNAP model of smoking cessation (52, 53)*

PRIME theory contrasts with the Stages of Change model (198) in suggesting that transitions between states can occur suddenly, depending on the balance of wants and needs in that moment. Certain factors will make transitions more likely, for example wanting to smoke (the enjoyment of smoking) will deter a person's quit attempt, while needing to smoke (the anticipated relief from a nicotine craving) and cue-driven impulses to smoke ('urges') leads to a relapse after the quit attempt has begun (262). If the individual who is trying to quit maintains absolute abstinence then the impulses, nicotine cravings and withdrawal symptoms will decline and this in turn will substantially reduce the overall risk of relapse with each week of abstinence (263). Unlike more traditional theories, such as TTM, PRIME theory acknowledges that it is unlikely that individuals will make coherent and logical plans

in a decision-making process. This approach to understanding smoking cessation is useful in regards to older smokers from deprived backgrounds who may encounter various barriers to quitting smoking.

3.5 Discussion

This chapter presented the theoretical underpinning used in this PhD, which is concerned with understanding the determinants of quit motivation and smoking cessation in an older, deprived population. Five theories and models of behaviour change regarding smoking attitude, belief and behaviour on smoking have been described and critically evaluated in this chapter. A range of behavioural theories, including HBM, EPPM and PRIME Theory were identified as being relevant in the current context.

Although all theories and models presented could be potentially applied to the context of smoking among older smokers from deprived backgrounds, they were considered as being potentially limiting if used in isolation. Some of the main limitations of the models and theories include a lack of inclusion of emotional factors and wider social environmental influences on behaviour that the target population may experience. For example, the HBM is useful for understanding how individual perceptions of severity, susceptibility, barriers and facilitators, and cues to action work to guide behaviour. However, the model does not include environmental or emotional factors, which are relevant and important in the context of quit motivation in older smokers from deprived backgrounds. TTM was deemed as not useful for the current research due to the lack of clear and distinguishable definitions for each of the stages of change and its assumption that individuals will often make coherent and stable plans when embarking on a quit attempt. Therefore elements of a range of the theories presented were applied to the current research.

PRIME theory seems to be the most applicable overarching theoretical framework for understanding quit motivation in older smokers from deprived backgrounds. However it does not incorporate relevant constructs reflecting self-efficacy, risk perception and self-exempting beliefs. Therefore, in order to address gaps and to understand their relation to quit motivation in the target population, relevant constructs and theoretical knowledge were derived from EPPM and HBM. PRIME Theory, EPPM and HBM were therefore identified as most relevant to the context and aims of this PhD.

There are elements of PRIME theory, EPPM and HBM that capture environmental and individual factors in relation to smoking cessation and this was considered a key strength for each model. Important constructs relevant to quit motivation in the target population, such as knowledge and beliefs about smoking, are covered in the chosen behavioural theories. Furthermore, PRIME theory suggests that environmental conditions can create distress and ultimately promote smoking or can help reduce the mental resources available for the exercise of self-control.

The primary aim of this PhD is to explore predictors of quit motivation in older smokers from deprived backgrounds, using a cross-sectional population survey and qualitative interviews. The qualitative studies will be conducted with the use of a semi-structured topic guide developed in accordance with relevant theoretical constructs identified in this chapter. Additionally, qualitative data analysis will involve framework analysis that will be based on the identified relevant theoretical constructs. Along with the findings of the systematic review (153) (Chapter 2), theoretical constructs identified as being most relevant to the context of quit motivation will be used to guide the selection of survey measures in the quantitative phase of this PhD.

Chapter 4

Development of a survey to identify determinants of quit motivation in older smokers from deprived backgrounds

4.1 Chapter Overview

This chapter describes the development of a survey to investigate the psychosocial determinants of quit motivation in older smokers from deprived backgrounds. The methods used to develop the survey included content validity analysis, to evaluate the extent to which survey measures were relevant to and represented the theoretical constructs of interest, and cognitive interviewing with the target population to assess the acceptability of the survey measures.

4.2 Introduction

The systematic review presented in Chapter 2 revealed gaps in evidence regarding the most effective behavioural SCIs for older smokers from deprived backgrounds. This research demonstrated the lack of evidence regarding the most suitable behavioural SCIs for this population. There is a clear need to understand psychosocial determinants of quit motivation in order to develop more refined, targeted interventions aimed at improving motivation to stop smoking and future attempts to cease tobacco use in the target population.

Evidence presented in Chapter 1 suggests that psychosocial determinants including self-efficacy, social support, self-exempting beliefs as well as factors such as co-morbid conditions, nicotine dependence and previous quit attempts can influence an individual's motivation to quit. However, there is a lack of research regarding the impact of these factors on quit motivation among older smokers from deprived backgrounds, specifically factors relating to social influences and pre-existing health issues. Important and relevant constructs were identified from theories relating to quit motivation in older smokers from deprived backgrounds (Chapter 3).

The primary aim of the cross-sectional population survey conducted in Chapter 5 is to identify determinants of quit motivation among older smokers from socioeconomically deprived communities. A key motivation for the study was to detect modifiable psychosocial variables that may be targeted in the adaptation of a supportive SCI for older smokers from deprived backgrounds. In quantitative research, it is important to consider the reliability and validity of methods and

measurements being used, therefore the current thesis chapter will report the survey development methods.

4.2.1 Aims and objectives

The aim of this phase of research was to develop a psychometrically sound survey to examine the correlates of quit motivation (the primary outcome) in older smokers from deprived backgrounds. Specific objectives included performing preliminary validation of the previously unvalidated survey items using cognitive interviewing and content validity analysis, in order to identify issues relating to the measure prior to use in the subsequent phase of survey data collection.

4.3 Content validity

Content validity provides evidence of the extent to which survey measures are relevant to, and represent, the constructs of interest (264). This was examined using content validity analysis (CVA). In the context of content validity, the term 'relevance' refers to the appropriateness of items included in the survey measures, while 'representativeness' is defined as the degree to which the items reflect and measure all dimensions of the construct. It was crucial that the items used to measure determinants of quit motivation were represented as fully as possible.

CVA is defined as a consensus estimate (265) that assesses whether a group of subject experts share a common interpretation of the construct of interest, and the extent of their agreement in rating the included items (266). As outlined in Chapter 1, social support during a quit attempt plays a crucial role in smoking cessation and can impact an individual's quit motivation. In the current context, the aim of CVA was to establish the extent to which items designed to measure social support and smoking cessation within the survey were relevant to and represent the construct of social support. CVA was conducted on this measure as these items were taken from a previous measure (267) and adapted for the purpose of an online survey (268). The other measures included in the survey had been previously validated (70, 269-276). Specific objectives of this stage of survey development were to assess the relevance of the social support items within the survey to the specific construct (social support and smoking cessation) and function of the survey as a whole. CVA will also examine the representativeness of the items in reflecting and measuring all elements of the social support and smoking cessation construct.

4.4 Face validity

This process also helps to understand whether the items were easily understood and acceptable to the participant (277). Cognitive interviewing was selected as the most appropriate qualitative methodology for the current study as it has previously been empirically validated as a technique used for pre-testing questionnaires (278). The method of cognitive interviewing as a way to investigate face validity in surveys has become increasingly popular (279). This form of interview can be used to evaluate sources of response error in questionnaire responders' understanding of included items and/or response categories available. Cognitive interviews help to facilitate understanding of the interpretation of questionnaire items and the mental processes in which individuals engage when completing the survey. It was expected that by using cognitive interviews for modifying elements of the survey, there would be improvement in the completion of the survey.

The Tourangeau (280) model is most frequently used in cognitive interviewing and was adopted in the current study. This model consists of four stages:

1. Question comprehension: what the responders believe the question is asking them and what specific statements might mean to different responders;
2. Information retrieval: the type of information that the responder needs to recall and the strategies that are used to evoke that information;
3. Decisional processes: the amount of effort that is given by the responders in order for them to answer certain questions and explore whether social desirability has an effect on their responses;
4. Response processes: whether the responders have the ability to match their internally generated answers to the responses categories that are provided for them in the survey.

Think aloud and verbal probing are methods that are traditionally used in cognitive interviewing. The think aloud method specifically instructs participants to express their thoughts and feelings as they are answering each item and then map their answer onto the responses provided (281, 282). The method of verbal probing involves the interviewer asking specific 'probes' for each question as a way to assess the four stages (280).

4.5 Summary of identified measures

Measures used in the survey were identified through scoping the available literature and online smoking research resources (i.e. NCSCT- National Centre for Smoking

Cessation and Training website for research resources (283), measures used in the Smoker's Toolkit Study (284)). Measures identified for use in the current study, including those that were refined on the basis of cognitive interviewing and CVA, are described below. The preliminary survey is included in Appendix 4.1.

Furthermore, relevant health psychology theories outlined in Chapter 3 helped to guide the choice of measures in the survey (Table 4.1) (52, 53). According to the Extended Parallel Process Model (252), in order for an individual to stop smoking, they must feel threatened by the consequences of smoking (e.g. increased risk of lung cancer) and at the same time must consider themselves able to take the necessary action to avoid this threat. Additionally, PRIME theory of motivation (52, 53), as described in Chapter 3 of this thesis, stipulates that an individual's decision to quit smoking is based on their evaluative beliefs about smoking which in turn influence their motivation to either quit or continue smoking. These motives then interact with internal conflicts (i.e. impulses and urges to smoke) and external triggers (e.g. cues within the environment) to determine the subsequent behavioural outcome.

The process of smoking cessation involves making a serious attempt to stop smoking and continue to the maintenance of abstinence, when often being motivated by multiple sources to smoke. In terms of PRIME Theory, the process of smoking cessation involves the formation of a personal rule to not smoke followed by the self-conscious implementation of the rule when faced with impulses, wants and needs to smoke (257). PRIME Theory also suggests that there are multiple levels at which human motivation can occur. Addiction to cigarettes involves multiple sources of motivation including: (1) the *want* to smoke for the enjoyment and (2) *cue-driven impulses* such as the need to smoke because of 'nicotine hunger' and *functional beliefs* regarding smoking that lead to relapse. This theory also argues that if an individual has weakened motivation regarding a self-imposed rule of not smoking that this may prevent smoking cessation. Other theories, including EPPM and HBM were applied in order to measure constructs such as social support during a quit attempt, self-efficacy, self-exempting beliefs and risk perception (Table 4.1).

Quit motivation-motivation to stop smoking

The Motivation to Stop Scale (MTSS) scale is a well-validated measure that incorporates the key elements of motivation: belief, desire and intention as outlined in PRIME theory (52, 53, 271, 273). The scale provides an ordinal measure of

motivation to stop smoking that can allow assessment of relevant aspects of motivation. The predictive validity of the measure was assessed by examining associations between scale scores and incidence of attempts to stop smoking (273). The MTSS scale has been shown to provide a strong and accurate prediction of quit attempts and is a frequently used single-item measure of motivation to stop smoking.

Smokers are asked: *“Which of the following describes you?”* with response categories: (1) *“I don’t want to stop smoking”*; (2) *“I think I should stop smoking but don’t really want to”*; (3) *“I want to stop smoking but haven’t thought about when”*; (4) *“I REALLY want to stop smoking but I don’t know when I will”*; (5) *“I want to stop smoking and hope to soon”*; (6) *“I REALLY want to stop smoking and intend to in the next 3 months”*; (7) *“I REALLY want to stop smoking and intend to in the next month”*, and *“Don’t know”*.

Nicotine dependence-The Fagerström Test for Nicotine Dependence

The Fagerström Test for Nicotine Dependence (FTND) is a standard instrument for assessing the intensity of physical addiction to nicotine. The test was originally developed as the Fagerström Tolerance Questionnaire (270) and was then modified by Heatherton (285). The FTND was designed to provide an ordinal measure of nicotine dependence related to cigarette smoking. It contains six items that evaluate the quantity of cigarette consumption, the compulsion to use, and dependence. Questions in the FTND include; *“How soon after waking do you smoke your first cigarette?”*, *“Do you find it difficult to refrain from smoking in places where it is forbidden? E.g. church, library, etc”*, *“Which cigarette would you hate to give up?”*, *“How many cigarettes a day do you smoke?”*, *“Do you smoke more frequently in the morning?”* and *“Do you smoke even if you are sick in bed most of the day?”*. Yes/no items are scored 0 to 1 (where 0=No and 1=Yes) and multiple choice items are scored from 0 to 3. The items are summed to yield a total score of 0 to 10. The higher the total Fagerström score, the more intense the individual’s physical dependence on nicotine.

Smoking self-efficacy questionnaire

The smoking self-efficacy questionnaire (SEQ-12) is a 12-item scale that measures an individual’s confidence to refrain from smoking when they are faced with internal stimuli (e.g. depression) and external stimuli (e.g. exposure to other smokers) (269). Content, construct and predictive validity and reliability have previously been demonstrated for this measure (269).

The instrument presents participants with situations in which people might be tempted to smoke: when they feel nervous, depressed, angry, very anxious; when they want to think about a difficult problem; when they have the urge to smoke, or when they are having a drink with a friend (see Appendix 4.1 for full list of questions). Participants respond on a 5-point Likert scale where 1 = “*not at all sure*” and 5 = “*absolutely sure*”, with a higher score indicating higher self-efficacy.

Quit confidence scale

A single item measure of quit confidence was adapted from a measure of smoking-related health cognitions and emotions used in the National Lung Screening Trial (272). Participants are asked “*How confident are you that you could quit smoking for good if you wanted to?*” with response options on a scale of 1 to 5 where 1 = ‘*not at all confident*’ and 5 = ‘*extremely confident*’.

Previous quit attempts

A measure of previous quit attempts was derived from the Smoking Toolkit Study (2014) of national smoking patterns and smoking cessation-related behaviours. These questions are prefaced with the statement “*These questions are to help us determine your smoking history*”. The first question is “*Have you made a serious attempt to stop smoking before?*”. A description of serious attempt is given as “*serious attempt means you decided that you would try to make sure you never smoked again*”. Response options include “*No*” and “*Yes*” with a space to write how many times. The next question asks “*What is the longest that a quit attempt has lasted in the past?*” with space for the participant to write the number of months, days or weeks. There are then three questions that ask about pharmacotherapy use in previous quit attempts, all with “*Yes*” or “*No*” response options; “*Have you ever used nicotine replacement products in the past?*”, “*Have you ever used Zyban (bupropion) in the past?*” and “*Have you ever used Champix (varenicline) in the past?*”.

Social support and smoking cessation

The NCSCT offers access to an adapted version of this measure as a research resource on their website (268). This measure was adapted from research by Burns et al (267) that explored support from a partner or if single, the person closest to them. The adapted NCSCT measure included 25 items and was used in the present

survey in order to identify support from a wider social network and not just a partner or someone close to the individual.

Respondents were asked about various forms of social support experienced during a previous quit attempt, for example “*Encourage you to keep at quitting*”, “*Celebrate your quitting with you*”, “*Say you were going to start smoking again*”. Response options were rated on a scale of 1 to 5 (1=Never, 5=Very often). Total possible score range for positive social support was 8-40 with higher scores indicating higher positive social support during a previous quit attempt. Total possible score range for negative social support was 3-15 with higher scores indicating higher negative social support during a previous quit attempt (see Appendix 4.1 for full list of social support statements). Participants are then asked how supported they feel by their partner, friends and colleague with response options ranging from “*not at all*” to “*extremely*”.

Self-exempting beliefs

This instrument was originally developed for use with deprived smokers in Australia by Oakes et al (274) and includes 16 items split into self-exempting (“bulletproof”) beliefs and risk-minimising (“jungle”, “skeptical”, “worth it”) beliefs. Examples of items are “*The medical evidence that smoking is harmful is exaggerated*” (self-exempting beliefs statement), “*You have got to die of something, so why not enjoy yourself and smoke*” (“worth it” beliefs statement) and “*Everything causes cancer these days*” (jungle beliefs statements) with agreement for each statement rated on a scale of 1 to 5 (1=*totally disagree*; 2=*disagree*; 3=*neither agree nor disagree*; 4=*agree*; 5=*totally agree*). Total possible score range was 16- 80 with higher scores indicating higher level/agreement of self-exempting beliefs. Previous research has provided support for the validity of this scale among a population of disadvantaged smokers (70). This research also confirmed earlier work that these categories of beliefs are related to quit intention (274). The full list of items is included in preliminary survey can be found in Appendix 4.1.

Comorbidity

The Self-Administered Comorbidity Questionnaire (SCQ) developed by Sangha et al. (275) was used to assess comorbidity. Health problems including back pain, depression and diabetes are listed (see Appendix 4.1 for full list comorbid conditions). Participants can receive a maximum of three points for each health issue: one point for the issue existing, one if they receive treatment for it and an

additional point if the issue causes a limitation in functioning. The measure was validated through content and convergent validity by Robinski et al (286) and proved to be a valid and acceptable measure of comorbidity.

Lung cancer risk perception

The following items were taken from a study of smoking-related health cognitions and emotions in a national sample of current and former heavy smokers in the National Lung Screening Trial (272). Exploratory and confirmatory factor analysis confirmed the proposed theoretical factor structure of the perceived lung cancer risk scale (272).

Three items were used to assess dimensions of lung cancer risk perception.

Absolute risk perception was measured using a single item: “*How likely do you think it is that you will develop lung cancer in your lifetime?*” with response options from 1 to 5 (‘*very unlikely*’ to ‘*very likely*’). Comparative risk perception was measured by asking “*Compared to others your age and sex, what do you think is your chance of getting lung cancer in your lifetime?*” with response options on a scale of 1 to 5 (‘*much lower*’ to ‘*much higher*’). Affective risk was measured using the item “*How worried are you about getting lung cancer in your lifetime?*”, with response options on a scale of 1 to 4 (1 = ‘*not at all*’ and 4 = ‘*extremely*’). Each item was treated separately and a scale was not created due to previous validation of these items.

Lung cancer experience

A single item adapted from the Cancer Awareness Measure (CAM) (276) was included to assess experience of lung cancer: “*Have you, your family or close friend had lung cancer?*” The participant was presented with the categories “*You*”, “*Partner*”, “*Close family member*”, “*Other family member*”, “*Close friend*”, “*Other friend*”, “*A member of your community*”. Response options for each category were “*Yes*”, “*No*”, “*don’t know*” or “*prefer not to say*”.

Table 4.1 *Theoretical modelling used to guide selected measures*

Constructs	Theory	Theoretical reasoning and rationale for inclusion
Motivation to stop smoking	PRIME Theory (52, 53)	<p>There are three central ideals of this theory of motivation:</p> <ol style="list-style-type: none"> 1. The wants and needs at each moment are what drive our behaviour 2. Intentions and beliefs about what is good and bad will only influence our actions if they create strong wants and needs at relevant moments 3. Our identity and how we feel about the image of ourselves is a strong source of wants and needs which can be sufficient to help overcome an individuals arising biological drives such as nicotine dependence
Nicotine dependence	PRIME Theory (52, 53)	<p>PRIME theory suggests that there are biological drivers of motivation regarding smoking. Impulses/inhibitions are consciously experienced as urges e.g. in regard to smoking, an impulse could be defined as the impulse to light up a cigarette.</p>
Smoking self-efficacy and quit confidence	EPPM (252)	<p>EPPM suggests that a fearful response to a smoking related disease is likely to result in an adaptive response (quitting smoking) if the individual perceives themselves to possess the ability to effectively quit smoking (high levels of self-efficacy).</p>
Previous quit attempts	PRIME theory (52, 53)	<p>PRIME Theory suggests that motives (e.g. the want to smoke, the need to have a cigarette or the want to stop smoking) are formed when a stimulus creates an image to a previous experience that is associated with either positive or negative feelings. Motives can be consciously experienced as a desire, attraction or repulse in relation to something that is being imagined.</p>

Social support and smoking cessation	PRIME Theory (52, 53)	<p>According to PRIME theory environmental conditions that don't provide balancing input will promote addictions. For example, this can occur if an activity (e.g. smoking) seems normal within a social group with which the individual identifies with. The theory suggests that an immediate social group will tend to be more of an influence compared to the wider society.</p> <p>Environmental conditions can create distress and ultimately promote addictive behaviours that offer escape or help reduce the mental resources available for the exercise of self-control.</p>
Self-exempting beliefs	HBM (224)	<p>Self-exempting beliefs are used to help rationalise or justify continued smoking despite there being well-known harms. The model focuses on an individuals' beliefs and its central concept is based on the fact that health behaviours are determined by a personal beliefs related to health issues.</p>
Comorbid conditions	PRIME Theory (52, 53)	<p>PRIME theory suggests that having a lack of opportunity for other sources of contentment can unbalance motivational systems towards rewards that are available, including reliable sources of reward such as smoking. Older smokers are likely to have comorbid conditions which may impact their ability to access other sources of reward and/or pleasure.</p>
Lung cancer risk perception	EPPM (252)	<p>EPPM suggests that a threat will be appraised by an individual based on the perceived susceptibility and severity of the threat. This model encompasses emotions and environmental factors and takes onboard an individuals self-efficacy and response efficacy.</p>

4.6 Content Validity

CVA was conducted on the social support measure to help establish the extent to which each item measured the intended construct (287). Selected experts were asked to review item content with the aim of re-phrasing and providing new wording for the items that represent relevant constructs.

4.6.1 Methods

Recruitment of content experts

Domain experts were purposively recruited based upon their expertise in measurements of health behaviours. All participants were emailed directly asking if they would be a content expert for the study. Those who were approached were not all 'experts' in smoking research but had a good level of awareness of the theoretical constructs surrounding health behaviours, including social support.

Content validity analysis materials

A CVA protocol was created and distributed to the expert panel (Appendix 4.6). The protocol was split into sections: overview and purpose of the survey, a definition of CVA and steps that this method entails, a description of participant eligibility and definition of the survey constructs that were being evaluated. Instructions on how to conduct CVA and a CVA score card were included in the protocol (Appendix 4.6).

4.6.2 Content validity ratings

A priori items were rated for their relevance to and representativeness of the construct. Each rater independently rated each item in the 'social support and smoking cessation' measure (Q15: Appendix 4.1) using the following definitions:

1. Relevance: appropriateness of items in relation to the construct of social support and smoking cessation and the function of the survey;
2. Representativeness: whether items cover a representative sample of the construct.

Raters scored each of the items on a scale of 1 (poor relevance/representativeness) to 4 (very good relevance/representativeness). Raters were also asked to respond with free text comments, especially if they gave a score of less than 3 for any item.

4.6.3 Analysis

The content validity index for each of the items was calculated as the percentage of those who gave a high score regarding relevance and representativeness. For each

item, the numbers of raters giving a score of 3 or 4 for relevance and representativeness was calculated. This number was then divided by the total number of raters to give a content validity index for relevance and representativeness, respectively.

Content validity was considered adequate if the index score was greater than 78% (288). This represents a level at which chance agreement is unlikely to explain the high score (288). If the content validity index was less than 78% for any of the items, then the following options were considered: 1) whether the item was sufficiently comprehensive to represent the specific construct, 2) whether the item measured other constructs and not only the one of interest, 3) whether the item should be removed from the survey, and 4) whether additional items were needed. Free text data were used to re-phrase those items that scored <78%. Items that scored >78% but received a substantial amount of critique in the free text comments section were re-evaluated.

4.6.4 Results

Six female researchers with experience in the field of health behaviour measurement were recruited. Eight items were subsequently removed from the original 25-item social support for quitting measure. Item wording was modified for seven items (Table 4.2). See Appendix 4.7 for individual item scores and rater comments. Respondents identified that certain items were not relevant to assessing social support and smoking cessation and therefore these items were removed (Table 4.2). Two items were identified as being too similar to other items and were therefore removed on this basis (“Help you think of substitutes for smoking” and “Express pleasure at your efforts to quit”). Further content validity feedback for items that were rated as ‘adequate’ included rewording as a way to improve the representativeness of the item to the construct.

Table 4.2 *Content validity feedback and changes to measure*

Item	Content validity index and feedback	Item amendment
a) Tell you to stick at it	Adequate CVI, rewording suggested	Changed to 'Encouraged you to keep at quitting'
b) Comment on your lack of will power	Adequate CVI, slight rewording suggested	No change
c) Celebrate your quitting with you	Adequate CVI, no suggestions for change	No change
d) Leave their cigarettes where you can reach them	Inadequate CVI, doesn't measure 'support' more about social context	Item removed
e) Express doubt about your ability to quit/stay quit	Adequate CVI, rewording suggested for simplicity	Changed to 'Say you were going to start smoking again'
f) Help you think of substitutes for smoking	Inadequate CVI, similar to item L	Item removed
g) Help to calm you down when you were feeling stressed or irritable	Adequate CVI, suggested it was a bit too generic	No change
h) Criticise any weight gain	Moderate CVI with feedback that this item may not be directly relevant to smoking and doesn't directly measure social support for quitting	Item removed
i) Comment that smoking is a dirty habit	Inadequate CVI, not very relevant, seems more like a measure of social norms	Item removed
j) Smoke a cigarette in front of you	Inadequate CVI, not a measure of support	Item removed

k) Talk you out of smoking a cigarette	Adequate CVI, suggesting for re-wording	Changed to 'Persuade you not to smoke'
l) Help you use substitutes for cigarettes	Adequate CVI, rewording of 'substitutes' and combine Item F of 'thinking of substitutes'	Changed to 'Help you think of/use replacements for smoking i.e. nicotine patches, stop smoking services'
m) Compliment you on not smoking	Adequate CVI, slight re-wording suggested	Changed to 'Congratulate you on not smoking'
n) Offer you a cigarette	Adequate CVI, no suggestions	No change
o) Express pleasure at your efforts to quit	Inadequate CVI, similar to item M	Item removed
p) Participate in an activity that helped keep you from smoking	Inadequate CVI, rephrasing suggested	Changed to 'Do an activity with you to keep you from smoking'
q) Express confidence in your ability to quit/stay quit	Adequate CVI, slight suggesting for re-wording	Changed to 'Say they were confident that you could quit/stay quit'
r) Congratulate you for your decision to quit smoking	Inadequate CVI, similar to M	Item removed
s) Mentioned being bothered by smoke	Inadequate CVI, not relevant	Item removed

4.7 Cognitive interviews.

Ethical approval to undertake cognitive interviews was obtained from the School of Medicine Research Ethics Committee at Cardiff University (SMREC Reference Number 19/07).

4.7.1 Methods

Participant recruitment

Participants were current smokers, aged 50 years or older and were recruited opportunistically from a deprived area of Newport, South Wales using snowball sampling. A Patient and Public Involvement (PPI) representative disseminated information about the interview study through word of mouth and sharing a study advertisement with eligible individuals in the local community (see Appendix 4.2).

Consent process

Potential participants who expressed an interest in taking part were contacted by the PhD researcher and were given a participant information sheet (see Appendix 4.3) to read in their own time and had the opportunity to ask questions. Participants were reassured that their participation was entirely voluntary, they were able to withdraw from the interview at any point without providing a reason for doing so, and that the interview was not a vehicle for smoking cessation. Interviews were audio-recorded with permission.

Cognitive interview process

A structured, pre-interview discussion took place as a way to ensure that the participants were fully aware of the think aloud and verbal probing techniques that would take place during the cognitive interviews, and to help minimise bias in the way that participants examined and reported on survey items. The researcher explained how the interview was going to be conducted and gave an overview of the reasons why participants were going to be asked to 'think aloud', using a standard operating procedure (Appendix 4.4). Think aloud and verbal probing techniques were discussed during this stage with the participants. Participants were then encouraged to report out loud their thoughts when they were answering survey items. It was important that participants were made to feel as comfortable as possible during the interview, to encourage them to be open and honest when talking about the survey items.

The main stage of the cognitive interviewing process was structured according to a defined interview schedule that included a range of probing questions for each item (Appendix 4.5). A combination of scripted and spontaneous probes was used to elicit real-time understanding of and responses to the questionnaire. A concurrent probing technique was used and the interview schedule was created following guidelines on cognitive interviewing (278). The schedule allowed exploration of the participants' cognitive processes relating to item comprehension and also how participants reached their chosen response to questions.

Participants were given a copy of the survey and were instructed to read each item individually and then answer it by mapping their answer onto the provided response options. Participants were also encouraged to try to think aloud at the time of reading and responding to the item. Once the item was completed, the interviewer asked for specific elaboration regarding various aspects of the question, such as how they arrived at their answer, whether the responses options presented captured their opinion/experience and their thoughts on the wording of certain questions (Appendix 4.5). Recognised probe categories such as comprehension, paraphrasing and recall were used in the interview schedule.

4.7.2. Analysis

Interviews were analysed descriptively. Audio recordings were listened to by the PhD researcher who made notes and summarised the findings (see Table 1). Coding of responses was informed by the following schema, adapted from Presser and Blair (289):

- If the participants had difficulty understanding the meaning of each item;
- If the participants had difficulty understanding the meaning of particular words or concepts;
- If different participants had different understandings of each item;
- If the participants experienced any difficulty in recalling, formulating or reporting an answer with the available response options for each question.

4.8.3 Results

Five participants (female, n=3 and male n=2) were recruited for cognitive interviewing. Participants' ages ranged from 50 to 88 years. Interviews lasted between 20 and 45 minutes.

Feedback and the main points from the cognitive interviews and subsequent adaptations are presented in Table 4.3. In general, participants felt they were able to complete the survey with ease, understood what the questions were asking and understand how to answer them with the given response options. There were no issues reported for the FTND, quit confidence and lung cancer risk perception measures.

Issues were reported regarding comprehension of the smoking self-efficacy measure. There was difficulty in answering these items and the majority of participants selected “absolutely sure” when they thought they would smoke, rather than when they would be able to refrain. Participants suggested it would be clearer if “*I could refrain from smoking*” was added to the end of each sentence and not just in the preface. Other issues included the instructions that were given before the smoking self-efficacy measure with participants suggesting ways in which to make them clearer. Participants suggested rewording the instructions so there is reference to refraining from smoking (Table 4.3). Furthermore, participants mentioned that a number of items within this measure were similar. Therefore decisions were made to remove some of these items, based on the cognitive interview data and also on a theoretical understanding of smoking behaviour and self-efficacy for the target population (Table 4.3).

In regard to the question on smoking status, participants mentioned a lack of response options to cover their smoking identity and suggested adding in responses for smoking every day, smoking cigarettes but not every day. They also felt that there needed to be a response to cover those who are trying to stop smoking and not using a tool to support their quit attempt (Table 4.3). Further issues were mentioned for the social support and smoking cessation measure in which participants felt there should be representation of being supported by a General Practitioner in this question. Feedback also suggested that instructions for this measure could be clearer. For the lung cancer experience question, one participant discussed that including a member of the community could be useful to include as they have experience of this. Finally, participants reported that the comorbid conditions measure was quite difficult to complete in paper form.

Table 4.3 Cognitive interview feedback and survey changes

Measure	Cognitive Interview feedback	Item amendment
Smoking status	<ol style="list-style-type: none"> Option to have “I smoke cigarettes” that doesn’t include hand-rolled Option to respond “No” for those who are trying to quit but not using any form of nicotine replacement therapy or smoking cessation counselling. 	<ol style="list-style-type: none"> Added “<i>I smoke cigarettes every day</i>” and “<i>I smoke cigarettes, but not every day</i>” Added “I am not using anything to help me stop smoking” to Q3.
Previous quit attempts	<ol style="list-style-type: none"> Clearer instructions needed for those who want to select “yes” (i.e. tick “No” or “Yes”) Clearer instructions on what these are so that participants are prompted to remember if they have used them (i.e. prescribed through your GP) 	<ol style="list-style-type: none"> Added in “<i>or ‘Yes’. If ‘Yes’ then write the number of times in the space</i>” Added in instructions “<i>This medication is prescribed through your GP.</i>”
MTSS	<ol style="list-style-type: none"> Some participants ticked more than one response option and said that the instructions for how to respond needed to be clearer 	<ol style="list-style-type: none"> Instruction added “<i>Please tick one answer.</i>”
FTND	No issues or feedback for this measure	-
Smoking self-efficacy	<ol style="list-style-type: none"> A lot of confusion around this item. Participants gave the option response the wrong way around i.e. answered “absolutely sure” <u>if they thought they would smoke, not if they thought they could refrain from smoking</u> Suggested maybe embedding the preface instructions from the top into the questions i.e. “<i>When I feel nervous I could refrain from smoking</i>” Some participants said they would prefer a yes/no response Some suggestions for rewording the instructions before the questions i.e. “<i>do you think you could refrain from smoking in the following situations...</i>” Confusion on how to answer “<i>When I want to think about a difficult problem I could refrain from smoking</i>” Some items were seen as being too similar in what they were asking (e.g. “feeling anxious” and “feeling nervous”) 	<ol style="list-style-type: none"> For each item “I could refrain from smoking” has been added at the end of each sentence to embed the instructions into the questions Removal of “<i>anxious</i>” as too similar to “<i>nervous</i>” Removal of “<i>When I was to think about a difficult problem I could refrain from smoking</i>” Removal of “<i>When drinking beer wine or other spirits I could refrain from smoking</i>” as too similar to “<i>When having a drink with friends I could refrain from smoking</i>” Removal of “<i>After a meal I could refrain from smoking</i>” as too similar to “<i>When having a coffee or tea I could refrain from smoking</i>”

Quit confidence	No issues with this item and no feedback for change.	-
Social support and smoking cessation	<ol style="list-style-type: none"> 1. No representation of their doctor in this questions 2. Instructions need to be clearer 	<ol style="list-style-type: none"> 1. Added in “<i>How well supported do you feel by your GP?</i>” 2. Instructions changed to “<i>The next set of questions asks about how supported you have felt in your attempt to previously stop smoking. Please tick one box in each row. In your attempt to previously stop smoking, how often did someone you know?</i>”
Self-exempting beliefs	No major issues, however length of completion was noted for this dimension and it took participants longer to complete these questions than other ones.	-
Lung cancer risk perception	No issues reported with this measure and no feedback for change.	-
Lung cancer experience	<ol style="list-style-type: none"> 1. One participant suggested the need to understand the impact of others within the community 	<ol style="list-style-type: none"> 1. Added in “<i>A member of your community</i>”
Comorbid conditions	<ol style="list-style-type: none"> 1. Some confusion with the structure of answering this item and how it is laid out (i.e. answering yes in column 1 and then needing to answer column 2 then column 3) 	<ol style="list-style-type: none"> 1. When designed online the structure and format of this question is clearer (i.e. drop-down boxes).

4.8 Discussion

The systematic review, presented in Chapter 2, demonstrated the need to further understand specific psychosocial needs of this population in order to develop targeted interventions to improve quit motivation and smoking cessation. In the current thesis chapter, existing measures were tested for their acceptability and content validity for use in measuring psychosocial determinant of quit motivation in older smokers from deprived backgrounds (Appendix 4.8).

The use of CVA provided preliminary validation that some of the *a priori* items in the survey adequately reflected the construct of interest (Social Support and Smoking Cessation). CVA also helped to facilitate the development of the survey through highlighting the need for item refinement or removal. Findings from cognitive interviews were used to ensure that the format of the survey was easily accessible and that individual survey items were clearly and correctly understood. Overall, the survey items were well received by participants with some improvements to wording structure being suggested in order to improve the readability.

Strength and limitations of survey development methods

The use of CVA helped to confirm that the survey was not over-representing, omitting, or under-representing elements of social support in regard to smoking cessation, and that variables that were not part of this construct were not reflected in the survey items (264). The recruitment of six experts to conduct CVA (290) and having a threshold of 78% for positive agreement (291) enabled the reduction of the probability of drawing incorrect conclusions regarding the items that required modification due to chance agreement from the raters. Although this method of survey validation does not establish test integrity, it can help to determine the degree of confidence placed on conclusions made about the construct of interest (292).

Content validity indices are only specific to the particular function of the survey and a distinct population, in this case older smokers from deprived backgrounds and social support influences that may affect their motivation to stop smoking. The content validity of the Social Support and Smoking Cessation measure is only valid in this context and for this population, therefore limiting wider generalisability of construct validity. Additionally, the definition of constructs can evolve and change over time and therefore the relevance and representativeness of this measure is

likely to degrade over time (264). Therefore, only conditional validity was established for these items in the survey. This form of validity refers to the concept that indices of validity can only be relevant for one function of a survey for the target population (293).

The use of cognitive interviews aided an evaluation of the possible sources of response error for the target population. However, it is important to acknowledge that the sample size for the cognitive interviews was small with only five participants recruited to the study which may have resulted in issues of generalisability. Concurrent verbal probing and think aloud techniques were utilised in the cognitive interviews. Participants were initially instructed to 'think aloud' when processing items and this helped to support an open-ended format of interviewing throughout. This method ensured that the participants were given the opportunity to provide information that may have been unanticipated by the researcher and established the notion of personal reflection by the participant being beneficial to the interview. However, the use of think aloud techniques has been previously criticised as being a method that places too much burden on the responder to verbalise their cognitive processes and thus create a bias in the individuals' information processing. Thinking aloud encourages participants to engage in a considerable amount of mental effort in order to process the questions compared to the amount of effort used when simply answering the questions. This may result in over-processing of information and different interpretations of items as opposed to answering them in a real-life situation.

Probes were used as a way to guide the participants' attention on the items and response formats presented. Throughout the interview process, the use of probes facilitated participants to think aloud and provide their own spontaneous thoughts and criticisms due to participants seeming to expect the use of such probes and thus pre-empted responses in some interviews. The use of concurrent probing allowed the exploration of information that was fresh in the participant's mind and resulted in it being easier to access and discuss. However, verbal probing has been criticised for its potential to bias responses through the probes selected and the way in which they were phrased (294). This potential for biased responding was minimised in the current study by the use of non-leading probes.

CVA of the Social Support and Smoking Cessation measure along with cognitive interviewing helped serve as preliminary forms of construct validation. However, there are alternative forms of validation that can be employed to further assess the

validity of survey measures, such as convergent validity and other forms of construct validity. In the subsequent thesis chapter, construct validity of the final survey items will be examined using principal components analysis as a way to assess the internal reliability of factor-derived scales.

Reflexivity

In order to overcome identified barriers when conducting cognitive interviews, it was important that I was conscious of my role when carrying out the interviews. Research has demonstrated that one of the most important elements of the cognitive interview method is establishing rapport between the interviewee and the interviewer (295). As I was an unfamiliar individual to the participant, it was imperative that I made them feel comfortable during the interview process. As a way to build rapport I made sure to treat each interviewee as an individual who has a unique set of needs. This was important as obtaining maximum retrieval during cognitive interviews is a difficult task that, for many, requires deep concentration. It was important that the participant felt an integral part of the research in order to be motivated to take part in the cognitive interview.

I was able to build rapport by interacting meaningfully with the participant and engaging in an open conversation prior to commencing the interview. This helped to personalise the interview and make the participant feel comfortable when being interviewed. Prior to the interview commencing, I asked open-ended questions to help prepare and encourage the interviewee to speak without interruptions and then offered follow-up comments to increase rapport and prime the participant to give detailed, elaborated responses.

Participants in the interviews had different levels of literacy and therefore it was important that I tailored my communication technique as a way to develop an interactive model of interviewing that was determined and defined by the participant. I consistently communicated empathy with participants, as a way to help build rapport, prior to the interview and also during the interview process when participants spoke about their experiences of quitting smoking.

4.9 Conclusion

The use of cognitive interviews and content validity resulted in a variety of item modifications that helped to increase the face validity of the overall survey and content validity of the Social Support and Smoking Cessation measure. These

methods were conducted prior to use in a questionnaire study with the target population. The psychometric properties of included measures will be reported in Chapter 5.

Chapter 5

Cross Sectional Population Survey of Factors Influencing Quit Motivation in Older Smokers from Deprived Backgrounds

5.1 Introduction

As discussed in Chapter 1, quit attempts by older, deprived smokers are less likely to be successful due to higher levels of nicotine dependence and/or low self-efficacy to quit (68, 69). Research has indicated that smokers from deprived backgrounds find quitting more difficult due to having less social support when making a quit attempt (83, 84). Self-exempting beliefs have also been shown to influence continued smoking among individuals from low socioeconomic groups (70). These beliefs may be adopted as a mechanism to help rationalise or justify smoking despite the well-known harms (70). Motivation to quit smoking and risk perception are important influences on smoking cessation. Previous research has demonstrated that adults with low motivation to stop smoking have lower risk perception compared to smokers with a high motivation to quit (296). Absolute risk perception refers to an individual's perception of the likelihood that they will develop a specific disease within a defined time period. Relative risk perception assesses how an individual compares the likelihood that they will develop a specific disease to the likelihood that others who are similar (i.e. in age or gender) will develop the disease over a specified time period (297-299). Both absolute and relative perceived risk of smoking-related diseases such as lung cancer have been linked to smoking (300). However, research in the area of lung cancer risk perception for the target population is limited, with one study demonstrating perceived lung cancer risk to be higher in this population compared to non-smokers (301).

Principal components analysis (PCA) was used to test the underlying factor structure of constructs. PCA is an exploratory technique that can identify the maximum number of factors. The aim of PCA is to produce a smaller number of linear combinations of variables (302). PCA was therefore considered particularly useful in reducing the number of variables within the survey into smaller components and assessing whether these components reflected *a priori* constructs and their related items. PCA with oblique rotation (302) was conducted on selected measures that underwent substantial changes after cognitive interviewing and content validity in Chapter 4.

5.1.1 Aims of the present study

The aim of the cross-sectional population survey was to identify determinants of quit motivation (the primary outcome) among older smokers from deprived backgrounds.

Study hypotheses were that higher motivation to quit smoking would be associated with lower nicotine dependence, higher self-efficacy, higher perceived social support, lower self-exempting beliefs and higher perceived lung cancer risk. The findings from this study were used to detect modifiable psychosocial variables that may be targeted in the adaptation of a supportive SCI for older smokers from deprived backgrounds (303).

5.2 Materials and methods

The survey was disseminated online between May and August 2019 using a variety of routes to recruitment including a population survey platform (HealthWise Wales), links with a local cancer charity (Tenovus Cancer Care) and targeted social media advertising.

Ethical approval

The study received ethical approval from Cardiff University School of Medicine (SMREC Reference Number: 19/06).

5.2.1 Participants and recruitment

Participants were current smokers, aged 50 years or more, from deprived backgrounds. The online study information sheet (see Appendix 5.1) outlined the sampling criteria (current smokers, aged 50+) and provided information regarding the purpose of the research. During the cognitive interviews that were conducted during the development stage of the survey (Chapter 4), participants also provided feedback on the participant information sheet and consent form to increase the suitability of research for the target population.

Patient and public involvement

Patient and public involvement was utilised through the involvement of an ex-smoker who had a lived experience of lung cancer and was from a deprived area of South Wales. This research partner provided feedback on the survey at various stages prior to recruitment commencing. The research partner commented on the wording and length of the survey, information sheet and consent form, and made suggestions on how to encourage recruitment of the target population. They helped

to spread awareness of the study when it went live online and distributed the online survey link in their social networks.

Inclusion/exclusion criteria

To determine study eligibility, participants completed five initial screening questions based on socioeconomic deprivation, smoking status and age. Participants were eligible if they were ≥ 50 years of age, a current smoker and met the threshold for at least two out of three individual-level deprivation indicators. Thresholds for deprivation indicators were: 1) *Education* - educated to O-level or GCSE equivalent (mostly grade D-G) or below; 2) *Household income* - casual labourer, pensioner, student, unemployed (e.g. pensioner without private pension and anyone living on basic benefits), semi-skilled and unskilled manual worker, skilled manual worker and those with no previous or current employment within the household; 3) *Home ownership* - renting from local authority/housing association or living with family/friends.

5.2.2 Sampling strategy and procedures

A link to an online version of the questionnaire was disseminated using a population survey platform (HealthWise Wales: www.healthwisewales.gov.wales) and via a Wales based cancer charity (Tenovus Cancer Care). HealthWise Wales is a national online, population survey funded by Health and Care Research Wales with the aim of creating a registry of people who live in Wales and are willing to be contacted to take part in research. Potential participants from HealthWise Wales and Tenovus Cancer Care Research Network were sent an e-newsletter that included a short study advertisement (Appendix 5.2) along with a link to the online survey. Facebook advertising was used to distribute the survey online and target smokers aged 50 years or older from deprived backgrounds. Adverts were targeted based on location and the most deprived areas from the Welsh, Scottish, English and Northern Ireland Index of Multiple Deprivation were selected (304-307). A study acronym (SASH; Study of Attitudes towards Smoking and Health), study logo and Facebook page were created in order to distribute the survey through Facebook advertising (see Appendix 5.3).

The link to Online Surveys was first presented to potential participants with the online information sheet including the statement “*By starting the survey this means that you have consented to the following...*”. After clicking the ‘Start’ button (i.e.

consenting to take part in the study) both eligible and non-eligible participants were given the option to be entered into a £50 shopping voucher prize draw.

Facebook analytics were monitored throughout recruitment to give insight into aspects such as the time of day, days of the week and the associated ad photos that were working best (308). This feature enabled an understanding of when to adjust the advertisement parameters (such as replacing poor-performing advert photos) in order to accrue the target sample size and ensure an equal representation of key demographics.

Sample size calculation

Sample size was determined on the basis of tobacco smoking rates in the UK population of older smokers (309) and expected response rate among smokers (310, 311). It was planned from the outset to measure the primary outcome of motivation to stop smoking on a 7-point scale, however it was not possible to know in advance whether there would be normal distribution of primary outcome and if the use of linear regression would be possible. The decision was thus taken to calculate the sample size based on a dichotomisation of the outcome. A sample of 300 respondents was chosen to provide 80% power to detect an odds ratio of 2.0 in the dichotomised primary outcome at a 5% significance level (312).

5.2.3 Survey measures

Details of the original measures can be found in Chapter 4. Measures that were included in the final version of the survey are briefly described below and provided in Appendix 5.4.

Demographic variables

Data were collected on gender, age, relationship status, highest level of education, home ownership, household employment and comorbid conditions (275). For the purpose of univariable and multivariable analysis, binary variables were created for: age (50-64 years old, 65 years or more), employment (lower employment level, higher employment level), home ownership (own house/mortgage or rent privately, rent from housing association or living with family/friends), relationship (widowed/divorced/single, married/living with partner) and education (low educational level, high educational level). A total score was created for number of comorbid conditions, with a higher score indicating the presence of more comorbid conditions (score range 0-14).

Smoking characteristics

Nicotine dependence was assessed using the Fagerström Test for Nicotine Dependence (FTND) (285) in order to create a total nicotine dependence score (Chapter 4). Previous quit attempts (313), including intensity of previous quit attempts (*number of quit attempts combined with duration of longest previous quit attempt*) were also measured. Participants were asked if they were currently trying to cut down on smoking and a subsequent question on smoking cessation aids used. Participants could select multiple options from a list of aids including nicotine gum, lozenges, patches, inhalator, mouth spray, electronic cigarette, behavioural counselling or not using anything to stop smoking.

Motivation to stop smoking

The Motivation to Stop Scale (MTSS) (273) is a validated measure that assesses the key elements of quit motivation: belief, desire and intention (52, 53). A full description of this measure is reported in Chapter 4. MTSS was treated as a continuous variable, with a low score demonstrating an absence of any belief, desire or intention to stop smoking and a high score demonstrating strong desire and short-term intention.

Social support and smoking cessation

The social support and smoking cessation questions (314) measured how supported the participant felt during a previous quit attempt. The measure included 11 items (Appendix 5.4). Participants were also asked how supported they felt by their partner, friends, colleagues and GP/ healthcare professional during a previous quit attempt, with response options ranging from “not at all” to “extremely”. Finally, participants were asked to what extent they felt they had someone to turn to if they found stopping smoking difficult, with response options on a scale of 1 to 5 (1=extremely, 5=not at all).

Self-exempting beliefs.

The self-exempting beliefs measure comprised of 8 items, with two subscales for self-exempting (“bulletproof”) beliefs and risk-minimising (“jungle”, “skeptic”, “worth it”) beliefs (274). Agreement with each item was rated on a scale of 1 to 5 (1=totally disagree, 5=totally agree). Total possible score range for risk-minimising beliefs scale was 5-25 and 2-10 for the scepticism scale, with higher scores indicating higher levels of agreement.

Smoking self-efficacy

The eight-item smoking self-efficacy measure (SEQ-12) (269) presented participants with situations in which they might be tempted to smoke such as when they feel nervous, depressed, angry, have the urge to smoke, are with other smokers and when they are having a tea or coffee. Participants responded on a 5-point Likert scale from 1 (“not at all sure”) to 5 (“absolutely sure”). Score range for this measure was 6-30 with higher scores indicating greater self-efficacy.

Quit confidence

Quit confidence was measured using a single item (315): “*How confident are you that you could quit smoking for good if you wanted to?*”. The response options were on a scale of 1 to 5 where 1=“not at all” and 5=“extremely confident”.

Lung cancer experience

As reported in Chapter 4, lung cancer experience was measured using 7 items to assess personal experience of lung cancer as well as experience of lung cancer among social contacts (family, friends, member of community) (276). Response options for this measure were ‘yes’, ‘no’, ‘don’t know’ and ‘prefer not to say’.

Lung cancer risk perception

In order to decrease participant burden, lung cancer risk perception was treated as 3 separate categorical items. Individual items were taken from original scales each measuring absolute risk perception, comparative risk perception and affective risk perception (272) (see Chapter 4 for details of the original measures and Appendix 5.4 for final measures included in the survey).

5.3 Statistical analysis plan

5.3.1 Descriptive statistics

Survey data were analysed using SPSS for Windows version 25. Descriptive statistics were used to summarise the demographic and smoking-related characteristics of questionnaire completers.

5.3.3. Multiple Imputation

In order to deal with missing data in preparation for univariable and multivariable analysis, multiple imputation was conducted on the original dataset. Multiple imputation of missing data involves dealing with nonresponse bias and narrows uncertainty regarding missing values through calculating several different options (i.e. imputation models) (316).

Multiple imputation using chained equations was conducted on the original dataset (317). All the incomplete variables were either dichotomous or treated as continuous. For each incomplete variable being imputed, all other variables were included in its imputation model. Where the incomplete variables were constituent parts of a composite score (e.g. positive and negative social support scale), the imputation was performed on the individual questionnaire responses, and these imputed variables were then summed to create the imputed composite score. Those who responded with '*Don't know*' to MTSS were removed from analysis.

5.3.2 Principal Components Analysis

Items measuring social support during a quit attempt, smoking self-efficacy and self-exempting beliefs were subjected to PCA. The adequacy of sampling for PCA was investigated using Kaiser-Meyer-Olkin (KMO) statistic (>0.3) (318, 319) and Bartlett's test of sphericity (320). Based on the Kaiser criterion, rotated factors with eigenvalues >1 were retained, exceeding the recommended value of 0.6 (318, 319). The internal reliability of the factor-derived scales was examined using Cronbach's alpha with a minimum accepted value of 0.70 (321). Inter-item correlation was investigated and was accepted when in range between 0.2 and 0.4 (322). Items were removed on the basis of statistical as well as conceptual concerns.

5.3.4 Univariable and multivariable analysis

Univariable associations between MTSS score and demographic (age, gender, education, income, living situation, presence of comorbid conditions, lung cancer experience), smoking-related factors (nicotine dependence, previous quit attempts,

smoking abstinence, smoking cessation aids) and psychosocial variables (self-efficacy, quit confidence, perceived social support and smoking cessation, self-exempting beliefs, lung cancer risk perception) were assessed. Independent t-tests, Spearman's Rank Correlation and Pearson's Correlation were used to test for univariable associations. Examination of the distribution of the outcome variable, and its mean and variance given predictors, suggested that a multivariable linear regression model was a suitable choice. A multivariable linear regression analysis was conducted, in which all variables were entered in a single step and MTSS was treated as a continuous variable. Confidence intervals of 95% were calculated for the associations between MTSS and variables that were statistically significant at $p \leq 0.05$ in univariable analyses were included in the regression model.

5.4 Results

5.4.1 Sample characteristics

A total of 578 individuals initially agreed to participate in the survey. Of these, 278 (48.1%) did not meet the inclusion criteria due to age ($n=2$), smoking status ($n=24$) and individual indicators of deprivation ($n=252$) (Figure 5.1). The target sample of 300 eligible participants was recruited to the survey. The majority of participants were recruited from Facebook advertising ($n=282$, 94%) with the remaining from HealthWise Wales ($n=9$, 3%), word of mouth ($n=6$, 2%) and Tenovus Cancer Care ($n=3$, 1%).

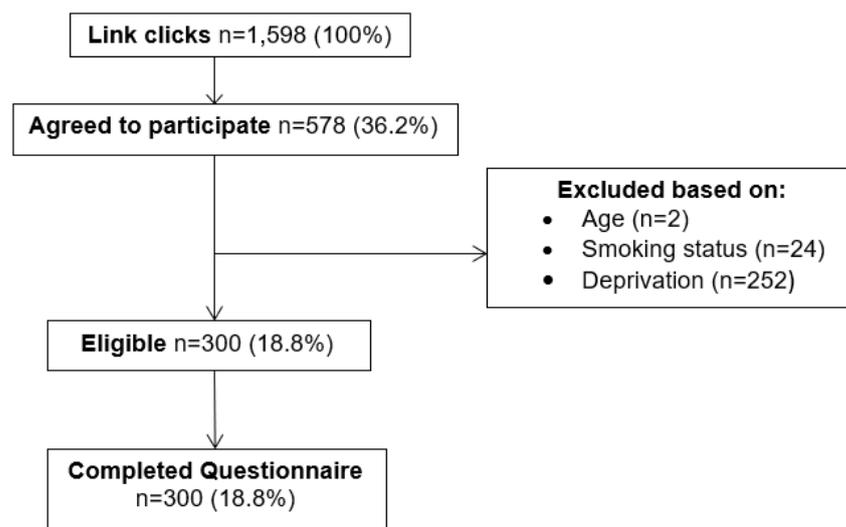


Figure 5.1. CONSORT Flow Diagram

Postcode data showed that most participants (66.7%) were recruited from England, with 59 (19.7%) from Scotland and 33 (11.0%) from Wales. Eight participants (2.6%) reported postcodes that were non-identifiable. Of the 33 participants recruited from Wales, 18 (54.5%) were from the two lowest deprivation quintiles. One hundred and fifty-nine participants (79.5%) were from the two lowest deprivation quintiles in England and fifty-nine participants (93.2%) were from the two lowest deprivation quintiles in Scotland (see Figure 5.2).

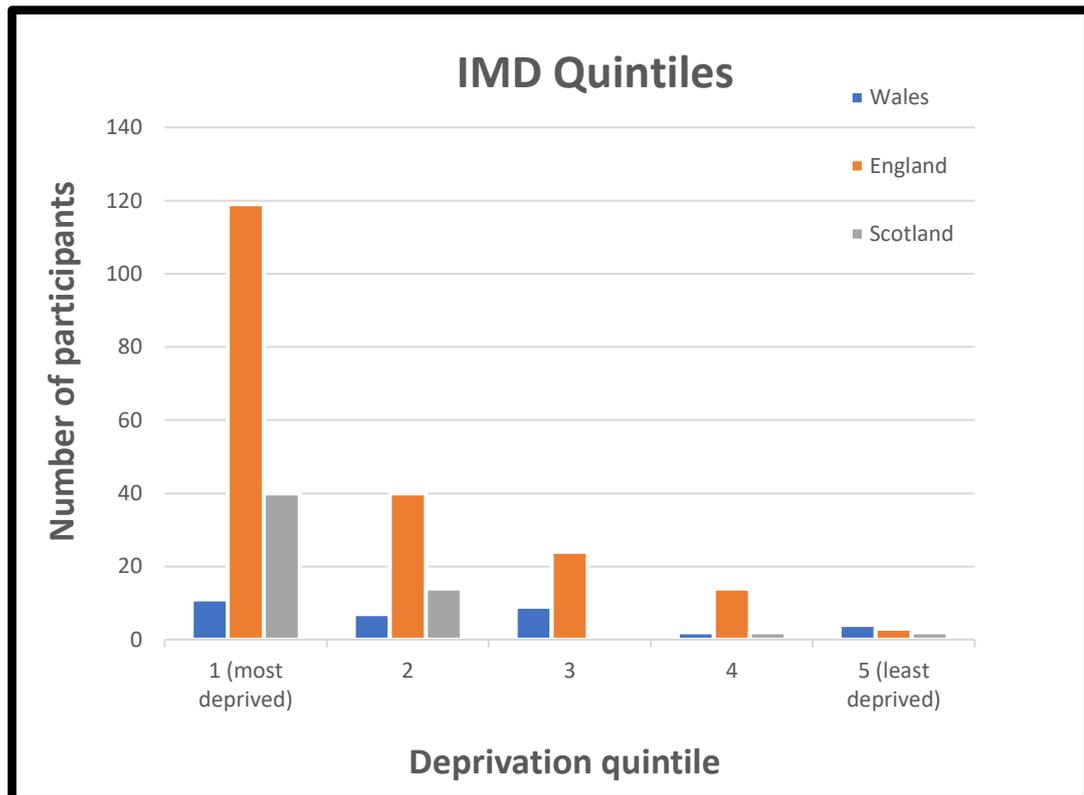


Figure 5.2 Number of participants recruited in each deprivation quintile from Wales, England and Scotland

As shown in Table 5.1, most participants were aged 50-64 years (83.7%), female (85.7%), had no qualifications or left school at age 16 (35.7%), were renting from local authority or housing association (72%) or were a pensioner without private pension or living on basic benefits (33.0%). Most participants were married/in a civil partnership (30.0%) or divorced/ separated (30.7%). In regards to pre-existing health conditions, most participants reported having depression (51.3%) and/or back pain (55.7%). Regarding motivation to stop smoking, 13.7% reported that they did not want to stop smoking (Table 5.1). Most participants had made a serious previous quit attempt (73.3%) and were currently trying to cut down on how much they smoked (66%). The most commonly used smoking cessation aid when trying to

cut down/stop smoking was e-cigarettes (28.3%), with over half the sample (51.1%) not using anything to help them cut down/stop smoking. The majority of participants responded with 'No' when asked if they have had lung cancer (80.7%), if their partner has had lung cancer (77.7%), a close family member (54.0%), other family member (58.3%), a close friend (57.7%), any other friend (56.7%) and a member of their community (40.3%).

Table 5.1 *Sample characteristics*

Variable	N	%
Country		
Wales	33	11.0
England	200	66.7
Scotland	37	12.3
Northern Ireland	0	0
Missing data	30	10.0
Age, years		
50-64 years	251	83.7
65 years or older	49	16.3
Missing	0	0
Gender		
Male	43	14.3
Female	257	85.7
Missing	0	0
Highest level of education		
Finished school at or before age fifteen	76	25.3
No qualifications/left school at 16	107	35.7
Completed CSEs, O-levels or equivalent (Mostly grade A-C)	56	18.7
Completed CSEs, O-levels or equivalent (Mostly grade D-G)	22	7.3
Completed A levels or equivalent	7	2.3
Completed further education but not degree	30	10.0
Completed a Bachelor's degree/Masters/PhD	2	0.7
Missing	0	0
Home/Living arrangement		
Own outright	19	6.3

Own mortgage	19	6.3
Rent from local authority/housing association	216	72.0
Rent privately	35	11.7
Living with family or friends	11	3.7
Missing	0	0
Employment		
Casual labourer, pensioner, student, unemployed (e.g. pensioner without private pension and anyone living on basic benefits)	99	33.0
Semi-skilled and unskilled manual worker (e.g. assembly line worker, refuse collector, messenger)	88	29.3
Skilled manual worker (e.g. electrician, carpenter)	45	15.0
Supervisory/clerical/ junior managerial/professional/administrative (e.g. supervisor, bank clerk, salesperson)	19	6.3
Intermediate managerial/professional/administrative (e.g. middle management, bank manager, teacher)	4	1.3
Higher managerial/professional/administrator (e.g. Chief executive, senior civil servant, surgeon)	0	0
No previous or current employment within the household	45	15.0
Relationship status		
Married or in a civil partnership	90	30.0
Living with my partner	38	12.7
Single (never married and not living with a partner)	43	14.3
Divorced or separated and not living with another partner	92	30.7
Widowed and not living with another partner	32	10.7
Prefer not to say	4	1.3
Missing	1	0.3
Pre-existing health conditions	-	-
Heart disease	28	9.3
High blood pressure	65	21.7

Lung disease	68	22.7
Diabetes	43	14.3
An ulcer or stomach disease	29	9.7
Kidney disease	7	2.3
Liver disease	5	1.7
Anaemia or other blood disease	17	5.7
Cancer	5	1.7
Depression	154	51.3
Osteoarthritis or degenerative	90	30.0
Back pain	167	55.7
Rheumatoid arthritis	42	14.0
Nicotine Dependence (FTND)		
Low dependence	23	7.7
Low to moderate dependence	59	19.7
Moderate dependence	154	51.3
High dependence	64	21.3
Motivation to Stop Smoking (MTSS)		
I don't want to stop smoking	41	13.7
I think I should stop smoking but don't really want to	90	30.0
I want to stop smoking but haven't thought about when	40	13.3
I REALLY want to stop smoking but don't know when I will	64	21.3
I want to stop smoking and hope to soon	19	6.3
I REALLY want to stop smoking and intend to in the next 3 months	14	4.7
I REALLY want to stop smoking and intend to in the next month	16	5.3
Don't know*	16	5.3
Previous serious quit attempt		
Yes	220	73.3
No	79	26.3
Missing	1	0.3
Currently trying to cut down smoking		

Yes	198	66.0
No	100	33.3
Missing	2	0.7
Smoking cessation aids (n=198)		
Nicotine gum	4	1.8
Nicotine lozenge	5	2.3
Nicotine patch	14	6.4
Nicotine inhaler/inhalator	6	2.7
Another nicotine product	3	1.4
Electronic cigarette	62	28.3
Nicotine mouth spray	3	1.4
Behavioural counselling (e.g. group sessions, telephone support, individual support)	2	0.9
I am not using anything to help me stop smoking	112	51.1
Lung cancer experience		
<i>You</i>		
Yes	8	2.7
No	242	80.7
Don't know	6	2.0
Prefer not to say	0	0
Missing	44	14.7
<i>Your partner</i>		
Yes	13	4.3
No	233	77.7
Don't know	6	2.0
Prefer not to say	2	0.7
Missing	46	15.3
<i>Close family member</i>		
Yes	103	34.3
No	162	54.0
Don't know	13	4.3
Prefer not to say	1	0.3
Missing	21	7.0
<i>Other family member</i>		
Yes	54	18.0

No	175	58.3
Don't know	30	10.0
Prefer not to say	1	0.3
Missing	40	13.3
<i>Close friend</i>		
Yes	60	20.0
No	173	57.7
Don't know	22	7.3
Prefer not to say	1	0.3
Missing	44	14.7
<i>Other friend</i>		
Yes	47	15.7
No	170	56.7
Don't know	30	10
Prefer not to say	1	0.3
Missing	52	17.3
<i>A member of your community</i>		
Yes	83	27.7
No	121	40.3
Don't know	48	16
Prefer not to say	1	0.3
Missing	47	15.7

**Participants who responded 'don't know' were removed from further analysis*

5.4.2. Principal components analysis and internal consistency of factor derived scales

Items measuring social support and smoking cessation, smoking self-efficacy and self-exempting beliefs were subjected to PCA; examination of data indicated suitability for PCA. The sample size for the survey was above $n=150$ and inspection of the correlation matrix revealed the presence of coefficients greater than 0.3.

Using Catell's scree test (323) a spot check of the variable scatterplots demonstrated mostly linear relationships.

Social support and smoking cessation

Inspection of the correlation matrix revealed the presence of coefficients of 0.3 and above. The KMO value was 0.80, exceeding the recommended value of 0.6 (318,

319) and Bartlett's Test of Sphericity (320) reached statistical significance ($p < 0.05$), supporting the factorability of the correlation matrix. PCA revealed the presence of three components with eigenvalues exceeding 1, explaining 35.9%, 17.2% and 9.3% of the variance respectively. Following inspection of the scree plot, two components were retained for further rotation.

Oblimin rotation was performed on the initial two-factor solution. As shown in Table 5.2, items loaded > 0.4 on either factor 1 (8 items, labelled 'positive social support') or factor 2 (three items, labelled 'negative social support'). There was a weak negative correlation between the two factors ($r = -0.16$). The positive social support subscale had good internal consistency ($\alpha = 0.85$) and acceptable inter-item correlation of $r = 0.41$. The negative social support subscale also demonstrated good internal consistency with Cronbach's alpha $\alpha = 0.64$. The inter-item correlation for negative social support was $r = 0.37$ (see Table 5.3).

Table 5.2. *Factor loadings of items measuring social support and smoking cessation*

Item	Factor 1 Positive Social Support	Factor 2 Negative Social Support
1. Congratulate you on not smoking	.783	.146
2. Celebrate your quitting with you	.762	.201
3. Say they were confident that you could quit/stay quit	.715	.158
4. Persuade you not to smoke	.689	-.145
5. Help you think of/use replacements for smoking i.e. nicotine patches, stop smoking services	.684	-.286
6. Help to calm you down when you were feeling stressed or irritable	.677	-.067
7. Encourage you to keep at quitting	.650	.016
8. Do an activity with you to keep you from smoking	.593	-.023
9. Comment on your lack of will power	-.134	.829
10. Say you were going to start smoking again	-.061	.807
11. Offer you a cigarette	.205	.596

Bold font demonstrates the items that loaded strongly on each factor.

Table 5.3 *Internal consistency of factor derived scales and sub-scales*

Scale	M	SD	Range	Total possible score range	Cronbach's Alpha
Self-efficacy	10.06	4.84	0.45	6-30	0.88
Positive social support	19.20	7.39	0.41	8-40	0.85
Negative social support	9.92	3.12	0.29	3-15	0.64
Risk-minimising beliefs	12.07	4.41	0.35	5-25	0.83
Scepticism	5.51	1.93	0.00	2-10	0.54

Smoking self-efficacy

The KMO value was 0.89 and Bartlett's Test of Sphericity (320) reached statistical significance ($p < 0.05$). A two-factor solution explained a total of 69.9% of the variance, with factor 1 contributing to 56.9% and factor 2 contributing to 13.1% of the variance respectively. The relationship between the two factors was moderately strong ($r = 0.49$).

The rotated solution showed the presence of several loadings on both factors with heavier loadings for items 1-5 and item 8 on component 1 (Table 5.4). Items 6 and 7 were subsequently removed due to low factor loadings on factor 1 in comparison to other items. A single smoking self-efficacy scale was created, comprising six items with alpha $\alpha = 0.88$ (Table 5.3). The mean inter-item correlation was slightly outside the suggested range of 0.2 to 0.4 ($r = 0.57$) (322).

Table 5.4. Factor loadings for smoking self-efficacy items

Item	Factor 1	Factor 2
1. When I am angry I could refrain from smoking	.909	-.089
2. When I feel depressed I could refrain from smoking	.879	-.031
3. When I feel nervous I could refrain from smoking	.877	-.045
4. When I am with smokers I could refrain from smoking	.718	.164
5. When having coffee or tea I could refrain from smoking	.455	.404
6. When having a drink with friends I could refrain from smoking	-.141	.944
7. When celebrating something I could refrain from smoking	.157	.781
8. When I feel the urge to smoke I could refrain from smoking	.441	.468

Self-exempting beliefs

The KMO value was 0.81, exceeding the recommended value of 0.6 (318, 319) and Bartlett's Test of Sphericity (320) reached statistical significance ($p < 0.05$). It was decided to retain two components for further investigation. A two-component solution explained a total of 61.2% of the variance with component 1 contributing to 48.8% and component 2 contributing to 12.4% of the variance respectively. The relationship between the two variables was strong ($r = 0.39$).

The rotated solution showed that items 1-5 loaded > 0.4 on component 1 (Table 5.5). The pattern matrix for a two-component loading demonstrated that items 7 and 8 relates to scepticism about the harms of smoking. It was decided to remove item 6 (*'everything causes cancer'*) due to this being a causal belief and loading similarly on both components. Component 1 was labelled 'risk-minimising beliefs' and component 2 was labelled 'scepticism'.

The risk-minimising beliefs scale had good internal consistency ($\alpha=0.83$) and inter-item correlation of $r=0.49$. The 2-item scepticism scale had a lower Cronbach's of $\alpha=0.54$ (Table 5.3). The mean inter-item correlation for this scale was $r=0.37$.

Table 5.5 Factor loadings for self-exempting beliefs

Item	Factor 1 <i>Risk-minimising beliefs</i>	Factor 2 <i>Scepticism</i>
1. You have got to die of something, so why not enjoy yourself and smoke	.848	-.044
2. I would rather live a shorter life and enjoy it than a longer one where I will be deprived of the pleasure of smoking	.844	-.151
3. I think I must have the sort of good health or genes that means I can smoke without getting any of the harms	.771	.062
4. I think I would have to smoke a lot more than I do to put my health at risk	.732	.025
5. Smoking is not more risky than lots of other things that people do	.550	.318
6. Everything causes cancer these days	.439	.439
7. The medical evidence that smoking is harmful is exaggerated	-.145	.864
8. Smoking cannot be all that bad for you because many people who smoke live long lives	.271	.648

5.4.3 Univariable analysis of factors associated with motivation to stop smoking

As depicted in Table 5.6, in regard to demographics and smoking characteristic, higher motivation to stop smoking was statistically significantly associated with lower nicotine dependence ($p \leq 0.05$), having made a serious quit attempt in the past ($p \leq 0.001$), higher intensity of previous quit attempts ($p \leq 0.001$), using a smoking cessation aid when trying to cut down/quit smoking ($p \leq 0.001$) and more nicotine replacement therapies being used ($p \leq 0.001$). Associations between MTSS score and gender, age, relationship, education, employment, housing and comorbidity were not statistically significant.

As shown in Table 5.7, in regard to psychosocial factors, higher motivation to stop smoking was statistically significantly associated with higher positive social support when making a quit attempt ($p \leq 0.05$), higher smoking self-efficacy ($p \leq 0.001$), higher quit confidence ($p \leq 0.001$) and lower risk-minimising beliefs ($p \leq 0.001$). Higher motivation to stop smoking was statistically significantly associated with higher perceived comparative ($p \leq 0.01$) and affective ($p \leq 0.001$) lung cancer risk, and having a close friend with lung cancer ($p \leq 0.05$). Statistically significant univariable associations were not observed for scepticism scale, all remaining social support variables, lung cancer experience (self, partner, close family member, other family member, other friend, a community member) and absolute lung cancer risk perception.

Table 5.6 Univariable associations between motivation to stop smoking and demographic/smoking characteristics (n=284)

Variable	N	MTSS mean (SD)	Test statistic/ Correlation Coefficient	P value
Gender¹				
Female	243	3.14 (1.62)	0.22	0.82
Male	41	3.07 (1.84)		
Age¹				
50-64 years	239	3.10 (1.65)	-0.72	0.47
65 +	45	3.29 (1.69)		
Relationship¹				
Widowed/divorced/single	161	3.14 (1.65)	0.14	0.89
Married/living with a partner	120	3.11 (1.66)		
Missing data	5			
Education¹				
Lower education	193	3.11 (1.62)	-0.27	0.79
Higher education	91	3.16 (1.72)		
Employment¹				
Lower employment level	262	3.13 (1.64)	0.24	0.81
Higher employment level	22	3.05 (1.81)		
Housing¹				
Own house/mortgage/rent privately	70	3.36 (1.70)	1.35	0.18
Rent from housing association/living with friends or family	214	3.05 (1.63)		
Comorbidity score²	284		0.00	0.97
Nicotine dependence score²	284		-0.11	0.05
Intensity of previous quit attempt score²	209		0.26	<0.001
Currently trying to cut down on smoking¹				
Yes	185	3.44 (1.57)	4.53	<0.001
No	97	2.54 (1.64)		

Using traditional NRTs to help cut down/quit¹				
Yes	23	4.87 (1.55)	-4.95	<0.001
No	162	3.24 (1.47)		
Using electronic cigarette to help cut down/quit¹				
Yes	58	3.21 (1.46)	1.37	0.17
No	226	3.55 (1.61)		
Trying to cut down/quit without any smoking cessation aid¹				
Yes	104	3.23 (1.44)	2.07	0.04
No	81	3.72 (1.70)		

¹ Independent t-test

² Pearson's correlation coefficient

Table 5.7 Univariable associations between motivation to stop smoking and psychosocial variables (n=284)

Variable	N	MTSS mean (SD)	Test Statistic/ Correlation Coefficient	P value
Psychological variables				-
Risk-minimising beliefs ¹	284	-	-0.27	<0.001
Scepticism ¹	284	-	-0.07	0.26
Quit confidence ²	284	-	0.40	<0.001
Smoking self-efficacy ¹	284	-	0.21	<0.001
Lung cancer risk perception ²				
<i>Absolute risk</i>	284	-	0.11	0.08
<i>Comparative risk</i>	284	-	0.15	0.01
<i>Affective risk</i>	284	-	0.36	<0.001
Social support and smoking cessation				
Someone to turn during a quit attempt ²		-	-0.04	0.53
Positive smoking social support ¹	211	-	0.14	0.04
Negative smoking social support ¹	210	-	-0.01	0.91
Support from partner during previous quit attempt ²	180	-	-0.01	0.89
Support from family during previous quit attempt ²	200	-	0.03	0.63
Support from friends during previous quit attempt ²	198	-	0.01	0.92
Support from colleagues during previous quit attempt ²	187	-	-0.00	0.96
Support from GP or HCP during previous quit attempt ²	188	-	-0.06	0.44
Someone to turn during if finding quitting difficult ²	284	-	-0.04	0.53
Lung cancer experience ³				
<i>Self</i>				-
Yes	19	3.19 (1.85)	0.22	0.83
No	246	3.08 (1.63)		
<i>Partner</i>				
Yes	19	3.58 (2.10)	0.77	0.45
No	223	3.13 (1.64)		

Lung cancer experience ³				
<i>Close family member</i>				
Yes	98	3.30 (1.58)	1.13	0.26
No	157	3.05 (1.65)		
<i>Other family member</i>				
Yes	63	3.29 (1.56)	1.38	0.17
No	174	2.96 (1.58)		
<i>Close friend</i>				
Yes	63	3.62 (1.68)	2.78	0.01
No	173	2.88 (1.62)		
<i>Other friend</i>				
Yes	53	3.34 (1.60)	1.42	0.16
No	174	2.96 (1.55)		
<i>A member of your community</i>				
Yes	87	3.29 (1.66)	1.84	0.07
No	124	2.87 (1.52)		

¹ Pearson's correlation coefficient

² Spearman's Rank Correlation Coefficient

³ Independent t-test

5.4.4 Multivariable modelling of determinants of motivation to stop smoking

Conditional on all other predictors in the model, a unit increase in intensity of previous quit attempts was associated with an estimated 0.17 increase in MTSS score ($p=0.03$). Statistically significant associations were found for the following variables: a unit increase for quit confidence was associated with an estimated 0.20 increase in MTSS ($p=0.01$), self-efficacy was associated with an estimated 0.22 increase in MTSS ($p=0.01$) and a unit increase in risk-minimising beliefs was associated with an estimated 0.18 decrease in MTSS ($p=0.01$). Those who reported using traditional NRT when trying to stop smoking or cut down scored a 0.26 higher MTSS score ($p<0.001$) compared to those who did not (Table 5.8).

Table 5.8 *Multivariable associations with motivation to stop smoking*

Variable	Estimated adjusted mean difference	Standard Error	95% Confidence Interval	P value
Intensity of previous quit attempts	0.17	0.08	0.02, 0.32	0.03
Currently trying to cut down on smoking	-0.02	0.31	-0.20, 0.16	0.81
Positive social support during a previous quit attempt	0.00	0.02	-0.14, 0.14	>0.99
Smoking self-efficacy	0.22	0.03	0.06, 0.37	0.01
Quit confidence	0.20	0.10	0.06, 0.35	0.01
Risk-minimising beliefs	-0.18	0.03	-0.32, -0.04	0.01
Close friend with a diagnosis of lung cancer**	0.13	0.26	-0.01, 0.26	0.07
Comparative lung cancer risk	-0.04	0.15	-0.18, 0.11	0.64
Affective lung cancer risk	0.12	0.10	-0.02, 0.27	0.10
Using traditional NRTs to help cut down/quit ¹	0.26	0.43	0.12, 0.39	<0.001
Not using any smoking cessation aids to help cut down ¹	0.02	0.27	-0.14, 0.18	0.78
Nicotine dependence	0.06	0.05	-0.08, 0.20	0.30

¹ Dichotomous variables (coded: yes/no)

5.5 Discussion

The current study examined the determinants of quit motivation in a sample of older deprived smokers. Higher motivation to quit was associated with higher intensity of previous quit attempts, higher quit confidence, higher smoking self-efficacy, lower risk-minimising beliefs and using traditional NRT when trying to stop smoking or cut down in the selected sample of smokers aged 50 years and over from deprived backgrounds.

The current research suggests that the most salient determinant of quit motivation in the target population was past use of traditional NRT (e.g. patches, gum, lozenges). Use of NRT has been shown to increase cessation success (324) and is more effective at promoting cessation in older age groups compared to younger groups (325, 326). The current findings confirm that NRT is an important tool in determining an individual's motivation to stop smoking, especially for an older, deprived population of smokers. However, evidence for which type of NRT works best for this population is limited and effective smoking cessation services may need to be tailored in order to fit the needs and preferences of this population.

Previous studies have found smokers from low socioeconomic groups to be less likely to use NRTs compared to those from more affluent backgrounds, and that one of the barriers to quitting in this population includes inability to easily access cessation treatment (327). Making NRTs easily accessible to this population could increase motivation to stop smoking and encourage smokers from low socioeconomic groups to make serious quit attempts that are more likely to be successful. Although an association between quit motivation and the presence of comorbid conditions was not observed in the current study, it has been proposed that SCIs, specifically NRTs, for older adults should be personalised due to this age group often having comorbidities and medication use that can reduce the effectiveness and use of NRT (328).

The use of behavioural counselling in the current sample was very limited, with only two participants reporting that they had used this form of support when trying to cut down or quit smoking. A review by Hiscock and Bauld (234) demonstrated that when targeting smokers from low socioeconomic backgrounds, services that combine behavioural and pharmacological support can have a positive influence on smoking inequality. However, as detailed in Chapter 2, evidence of interventions that are most effective among lower socioeconomic groups is sparse and the most

effective form of behavioural support for an older, deprived population in improving smoking cessation rates is yet to be identified (153).

Vangeli et al (329) reported that past quit attempts are highly predictive of future attempts to stop smoking. Similarly, the current research demonstrates the importance of previous quit attempts on motivation to stop smoking in the target population and suggests that a higher intensity of previous quit attempts may result in higher motivation to stop smoking. Future interventions should focus on encouraging the target population to persist with their quit attempts as well as promote the use of behavioural support and NRT in order to improve motivation to quit.

The current study further illustrates the importance of quitting self-efficacy in relation to improving motivation to stop smoking among older, deprived smokers. Previous research from Siahpush et al (330) showed that low self-efficacy can explain the lower smoking cessation rate observed among low socioeconomic smokers. Individuals from deprived backgrounds are more likely to be exposed to stressful and disadvantaged lives and have less access to material and social resources, which in turn can reduce self-efficacy and motivation to stop smoking (331, 332).

Risk-minimising beliefs may be adopted in order to justify continued smoking despite the risks to health (274, 333). Similarly, previous studies indicate that individuals from socially deprived backgrounds are more likely to hold self-exempting beliefs (225, 274, 333, 334). Older smokers who have previously been shown to hold these beliefs may consider themselves as '*survivors*', resulting in a lower motivation to stop smoking (4).

5.5.1 Study strengths and limitations

Reach and engagement of participants from socioeconomically deprived groups

The use of an online survey conferred advantages such as low cost, wider reach to potential participants, lowered level of socially desirable responding and elimination of the need for data entry or complex branching and question prompting (335). Furthermore, with the current target population of older smokers, this form of data collection offered a non-judgmental space which can help overcome barriers to engaging in research that are often seen in this population, such as smoking related stigma (336). However, online survey completion poses some disadvantages that should be addressed. The lack of an interviewer to guide and prompt the questions may have resulted in responses being less accurate than if the survey was

conducted over the telephone or in person. Additional disadvantages to this form of data collection are that some individuals may not feel comfortable in using computers or smartphones (337-339).

The current study used targeted Facebook advertising to recruit participants. Social media platforms such as Facebook are used daily at a high rate for information exchange, and offer a useful avenue for recruitment to health research. The use of social media in the context of health research has previously been explored and offers a unique and cost-effective opportunity in recruiting. For example, previous research has demonstrated the use of Facebook and Twitter to recruit for and deliver behavioural interventions for smoking cessation (340). The current use of social media-enabled research was useful and well suited in studying a health topic that is often stigmatised, as well as enabling connection with a population that are seldom-heard (341-344).

However, using a social media platform such as Facebook can present a challenge to recruitment in gaining responses from non-targeted users (308). The use of a monetary incentive may have attracted responders who were ineligible to take part in the survey but attempted to answer the screening questions 'correctly' in order to enter the study and gain access to the incentive.

Measurement issues

The survey enabled the identification of key variables and facilitated focus on key issues for consideration during the intervention adaptation phase of this research. Individual survey items were combined as a way to form scales based on self-efficacy, social support and self-exempting beliefs. The internal validity of factor-derived subscales was variable, with items related to negative social support and scepticism demonstrating low internal consistency due to the limited number of items present in these scales (322). It has previously been reported that the accepted range of 0.2 to 0.4 mean inter-item correlation is the optimal range in order to ensure that the complexity of the items is fully represented and the constructs measure is not too narrow (68). Therefore, the low Cronbach's values suggest that there is a possibility that the scales may not be reliable.

The current study lacked observed effects for a range of variables which could reflect the quality of the measures available. For example, the social support and smoking cessation measure did not examine general social support which may play an important role on quit motivation for the target population. Suitable validated

measures are needed to better capture evidence of psychosocial influences on smoking behaviour in older smokers from low socioeconomic groups. Furthermore, not all of the theoretical constructs identified in Chapter 3 (i.e. response efficacy) were covered in the current research due to the length of the survey and completion time. Future research should focus on examining other potential determinants of quit motivation in older smokers from deprived backgrounds.

Cross-sectional study design

Due to the cross-sectional study design, caution is needed when interpreting associations due to shared-method variance and inability to infer causal relationships (345). Although the cross-sectional nature of the survey was a useful design for identifying the determinants of quit motivation for the population within a given time (346), it could not prove causality and thus could only indicate associations between the given factors (347). Furthermore, shared method variance may have been observed in the current research findings. The measurement of variables at one time point may have led to inflated associations between quit motivation and the psychosocial determinants that might have not have been observed if these had been measured prospectively.

Sampling issues

A strength of the methods utilised in this study is the measurement of deprivation using a screening algorithm which consisted of multiple individual-level socioeconomic indicators. This method aided engagement and recruitment of participants who are representative of the target population of smokers from deprived backgrounds. Although the recruited sample represented those from a deprived background, there was an under-representation of male participants and those aged 65 years or older. This may have resulted in a reduced power to detect statistical significant effects of variables, such as comorbidity, on quit motivation. Furthermore, older adults are less likely to have access to social media or the internet (348) and men are traditionally more difficult to recruit to research (349). A more representative sample could have been achieved through alternative approaches to recruitment such as tailored advertisement to target males and/or those over the age of 65 and boosting recruitment using strategies through different recruitment sources. For example, community groups and other social media platforms could be utilised to encourage representation of males and older individuals.

Implications for future research

Previous studies suggest that smokers from deprived backgrounds are equally motivated to try and quit smoking but less likely to be successful during a quit attempt compared to more affluent smokers (36, 350-352). This paradox results in lower quit rates and potentially exacerbates inequalities in the prevalence of smoking. An important factor that contributes to higher smoking rates among deprived smokers lies in the scarcity of research regarding effective SCIs for more disadvantaged smokers (353). Future research should aim to further explore the identified psychosocial determinants of quit motivation and contribute to research on how best to target and older, deprived population of smokers.

5.5.2 Conclusion

Older smokers from deprived backgrounds face a breadth of complex barriers to quitting smoking and interventions are needed to increase self-efficacy for quitting, dispel risk-minimising beliefs and emphasise elements of previous quit attempts (i.e. NRTs used) that are associated with motivation to stop smoking.

The current research is valuable in the context of targeted SCIs for a population who are at high-risk of developing a variety of smoking related diseases, including lung cancer. The next chapter will explore the psychosocial variables that were examined in the current survey in order to understand in greater depth influences on quit motivation in the target population.

Chapter 6

Exploration of modifiable psychosocial factors influencing smoking cessation and quit motivation: a qualitative interview study with decliners from the Yorkshire Enhanced Stop Smoking (YESS) study

6.1 Introduction

6.1.1. Integrated lung cancer screening and smoking cessation support

As discussed in Chapter 1, attendance at lung cancer screening can offer eligible individuals a 'teachable moment' for smoking cessation, meaning that it is occurring at a time when participating smokers might be particularly receptive to offers of assistance to quit smoking (124, 354, 355). The Yorkshire Lung Screening Trial (YLST) is currently assessing the impact that a national screening might have on lung cancer outcomes in the UK (356). The YLST aims to test LDCT screening in targeted community settings, concentrating specifically on deprived areas of Leeds. Adults aged 55-80 years old, who are current or ex-smokers, are randomised to intervention or usual care groups prior to being approached for the study. The intervention group consists of a 'lung health check' that takes place on a mobile van and involves LDCT for high-risk individuals, and is a pilot health service which is nurse led. Unless they explicitly decline, current smokers are offered the chance to see a specialist smoking cessation practitioner in a nested sub-study - the Yorkshire Enhanced Stop Smoking Study (YESS).

The YESS study (357) aims to address the deficiency in the existing literature by comparing a theoretically based SCI with standard care for participating smokers. The intervention is underpinned by EPPM and aims to improve an individual's motivation to stop smoking by increasing the perceived threat of smoking as well as perceived efficacy for quitting (252). Prior to participation in the study, smoking cessation support is provided on an opt-out basis to all eligible smokers attending lung screening as part of the YLST. YESS is testing whether the provision of enhanced, personalised information delivered by a smoking cessation practitioner (SCP) can increase cessation rates within the context of a lung screening programme.

Participants for the PhD study were recruited from the YLST and included those who declined to take part in the YESS study. Some of the data collected from the interviews for this PhD were used as part of a process evaluation for the YESS study, as a way to understand general barriers and facilitators to engaging the lung-

screening eligible population in smoking cessation support during a lung health check.

Semi-structured qualitative interviews were used to explore in greater depth the psychosocial determinants of quit motivation. Qualitative methods offer a rich insight into the understanding of psychosocial determinants of quit motivations such as social support and smoking cessation, risk-minimising beliefs and comorbid conditions (identified in Chapter 5 (303)), as well as continued smoking and smoking cessation in a lung cancer screening context.

The current study represented a unique opportunity for capturing rich data on quit motivation in a sample of older smokers from deprived backgrounds. The lung cancer screening context was used as an exemplar of a clinical situation in which the target population are offered and decline smoking cessation support. Declining smoking cessation support in this context this would suggest having a low motivation to stop smoking. Therefore, the PRIME Theory of motivation will be used to help structure the interview schedule as a framework that focuses on the emotions and drivers of motivation (52, 53).

6.1.4 Aim and objectives

The aim of the current qualitative research was to explore psychosocial influences on smoking, smoking cessation and quit motivation in lung health check participants who declined the offer of smoking cessation support in the YESS study. Data from this section of the PhD will help to further explore determinants of motivation to stop smoking in a sample of participants who declined smoking cessation support and attempt to understand the needs and preferences of the participants in helping them make an attempt to stop smoking in the future.

6.2 Methods

This study received ethical approval from the East Midlands, Derby Research Ethics Committee (REC: 18/EM/0199) (Appendix 6.1).

Inclusion criteria

Participants were current smokers aged 55-80 who had taken part in the YLST and declined smoking cessation support as part of the YESS Study, and had consented to be contacted for a further interview.

Interview participant recruitment

I contacted possible participants in accordance with the YESS protocol and invited them to take part in a telephone interview. Participants were told that the interview was voluntary, confidential and that choosing not to take part would not have any effect upon their care or treatment within YLST. Forty-two potential participants were successfully contacted by telephone and 28 of these declined to take part in the study. If the participant expressed an interest in taking part in the telephone interview I organised a suitable time and date for the interview to take place within 1-2 weeks. Prior to the interview the participant received a hard copy of the interview consent form (Appendix 6.2) and information sheet (Appendix 6.3). Further consent to participate and permission to audio-record the interview were taken verbally at the point of the interview. Postcode data were collected from the main YESS trial for each potential participant and stored on a password protected Cardiff University computer.

The interviews (n=14) took place over the phone and prior to the interview questions commencing, I completed a telephone consent procedure in which participants were also reminded that they were not obliged to participate in the interview and that they were free to withdraw at any point without giving a reason. Interview duration ranged from 20-40 minutes. After the interview was completed, the participant was sent a £10 shopping voucher as a thank you for taking part in an interview. All audio recordings were uploaded onto a password protected Cardiff University computer and were uploaded to a transcription company (Essential Secretary) via their secure and encrypted portal.

Throughout the interview phase of the research, I kept a personal log following the interviews in order to reflect on the more general aspects of the interview as well as the participant's perceptions.

Interview schedule

A semi-structured interview schedule (Appendix 6.4) was developed based on theoretical constructs that were identified as relevant in the field of smoking and smoking cessation for older, deprived smokers (Chapter 3). Although the ordering of the questions in the schedule was pre-determined, there was the opportunity to deviate from the schedule and explore other issues as they arose. Open discussions were invited on the following topics:

- i. Reasons why the participant declined to see the SCP as part of the YESS study and what could be done to encourage engagement with the study;

- ii. Views on stopping smoking and their current motivation to stop smoking using the Motivation to Stop Scale (271, 273);
- iii. Self-efficacy in relation to quitting smoking;
- iv. Previous quit attempts;
- v. Impact of their social network on smoking and quitting;
- vi. Any comorbid conditions that may impact their motivation to quit smoking.

Due to COVID-19 and the impact on research studies being conducted, the YESS study was paused during 2020 and therefore no further participants were available for recruitment to the present PhD study. As a result, an updated version of the topic guide (Appendix 6.5) that aimed to explore in greater depth what participants felt they needed to help prompt them to stop smoking was only utilised with two participants.

Data management

Interview data were entered into the qualitative analysis software programme NVivo 10 (QSR International, 2012) for storage, coding and indexing.

Researcher role, values and relationship to participants

The interviews were also used to assist in a process evaluation stage of the YESS study in order to understand barriers to engagement with the SCP on the YLST van. Therefore, it was imperative that the interview study design and data collection complimented the needs of the wider research study as well as addressing the PhD aims. My role included developing the topic guide, approaching potential participants, carrying out consent, collecting interview data, analysing data and interpreting results. I worked with a member of the YESS study team in order to distinguish the PhD research from the wider YESS study requirements. This YESS study team member (Dr Harriet Quinn-Scoggins-HQS) also dual coded a proportion of the PhD interview data, which enabled open discussions and setting out clear, distinct research aims.

In qualitative research it is imperative to reflect upon the personal values of the researcher as well as their relationship with the participants. The researcher should have an awareness of how these may influence responses during an interview and the interpretation of findings. I am a white, middle class female with a good educational background who has been given opportunities to reach my maximum potential both socially and academically. I am interested in the social determinants of health and believe that we should live in an equal society where a system does

not fail to support those who are most in need. I have never been a smoker and therefore do not have the experience of being addicted to tobacco. Additionally, I have previously trained as a smoking cessation practitioner and have experience of working for a smoking cessation service. It was therefore important that I did not approach the interviews with the aim of trying to make the participant consider quitting smoking, but rather explore the topics set out in the interview guide and explore further prompts where available. When conducting the interviews, I was conscious of the potential for a power imbalance and how this could impact rapport, trust and openness from the participants. I therefore made an effort to make them feel comfortable through engaging in conversation as a way to make them feel at ease. I was aware that participants might feel apprehensive about someone from a University asking them to take part in smoking-related research. It was important that I was transparent about the purpose of my role and my PhD research in order to gain the participant's trust.

6.3 Analysis

Interview transcripts were analysed using inductive and deductive thematic analysis (358). This process involves familiarisation with the data, systematically coding it, generating a set of initial codes, organising these codes into structures that hold overarching themes and subthemes, reviewing and then refining themes, and defining and further refining themes as a way to create a coherent and consistent accounts of the results. A second coder (HQS) checked a sample of the transcripts (20%) and double coded 100% of the framework matrix, in discussion with myself at different points throughout the analysis process. This helped to enable revision of coding, structures and subsequently the development of themes.

Framework analysis

Framework analysis sits in a broad family of qualitative analysis methods that are frequently termed 'thematic analysis' or 'qualitative content analysis' (359) and has been widely applied in health research (360-367). Framework analysis helps identify commonalities and disparities in qualitative data, prior to focusing on the relationships between different parts of the data thus drawing descriptive and/or explanatory conclusions around the identified themes.

Framework approach involves a systematic and interconnected five-step process of analysis. The process is depicted as a linear progression, but in practice is overlapping and iterative (Figure 6.1). During the analytical stage, the approach was developed over time from a theory driven framework analysis to a more inductive

thematic analysis. A more inductive analysis approach was created due to the new themes emerging from the data and subsequent reiterations and re-visiting of previously analysed interviews. The framework analysis steps that were adopted were suggested by Ritchie and Spencer (Figure 6.1) (368).

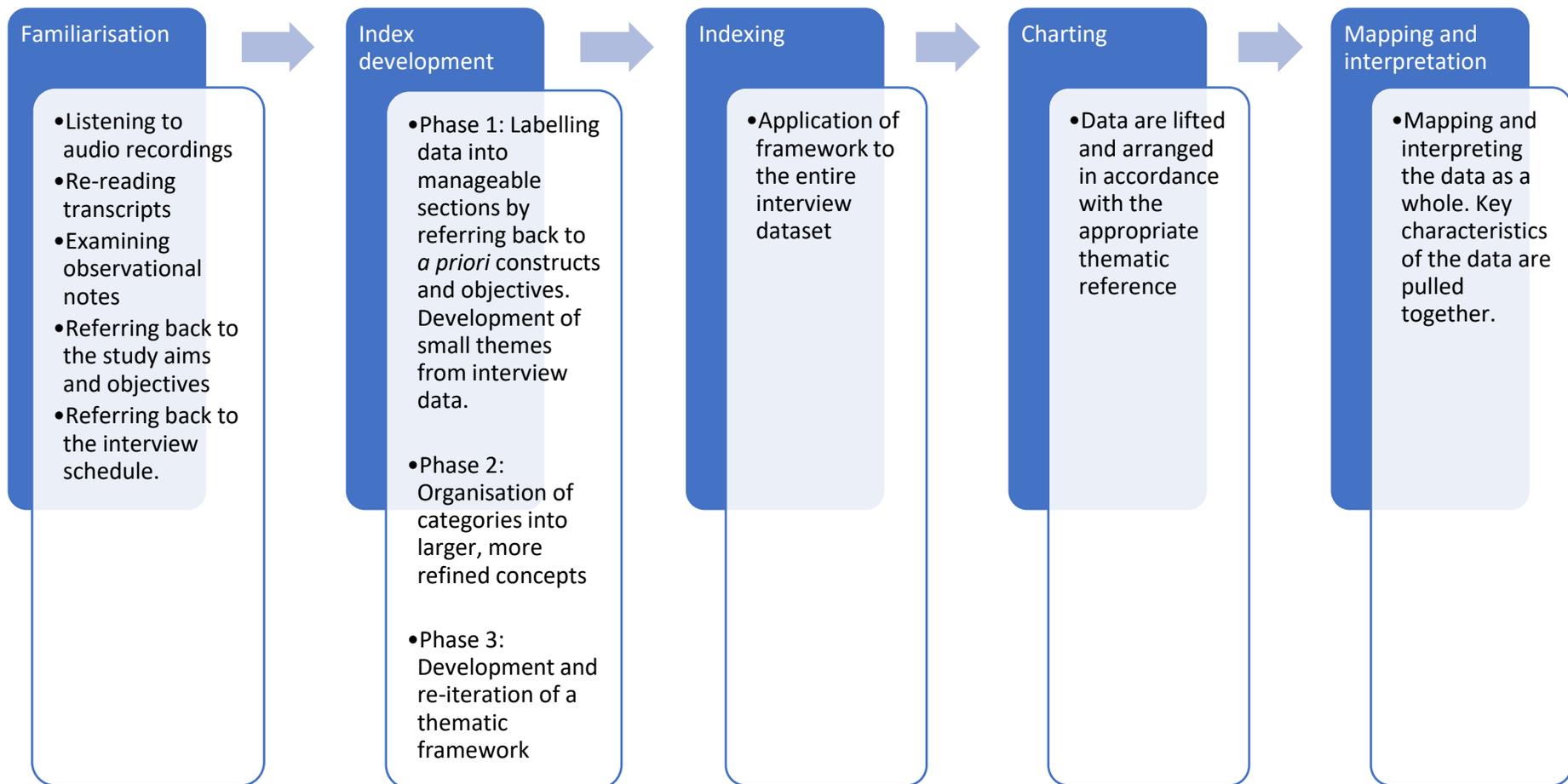


Figure 6.1 Framework Analysis Process (adapted from Richie and Spencer, 2002) (368).

Stage 1. Familiarisation

Familiarisation refers to the process in which the researcher starts to become familiar with the transcripts and thus develops an overview of the collected data (369). This stage of the analysis was imperative in developing the foundation of the conceptual framework (370) used to understand psychosocial determinants of smoking cessation and quit motivation. Throughout this stage, key ideas and recurrent themes were reported and the general atmosphere of the interviews was considered. Any early emerging impressions were noted, such as how the researcher felt when listening to the participant and any specific details that they wanted to remember for later. The familiarisation process was repeated until it was felt that the researcher understood the diversity of the responses within the dataset.

Stage 2. Index development: Identifying a thematic framework

Following the familiarisation phase with the data, data coding was begun on sections of transcripts that were relevant to the PhD research question (369). This process involved making judgements regarding the meaning, relevance and importance of issues as well as the implicit connections between ideas. This stage mainly included the identification of key themes, issues or any discussion points that were embedded in the transcripts. These were then assigned a code that best captured the overall essence of the theme identified.

Coding took place over two phases: firstly, coding that involved identifying the small categories (codes) from the interview data. These categories can be broadly described as beliefs, attitudes, personal experiences and reflections as well as any contextual issues. The second phase of coding was mainly inductive in nature as well as reflexive and progressively more thematic. The relationships between these initial categories were considered as a way to develop secondary categories.

3. Development of conceptual framework

The thematic framework used in the current research was developed based on previously identified relevant theory (Chapter 3), research questions and aims and objectives. It was adjusted throughout by addressing the analytical themes that arose from the patterns of participant views. Once these recurring themes were identified, the initial conceptual framework (i.e. 'index') was formed. Themes within the index were clustered together under a number of 'main themes', which were used to help give an overall structure to the framework.

The first version of the conceptual framework (i.e. index) was largely descriptive and relied heavily on constructs derived from related theory and the interview schedule. Following this, an iterative and reflexive method took place to facilitate further development of the framework. The final, refined framework became more responsive to new emerging themes and thematic, ensuring that all themes were encompassed in the framework and was applied to all interview transcripts. Chunks of the data that were relevant to the research questions were indexed according to the framework and all transcripts were read and annotated in accordance with the thematic framework. The meaning of each section of text was inferred and its relevance within the text as well as the whole interview was considered and then mapped onto the framework.

It was frequently found that certain sections of text contained a number of different themes which led to multiple referencing within a section of text. Multi-referencing enabled the exploration of associations within the data (370). Double coding took place as a way to test the utility of the framework and to ensure the shared understanding of the data that was coded into the framework (371). Discrepancies were resolved through discussion.

4. Thematic charting

The fourth step is 'charting' and this involves data being lifted from the original textual context and set into charts that include headings and subheadings created during the thematic framework (369). This stage was applied as a principle for synthesising and developing a final coding framework in order to extract all the detail from the presented data and thus ensure coding of elements that might have been missed with a more simple *a priori* approach. For the present study data were charted into a data matrix using Microsoft Excel. As suggested by Ritchie and Spencer (369), charts were developed for each key subject area along with entries made for each participants in the same order in every chart. This process enabled comparison of indexed text between participants and also between identified themes.

5. Mapping and interpretation

During this phase of analysis, it was imperative that any outcomes or recommendations made reflect the attitudes, beliefs and values of those interviewed. This involved analysis of the key characteristics that are set out in the charts and provided a schematic diagram which helped in guiding the interpretation of the data (369). The thematic framework, research notes and charting matrix were

used to help compare and contrast the beliefs and experiences of the participants, whilst continuing to explore for patterns and connections within the data. Mapping and interpretation included identifying expected and emerging influences on smoking and smoking cessation with regard to their relationship and relative importance. This stage of the analytical process helped to further define the concepts identified in the framework.

6.4 Results

6.4.1 Sample characteristics

Fourteen participants were recruited to the study, of whom one participant was subsequently removed at analysis stage due to language barriers. The age of included participants ranged from 58 to 79 years. Nine interview participants were male and nine were residents in the most deprived 10%-50% of neighbourhoods across England (372). Twelve participants reported having low motivation to stop smoking, i.e. they did not want to stop smoking (see Table 6.1).

Table 6.1. *Interview participant characteristics*

Participant number	Age	MTSS score	YESS decline point	Index of Multiple Deprivation decile (1-10*)
1	59	2	2	3
2	69	2	2	6
3	58	2	2	3
4	79	2	2	10
5	63	4	1	1
6	68	2	2	5
7	66	2	1	2
8	59	1	2	1
9	69	1	1	5
10	70	2	1	1
11	77	1	2	6
12	75	1	2	5
13	68	1	2	7

*1= most deprived, 10=least deprived

6.4.2 Themes identified

As depicted in Table 6.2, the full thematic framework contained four first level themes. The four themes were: Beliefs about smoking and smoking cessation; Contextual barriers to quitting smoking; Perceived effectiveness of SSS and smoking cessation aids and Social influences on smoking and smoking cessation.

Table 6.2 Major themes identified in qualitative analysis

Major theme	Description
1. Beliefs about smoking and smoking cessation	Reference to internal drivers of smoking and quitting smoking. Evaluative beliefs surrounding smoking and smoking cessation, including risk-minimising beliefs and self-efficacy. Cognitive dissonance of attitudes towards smoking, smoking as a way to cope with various difficult life stressors.
2. Contextual barriers to quitting smoking	Discussions around reasons for lack of motivation. Reference to contextual factors (e.g. age, pre-existing health conditions and competing priorities).
3. Perceived effectiveness of stop smoking services and smoking cessation aids	Reference to previous smoking cessation attempts and physical side-effects/emotional experiences during these. Attitudes towards behavioural support, NRT and e-cigarettes.
4. Social influences on smoking and smoking cessation	Reference to influences on smoking behaviour in the social environment, interpretation of the attitudes of other smokers

A framework matrix was developed based on the four main themes and 18 sub-levels identified in the framework. Figure 6.2 presents the coding tree used to provide more insight into the influences on smoking and smoking cessation in smokers who decline cessation support in a lung screening setting.

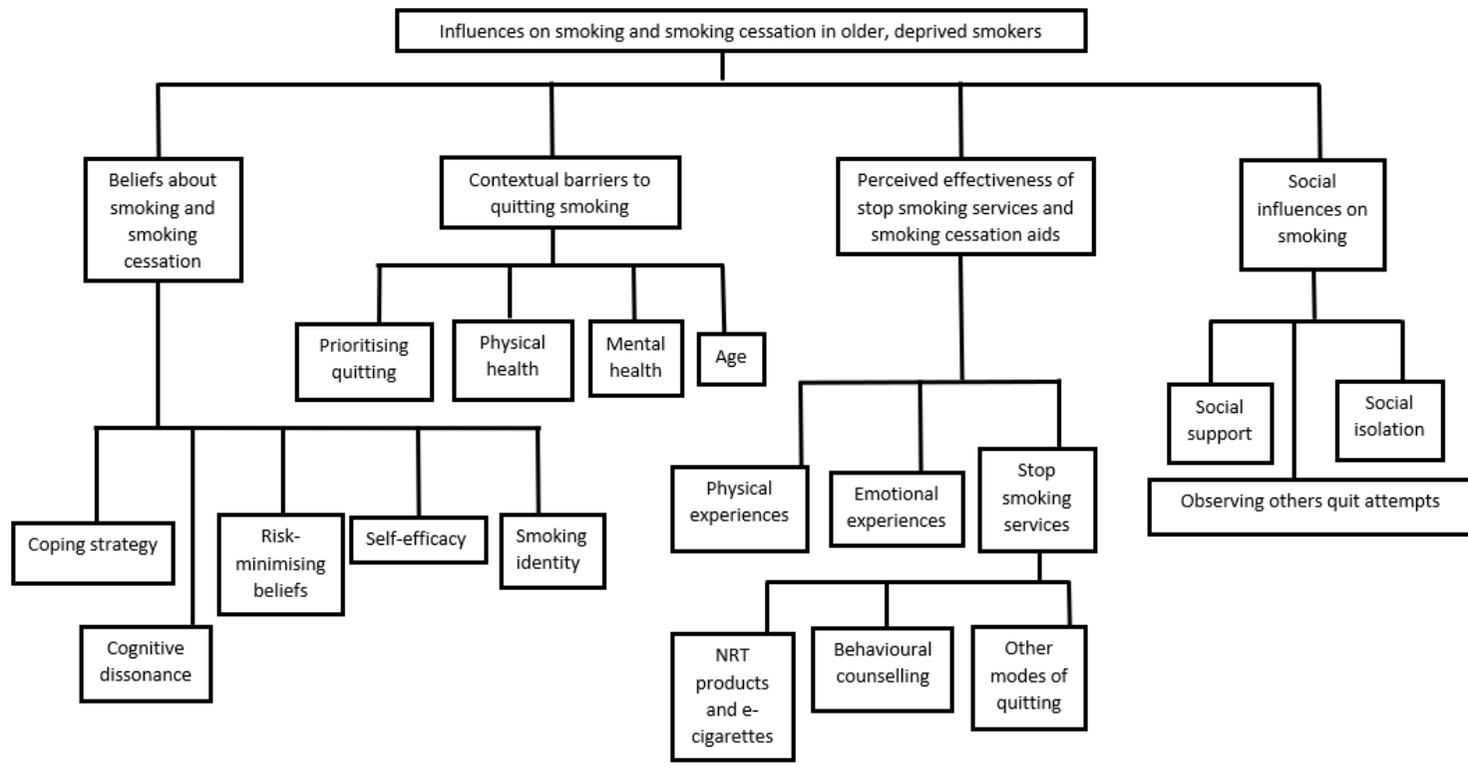


Figure 6.2 Coding tree for thematic analysis

6.4.3 Beliefs about smoking and smoking cessation

Participants gave a variety of reasons for continuing to smoke, with some mentioning positive reasons why they engage in the behaviour. Experiencing enjoyment from smoking was described by the majority of participants. One participant mentioned being aware of the health risks of smoking but did not perceive this to be sufficient reason to stop:

It's just that I enjoy a cigarette, I know the risks involved...I don't need to be told yet again (P9)

Those who declined to immediately see the SCP reported that this encounter would not have prompted them to make a quit attempt. When approached about quitting smoking, defensive and guarded responses were reported by some participants. Participants mentioned that discussing quitting smoking often caused them to feel anxious and therefore to smoke. As a result of these evoked emotions, they preferred to eliminate worry about the prospect of smoking cessation and continue to smoke:

It was a bit awkward really, but, erm, I felt that the practitioner wouldn't help me...I think the more you try and convince me to stop smoking, the more I'd do it (P8)

And I just get fed up with people saying, oh you should do this, do that, do that, you know, that... 'cause that heightens my anxiety to smoke more. It's much easier not to bother and just worry everyday about smoking (P1)

Fatalistic views of their health and a lack of control over their future were also present for some participants. Participants believed that the damage to their health due to smoking was irreversible and therefore that any modifications made to their smoking status would not have a major effect on their health.

It might just get a little bit better. I know it'll never be right, I've done some damage (P9)

Smoking as a coping mechanism

Some of the previous mentioned beliefs surrounding smoking cessation were also demonstrated as coping mechanisms. The belief that smoking is a behaviour that helps participants cope with stress was found in the present interviews. The majority of participants reported not wanting to quit smoking because they used smoking as a way to help them cope with a variety of external circumstances. Smoking due to

family stress was prominent in participants' discussions and was a reason for their lack of motivation to stop smoking. Participants expressed having competing priorities that outweighed their need and desire to stop smoking. Many external circumstances included supporting family members during a difficult period:

I now have some present family problems, um, I think my daughter's inherited some mental health problems, and she's um, quite a cause for concern for me really. So er, I think it's been just ... it's been a comfort really (P2)

Cognitive dissonance of attitudes towards quitting smoking

Cognitive dissonance was demonstrated through many of the participants holding beliefs regarding smoking that conflicted with their behavioural actions and thus led to rationalising their behaviour. Although the majority of participants enjoyed smoking, there were some positive attributes to smoking cessation that were reported. Potential positive benefits of quitting smoking included better health and improved functional ability, and not spending money on cigarettes.

I'd be like that once I stopped smoking, I'd be saying look at them idiots smoking and wasting money (P5)

I think I probably would have more, like I love walking but I'm no good these days at walking up hills. I think it would help in those sorts of ways (P6)

Smoking identity

The belief that smoking was a part of an individual's identity was demonstrated in some participants. For example, participant 8 spoke about how smoking was part of their everyday life and a habit that they frequently engaged in. They mentioned that smoking is something they are known for and is therefore a part of their identity.

Well it's just sort of part of me, erm, to be able to smoke. Erm, I've always liked smoking and what have you. (P8)

Even when I'm, err, doing.. working and what have you, it was always known for me to have a cig where I was painting, or doing any woodworking jobs and what have you (P8)

Risk minimising-beliefs

A highly salient theme was risk-minimising beliefs. Some participants reported feeling optimistic regarding their risk of developing smoking-related diseases and their current health status. One participant mentioned that they viewed smoking as a risk but also believed that there is risk attached to quitting smoking. This belief derived from knowing people who have quit smoking and have gone on to develop a smoking-related disease. This participant possessed fatalistic views about smoking cessation and therefore a lack of confidence in quitting:

I can't see it, cut down, yeah, to try and stop things getting worse for me self but... It's people like the three that have given up smoking, two pass away and one's fighting cancer, in my head I'm thinking smoking, it's a risk as a lot of other things are but it sounds like it's a risk if you give up after so long smoking (P1)

Some participants demonstrated an awareness of smoking impacting their health. However, they perceived their short-term risk to be minimal and this outweighed the seriousness of the issue, resulting in continued smoking.

You know it's that side of it [coughs], I can tell that it's affecting my voice box 'cause I've got all gruff and all that now, er, but it's that thing where, you know, one more won't make me any worse today. (P1)

Participant 2 demonstrated a belief that smoking cessation would result in them adopting another behaviour that may be detrimental to their health. The participant referred to the trade-off between health risk behaviours and downplayed the risk attached to smoking as a result of believing that the substitution would impact their health in an equal way to smoking:

If I stopped what would I do with it? Would I actually supplement it with food or, or what, on what, so at the end of the day it balances out itself, in my opinion, in my opinion it does. (P2)

When participants discussed their smoking behaviour and reluctance to quit smoking, two participants made reference to the way in which they smoke their cigarettes. These participants mentioned that they either only smoked a small amount of a cigarette or did not swallow the smoke. This demonstrates a perception that these behaviours are not as harmful as the 'normal' way to smoke a cigarette.

This might sound stupid to you, but when I have a cigarette I don't smoke it and swallow it all. (P2)

Amount of cigarettes smoked was a risk-minimising belief found in the current sample. Participants seemed to believe that they were not at risk of having poor health as they do not smoke many cigarettes. Frequency of smoking in comparison to others and to themselves at different stages of their lives was referenced. Participants believed that by doing this they have control over their behaviour. Participants justified their current behaviour by comparing it to their previous behaviour of smoking more cigarettes.

You know, so again, you know, and he smoked a hell of a lot more than I ever did. (P12)

Despite the majority of participants reporting having pre-existing health conditions, many perceived their health to be in a good state. Some participants acknowledged that their health had declined due to age but that they were still able to do many tasks.

I can still do a fair bit...Not as much as I could. There again, I'm a lot older than I were when I was 30 (P12)

Some participants believed that smoking was not presenting any risk to them and they were still able to engage in their usual lifestyle. The majority of participants believed that their risk of poor health as a result of smoking was low due to not exhibiting typical symptoms of being a smoker and generally feeling healthy for their age.

It hasn't really harmed me, I don't cough or 'owt. I've not smoker's cough or 'owt like that (P8)

However, some participants displayed higher levels of risk perception of a smoking-related disease and described a fatalistic attitude towards their health. For example participant 1 believed that there was a high chance of them developing cancer as a result of smoking and that smoking had a direct impact on the length of their life.

It's that fear of [coughing] being a smoker how much longer have I got left. It's not if I get cancer, it's when I get cancer in my mind (P1)

Conversely, there were some participants who demonstrated a perceived lack of control over having a physical health issue. There was evidence of a dissociation between physical health issues and smoking among some participants. For example, participant 7 demonstrated a belief that their heart condition was out of their control and that smoking did not impact their health.

I'd heard that it's not necessarily smoking that ... that caused your heart attack, in my case...It were ... it were things that had happened er ... I don't know, through my genes I suppose. It was inevitable that I was going to have this regardless of whether I smoked or not (P7)

Low self-efficacy

Some participants believed that they lacked the confidence necessary to quit smoking. These participants demonstrated low self-efficacy in relation to smoking cessation.

I don't think I would stop, no I don't think I could (P9)

Participant 6, in particular, had low self-efficacy in their ability to stop smoking as a result of a previous failed quit attempt and their personal life. This participant discussed not wanting to fail and that fear of failure was preventing them from making a quit attempt as well as impacting their motivation to stop smoking. They mentioned that they would rather continue smoking and feeling unhappy than risk a further unsuccessful quit attempt. Participant 6 also described low self-efficacy in other aspects of their life that were not specific to smoking.

So I don't try anything, I'm not trying to stop, therefore I've not failed, I'm just an unhappy smoker (P6)

Um rightly or wrongly because of the upbringing I've had, because of the low self-confidence I've had, um I don't want to set myself up for failure. And my head occasionally said you are so stupid, you'll never know if you don't try. I then go back to yeah but I did try, and the bloke said I'd failed, I don't want to fail. I'm fed up of being a failure, I want to achieve something (P6)

When discussing a lack of confidence in their ability to quit smoking, participants referred to not possessing the willpower to enact or sustain a quit attempt. They believed that they did not have the strength to quit smoking and demonstrated high resistance to change even if they were faced with poor health.

It goes through me mind thinking everything I say it's all an excuse 'cause I'm just weak and I can't, I haven't got the, whate-, the willpower to even try (P1)

Even if I was on my, erm, last legs, absolutely gasping for breath, you know I've been doing some exercise like running or 'owt like that, I'd still want a cigarette. (P8)

However, some participants demonstrated high quit confidence and a belief that they would be able to quit smoking if they decided to. Participants mentioned that they have proven success in quitting previously and therefore felt confident in their ability to quit.

I would set my mind to it and I would do it...And I've been able over the years to do things that I've thought can I really do that ...And done it (P12)

I've got to an age where if ... if I decide to do something ... I'll do it erm ... I'll follow it through (P7)

6.4.4 Contextual barriers to quitting smoking

Age as a barrier to quitting

Some participants described low motivation to stop smoking because of their age. Age as a barrier to quitting was demonstrated in those who felt giving up smoking was a change in their behaviour that they were not willing to make at their stage of life. Participants mentioned feeling content with their life and therefore not wanting to make an attempt to stop smoking as this was not important to them:

I don't want to, at my age I, I really don't want to start giving up things that, I don't know, maybe I'm content (P2)

Well it would be more important if I was younger (P4)

Prioritising quitting

The prioritisation of making a quit attempt was a barrier to stopping smoking, with many participants stating that they felt quitting smoking was not something that they viewed as a main concern. The importance of quitting was understood, and participants were aware that they should quit. However, smoking was ranked below other issues that participants deemed as more important to address:

Do I think I should? Yes I do, both for health and finance, but it's the bottom of the pile at the moment (P6)

Well at the moment, I feel like I can't do both because ...I'm trying to do one thing; I'm doing one step at a time. I've stopped drinking and now I've started on the cigs (P5)

Participants mentioned that their lives were stressful as they face a variety of difficult circumstances and that smoking offered a consistent pleasure that they do

not get from other areas of their lives. The majority of participants mentioned that tobacco smoking was one of their only pleasures that they did not want to relinquish:

I haven't got a great deal in my life anymore. I mean I'm retired, I'm widowed, erm, I haven't got a lot (P2)

The majority of participants discussed that there is nothing that could make them stop smoking. However, two participants mentioned that the only possible way that they would be able to quit smoking was if they had an easier life. Participant 4 mentioned having previously been in an abusive relationship and is currently a single parent to a child with mental health issues.

I suppose if er, the problems I have went away, that would be one, I suppose, possibility (P4)

It's like when life pressure's not quite as stressful as it is (P6)

Mental health

Two participants mentioned having clinically diagnosed mental health issues including anxiety, depression and schizophrenia, which they felt impacted their smoking behaviour and motivation to stop smoking. Participant 1 reported suffering from anxiety and depression, and worried that if they were to quit smoking then their mental health would be negatively impacted. They mentioned that their mental health was affected by having a range of physical health issues and that smoking was a coping mechanism:

If I was to give up me anxieties would be through the roof I believe and, I, I've got nothing to help me, help through the... You know, the bad times of the days which is quite often, nearly every day because of me physical health as well as that (P1)

Physical health

The majority of participants interviewed mentioned having comorbid health conditions. Some participants reported having had a clinical diagnosis such as COPD and sleep apnoea, and some discussed undiagnosed issues such as back ache. Participant 1 in particular had a range of complex physical health issues and thus perceived themselves as being in a physically bad state. Participants discussed how their poor physical health in turn had an impact on their mental health and their

smoking behaviour. Participants mentioned that smoking was a way for them to cope with their physical pain and they viewed tobacco smoking as a form of self-medication that helped them to deal with their physical issues:

It's the cigarettes are also one of my medications if you know what I mean. I take all my tablets and have a cigarettes and then all my problems will be all alright for a bit (P1)

6.4.5 Perceived effectiveness of stop smoking services and smoking cessation aids

Physical side-effects

The majority of participants mentioned experiencing side effects from NRT during a previous quit attempt, and the impact this has had on their current views towards stopping smoking. There was a general lack of awareness regarding which NRT would most suit them, due to previously having bad experiences and then immediately stopping their quit attempt. The most frequently discussed side effect was from using nicotine patches.

I tried a patch, but they didn't work, I suffered badly...I had very bad side effects. I had to give up because of the side effects. (P1)

But then the patches started to burn my arm...And I stopped using them. It just put me off a little bit, I don't know, it's a strange thing to, to describe (P10)

Scepticism about other nicotine replacement products, such as inhalators, was also mentioned. However, some participants found that nicotine replacement products helped to ease their cravings and saw this as a positive element when trying to quit.

They just ... no, I didn't find them any good at all...I think, I, I would've thought the, um, imitation cigarette would've worked but it didn't. It was hard. (P12)

Well I found the patches, or whatever, the nicotine replacement helped to stop my craving (P13)

Some participants had a negative opinion of e-cigarettes based on previous experiences and described the size of the e-cigarette, the flavours and the vape cloud as off-putting. Additionally, one participant felt that their health was worse after having used an e-cigarette.

Well carrying around this big cumbersome thing that bellows out loads and loads of steam and for what (P2)

Actually when I first started it, I coughed worse, when I first used it (P9)

Emotional experiences

When discussing their previous quit attempts, participants referred to their emotional responses to stopping smoking and how they felt during their quit attempt. Feeling defeated and an overall lack of self-efficacy as a result of a failed previous quit attempt were described, which resulted in participants not having the confidence to make a future quit attempt.

I think it just instilled in me that if I tried anything else I'd fail anyway. And then I didn't want the pressure of people knowing that I were trying this, um and I'd failed. A bit like failing your driving test every time (P6)

One participant did demonstrate high levels of self-efficacy during a previous quit attempt. They mentioned that their previous quit attempt had proven their ability to make a successful future quit attempt if they chose to do so:

It proved to me that I could do it if I wanted to (P13)

Some participants reported missing smoking when they made a previous attempt to stop and found it difficult to refrain from smoking. Participants mentioned that when making a quit attempt they often found themselves looking for their cigarettes and their cravings were heightened. Participants discussed that their mood was negatively affected when they previously tried to stop smoking and therefore they decided to end their quit attempt.

But the second time, this last time, I, I find it, found it very hard to, er, not go looking for any (P12)

We stopped for about six months, but er, weren't happy, didn't feel happy. Yeah, I, I did feel, er, quite miserable to be honest (P12)

Stop smoking services

A lack of awareness of local smoking cessation services available to support participants was a prominent theme. Participants either reported not knowing about these services in their community or having a vague understanding of their existence. Participants were unaware of how these services could support them

during a quit attempt in the future and demonstrated a lack of awareness regarding the range of behavioural formats that are available:

Er, nothing really. I know, once when I, oh, I don't know when, when I've been to doctors about me breathing I think it was...but I don't, that's the only bit I know about. I know you can go online and see things (P1)

I don't know anything about group ones at all really, um I didn't know they did them (P6)

Behavioural counselling

One participant mentioned that they had previously used a smoking cessation service and attended behavioural counselling when attempting to stop smoking. This participant viewed their experience positively and mentioned that if they were to make a quit attempt in the future, they would utilise this service again. The participant discussed that having their carbon monoxide levels measured each week was a positive experience for them.

I know that when I were going on that machine, every time I went, it got less and less and less. You know, which I thought was good. (P10)

However, generally there was a lot of scepticism towards behavioural counselling with participants reporting that they would not utilise this form of support if they were going to quit smoking in the future. Some participants reported not wanting to attend behavioural counselling due to the fact they do not like to be around other people. Participants were also unaware of what this form of support would offer them and demonstrated reluctance to attend, as they believed it may be too much pressure for them.

I don't know what kind of support I'd expect...You know like... you know I'll come round now and we'll... we'll er... I'll tie your hands together' or whatever I don't know (P7)

If they try and shove me off to one of them things, smoking things, I won't go because I don't like being round too many people, I can't do it (P5)

Nicotine replacement products and e-cigarettes

Six of the participants interviewed expressed scepticism towards using e-cigarettes when trying to quit smoking. The main view of e-cigarettes was that they were

potentially dangerous to the user. The majority of participants held this belief as a result of messages from those within their social circle as well as healthcare professionals. The participants had received information that e-cigarettes could be harmful to their health along with the fact that there is not enough known about them as a smoking cessation aid.

I were put off by them, when I first went down to the Stop Smoking clinic, because they said "Oh they're not good"... err because I was told that you couldn't, at one time they were going to put them on the NHS, and that's I asked about them, and she said "No they're not, because they're not good, they're not a good thing" (P10)

Well I've got some friends what have them and erm, they're right fragile and plus they were charging one up once and the thing exploded (P5)

Participants also mentioned uncertainty surrounding the impact of e-cigarettes on their health. Participants felt conflicted over the messages that they had heard about e-cigarettes and therefore decided not to utilise them. They viewed them as a smoking cessation aid that could be addictive and believed that they would be replacing one unhealthy behaviour with another.

Rightly or wrongly I just tend to think (a) will they say in 10 years' time well the time it's don't have red wine, it's bad for you, and then you should have red wine, they've decided it's good for your heart. Um so I don't think there's enough research in it. Um and secondly is it just giving one addiction up for another one? (P6)

Participant 2 reported that the overall appearance of e-cigarettes (i.e. the cloud) was slightly off-putting to them; however, they reported still using an e-cigarette despite this view.

I mean people walk round with this, and a big bellow of smoke comes out, or steam comes out and for me I, I think it looks bad, well that's my opinion (P2)

Other modes of quitting

Quitting smoking as a solitary pursuit was found in some participants who mentioned that if they were to quit in the future, they would not utilise any of the support that is available (i.e. NRT and/or behavioural support). Participants felt that they could avoid the pressure of failing by not attending behavioural counselling or avoiding telling

someone they were quitting. Instead, participants mentioned that they would prefer to make an attempt to stop smoking without any support and would rather go on this journey alone as a way to avoid being judged.

I would probably not tell anybody and do it privately to see if I could achieve it. And then it takes a little bit of the pressure of I'm failing away (P6)

I wouldn't want to go somewhere; I would like to try myself first (P7)

Participant 4 discussed that a friend within their social circle had quit smoking after having had hypnosis. The participant was aware that this was not a well-known smoking cessation method, but would be open to trying this due to observing a friend having had it and successfully quit smoking.

I would as I said, consider, hypnosis, if I knew more about it, and how effective it was (P4)

6.4.6 Social influences on smoking and smoking cessation

Social isolation

The majority of the participants reported living a socially isolated life in which they rarely had contact with family members, friends or other people in their social network. Participants spoke about how they do not have regular contact with family members and therefore lacked social support. Loneliness was often reported as an outcome of social isolation:

I mean I'm not around people. I'm on me own at home and I have been for the last god knows how many years (P1)

Nobody usually comes and knocks on my door, or very few people come and what have you, so I am quite lonely as well (P8)

Participants reported feeling isolated due to their social circle not wanting to visit them because they are smokers. The issue of shame and worrying about what others think of them was a theme for some participants who exhibited distress and upset from being socially isolated as a result of their smoking. Participant 1 described their home conditions that deterred family and friends from visiting which compounded feelings of isolation and led to worsened mental health. Stigma and shame related to social isolation were also apparent. Participants mentioned that family and friends did not want to see them due to the fact that they still smoked and the rest of the family had quit.

So people don't come to me, 'cause I've got a house that smells of smoke and, bleurgh...It puts me into a lower depression than I'm already in (P1)

You know, they don't really want to see me and that. I think it's because they haven't ... I'm a smoker and they've all sort of given up smoking and what have you (P7)

I don't want my house to look like this, it's absolutely disgusting, it's what do people think, how, how ashamed I am and it's awful, but I can't physically do a lot about it, I can't cover it all up with paint, I can't do it (P1)

The link between social isolation and therefore a lack of social support was often spoken about. Feeling socially isolated and not having anyone to hold themselves accountable to was a theme that emerged. Participant 7 in particular demonstrated that being socially isolated meant that not having any social support could be a reason that they decline a quit attempt.

I don't have to answer to anybody so I could turn round and say "No I'm not doing it" (P7)

Social support during a quit attempt

Social support during a previous quit attempt was a dominant theme within the topic of social influences on smoking. One participant, who mentioned not seeing many people within their social circle and feeling isolated, also reported that during a previous quit attempt their family and friends did not know that they were trying to stop smoking. Fear of being perceived negatively through failing during a quit attempt was a factor for some participants. These individuals discussed how they would make a conscious decision not to let their family or friends know about a quit attempt in the future, in order to avoid feeling like they have failed.

I would probably not tell anybody and do it privately to see if I could achieve it. And then it takes a little bit of the pressure of I'm failing away (P6)

Although many participants were socially isolated and reported not smoking with other smokers, some participants described experiencing negative social support (i.e. encouragement of smoking) within a social setting. Participants discussed how they perceived this form of support as a suggestion that people surrounding them do not want them to quit smoking.

A lot of people ask me, erm, when I'm out and about and what have you, erm, oh have you no cigs, you know, err do you want one? Nobody seems to want me to stop smoking (P8)

Participant 8 also demonstrated a sense of reliance on other smokers in their circle to give them a cigarette if they do not have one, thus impacting their ability to make a quit attempt.

It affects mine a great deal really because if I haven't got any and they've got any I think well, you know, erm, can you give me one (P8)

A lack of social support from family and friends was prominent when participants discussed the possibility of making a future quit attempt. One participant felt that if they were to make the decision to stop smoking in the future it would be met with a negative response from those smokers in their social circle.

They'd probably say, oh are you deserting us and ... something like that (P13)

However, a small number of participants discussed either experiencing positive social support (i.e. encouragement to continue smoking abstinence) during a previous quit attempt or the expectation of receiving positive social support from their social circle if they were to make a quit attempt in the future.

Well you know, they thought it was a good thing, that I had, had done it (P10)

I mean my wife doesn't smoke and um she's constantly onto me, constantly (P9)

Observing other quit attempts

Several participants held negative opinions of those in their social circle who had tried to give up smoking and they viewed the quit attempts as pointless and not successful. For example, Participant 2 mentioned that those within their social circle are often smoking during social occasions when trying to stop smoking.

Within three months they've got a cigarette in their mouth and I'm thinking well what was the point of all that? (P2)

The dissemination of messages regarding NRT and smoking cessation among those in the participant's social circle was also described. Participants all mentioned receiving information about smoking cessation attempts from a friend or family

member. The messages received were perceived as negative and discouraged the participants from making a quit attempt:

I mean, I've heard people say that they've tried all these things, and they weren't really very effective. So um, I think that would ... I would find that difficult (P4)

See, but other than that, he says, "No, I can't say I've noticed any difference"...so again, it's another factor in my thinking, you know, well, why (P12)

6.5 Discussion

The current study gives an understanding of the influences on quit motivation in the context of readily accessible, community-based lung screening trial with integrated smoking cessation support. The findings presented in this chapter provide an insight into some of the modifiable psychosocial influences on smoking and smoking cessation in a sample of smokers recruited from the YESS trial who declined support from a SCP (357). These smokers either declined to have immediate smoking cessation support in a healthcare setting or declined ongoing support when leaving the healthcare setting. To date, very little research has attempted to gain an in-depth understanding of those who decline smoking cessation support in a lung screening setting. The current research explored smoking and smoking cessation which is an understudied area of work with a population that are underrepresented in the current literature.

6.5.1 Summary of findings

Interview participants were highly resistant to change, had low motivation to stop smoking and faced a breadth of barriers to initiating a quit attempt. Participants described modifiable psychosocial factors that influences their quit motivation and smoking cessation, including self-efficacy, perceived effectiveness of SSS (included NRT and behavioural counselling), risk-minimising beliefs, social influences on smoking and beliefs about smoking/smoking cessation. Non-modifiable psychosocial factors that were described included contextual barriers such as age and mental and physical health.

6.5.2 Findings in relation to previous research

The present study found that the majority of participants scored low in regard to their motivation to stop smoking and demonstrated being highly resistant to

changing their smoking behaviour. Due to unmet psychosocial needs, participants are unlikely to see quitting as a priority and therefore consider smoking to be necessary to everyday coping and stress relief. This finding is similar to other studies which have demonstrated increased smoking as a maladaptive mechanism of coping with stress (373-375) and having fewer resources needed to successfully cope with stress (376-378). Similarly to findings from the present study, previous research has found that socially disadvantaged smokers are likely to experience additional stressful situations. Such situations have been associated with higher smoking rates in disadvantaged smokers compared to more affluent smokers (377, 378).

Participants reported having suffered with mental health issues, such as anxiety, depression and schizophrenia, and were using smoking as a way to control these issues. Participants also demonstrated fear of smoking cessation due to it potentially worsening their mental health. As previously identified in other studies, participants reported experiencing irritability, depression and anxiety when they have not smoked for a while (379, 380). These feelings are then relieved by smoking (381) therefore creating a perception that smoking has positive psychological benefits, when in fact smoking cessation has been shown to be associated with reduced depression, anxiety and stress (382).

The majority of the smokers reported having current poor physical health and/or previous episodes of bad health that have not prompted them to stop smoking. A sense of fatalism in older smokers has previously been highlighted by Cox (383), and the present findings demonstrate the wider determinants of smoking. For example, mental health and social isolation may lead to pessimism regarding making a quit attempt. Similarly to previous studies (71), the present interviews demonstrated that participants perceived their age as a barrier to quitting, believing that they are too old to quit. The barriers to a smoking cessation attempt outweighed the perceived benefits of quitting smoking. Participants appeared to believe that the '*damage was done*' and that it was unlikely that they would benefit from stopping smoking at this stage of their life.

Previous research has shown that trigger events, for example an episode of bad health, can result in a quit attempt for older smokers (71) however, the current results did not reveal this. The benefits of quitting smoking for life expectancy accumulate with years since stopping smoking (384) and there are positive health benefits to quitting smoking at any age (384). It is possible that emphasising healthy

life years may be an important factor in improving quit motivation for older smokers, as smoking risks such as vascular diseases and myocardial infarction are not modified by age (385).

A predictor of successful smoking cessation for those over the age of 60 is living with others (386) and the presence of a supportive environment can help a smoker quit and also prevent relapse (387-389). The feeling of loneliness has been associated with higher smoking and social support has been shown to be beneficial when contemplating and maintaining smoking cessation (390). Social relationships can affect health behaviours in a variety of ways, for example via the diffusion of knowledge surrounding health behaviours (391). As found in the current research, these social relationships may play an important role in the dissemination of health risk behaviours, including smoking (392).

Depression and anxiety have previously been associated with loneliness (393). Participants reported lacking a consistent social support system and experiencing feelings of exclusion, stigmatisation and segregation which in turn can impact their mental health and thus their motivation to stop smoking. Smoking-related stigma was present in the findings and encouraged secrecy and social withdrawal from non-smokers (182), which can further exacerbate health inequalities. However, this subjective experience of smoking-related stigma among older, more deprived smokers is not fully understood and requires further attention.

The completion of smoking cessation treatment improves the likelihood of quitting smoking (36). However, previous research has found that individuals from a low socioeconomic background are more likely to stop using pharmacotherapy early in a quit attempt compared to more affluent smokers (394). Around 73% of participants in the present research had made a previous quit attempt. During these quit attempts, participants mentioned having bad side effects from using nicotine replacement therapies which then caused them to relapse and continue smoking. Previous research has shown that the most frequently reported side effect of nicotine patches are local skin reactions (395). Previous studies have shown that smokers frequently display negative attitudes towards pharmacological aids and report concern regarding the safety and efficacy of them (396-398). These negative perceptions have previously been found to predict lower intention to use nicotine replacement therapies as well as poor adherence in smokers who use them (399-402). Research has previously highlighted that the use of NRT is associated with higher abstinence rates in older smokers (196), however this demographic may be

more resistant to smoking interventions (71, 403). The current research reflects these findings and adds to the knowledge of beliefs about NRT specifically for older smokers from deprived backgrounds.

A further identified aspect of a previous quit attempt that may impact motivation to stop smoking is the effect that these attempts have had on self-efficacy to quit. Findings showed that participants lacked confidence to make a future quit attempt and perceived this as being a result of their failed previous quit attempts. Another explanation could be that more stressful and disadvantaged lives can reduce an individual's self-efficacy; this could decrease confidence in their ability to quit and ultimately overcome previously discussed barriers to quitting. Interventions that encourage discussions about negative previous quit attempts and aim to encourage the use of other forms of NRT could be beneficial to increasing self-efficacy in quitting smoking for the target population.

One of the barriers to smoking cessation in this population includes inability to easily access treatment (327). Similarly to research by Roddy et al (404), participants demonstrated a lack of knowledge regarding the available services to support them in quitting smoking and perceived them to be ineffective despite much evidence to the contrary (36, 44, 179). Perceptions of SSS among older, deprived smokers is currently an under-researched area. The present findings add to the limited understanding of how SSS could be adapted to improve access and uptake for this population. For example, raising awareness of the different forms of behavioural counselling (153) and the usefulness of e-cigarettes could be beneficial for older smokers from deprived backgrounds.

The majority of participants held negative beliefs about e-cigarettes with many perceiving them as dangerous and not an appealing tool to help them stop smoking. The health consequences of long-term e-cigarette use are largely unknown (405-407). However, there is mounting evidence demonstrating that they are substantially less harmful than tobacco smoking (195, 407-409) and that vaping can support smoking cessation (190, 407, 410, 411).

The belief that e-cigarettes are more harmful than tobacco smoking increased rapidly among smokers in the UK after the US lung injury outbreak during the Autumn of 2019 (412). The current interviews took place during this period and therefore participants may have been deterred by safety fears about using e-cigarettes to quit smoking. It is currently difficult for smokers to make sense of the various contradictions surrounding the impacts of vaping. Dispelling negative beliefs

about e-cigarettes among the target population is an important factor in encouraging the use of a smoking cessation tool that demonstrates less harm compared to tobacco smoking (407).

The majority of participants were from more deprived areas of Leeds (372) and reported experiencing unsuccessful previous quit attempts. Previous research has found that the disadvantages of being from a low socioeconomic background can reduce the chances of successful cessation (36). Smoking as a means to deal with difficult circumstances and poor mental health was observed in the current research with participants having complex, competing life stressors. Self-reported stress is a commonly observed barrier to smoking cessation (413, 414), with individuals reporting lower levels of stress having a better chance of experiencing successful cessation (413). Furthermore, individuals with poor mental health are more likely to live in circumstances of socioeconomic deprivation. This has been shown to be partly due to the role that deprivation plays in the causal pathway to developing a mental health condition (415), and that living with poor mental health can lead to a loss of employment, income, housing and other attributes.

The current findings demonstrated that isolation from social networks and a limited opportunity for respite appear to not only foster smoking behaviour but also discourage or undermine smoking cessation. Similarly to the current findings, a recent report has demonstrated that older adults are at an increased risk for experiencing social isolation and loneliness due to facing predisposing factors including living alone, the loss of family or friends and chronic illnesses (416). Additionally, previous research has shown that low education and low income are independently associated with social isolation (417). The majority of the current sample reported experiencing social isolation, in which they rarely had regular or extended contact with family or friends. Participants reflected on how this impacted their smoking behaviour with many feeling they lacked the positive social support necessary for quitting smoking. These results demonstrate the importance of wider determinants including the broader contextual factors that the target population may face.

6.5.3. Theoretical mapping

The findings of the present study can be mapped onto relevant theory presented in Chapter 3. The PRIME theory states that evaluative beliefs regarding smoking can influence an individual's motives and desires to continue/quit smoking (52, 53). The results from this research demonstrate that participants experienced social isolation

and a range of complex, conflicting external factors that impact their beliefs on smoking and smoking cessation. PRIME theory (52, 53) also states that environmental cues can influence the decision to smoke through triggering impulses. However, a socio-ecological model (418, 419) may better encompass the wider determinants that were found in the present study and will be discussed subsequently.

Perceived effectiveness of SSS and smoking cessation aids was present in the study findings with external cues, such as previous exposure to smoking cessation services and aids, being perceived as having an impact on participants' motivation to stop smoking in the future. Attitudes towards behavioural support, NRT and e-cigarettes were also referenced and uncertainty about their effectiveness were found. Additionally, in accordance with PRIME theory (52, 53), there were several barriers that undermined motivation to stop smoking. Frequently reported barriers were enjoyment of smoking, physical and mental health issues and competing priorities.

6.5.4 Strengths and limitations

In this study, telephone interviews were used to collect data. The advantages of using this method of data collection include easier access to participants across the UK and reach to seldom-heard populations. Although the use of telephone interviews enables access, one of the disadvantages of this method is the reduction of social cues. The topic of conversation (i.e. smoking and smoking-related health issues) could create barriers to discussions due to the likeliness of smoking-related stigma being present in the current sample (182, 420, 421). In order to overcome these potential barriers to discussions, it was imperative to establish rapport with participants through the use of verbal communications as a way to foster trust and compassion.

The majority of the 13 participants were recruited from the most deprived deciles and the sample recruited for the YLST are heavily weighted towards disadvantaged individuals due to recruitment occurring in deprived areas of Leeds. However, individual-level deprivation indicators were not collected and postcode-level data showed that some participants recruited were from the least deprived deciles. Therefore caution should be made when interpreting results in relation this study due to issues involving sample representativeness of a deprived population .

Due to COVID-19 the updated version of the topic guide was only used for two of the recruited participants. This may have implications for information power due to

caution surrounding the amount of information that is relevant to the present study (422). However, despite the inability to recruit additional participants, this research produced rich, informative data that were analysed rigorously using in-depth framework analysis. Framework analysis was particularly relevant for the present research as findings will be used to help adapt a behavioural intervention that can be used to better inform policy and practice (423). The use of framework analysis enabled a rich, clear and structured representation to be obtained regarding the influences on smoking and smoking cessation in the context of older smokers from deprived backgrounds. In addition, the structured nature of using a framework helped to facilitate the viewing and assessment of the data analysis by a researcher independently of myself (424).

It was acknowledged for the current phase of research that I was an active participant in the knowledge and production, and therefore not a neutral bystander. My background along with my pre-conceived beliefs, understanding and biases about smoking, can influence the methods selected for investigation as well as the way in which data are analysed and interpreted (425).

6.5.5 Implications for practice, policy and future research

Smoking cessation services are among the most effective and cost effective forms of healthcare interventions available in the world of medicine (426-428). These services have huge public health potential, particularly in relation to older smokers from more deprived backgrounds who could experience reduced mortality (429), additional healthy life-years (430) and reduced morbidity (431). The current interview findings demonstrate the need for services to be more widely and appropriately promoted in order increase awareness of their varying formats and effectiveness.

There have been varied community approaches used to mitigate the negative health impacts of social isolation and loneliness (416). Connecting older, deprived smokers with volunteer organisations and local community groups has the potential to positively affect health and well-being directly (e.g. through lowering stress) and indirectly (e.g. by improving access to local services). Elements of social prescribing (432) may be useful in referring the target population to these organisations and the value of embedding this in a SCI should be explored.

The smokers in the current research had low motivation to stop smoking and a breadth of conflicting life stressors. The current sample reported being less likely to make a quit attempt due to perceived negative impact on their mental health, and

reassuring smokers that stopping smoking is associated with positive mental health outcomes could be beneficial. Providing enhanced cessation support to smokers who are experiencing stress (433, 434) may aid reduction in smoking prevalence, particularly among older smokers from disadvantaged backgrounds (378). For example, the use of social support interventions that target stress management and coping skills could be utilised with the target population (433, 434).

Participants discussed how smoking was their only pleasure in life with reference to losing loved ones and not seeing family or friends. These older, socially isolated smokers might be using smoking as a tool to help fulfil their social needs or for self-medication reasons (435). Further understanding of how loneliness, as a result of social isolation, induces vulnerability to smoking may aid intervention development to reduce the tendency to smoke when experiencing loneliness. Additionally, results from the present study revealed that the majority of smokers believed that nothing could prompt them to make a quit attempt. Gaining feedback on alternative quit support and aids that may prompt a quit attempt could be beneficial for future intervention design aimed at increasing smoking cessation in the target population who are more socially isolated.

An important contributing factor to high smoking rates among deprived groups is due to the overall scarcity of research and outputs targeting disadvantaged smokers (436). Additional research that aims to understand those who are highly-resistant to quitting could help to further knowledge on improving their motivation to stop smoking and likelihood of making a quit attempt. Furthermore, examining an individual's social support and network characteristics in relation to their smoking behaviour may help to increase the understanding of how the environment shapes smoking cessation and suggest avenues for future interventions for the target population.

Knowledge and understanding gathered from this research has use for further applied understanding of older smokers from deprived backgrounds who are likely to be a lung-screening eligible population. Additionally, lessons learned from this work could be useful in other healthcare settings with transferable knowledge on barriers to smoking cessation for this population and how best to engage them in behaviour change when they are highly resistant to quitting smoking.

6.5.6 Conclusion

The present study facilitated a deep understanding of the beliefs surrounding smoking and smoking cessation and further potential psychosocial factors that

influence older, deprived smokers' motivation to stop smoking. To promote cessation in this population, interventions should aim to encourage positive beliefs about smoking cessation aids, address existing mental health issues and increase confidence in quitting after having experienced a previous unsuccessful quit attempt. It is important that interventions address the context of social isolation and a lack of positive support for smoking cessation that exists in this population.

Findings from the present chapter will be used in combination with findings from the systematic review (Chapter 2) (153) and cross sectional survey (Chapter 5) (303) to generate recommendations for adapting an intervention designed to improve quit motivation in older smokers from deprived backgrounds. Recommendations for intervention adaptation will be informed by the ADAPT guidance (437), described in Chapter 7.

Chapter 7

Recommendations for the adaptation of a smoking cessation intervention for older smokers from deprived backgrounds

7.1 Chapter Overview

The current chapter represents the final phase of this thesis and builds on the findings from the systematic review, survey and qualitative interview studies reported in previous chapters. This chapter aims to describe a hypothetical worked example of the adaptation of a behavioural SCI, designed to improve smoking cessation in the target population. Recommendations for the adaptation of a SCI and evaluation planning using the ADAPT guidance are reported. Finally, the ADAPT guidance will be critically evaluated for its usefulness as a framework for intervention adaptation in the context of smoking cessation for older smokers from deprived backgrounds.

7.2 Introduction

Research has successfully demonstrated that gold standard SSS are the most effective way to quit smoking and are also one of the most cost-effective interventions in the NHS (438). However, previous reviews have found that despite behavioural SCIs appearing promising, findings for their effectiveness are inconsistent and rates of smoking cessation remain lower among disadvantaged groups (439, 440). Further work is needed to improve engagement in a behavioural SCI that has known effectiveness and cost-effectiveness with older smokers from deprived backgrounds. This work could help in understanding how effective SCIs can be integrated in a lung screening setting.

One of the aims set out in the Tobacco Control Plan is a focus on reducing inequalities in smoking cessation (441). Social prescribing may be able to play a role in achieving this aim through the consideration of the wider determinants of health and placing emphasis on wellbeing rather than health alone (442). Social prescribing uses non-medical, asset-based methods and can link people into community support to improve their health and wellbeing. Elements of social prescribing have the potential to support older smokers from deprived backgrounds with a wide range of emotional, social and practical needs. Many of the schemes offered focus on improving mental health and physical wellbeing. This can provide new life opportunities for those who may need them most, including opportunities to

forge new relationships, be creative and independent while also improving physical and mental health.

In regards to SCIs for the target population, behavioural SCIs that are tailored to and delivered at the individual level and recognise the wider context of older, socioeconomically disadvantaged smokers have been shown to be beneficial (50, 443). Tailoring a behavioural intervention through combining policy initiatives such as gold standard SSS behavioural support and social prescribing could be useful for the target population. The addition of social prescribing may enable a SCI for the target population to function as intended in improving the wider determinants of smoking through referral to local support groups.

The systematic review from Chapter 2 of this PhD demonstrated that a tailored multimodal intervention delivered in a community setting has the potential to positively impact smoking outcomes for older smokers from deprived backgrounds (153). However, the review identified a current gap in understanding of the most effective behavioural SCIs for the target population. This gap was addressed in Chapter 5 to identify psychosocial variables that could be targeted in an adapted behavioural SCI in order to improve quit motivation for the target population (303). Finally, findings from Chapter 6 of this thesis identified the importance of the wider determinants of smoking in a lung screening population who declined smoking cessation support. These findings will be further discussed in relation to the hypothetical adaptation of a SCI for the target population using the ADAPT guidance (437). A worked example of the adaptation of a SCI for the target population will be described based on the accrued evidence from the PhD studies (Chapters 2, 5 and 6).

7.2.1 Intervention adaptation using the ADAPT guidance

There has been a recent growing interest in maximising the use of existing population health interventions by implementing them beyond the original study context. Existing interventions can provide a good starting point in a new context and demonstrate that intervention development may not be necessary. However, there is a lack of overarching guidance to facilitate the intervention adaptation process. The ADAPT framework was developed as a guide on how to adapt extant interventions for new contexts and to respond to the complexities of intervention adaptation by providing comprehensive and systematic decision making tools (444).

Recent guidance regarding development of health interventions demonstrated that the adaptation of an intervention may often be a useful alternative to developing a new intervention (445, 446). It is important to define adaptation as distinct from development due to difficulty in distinguishing when an intervention has been developed and when it has been adapted. New interventions are often formed through combining elements from multiple previously successful intervention with newly developed components to enhance fit or effectiveness. The ADAPT guidance has defined adaptation as “*Intentional modification(s) of an evidence-informed intervention, in order to achieve better fit between an intervention and a new context. This includes planned adaptation (i.e. changes made prior to introducing a new intervention) and responsive adaptations (i.e. changes made intentionally, but in response to emerging contextual issues occurring during implementation).*” (437)

The ADAPT guidance provides direction on identifying when adapting an existing intervention is preferable to developing a new one, and selecting an appropriate evidence-based intervention for adaptation (437). This guidance can also be utilised when ‘scaling out’ interventions and reporting adaptation processes and outcomes. The guidance was adopted for the current research as a way to plan and recommend adaptations of a SCI for older smokers from deprived backgrounds.

7.2.1 Aims and objectives

This chapter aims to describe a hypothetical worked example of the adaptation of a behavioural SCI for older smokers from deprived backgrounds using the ADAPT guidance. There were three objectives to this phase of work: (1) assess the rationale for intervention, consider intervention-context fit and select a suitable intervention; (2) plan for adaptations and (3) critically evaluate the ADAPT guidance for its usefulness in the context of smoking cessation for the target population.

7.3 Adaptation of a smoking cessation intervention using the ADAPT guidance

The ADAPT guidance sets out four study recommendations to follow for intervention adaptation (Figure 7.1). For the purpose of the thesis, relevant aspects of steps 1 to 3 will be described and a set of recommendations will be reported for the adaptation of a SCI for older smokers from deprived backgrounds (Box 7.1).

1. Assessing the rationale for intervention and selecting a suitable intervention
2. Planning for adaptations
3. Plan for piloting and evaluation

Box 7.1 *The ADAPT steps utilised in Chapter 7*

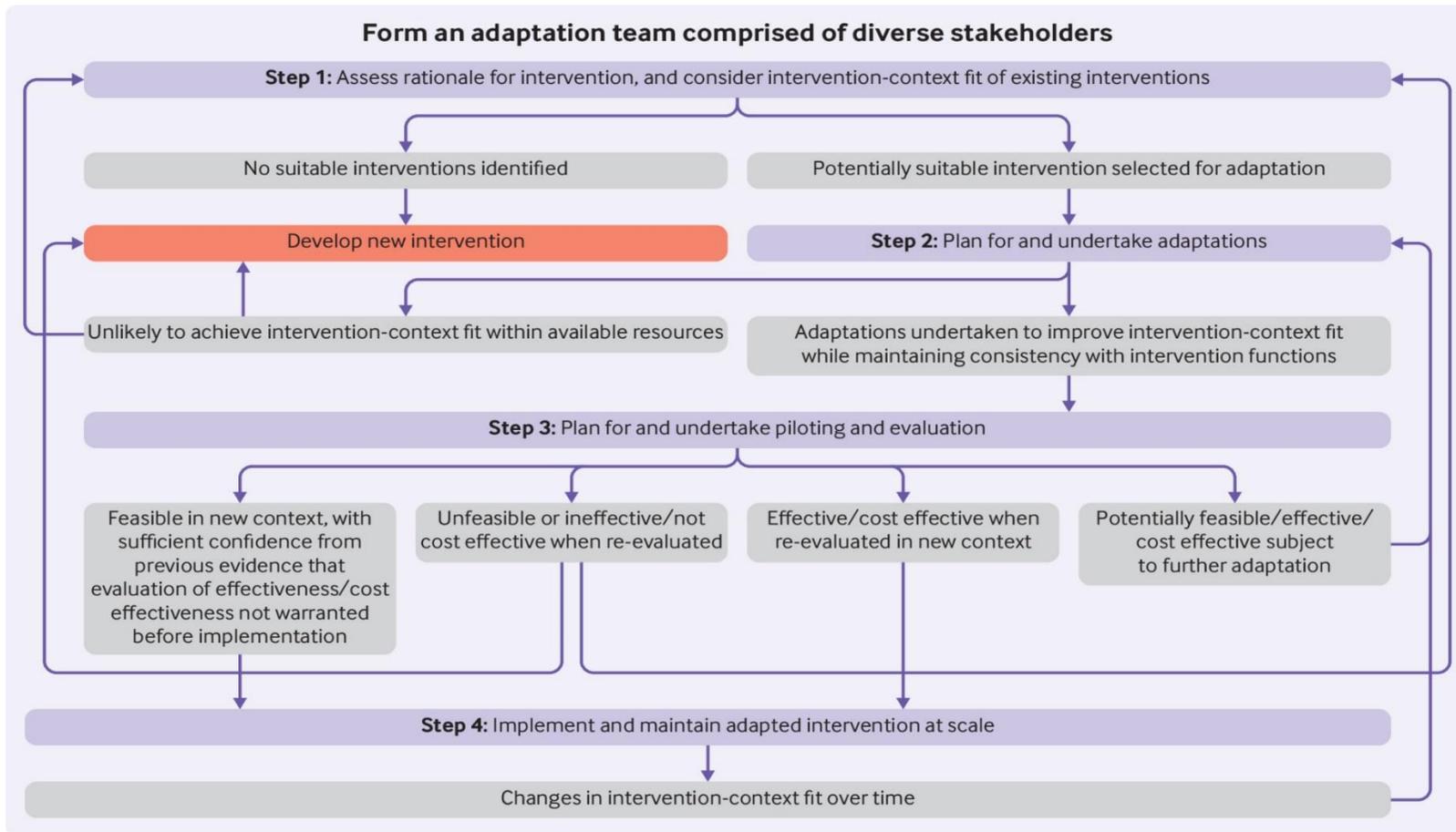


Figure 7.1 ADAPT process model for the adaptation of interventions for a new context (437).

A working group of academics and a research partner

The ADAPT guidance recommends involving diverse stakeholders early and consistently throughout the adaptation process (437). The team that was established for the current PhD project consisted of senior academics with a variety of expertise and backgrounds including health psychology, behaviour change, smoking and smoking cessation, quantitative and qualitative research methods and complex intervention development. A research partner who represented the target population was involved in the developmental stages of the PhD research.

If the ADAPT framework was to be prospectively applied it would be important to involve stakeholders at Step 1 (identify candidate interventions and contextual fit), leading into Step 2 (plan/undertake adaptations) (437). This step involves bringing together candidates who understand the evidence base for the intervention along with those who have a lived experience of the context to which it is being adapted. Workshops or focus groups with key stakeholders (e.g. public health professionals, smoking cessation practitioners and the target population) would be necessary to discuss the factors that will inform selection of interventions and piloting/evaluating the adapted intervention. Factors would include: 1) likely intervention effectiveness, feasibility of implementation, potential acceptability and equity in reach/uptake, possible costs and cost-effectiveness implications in the context of older age/deprivation; 2) map the key adaptations required; 3) explore what implementation fidelity means to stakeholders (in order to understand what they see as key mechanisms) and how it could be achieved and measured in the next phase of piloting/evaluation; 4) consider the potential resourcing of the intervention and what might be a feasible, affordable and cost-effective delivery model; and 5) identify possible delivery organisations and the capacity building required for sustainability.

7.3.1 Step 1: Assess the rationale for intervention and consider intervention-context fit of existing interventions

Define the problem in the target population

The adaptation of interventions has been demonstrated to improve treatment engagement as well as the salience of treatment strategies for individuals (447, 448). However, existing attempts to adapt behavioural SCIs for the target population are limited. It has previously been recommended to develop SCIs that are tailored, or adapted, to the specific needs of smokers from low socioeconomic backgrounds

(34, 449-451). Additionally, as discussed in Chapter 6, improving the wider determinants of smoking such as social support, mental health and comorbid conditions could positively influence smoking cessation and quit motivation through improving the health and wellbeing of the target population.

As demonstrated in the qualitative phase of this PhD, the target population face multiple complex issues that impact their motivation to stop smoking and the likelihood of them making a future quit attempt. Findings from the cross-sectional survey (Chapter 5) demonstrated that factors including self-efficacy, risk-minimising beliefs, NRT use and previous quit attempts can influence motivation to stop smoking and smoking cessation attempts in the target population (303).

Furthermore, findings from the qualitative phase of this PhD showed that those who declined smoking cessation support within a lung screening setting reported high levels of social isolation, complex life stressors and pre-existing health conditions including mental health issues. These results further demonstrate the indirect wider contextual determinants that can impact their smoking behaviour and motivation to stop smoking. Targeting the identified psychosocial determinants in a SCI for this population could be beneficial in improving motivation to stop smoking.

Obtain detailed information on the selected intervention and its context

The next step of the ADAPT guidance involves identifying candidate interventions (437). As described in Chapter 1, some of the mechanisms that encourage smoking in low socioeconomic smokers include little support to quit, a lack of interest in (or understanding of) the harms of tobacco smoking, higher nicotine addiction, low self-efficacy and stress (452). Specific SCIs have been suggested as a way to address these mechanisms that are likely to decrease quit rates and maintain smoking among disadvantaged smokers.

Behavioural support interventions for smoking cessation have been shown to be highly cost effective and life-preserving (453, 454). Behavioural support interventions have demonstrated effectiveness in various research trials that have been increasingly implemented as a part of routine healthcare practice in a number of high and middle income countries (455). For example, in the UK, implementation of behavioural support is through a network of locally organised SSS that offer smokers medication and weekly behavioural support sessions. Individuals who engage with this service are on average four times more likely to stop smoking (456). However, as detailed in Chapter 1, older smokers may be less likely to

engage with SSS and services may need to be tailored to the needs of this population (325).

The systematic review reported in Chapter 2 suggested that behavioural sessions delivered in a community setting and tailored to individual needs may have a positive impact on smoking cessation outcomes for older smokers from deprived backgrounds (153). Tailored SCIs have been previously developed specifically for adults from socioeconomically disadvantaged backgrounds and aim to overcome barriers to smoking cessation such as lack of social support, addiction, low self-efficacy, stress and inadequate life opportunities (452). Additionally, using pharmacotherapy along with structured behavioural support in order to assist smoking cessation has demonstrated promise with disadvantaged smokers (44, 457).

The PRIME theory (52, 53) was identified as one of the theories of choice for the current PhD and underpins behaviour change techniques used to support smoking cessation in SSS. The overall goal of behavioural support is to adjust the balance of impulses and inhibitions through the reduction of impulses to smoke via increasing an individual's motivation and capacity to be able to resist impulses on all relevant events in the direction of a new behaviour pattern (i.e. not smoking following the quit point). This process currently involves 1) minimising a smoker's motivation to smoke (e.g. through challenging beliefs regarding the benefits of smoking); 2) maximising a smoker's motivation not to smoke (e.g. maintaining the reasons for stopping); 3) maximising their skills and capacity for self-control (e.g. through avoiding smoking cues), and 4) enhancing the use of stop-smoking pharmacotherapy. These steps can be achieved in a variety of ways through NHS SSS including helping smokers make appropriate plans, changing beliefs, changing biological drivers of want or need to engage in smoking, and altering exposure to stimuli that may trigger an impulse to engage in smoking.

Behavioural support within SSS can be implemented in a variety of contexts for this population i.e. over the phone, one-to-one counselling, or group sessions at accessible settings such as community centres and GP surgeries. As described in Chapter 2 of this thesis, tailored, multimodal SCIs that can be embedded within disadvantaged communities have the potential to improve smoking outcomes for the target population (153). Furthermore, behavioural interventions take the form of advice, discussion, encouragement, along with other activities that are designed to help smoking cessation attempts succeed (458). Interventions commonly employ

behaviour change techniques that address elements such as self-efficacy and motivation (frequently through motivational interviewing techniques) (459, 460). Enhancing motivation to stop smoking is an imperative part of the overall treatment for tobacco addiction as it can increase smokers' enthusiasm, their sense of purpose and willingness to quit (461). Behaviour change techniques that are used in behavioural interventions for smoking cessation are complex and can work in a variety of ways, and this can make it difficult to identify the most effective components (458).

The therapy that is provided by SSS is not standardised and is also delivered by a variety of advisor types in a variety of settings. The current SSS model of behavioural support does not allow for specific targeting of stress associated with life events or complex circumstances (462). Targeting these elements could help modify an individual's coping appraisals and responses to events/circumstances and improve the wider determinants of smoking.

As previously mentioned, psychological differences that lead to self-efficacy are currently addressed in behavioural support and counselling for the target population. However it is difficult to address individual coping mechanisms in response to life stressors in behavioural support and a more intensive approach that addresses the wider socio-ecological context should be considered for the target population. Previous tailoring of interventions may have failed to make SCIs effective for the target population due to a lack of addressing the contextual influences on quit motivation and smoking cessation in older smokers from deprived backgrounds. Results from the present PhD have demonstrated that for the target population, addressing wider determinants identified in Chapter 6 (i.e. social isolation, poor mental and physical health and stress) may have a positive impact on motivation to stop smoking among this population.

Consider the robustness of effectiveness claims

Critically considering the claim that behavioural SCIs have demonstrated effectiveness in other contexts is crucial. The replication of scientific findings and considering more than a single study as a way to provide definitive evidence regarding an intervention's success is a key factor of science (463). This stage of the ADAPT guidance suggests that when selecting an intervention that has previously demonstrated effectiveness in other contexts, it is imperative to be critical of these claims (437). The robustness of effectiveness claims for behavioural SCIs

for older smokers from deprived backgrounds was reported in Chapter 2 of this thesis (153). The review suggested that tailored, multimodal behavioural interventions embedded in local communities could potentially support cessation among the target population. Furthermore, as previously described in this thesis, there is a breadth of research to demonstrate the effectiveness of behavioural support with NRT for the target population and interventions have previously been robustly tested in various high-quality evaluations across several contexts. The evidence that behavioural SSS are effective for the general population is fairly unequivocal, however engagement with effective SCIs such as the SSS model among the target population is challenging.

7.3.2 Step 2: Plan for adaptations

The following section of this chapter will address a set of recommendations for a hypothetical worked example of the adaptation of an existing behavioural support intervention for smoking cessation. Based on the systematic review findings from Chapter 2, it is recommended that behavioural counselling should be multimodal and tailored to meet the needs of older smokers from deprived backgrounds (153). Implementing behavioural counselling (as described by the well-established SSS model) in local communities would also be beneficial for improving smoking cessation outcomes. In regard to intervention content, adaptation of behavioural counselling for older, deprived smokers should include increased effort to understand and explore previous quit attempts, use of NRT (including e-cigarettes) during previous quit attempts, self-efficacy for quitting and risk-minimising beliefs. This could be achieved through mechanisms such as Motivational Interviewing (460) and behavioural change techniques to, for example, encourage self-efficacy (458). Addressing the wider determinants of health (i.e. life stressors, mental and physical health and social isolation) could be targeted through the additional of elements of social prescribing (432) (Table 7.1). Additionally, co-production with the target population and future PPI involvement would be imperative when planning for the proposed intervention adaptation.

Table 7.1 *PhD findings mapped on to the ADAPT framework*

Steps from the ADAPT framework	Key findings from current PhD research
<p>1. Assess the rationale for intervention and consider intervention context fit of existing interventions</p>	<p>Systematic review (Study 1): A combination of pharmacotherapy and a behavioural counselling intervention that is intensive, multimodal and community based.</p> <p>Cross-sectional survey (Study 2): Psychosocial factors to target in a behavioural SCI include self-efficacy, risk-minimising beliefs and previous quit attempts, including NRT use.</p> <p>Qualitative interviews (Study 3): Psychosocial influencers of smoking cessation in lung screening participants include wider determinants such as lack of support, social isolation, mental and physical health and life stressors.</p>
<p>2. Plan for and undertake adaptations</p>	<p>Enhanced behavioural counselling used as a part of the gold standard SSS model (Study 1) to focus on the identified psychosocial factors (Study 2), with the addition of components from social prescribing to address the wider determinants of smoking in the target population (Study 3).</p>

Identify and respond to contextual constraints and facilitators

In planning for and undertaking adaptations, it is important that contextual constraints and facilitators are identified and addressed (437). Interventions that adopt a more tailored approach using personalisation to the local context could be more likely to demonstrate positive effects. However, there are some challenges to delivering an adapted behavioural intervention that should be highlighted, including availability of and engagement with suggested local services (such as community groups including group learning, gardening, arts and activities). In addition, the successful implementation of the intervention would involve behaviour change on the part of both the smoking cessation practitioner (SCP) delivering it and the participant. It would therefore be important to involve the target population and SCPs as stakeholders in the development of the proposed intervention as a way to address and overcome potential implementation barriers. It would also be necessary to involve representatives from Public Health, community organisations, private and charitable sector organisations (i.e. a mental health charities) and those involved in previous evaluations of behavioural SCIs for the target population. This thesis chapter is a worked example of a hypothetical intervention and it is imperative that future work involves these groups throughout the process, from stakeholder engagement to intervention delivery and evaluation.

The current recommendations for adapting a behavioural SCI for older smokers from deprived backgrounds could be difficult to apply in certain modes of delivery of smoking cessation support. For example, group behavioural therapy often allows individuals to learn behavioural techniques, and group members to provide peer support (453). Discussing factors such as mental health could be difficult due to stigma (464), and therefore participants may be resistant to discussions with the SCP or other intervention providers when surrounded by those attending the behavioural support.

Adapt intervention materials

The ADAPT guidance suggests that in order to achieve intervention-context fit, adaptations should be brought together into detailed intervention materials (437). Presenting a newly adapted intervention as a whole, can help enable a close consideration of whether the proposed changes enable the intervention to function as intended. This process may also allow an understanding of whether the adaptations undermine the overall functionality of the intervention or have modified

the intervention to an extent whereby a new intervention has been created (465). If the current hypothetical worked example of adaptations was carried out in a future study, all proposed adaptations along with the previously described rationale would be set out through protocols, manuals and delivery plans and would include the below points:

1) Address wider determinants of smoking

In order to fully address various health behaviours including smoking and to assist individuals in quitting, attempts should be made to modify factors that are external to the individual smoker (466). The proposed adapted intervention takes elements of social prescribing (432) into account as a way to 1) improve more meaningful participation in community networks; 2) increase self-efficacy; 3) enhance self-esteem, and 4) improve motivation (Figure 7.2). Adopting a 'whole systems' approach to behavioural support for smoking cessation may act as an important catalyst for behaviour change and focus attention on the interconnections between the individual, their community and other environmental factors that influence motivation to stop smoking.

An individual's environment can significantly influence decisions that they make and the improvement of an individual's social and community networks should not be undervalued (418, 467). The proposed adapted behavioural intervention should take the local environment of the smoker into account and attempt to improve wider determinants that are addressed in population level tobacco control interventions (44). Embedding referral to local community services into pre-existing behavioural support for smoking cessation is a key recommendation of the current phase of intervention adaptation (Figure 7.2).

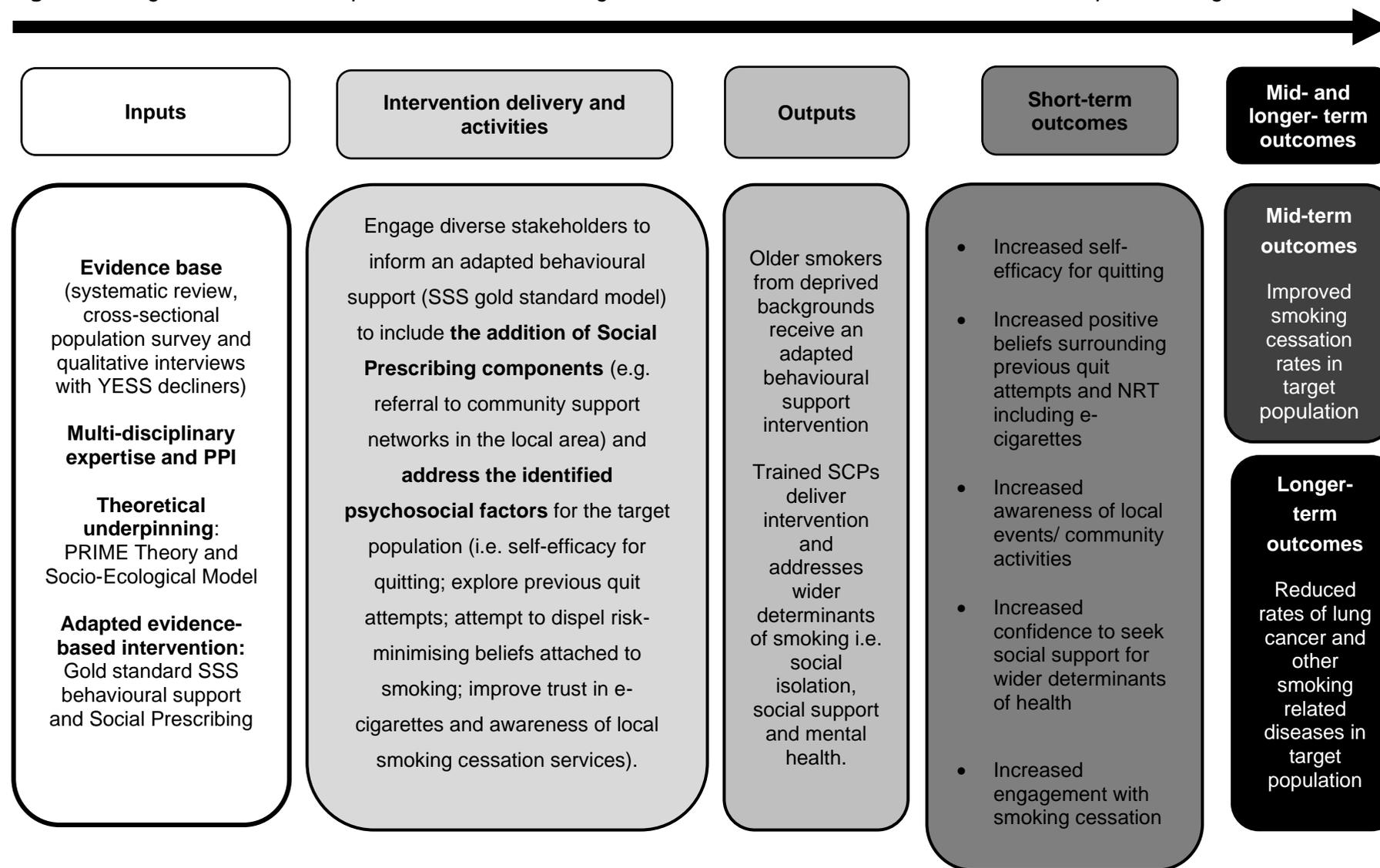
2) Embed referral to local community services

The adapted intervention involves elements of social prescribing (e.g. using available assets in the community and would offer the ability to link people into community support) in order to improve health and wellbeing. This addition to behavioural support for the target population could help with a range of emotional, social and practical needs. As demonstrated in Chapter 5 and 6, older smokers from deprived backgrounds often have mental health issues and are socially isolated. Addressing the wider socio-ecological determinants offers the potential for new life

opportunities including opportunities to forge new relationships, creativity and independence as well as improving their physical and mental health.

It is recommended that SCPs have an in-depth awareness of suitable local services in the community. Being trained in motivational interviewing to address the wider determinants of smoking could also be useful and help to elicit change talk surrounding the wider influences on smoking cessation and quit motivation (468). Additionally, the SCP who delivers the intervention should possess strong interpersonal and motivational skills separately to smoking cessation support.

Figure 7.2 Logic model for an adapted behavioural smoking cessation intervention for older smokers from deprived backgrounds



Consider potential for unintended consequences

It is highly likely that the adapted behavioural SCI may replicate similar benefits regarding smoking outcomes and motivation to the existing behavioural support that is implemented in the current SSS model. However, embedding support for the wider determinants of smoking could result in unintended consequences that have not previously been observed. Therefore, it is important that ongoing qualitative work is conducted throughout the stages of piloting, evaluation and implementation to capture any emerging unintended 'side effects' in a new context (e.g. discussing mental health and social isolation in a group behavioural setting) and create plans to mitigate them.

Consider costs and resources needed for the adapted intervention

The ADAPT guidance suggests that considering resources should form part of earlier assessments of adaptation decisions (437). The proposed adapted behavioural SCI would work with differing local resources and therefore the cost of delivering the intervention will differ substantially between contexts.

In order for the current recommended adapted intervention to be successfully implemented, it is proposed that the intervention would be used in existing SSS (i.e. local Public Health teams, Help me Quit service). In regards to real life implementation, additional resources would include the availability of existing wellbeing services in the area (i.e. community support groups and activities) as well as any necessary training for the intervention provider (e.g. training SCPs in Motivational Interviewing (468)). Furthermore, the addition of further support for wider determinants within behavioural support for smoking cessation would mean that the timing of behavioural sessions may increase in length in order to allow for discussions. The use of stakeholder engagement would be crucial in order to explore whether SCPs would be receptive to delivering a more intensive approach.

Supporting smokers to make meaningful and sustainable lifestyle changes is extremely complex, time-consuming and challenging for time-limited healthcare professionals (469). Therefore, it is likely that the adapted SCI will differ depending on local resources and costs. Integrating a health economics evaluation when piloting the intervention could help in deciding if the cost of the intervention is likely to be too resource intensive and whether changes to the adaptation may need to be made or the decision to develop a new intervention may arise. The health economics evaluation could assess the additional costs of training SCPs in delivering the intervention and

extending the length of sessions. Costs and resources for increasing behavioural support sessions should also be considered if the proposed adapted intervention was implemented.

Recruit individuals and groups to deliver the intervention

Individuals who were identified as part of the adaptation team would be used to help recruit individuals to deliver the intervention. If a decision was made to proceed with the proposed adapted intervention it would be imperative to identify and recruit a network of individuals and groups who would be involved in the delivery of the intervention (437). A SCP who has already completed relevant NCSCT would potentially deliver the adapted intervention. The SCP could then be provided with additional training in order to deliver the adapted behavioural support.

7.3.3 Step 3: Plan for piloting and evaluation

For the purpose of this hypothetical intervention adaptation exercise, the following section will consider recommendations for planning and conducting piloting and evaluation of an adapted intervention for older deprived smokers.

Consider the extent and type of evaluation warranted

If the adaptation team are confident that the SCI will work if people engage with it, then the main uncertainty will be around whether people will engage with the intervention. A small scale evaluation that looks at whether the adaptations impact on engagement with the intervention may be sufficient if evidence already suggests that it will work within the target population (470). According to the ADAPT guidance, interventions with a prior evidence base can 'borrow' evidence that has been gathered from prior evaluations rather than needing to undertake a full evaluation again (437). For the purpose of the current work, it would be beneficial to conduct a small-scale evaluation of the acceptability and feasibility of the adapted intervention components. This could be done through consultations with intervention users and providers using qualitative interviews and/or focus groups.

Due to prior evidence for the effectiveness of behavioural SCIs, it may be that the current adapted SCI would undergo some form of evaluation embedded within the implementation of an existing SCI. This could take the form of a trial in which participants are randomised to receive the adapted version in order to evaluate whether the additional costs arising from the enhanced intervention components

improve uptake and cessation. This approach is consistent with the main principles of the Medical Research Council guidance which places emphasis on the importance of evaluations focusing on the uncertainties that could occur when introducing a new intervention in a complex system (471, 472). Additionally, it would be useful to draw on existing applicable theories when evaluating the adapted intervention so that they can be tested and refined. For example, behavioural theories (described in Chapter 3) would be useful for adapting the proposed intervention as it works at the individual level. It may be useful to also consider a socio-ecological approach when intervening at the individual and wider social level (418, 473).

Consider the value of the adapted intervention to policymakers, practitioners and other stakeholders

Additional consultation exercises would need to be conducted in order to understand the value of the adapted intervention to policymakers, practitioners and other stakeholders. The views and perspectives of key decision-makers (e.g. SCs, public health, government policy, primary care, third sector, members of the public and community partners) would be critical in identifying mechanisms for piloting and evaluation. This could be addressed through stakeholder meetings to review, discuss and advise on plans for next steps of intervention evaluation. Considerations of how the adapted behavioural SCI could fit with local and national policy on smoking related outcomes is highly important for implementation.

Improvement of other wellbeing outcomes could have implications for various stakeholders including Public Health, the National Health Service and local authorities (474). Having good social connections and engagement in a community are important for mental health and can offer protection when there is exposure to stressors (36-38). The current adapted intervention would aim to improve the social connections and community links among the target population that may also improve other aspects of their lives, such as loneliness, mental health and any other comorbid conditions.

Consider resources available for evaluation

The ADAPT guidance highlights the importance of considering available resources prior to commencing an evaluation, due to the important role this will play in determining what kind of evaluation work should be conducted (437). It would be critical to pay attention to availability of health and wellbeing services in disadvantaged communities when considering resources for an evaluation. The work would support

current UK policies on addressing health inequalities in relation to tobacco usage and local tobacco control activities (441).

Evaluate feasibility and consider further adaptations based on feedback

The ADAPT guidance suggests that once the adapted intervention model has been agreed then small scale testing would be useful. This would help to further understand feasibility, address practicalities of implementing the intervention, troubleshoot issues with relevant stakeholders and make further adaptations if necessary. It is likely that the current intervention would require an evaluation of effectiveness and cost-effectiveness. The addition of intervention intensity and cost required to potentially enhance uptake in the population would need exploration. An evaluation would provide an understanding of whether the intervention is worth implementation in terms of enhancing uptake and effects for the target population in relation to what already exists.

Once the recommended intervention adaptations have been made and stakeholder perspectives have been integrated, feasibility testing should be conducted. The MRC guidance highlights the importance of carrying out feasibility testing across a number of sites in order to evaluate the extent to which the intervention is acceptable and feasible in other communities (472). Therefore, feasibility testing of the adapted intervention should be conducted across various socioeconomically deprived areas in order to target the population of older deprived smokers. The extent of feasibility testing for the adapted SCI would ultimately depend on the degree of uncertainty around delivering the intervention. According to the ADAPT guidance, if uncertainty regarding effectiveness was minimal then piloting of the intervention could be embedded within a move straight towards full implementation. In such instances, it would be useful to integrate piloting of data monitoring structures into the roll out of the intervention.

Feasibility testing enables the estimation of sample size for a larger study as well as assessing the appropriate methods for recruiting participants. This would include estimates of the number of individuals in a community who are eligible for the intervention and willingness of SCPs to carry out the intervention. Assessment of fidelity could be conducted throughout the intervention period to facilitate delivery of the intervention (i.e. determine whether it is feasible to deliver the behavioural intervention as intended).

Acceptability of the intervention and study procedures could be assessed through the use of both quantitative and qualitative methods. Quantitative data could be collected in order to investigate continued engagement with the intervention, whether the participant engages with recommended/referred community-based activity and whether the participant makes a quit attempt. An embedded qualitative study could obtain participants' (i.e. users and providers) views and experiences of the enhanced behavioural intervention, including perceived barriers and facilitators to using the intervention.

Undertake evaluation of effectiveness, cost-effectiveness and/or process evaluation (if warranted)

A controlled evaluation may be considered if the intervention was shown to be acceptable and the appropriate amendments were made to the intervention after feasibility testing. It is likely that a degree of uncertainty will remain for the recommended adapted SCI therefore an evaluation of its effectiveness, cost-effectiveness and process is likely to be needed. A RCT would be the most robust at estimating effects of the intervention. Additionally, a process evaluation (471) of the adapted intervention would aid in understanding the perceived impacts of the additional smoking cessation support, intervention-context fit and explorations of any unintended harms and processes. This could be conducted through a combination of quantitative (i.e. measurement of key process variables) and qualitative methods (i.e. capturing emerging changes in experiences of the intervention) (471). These methods would be useful in assessing mechanisms of change that are relevant to specific underpinning theory, such as PRIME theory and a Social Ecological Model. The delivery of an intervention is an active and creative process (475) and the ongoing response to adaptation is considered to be a fundamental part of this. The evaluation of the adapted SCI would also draw on existing process evaluation data and findings would build upon these.

The ADAPT guidance emphasises the importance of drawing upon other existing guidance for the reporting of interventions (437). If variations were required, it would be important that other sources of existing guidance are utilised following the testing of the adapted intervention. For example the use of The Template for Intervention Description and Replication Population Health and Policy framework, which includes recommendations on the reporting of planned and unplanned variations in delivery that could arise (476).

7.4 Discussion

The ADAPT framework was applied as a way to develop recommendations for hypothetical intervention adaptation which could be used to improve quit motivation and therefore cessation outcomes in older smokers from deprived backgrounds. The ADAPT guidance was also utilised as a framework to guide recommendations for planning and evaluating the proposed adapted intervention. It is recommended that the adapted intervention includes elements of social prescribing and enhanced behavioural counselling for the target population. The referral aspects of the behavioural support would be tailored based on local resources and availability of community support, such as wellbeing activities, to improve social isolation, support and mental health. Furthermore, discussions around psychosocial factors that are currently addressed in behavioural support for smoking cessation (i.e. self-efficacy, NRT use and risk-minimising beliefs) should be enhanced and improvements made for the target population.

Previous research has demonstrated that adapting evidence based programmes is common in practice (477, 478) and it has been suggested that adaptations are necessary in order to meet the specific local needs of deprived smokers (479). Given the complex and long-term nature of the problems faced by smoking cessation service users, it is unsurprising that a holistic and relatively intensive approach would be required to help facilitate and maintain behaviour change. The Tobacco Control Plan specifies the need for local areas to develop their own tobacco control strategies through the provision of evidence-based stop smoking interventions (479). The current recommendations provide steps in the direction of developing a local approach to improving the wider determinants of smoking for the target population

Intervention adaptation can be effective and some studies have shown that cultural adaptations of prevention programmes can have a positive impact. For example, Kumpfer et al (480) demonstrated that cultural adaptation can greatly improve an intervention acceptability, lead to more successful recruitment and retention, and have minimal negative impacts on outcomes. The adaptation of a behavioural SCI for the target population could help to improve the relevance of the intervention to participants, which could therefore increase attendance to SSS and encourage behaviour change. Furthermore it may enhance the fit between the intervention and the economic and community context in which it has been implemented, resulting in an increased sustainability. On the other hand, research has shown that there are disadvantages to adapting interventions, including intervention delivery delays, undesired outcomes, a

decrease in benefit to participants if the adaptation has been based on a false assumption, and an intervention resulting in uncertainty if untested (481).

7.4.1 The ADAPT guidance as a framework for intervention adaptation

7.4.1.1 Strengths and limitations of the ADAPT guidance

Previous research has shown that, in theory, tailoring interventions based on individual characteristics has the potential to enhance effectiveness by reflecting their needs and preferences as well as overcoming specific barriers in order to achieve the desired change (482). Interventions have previously been adapted in order to enhance reach, effectiveness, adoption, implementation and maintenance (483). The ADAPT guidance is a new framework which is useful for identifying key issues that would need addressing when adapting an intervention for a new context. The guidance presents an in-depth, systematic framework to guide intervention adaptation as well as further, ongoing innovation and methodological development (437). However, the ADAPT guidance, and similar adaptation frameworks (e.g. the ADAPTE framework (484)) can lack a clear understanding of how much time and resources are actually saved through using an adaptation rather than development framework. Using the ADAPT guidance in practice could be time and resource intensive, despite its original purpose of increasing efficiency and decreasing duplication of effort in comparison to intervention development.

A common missing element of adaptation frameworks is that they do not provide advice on how to implement the adapted intervention (485). The ADAPT guidance recognises the importance of involving stakeholders in the adaptation process and providing specific resources to support implementation of the adapted intervention (437). However, there is still a lack of clarity in how the local SCPs and policy-makers could be advised in implementing the intervention. Future refinement of the guidance, through synthesising lessons learned and understanding how researchers have applied it could provide solutions to this issue.

Due to the ADAPT guidance being a new framework, it is unclear whether the shortcuts that are taken in using this adaptation framework affect the resulting intervention. However, the ADAPT guidance offers clearly laid out steps for intervention adaptation and provides a structured process with suggestions of additional useful frameworks (437). In order to address gaps in the ADAPT guidance, future independent studies need to be conducted to evaluate the usability of the framework as well as to assess its effectiveness in implementation and use in different settings.

7.4.1.2 Strengths and limitations of the current hypothetical application of the ADAPT guidance

Although the ADAPT guidance provides a suitable framework for adapting a behavioural SCI for the target population, there are other frameworks that could have been relevant for use. For example, the COM-B model is widely used to guide the development of behaviour change interventions and addresses motivation as a core part of the model (486). Motivation was identified as a key psychosocial variable throughout this research as well as in the selected theoretical underpinning (PRIME theory (52, 53)). The use of the COM-B model could have allowed for the specific identification of important internal and external drivers (e.g. the wider social determinants) of smoking, smoking cessation and quit motivation. Unlike the ADAPT guidance, this model has previously been used for intervention development in the area of smoking cessation (466). However, it has little application in the field of intervention adaptation and therefore a specific adaptation framework was selected and deemed most appropriate.

A second limitation regarding capacity is that the use of the ADAPT framework may require a specific level of methodological expertise that is not available to many groups. If the recommended adaptations were to be carried out, then the intervention adaptation team may benefit from sourcing a specific methods group to select and appraise published intervention guidelines. Additionally, there is a gap in knowledge surrounding intervention adaptation in low resource settings. The ADAPT guidance discusses the need to identify available resources and funding for the adapted intervention (437). However, a more pragmatic and efficient process might need to be used due to potentially resource-limited environments. This may include practical issues such as the availability of health and wellbeing services that need to be addressed in the adapted intervention guidelines.

If the following recommendations are implemented and the SCI is adapted for the target population, it will be imperative to build further sustainable partnerships and make thorough plans for adapting the intervention. The ADAPT guidance emphasises the importance of building plans for those who will provide specific resources to support implementation of the adapted intervention (437). It would be essential to work closely with relative stakeholders and also continue to recruit an expanded network of individuals and groups (487). Furthermore, it will be important to involve teams who have previously implemented the original intervention at scale or are currently doing so. Engagement with these groups throughout adapting the SCI would provide useful

information on any challenges and solutions when attempting to take the intervention to scale.

7.5 Conclusion

The ADAPT guidance was used to set out recommendations through a hypothetical worked example of the adaptation of a behavioural SCI for older smokers from deprived backgrounds. When adapting a SCI for the target population it will be important to place emphasis on the enhanced targeting of psychosocial factors and additionally address the wider determinants of smoking, through referral to relevant community support groups. If the proposed recommendations were implemented, a future pilot evaluation would be required to assess the initial feasibility and acceptability of the adapted SCI.

Chapter 8

General discussion

8.1 Chapter Overview

The current chapter presents an overview of the PhD findings and how they were used in combination with an intervention adaptation exercise to adapt a SCI for older smokers from deprived backgrounds. Each phase of work is summarised and discussed in relation to the existing evidence. The methodological strengths and weaknesses of the PhD are discussed, along with potential future implementation and evaluation of the recommended adapted intervention.

8.2 Summary of thesis findings

The PhD aimed to understand the influences on quit motivation and smoking cessation in older smokers from deprived backgrounds with a view to adapting a targeted SCI. There were five PhD objectives: (1) identify studies of effective behavioural SCIs for the target population; (2) identify relevant theory for quit motivation and smoking cessation among older smokers from deprived backgrounds; (3) examine psychosocial factors associated with quit motivation using quantitative methods; (4) understand psychosocial factors influencing smoking cessation in those who declined smoking cessation support during a lung health check using qualitative methods; (5) adapt a SCI to improve quit motivation in older smokers from deprived backgrounds and produce a set of recommendations for its future use. Each aim and objective will be addressed and discussed.

Objectives 1 to 4 contribute to the first aim of the PhD, to understand the psychosocial determinants of quit motivation and smoking cessation among older smokers from deprived backgrounds. A systematic review described in Chapter 2 was conducted to identify relevant literature relating to existing effective behavioural SCIs for the target population (objective 1) (153). The systematic review was useful in understanding the behavioural elements of SCIs and their impact on smoking abstinence and psychosocial variables. Findings suggested that tailored, multimodal behavioural interventions that are embedded in local communities could potentially support cessation among the target population. These findings are similar to previous research demonstrating that behavioural interventions delivered at the individual level of deprived smokers might prove more successful (50, 443). The systematic review also identified the need for further understanding of the psychosocial barriers to quitting in the target population in order to inform the design and conduct of a suitable

behavioural intervention (153). This gap in the literature was addressed in the subsequent quantitative and qualitative studies of the PhD.

Theories and models that were considered relevant to smoking cessation and quit motivation were identified in Chapter 3 (objective 2) and PRIME theory, EPPM and HBM were presented as useful frameworks for understanding quit motivation and smoking cessation. The main overarching theory that was utilised throughout this PhD was PRIME theory. This theory offered a useful framework for developing and interpreting the results of a cross-sectional survey and analysing qualitative data to explore individual and environmental influences on motivation, and to guide an understanding of the influences on smoking behaviour among older smokers from deprived backgrounds.

Survey development took place and involved the use of cognitive interviewing and content validity to produce a questionnaire that examined a range of psychosocial factors and their influence on quit motivation (Chapter 4). This study helped to address the knowledge gap in determinants of quit motivation for older smokers from deprived backgrounds. A quantitative examination of the psychosocial determinants of quit motivation for the target population, using a cross-sectional population survey, was reported in Chapter 5 of the current thesis (objective 3) (303). Findings were used to identify which psychosocial factors were associated with quit motivation in the target population. The quantitative study was useful for identifying potential modifiable psychosocial factors of SCIs that are associated with motivation to stop smoking. Results showed that higher motivation to quit was statistically significantly associated with a higher intensity of previous quit attempts, higher quit confidence, higher smoking self-efficacy, lower risk-minimising beliefs and use of traditional NRT when trying to stop smoking or cut down. Psychological determinants identified in this study (i.e. self-efficacy and risk-minimising beliefs) have previously been shown to impact smoking cessation and quit motivation in deprived smokers (34). Additionally, experiences of previous quit attempts and using NRT have also been shown to impact smoking cessation in disadvantaged smokers (34). However, these psychosocial influences of quit motivation are novel for a population of older, deprived smokers. This study has added knowledge to the context of SCIs for a population who are at high-risk of developing a variety of smoking related diseases, including lung cancer.

Ongoing work from SCALE aims to understand how to integrate smoking cessation within the lung cancer screening context (129). Recent research has demonstrated that in order to help maximise the reach of SCIs in a lung screening setting, it is imperative

to utilise multimodal approaches to engage smokers and that a wide range of cessation treatments are offered (488). Chapter 6 reported a qualitative exploration of smoking cessation and motivation to stop smoking among those who declined smoking cessation support at a lung health check, using telephone interview methods (objective 4). Findings were used to gain an in-depth insight into those who lack motivation to stop smoking and reasons why they declined smoking cessation support during their lung health check. The qualitative study was useful for identifying and understanding quit motivation on both an individual and wider social level. These findings highlighted the important role of the broader social determinants of health on smoking behaviour. Factors such as mental health, comorbid conditions, life stressors including social isolation and a lack of social support were identified as key reasons for a lack of motivation to quit smoking among the target population. The population also demonstrated a lack of awareness of available smoking cessation services as well as negative views of e-cigarettes. Understanding these barriers may help smoking cessation practitioners tailor behavioural counselling (both within and out of a lung cancer screening setting) to provide increased support in order to deal with stressors. For example, practitioners may help in managing a smokers' expectation regarding smoking cessation during extreme stress.

This qualitative research highlighted further psychosocial influences of quit motivation and smoking cessation that could be targeted in a SCI for those who are likely to form part of the lung screening eligible population. Findings showed that behavioural counselling for smoking cessation should attempt to improve the wider determinants of smoking in order to indirectly enhance an individual's motivation to stop smoking. The use of social prescribing embedded in a behavioural SCI for the target population may assist in improving social isolation and poor mental health found in older smokers from deprived backgrounds (Chapter 5 and 6).

Addressing the wider context of deprived smokers has previously been suggested in work by Kock et al. (451) who argued that new multifaceted approaches are needed at the individual community and population level. In Chapter 7, findings from an intervention adaptation (437) were reported (objective 5). The chapter reported a hypothetical worked example using the ADAPT guidance to develop a set of recommendations for adapting a behavioural SCI for the target population. Enhanced behavioural counselling and the addition of elements of social prescribing as part of the gold standard SSS model was proposed using primary and secondary data reported in Chapters 2, 6 and 7. Recommendations for adapting a behavioural SCI were reported in accordance with the ADAPT guidance. It was recommended that existing, gold

standard behavioural support should be adapted to address the identified psychosocial influences on quit motivation and smoking cessation. Additionally, the wider determinants of smoking should be tackled through social prescribing referral to community health and wellbeing groups. To my knowledge, the use of social prescribing in a SCI has not yet been explored. Future work should seek to adapt a behavioural SCI involving diverse stakeholder groups to inform the recommended adapted SCI and plan for evaluation.

8.3 Study methodology strengths and limitations

8.3.1 Review methodology

A systematic review was considered the most appropriate method due to the high volume of published articles on SCIs. Systematic reviews are considered to be the highest level of research evidence as a result of the inclusion of good quality evidence, replicability and low bias due to coding at all stages. Due to the heterogeneity of the research methods used in the included studies, a meta-analysis was precluded and is a limitation of the systematic review study.

8.3.2 Quantitative methodology

The quantitative phase of this research facilitated the identification of psychosocial factors associated with quit motivation among older smokers from deprived backgrounds. The development of the survey was informed by theory outlined in Chapter 3 and was an iterative process that involved various modifications of questionnaire items. Validation methods were used in order to investigate whether items accurately measured the construct of interest and ensured that the items were understood and acceptable to the participants. Psychometric testing of the final survey items assessed underlying factor structure and internal consistency of selected measures.

Although content validity analysis, cognitive interviewing and principal component analysis were valuable methods for testing the internal validity and reliability of the questionnaire items, there are alternative validation methods that could have been applied. For example, predictive validity would have demonstrated how well the measures in the survey predict future behaviour (489). Although the item used to measure the primary outcome (motivation to stop smoking) has previously been validated in this way (273), predictive validity of the scale has not been conducted with the target population and may have benefited this research.

8.3.3. Cross-sectional research design

Furthermore, a limitation of cross-sectional research is that it does not allow causal relationships to be inferred (347) and therefore this may have led to the observation of inflated associations between variables that were all measured at one time point. Prospective research would allow the examination of effects of causal psychosocial factors on quit motivation. However, due to the timeframe required and costs associated with prospective research, this was unachievable within the scope of the PhD study.

8.3.4 Qualitative methodology

Qualitative methods were considered most appropriate in the context of this research as a way to further explore the factors examined in the quantitative phase. Telephone interview methods were used to facilitate an in-depth exploration of the topic under investigation. Interviews enabled a deep understanding of a participant's experience, exploration of the wider environmental factors and how these might have influence on quit motivation and smoking cessation.

Although qualitative methods were selected for understanding the wider social and environmental influences, there are limitations to this research method. Qualitative methods are frequently criticised for lacking representativeness, as in-depth examinations of individuals on a case-by-case basis might not be generalisable to other contexts or wider populations. For example, awareness of behavioural smoking cessation services in assisting a quit attempt might be specific to a UK context and certain areas of the UK depending on availability of services. However, it is likely that the identified barriers that are related to economic hardship are universal to those from low socioeconomic groups, regardless of their geographical location.

Additionally, qualitative methods are often met with criticism due to limitations associated with the subjective nature of data analysis and the potential for researcher bias to influence the interpretation of the findings. However, some have argued that this is a strength of qualitative research (490). Measures were taken to reduce the potential for subjectivity by involving the supervisory team and a qualitative researcher from the YESS study team to conduct double coding.

It is important to acknowledge that throughout qualitative data collection and analysis, I was reflexive in regard to the potential influences that my own values might have on the collection and interpretation of interview data. I made a conscious effort to address this throughout the interviews by building rapport and making sure I took the time to

make the participants feel comfortable. Throughout data analysis I was aware that my own experiences might influence my interpretation of findings. However, it is likely that as a researcher I will never fully be able to understand the day-to-day struggles and the economic difficulties that those who took part in the study may face. I have also never identified as a smoker and therefore I am not able to fully understand tobacco smoking as an addiction. In order to provide further insight into these complexities and issues of deprived individuals ethnographic methods could be implemented in the future.

8.3.5 Theoretical underpinning

On reflection, many of the theories and models covered in Chapter 3 are individualistic and results from the quantitative and qualitative phase of this PhD suggest that the use of a wider socio-ecological model (SEM) may have also benefited this PhD. PRIME theory of addiction suggests that immediate social groups tend to be more of an influence in comparison to the wider society. However, results from the qualitative study (Chapter 6) of this PhD showed that the target population experienced social isolation and had little interaction with any social groups. These findings demonstrate that wider determinants play a crucial role in influencing quit motivation and smoking cessation in older smokers from deprived backgrounds. A SEM emphasises the importance of an individual's social and environmental influence (491, 492). The model takes into account the environmental causes of behaviour and assumes that there are multiple interacting levels of influence on behaviour (419).

The Ecological Model of Health Behaviour (493) (Figure 8.1) was developed as an adaptation of Bronfenbrenner's ecological model of child development (494) with more of a specific focus on health behaviour. The first level can be defined as the characteristics of the individual, including their knowledge, self-efficacy and beliefs ('intrapersonal factors'). The second level are the informal and formal relationships that exist within an individual's social networks, such as their family and friends ('interpersonal factors'). The third level of the model refers to the individual's social and organisational institutions that can influence behaviour ('institutional factors'), such as a workplace and neighbourhood organisations. The fourth level of influence refers to 'community factors'. This is defined as relationships among organisations and the informal networks within a defined geographical boundaries. The fifth and final level in this model of influence is 'public policy' which can be defined as the laws and public policy that can restrict and influence a behaviour (e.g. a ban on smoking in public places).

A SEM for the improvement of health, such as smoking cessation, highlights the importance of social and physical environmental determinants of health behaviours. For example, environments where individuals spend a lot of time and are interacting with others who are important to them, such as their local community, are an important influence on smoking behaviour (495). The current research may be limited in that it did not fully take into account these wider determinants when selecting survey measures and developing topic guides. A SEM argues that interventions solely based on an individual's decision-making are less effective and that multi-level interventions should be used to help prevent and/or cease tobacco use. If the feasibility of the proposed adapted intervention (Chapter 7) is to be evaluated in future work, then the use of a wider systems approach should be employed as a way to encompass broader determinants of quit motivation and smoking cessation for the target population.

The Ecological Model of Health Behaviour has previously been applied to a variety of health behaviours and has also been used to create multi-level interventions designed to successfully reduce socioeconomic inequalities (496). For example, SEMs have been used to help understand sources of smoking behaviour and to aid in the development of interventions to reduce smoking rates (497). Although PRIME theory was utilised in the PhD, a SEM would have explicitly taken into account the wider environmental influences on quit motivation and smoking cessation for the target population. The application of a SEM within the current research may have been useful in facilitating a detailed analysis of quit motivation and smoking cessation across the various levels of influences found in the PhD (Chapter 5 and 6) in order to understand wider contextual factors. However, a SEM does not offer insight into how knowledge and beliefs surrounding smoking could influence the decision to stop smoking, and therefore the selected theories (identified in Chapter 3) were useful in addressing these aspects of quit motivation and smoking cessation.

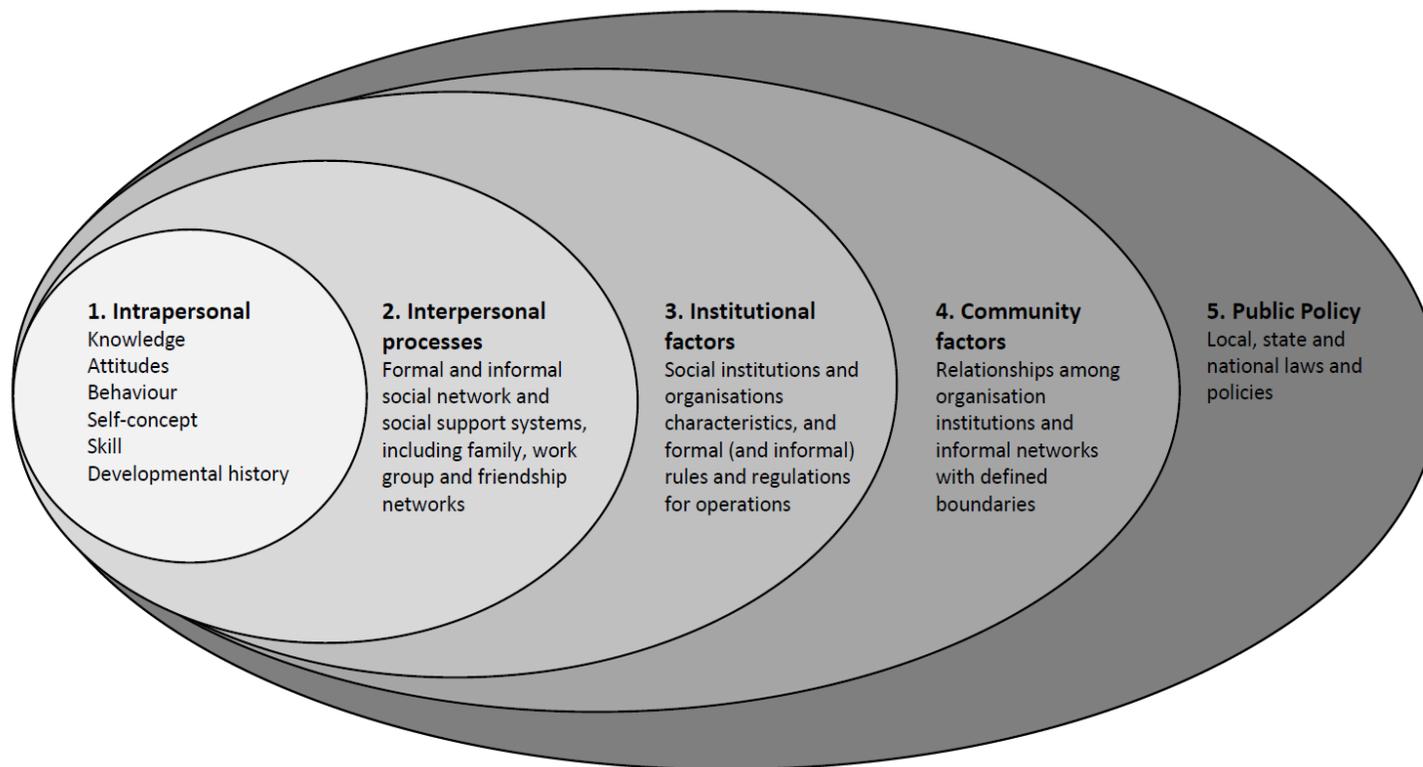


Figure 8.1 *Ecological Model of Health Behaviour (493)*

8.3.6 Patient and Public Involvement

There is currently little evidence that describes the use of Patient and Public Involvement (PPI) in doctoral research (498, 499). PPI offers the chance to involve an individual who has a lived-experience and a real-world perspective in order to improve the value of the research (500). PPI was adopted in the current research in an attempt to carry out research 'with' or 'by' members of the target population rather than 'to' or 'for' them.

A range of principles and values that were utilised when undertaking the current doctoral research. These can be mapped onto the UK Standards for Public Involvement framework of good practice for PPI research (501). Values included respect, fairness of opportunity, transparency, support, responsiveness and accountability. These values were crucial as they helped to facilitate PPI in this research and led to the development and fostering of a positive relationship.

When the PhD project commenced in 2017, I contacted an individual who had previously been involved in research on cancer symptom awareness in deprived communities of South Wales. This individual expressed an interest in being involved in future research and agreed to be the research partner for the current PhD. During an initial face-to-face meeting, the research partner was presented with the study aims, expectations regarding their involvement in the study and frequency of communication. It was important that the research partner felt they had the opportunity to be involved in all or any of the research processes and that there was flexibility regarding their involvement (e.g. responding to emails and attending meetings).

Previous literature suggests that the use of PPI can often be perceived as time-consuming and resource-intensive. However, the use of a research partner in the current PhD involved planning from the outset and required minimal resources, which enabled productive and meaningful involvement. Understanding the research partner's motivations for being involved along with their expectations was necessary and allowed a close partnership between myself and the research partner. During the initial planning phase of this PhD, discussions with supervisors led to an understanding that the involvement of the research partner should be flexible and determined by their availability/capacity to be involved in the research.

Overall the involvement of PPI has been extremely valuable for various phases of my PhD such as, topic guide creation, cognitive interview recruitment and survey

development and also provided direction when developing key documentation. Working with a research partner helped to identify potential issues, including engaging the target population in research and development of solutions to overcoming these barriers. Involving a research partner also had a positive impact on the research quality and relevance. For example, they participated in developing and testing the interview schedule that was utilised for the qualitative stage of the PhD. The research partner was involved in some engagement activities during the research including advertising for research participation opportunities and disseminating study information to individuals in the community.

There were some difficulties with the continued use of PPI due to a breakdown in communication at the start of the COVID-19 pandemic in 2020. This meant that the research partner was not involved in data analysis or interpretation of data for the quantitative and qualitative elements of the PhD. Recruiting a group of diverse research partners would be beneficial to having wider feedback and input, as well as reducing pressure on one individual. This would also mean that there is more of a chance of having continued PPI if an individual withdraws from their position or communication breaks down. There was no formal evaluation undertaken for the use of PPI in the current research project and future work should aim to involve older smokers from deprived backgrounds in research.

8.4 Strengths and limitations of sampling methods

8.4.1 Quantitative study

Using multiple individual level indicators to increase representation of adults from low socioeconomic groups in the quantitative survey was a strength of this study (Chapter 5) (303). However, there are limitations associated with sampling participants through this method, including potential sample bias towards those who are more motivated to take part in research or discuss their smoking behaviour. Framing the study around smoking might discourage individuals to take part due to smoking related stigma that is often experienced in those from deprived backgrounds (502, 503). To overcome some of these limitations and bias towards females, the targeted Facebook advertisements described in Chapter 6 were tailored to include friendly and engaging language in the advertisement text. A monetary incentive was also utilised as a way to engage those who might not usually take part in smoking related research. In addition, opportunistic recruitment methods were utilised and included snowball sampling via a community partner, but

these were not successful. There are limitations that are associated with snowball sampling due to the weaknesses associated with selection bias (504).

A further limitation associated with the sampling for the quantitative study is that there is a limit to understanding, identifying and describing the population that completed the survey. Furthermore, online surveys are completed by those who are literate and have access to the internet. Although internet usage has increased among older individuals (505), there is still difficulty surrounding engaging this population in online research.

8.4.2. Qualitative study

The use of a sample of individuals who are a lung-screening eligible population is a strength of this study as it provided an understanding for reasons for declining smoking cessation support as part of a lung health check. Data from this study helped to provide an understanding of the psychosocial influences on smoking cessation in a lung screening eligible population for which the target population of this PhD are likely to form a part of.

A limitation of this study is that the participants were recruited from an ongoing lung screening trial in which a smoking cessation study was nested and therefore were previously engaged in research on lung cancer and smoking (506, 507). This potentially biased the sample towards those who were more motivated to take part in research or talk about smoking and smoking cessation. Additionally, framing the study around smoking may have encouraged those who were more likely to seek support for quitting to take part in the interview study. Furthermore, individual indicators of deprivation were not collected and results therefore may not accurately represent an individual's current socioeconomic circumstances. The addition of individual level indicators that were utilised in the quantitative study of this thesis are likely to overcome these issues.

8.5 Adaptation of a behavioural smoking cessation intervention for older smokers from deprived backgrounds using the ADAPT guidance

Re-inventing the wheel in regards to developing a behavioural SCI was not suitable and the adaptation of an SCI for the target population seemed more appropriate (Chapter 7). The ADAPT guidance (437) was used as a framework to guide a worked example of the adaptation of a behavioural SCI for the target population. The ADAPT guidance was selected due to its systematic framework and relevance to preparing for intervention evaluation.

The worked example of the adaptation process using the ADAPT guidance (Chapter 7) firstly involved assessing the rationale for a behavioural SCI and considering the intervention context fit. Due to the results from the present PhD (Chapter 2, 5 and 6) and the guidance set out in the ADAPT guide, it was decided that a behavioural SCI that could be adapted based on identified psychosocial factors for the target population was suitable in the current context.

The ADAPT guide offers researchers a step-by-step guide to intervention adaptation and preparation for re-evaluation, which was a key benefit of the framework. The guide helps with the adaptation of complex population health intervention and can minimise wasting resources on inappropriate adaptations as well as improving understanding of how best to evaluate adapted interventions (437). There is a current lack of overarching guidance for the adaptation of population health interventions, including SCIs, that can be implemented and evaluated in other contexts (508). The ADAPT guidance was useful in the context of the current research as it helped to hypothetically inform decisions on whether a behavioural SCI was appropriate for the current context.

8.6 Future of the intervention

One of the objectives of this PhD was to create a set of recommendations for adapting a SCI to help improve quit motivation and encourage smoking cessation among older smokers from deprived backgrounds. Recommendations for adapting a behavioural SCI were set out and suggested further emphasis placed on improving self-efficacy for quitting, dispelling risk-minimising beliefs, discussions on previous quit attempts and the use of NRT. Additionally, behavioural SCIs should address the wider social determinants of smoking via the addition of referral to community wellbeing support groups.

Aspects of social prescribing have the potential to support older smokers from deprived backgrounds with a wide range of emotional, social and practical needs. Many of the schemes offered through a social prescribing referral process focus on improving mental health and physical wellbeing (432). This could provide new life opportunities for older smokers from deprived backgrounds, including opportunities to forge new relationships, be creative and independent while also improving physical and mental health. However, there is currently a lack of high quality studies presenting the effectiveness of social prescribing (509), and the future of the

proposed intervention (Chapter 7) would depend on further results of the effectiveness of social prescribing.

8.6.1 Recommendations for future evaluation

Feasibility testing

As discussed in Chapter 7, once the recommended intervention adaptations have been implemented, feasibility testing should be conducted. The Medical Research Council guidance highlights the importance of carrying out feasibility testing across a number of sites in order to evaluate the extent to which the intervention is acceptable and feasible in other communities (510). Therefore, feasibility testing of the adapted intervention should be carried out in socioeconomically deprived areas.

Additionally, it is important that the suitability and acceptability of any questionnaire measures being used should be assessed. The distribution of multiple responses or incomplete responses to questions and/or statements would be observed and therefore a think-aloud method could be utilised for questionnaire completion. A proportion of the participants could be used to assess comprehension of questions and the views of the appropriateness of response options in order to make adjustments to the questionnaire measures. Additionally to this, response rates to distributed questionnaires would be calculated to assess compliance. Finally, it would be important to record the time required to collect and analyse the data in order to estimate timing for future, larger studies.

Pilot testing

Before scaling up to a controlled evaluation, pilot testing of the intervention would be required. At pilot testing, the intervention study is designed to replicate that of a larger controlled trial but on a smaller scale. Feasibility testing is carried out to help ensure that the various components of the intervention study run in the way they were intended to, such as recruitment of participants, randomisation and the completion of baseline and follow-up measures. Pilot testing can potentially offer a preliminary insight into intervention effectiveness. It is envisaged that the controlled evaluation would be a RCT; therefore, participants at the pilot testing stage would be randomised to one of two arms: an intervention arm where the individual would take part in the adapted behavioural SCI and a control arm where individuals would receive standard smoking cessation support. Using PRIME Theory (52, 53) to help guide choice, potential measures for examination could include: 1) intervention uptake, 2) smoking cessation, 3) quit motivation using the Motivation to Stop Scale

(273), 4) engagement with/ motivation to engage with community support groups and 5) utilisation of social support during a quit attempt.

During pilot testing, it would be preferable if post-intervention follow-up questionnaires were completed at least one month after the intervention was conducted. Longer time periods for completion of follow-up questionnaires would be advantageous, however due to time and funding capacity, a shorter follow-up time of two or three months might be more appropriate.

Controlled evaluation

As discussed in Chapter 7, a controlled evaluation would depend upon the outcome from the pilot and feasibility testing. The measures collected during a controlled evaluation might be similar to those utilised at the feasibility and pilot testing phase. They are likely to involve survey based measures, including those used in Chapter 6 of this PhD. If the intervention is effective then implementation can be considered.

8.6.2 Considerations and challenges of intervention implementation

Encouraging participation in the intervention

As mentioned in Chapter 7, encouraging participation in the proposed adapted intervention is likely to offer the greatest challenge for intervention implementation. This is a major challenge and obstacle for current smoking cessation services that, despite their effectiveness, demonstrate a low uptake (<5%) and are in decline (52, 53, 511). A recent review by Latif et al (512) has demonstrated that in order to enhance a smokers' ability to engage with SSS it is important that services use 'credible' advisors who are empathetic, non-judgemental and come from a diverse background. Furthermore, targeting individuals via social networks may have the potential for intervention messages to reach those who might not engage with the adapted SCI. The importance of social connections highlighted in Chapter 6 of this thesis should be considered as a way to engage older smokers from deprived backgrounds in an adapted behavioural SCI.

Similarly to previous research, this thesis has identified several significant barriers to overcome in order for individuals to seek and reach smoking cessation services. Previous research has demonstrated that access to services could be improved through ensuring that they are conveniently located and offer the availability of home appointments (513, 514). The recent COVID-19 pandemic may have implications on how SSS are delivered (i.e. virtually). Evidence for engaging the

target population in online SCIs is limited and this mode of delivery should be further explored as a mechanism for encouraging smoking cessation with the target population.

The use of social media and smoking cessation

There have been many innovative cessation measures that have been implemented throughout the last five years, for example the use of smartphone apps and sending regular text messages. The COVID-19 pandemic has presented an important opportunity to build on the use of technology-based cessation methods as a way to provide remote support. Many of these interventions can be tailored to meet the needs of the individual and enable wide reach. Research has demonstrated that social media is integrated into most people's day-to-day lives and offers the potential to reach broad audiences, including older smokers from deprived backgrounds (303) who may not be engaged in smoking cessation services.

As a result of physical distancing recommendations because of COVID-19, many individuals have made more use of social media (515). An increased use of social media could be leveraged to encourage smoking cessation, with previous research demonstrating that social media interventions are feasible, acceptable and resulted in smoking cessation (516). Methodology in the survey study for this PhD successfully demonstrated the use of Facebook in engaging and recruiting older smokers from deprived backgrounds to a questionnaire focused on quit motivation. However, there was an underrepresentation of males in this study and therefore mechanisms to engaging this population through Facebook needs exploring. Using social media to encourage uptake of the proposed adapted SCI (Chapter 7) may have broad appeal and application to the target population. For example, targeted advertisements that aim to engage the target population could raise awareness of local community wellbeing services in order to improve social isolation. Social media may provide an additional and innovative way to reach the target population, especially those who are not actively engaged in smoking cessation services. However, it is important to recognise that older age groups may have experienced reduced digital communication during the COVID-19 pandemic (515) and other mechanisms to engage this population in smoking cessation messages should continue to be explored.

8.6.3 Considerations for practice, policy and future research

Consideration of how the recommended SCI could fit with local and national policy on smoking is important for implementation. A report published in 2021 highlighted the importance of behaviour change policy and interventions in order to deliver a Smokefree 2030 (517). Emphasis has been placed on future national targeted investment as a means to reach disadvantaged smokers, including enhanced support for materially deprived communities in which smokers are concentrated (517). It has been suggested that additional support should be provided for smokers in communities with higher smoking rates, as well as enhancing smokers mental health as a way to improve the wellbeing of the poorest communities (517).

There is a clear case for policy to prioritise a comprehensive approach that aims to motivate quit attempts in the target population of this thesis. A key implication outlined in the Smoking and Health report by the Tobacco Advisory Group of the Royal College of Physicians is the need for interventions that will stimulate quit attempts in older smokers (518). This is partly due to lower prevalence of quit attempts being associated with an increase in the mean age of smokers (519).

NICE Guidelines for stop smoking interventions and services report recommendations for prioritising specific groups that are at high risk of tobacco-related harm including people living in disadvantaged circumstances and communities with particularly high smoking prevalence. The research presented in this thesis suggests that SSS should work with local health and wellbeing services as a way to direct the target population to services that could help improve psychosocial determinants of quit motivation. The proposed adapted intervention could benefit a population that have high smoking rates and lack success in smoking cessation attempts.

The need to improve health outcomes, including lung cancer, in the most disadvantaged communities is one of the strategic aims of the UK Government initiative to tackle poverty. The research presented in this PhD offers transferable knowledge surrounding psychosocial influences of quit motivation and smoking cessation for a population who will likely form part of a lung screening eligible population. It is possible that the targeted behaviour SCI described in Chapter 7 could be implemented in a variety of healthcare settings including a lung cancer screening environment where gold standard SSS support should be delivered. The optimal model for delivering smoking cessation support in a lung screening setting is still not yet clear and ongoing research aims to address this (129, 507). However, research does suggest that smokers attending lung cancer screening should be

provided with immediate access to a SCP for behavioural support, advice, NRT and opt out SSS appointments (520).

The delivery of behaviour change advice in existing health care services is consistent with government policy on 'Make Every Contact Count' (521). The proposed adapted intervention could also be implemented in other cancer screening settings. Previous research has shown that cancer preventive examinations can act as ideal settings for the promotion of healthy lifestyles (110, 522). Research has demonstrated that willingness to receive lifestyle advice, including smoking cessation messages at cancer screening is high and a cancer screening setting could provide an opportunity to support this behaviour change (523).

Implementation of the adapted intervention in other screening settings may improve quit motivation and mental health and wellbeing for older smokers from deprived backgrounds.

Finally, the urgency to offer and promote effective SCIs in order to treat those with mental health conditions has been widely recognised in various UK national policies and guidelines (524-527). Smoking is a major contributor to health inequalities among individuals with and without mental health conditions (524). Approximately 50% of those who completed the survey in Chapter 5 reported having depression (303). Therefore the current research offers an understanding of the psychosocial determinants that could be targeted in SCIs for a population who are likely to experience mental health conditions and social isolation. Furthermore, the proposed adapted intervention could improve social connections for the target population which may have been worsened as a result of the COVID-19 pandemic.

COVID-19 pandemic and smoking cessation

Throughout the pandemic, research has highlighted the association between smoking and adverse COVID-19 outcomes as well as the need for older smokers to quit (528). Recent findings have demonstrated that during lockdown, an increase in smoking prevalence was evident among younger adults aged 18-34 years old and rates were relatively stable among older age groups (529). Additionally, data has shown that more than 176 million smokers globally have attempted to quit during the last 12 months and most stated using little to no assistance when making a quit attempt (529, 530). Although there are obvious benefits of quitting smoking during the pandemic (531), an individual's ability to stop smoking and their motivation have been affected by new and unforeseen stressors. At the social/community level,

those attempting to make a quit attempt have described numerous potential barriers, including minimal access to coping strategies that were previously available such as visiting family and friends (532).

Qualitative research from Cordon et al (533) found that smokers enrolled in a lung screening and tobacco health trial during COVID-19 reported new barriers to cutting down or stopping smoking. Barriers included a reduction in confidence as a result of pandemic-related stressors. Research into changes regarding motivation to stop smoking during COVID-19 have also found that boredom, uncertainty and stress all affected smokers self-efficacy and their ability to quit (532, 534). These findings are similar to those identified in the current thesis regarding barriers to smoking cessation (Chapter 6) and determinants of quit motivation (Chapter 5) (303).

Understanding barriers to smoking cessation in a COVID-19 context is imperative and can help practitioners to tailor behavioural counselling to address specific concerns, such as providing increased support to deal with additional stressors.

The qualitative study conducted as part of the current PhD demonstrated that pre-COVID, most of those who declined smoking cessation support during a lung health check were experiencing social isolation prior to the pandemic. Social isolation is an important public health issue that over the last 12 months has gained much recognition due to the risks presented to older adults as a result of physical distancing. COVID-19 has further highlighted the need for more community-based organisations to help maintain the provision of services and programmes for supporting and engaging older, deprived individuals during the difficult time of physical distancing. The recommended adaptations that have been described in Chapter 7 offer mechanisms for improving social connectivity. This could positively impact older smokers from deprived backgrounds who may have become further isolated as a result of COVID-19.

This PhD collected data prior to the COVID-19 pandemic and there may now be additional determinants of quit motivation and psychosocial variables that should be targeted in the proposed adapted behavioural intervention. It will be imperative that future research focuses on assessing the ways in which smoking cessation services can help older smokers from deprived backgrounds to make or maintain progress during the remainder of the pandemic. This may help to provide an insight into helping smokers manage other stressors in the future and improve their motivation to stop smoking.

Social distancing measures that have been in place during COVID-19 have meant that SSS delivery in the UK has moved mostly to telephone and online consultations (535). The provision of support that is accessible and suitable for more at-risk communities is even more important in a COVID-19 context and encouraging the target population to stop smoking is vital. The target population may further benefit from awareness of, and linking to, community support (i.e. online health and wellbeing sessions) that may now be available in light of COVID-19. For example, a social prescribing programme, Connected Communities, is currently utilising virtual technology and mobile service vehicles to reach socially isolated and lonely individuals who live in rural areas (536-538).

As research surrounding the connections between COVID-19 and smoking grows, evidence-based smoking cessation support, research and practice should continue to adapt to any further public health threats. The pandemic has caused the greatest harm to those groups who are most vulnerable in society. There are many overlaps with risk factors and health issues that are related to COVID-19, therefore prioritising smoking cessation and support for the target population of this thesis is important and also part of the wider measures for the UK to move towards being a tobacco-free country (517).

8.7 Conclusion

Quit motivation and smoking cessation among older smokers from deprived backgrounds is an under researched area and the current PhD aimed to understand the needs of this complex population in improving their motivation to stop smoking. Self-efficacy for quitting, risk-minimising beliefs, previous quit attempts (including NRT use), awareness of SSS, mental health and comorbid conditions were all found to be influential on quit motivation and smoking cessation in the target population. Social isolation and social support were also key in influencing an individual's motivation to stop smoking and the likelihood of making a quit attempt. Environmental factors that are associated with living in deprived communities were found to influence quit motivation. In response, an enhanced behavioural SCI designed to improve the wider determinants of health through referral to local community groups for the target population has been recommended. Future work to adapt and evaluate a behavioural SCI using a stakeholder-engaged process is warranted. There is also potential for this behavioural SCI to fit with future policy

initiatives for increasing smoking cessation rates, improving social connections among older smokers from deprived backgrounds, and longer-term improvement of lung cancer and other smoking-related diseases.

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Appendices

Appendix 2.1 *Table of intervention content*

Study	Intervention setting	Intervention Provider	Mode of delivery	Duration/intensity of intervention	Behavioural intervention components
Sheikhhattari (2016) Community Based Participatory Research	Community settings	Most successful during phase 2 and 3 when a trained peer motivator delivered the intervention	A peer motivator (use of a former smoker) was used in phase 3- the most effective phase of the study.	Group counselling- 6 week smoking cessation module, followed by a 6-week relapse prevention module. Graduates of the cessation classes were followed up at 3 and 6 months	The final phase (developed through participants and stakeholder feedback) achieved a more tailored approach to meet the needs of the participants in a respectful and supportive environment
Lasser (2017)- Patient navigation and financial incentives	Smokers receiving primary care at Boston Medical Centre	Patient navigator- PN had received 10 hours of training in MI techniques, including use of a structured script. Both navigators had experiences backgrounds in community work	Either phone or in -person meeting	4 hours of patient navigation delivered over 6 months. No designated specific amount of calls or meetings but a goal of 4 hours pf PN per patient.	PN's identified and discussed social contextual factors using MI techniques. For those ready to quit, directly connected to existing smoking cessation resources e.g. a quit line and hospital based smoking cessation group. Discussed medication use. Navigators were not formally trained in tobacco treatment. Potential to get \$750 of financial incentive at 12 month follow-up for abstinence

Bade (2016)	Lung cancer screening trial. The quit-smoking counselling was delivered in a separate room to the lung check	Two psychologists, specially trained in the WHO collaboration centre for tobacco control.	In person, before or after randomisation and screening and then a at least one subsequent telephone contact	The in-person counselling lasted 20 mins. Those who specified a quit date had the opportunity for four advices by telephone	Dependent on the pp disposition for changing (based on TTM) e.g. if low then motivating aspects were communicated, if advanced then specified plans for quitting were developed.
Ormston (2015)	Community pharmacy or cessation group	Group sessions-SSS staff or primary care practice nurses. 1-1 delivered by community pharmacy in their pharmacy	Group sessions-SSS staff or primary care practice nurses. 1-1 delivered by community pharmacy in their pharmacy	Support was delivered in groups or one-to-one	Financial incentives of £12.50 weekly vouchers with verified carbon monoxide test. Behavioural support based on NHS Scotland guidelines for SSSs e.g. set a quit date, provide encouragement and motivation during the quit process and help to deal with withdrawal symptoms and cravings

Neumann (2013)	Pharmacies, hospitals, and communities in Denmark that report to the national Smoking Cessation Database	Certified staff	Group or 1-1 format, group size varying between 2-26 participants. Allocation of individual to either group or 1-1 was at the discretion of the units or instructor	5 meetings over 6 weeks with a hotline available during the daytime	Manual based teaching sessions, clearly structured patient education programme, motivational conversations, reflections on benefits and costs of smoking vs cessation, teaching and training around risk situations and relapse prevention along with withdrawal symptoms and medical support and future planning.
Copeland (2005)	GP's in North Wales	GP	Face to face with GP	One off meeting with GP	General practitioner initiated the smoking cessation aspect of the conversation and subsequent prescription of NRT.
Bauld (2009)	Community or Pharmacy based support in Scotland	Group service in community is with a trained advisor. Pharmacy support was delivered by a trained pharmacist	Group if in community, 1-1 if in pharmacy	Pharmacy, 1-1 lasted between 5 and 15 minutes (not defined as brief counselling). Group service involved 7 weeks of support lasting around an hour	Behavioural elements not reported in paper-discusses choice of medication.
Celestin (2016)	Classroom at the referral hospital	Certified tobacco treatment specialists	Group sessions	4 one-hour sessions conducted once a week within a one month period	Used the 5As as a framework. Standard care and group behavioural counselling within 2 weeks of referral. Covering a range of topics including problem solving, skills training and intra-treatment support

Park (2015)	LDCT screening	Primary care clinician	One-to-one	5A delivery were computed for each of the 5 years after smokers' initial screen. No mention of duration of session with clinician	Prevalence of 5a's
Stewart (2010)	Accessible community centres and familiar settings (e.g. employment counselling centre)	Groups were facilitated by experienced professionals and peers (former smokers). In addition to the support group, women had the option of accessing one-to-one support from peer mentors.	Dyads and/or group sessions	Once a week for 2-3 hours, ranged from 12-16 weeks	Information, affirmation and emotional support. Empowering strategies to enhance self-efficacy, coping and positive health behaviours. Comprehensive focus on the social and economic context of women's lives, not solely on their tobacco use and cessation. Program accessibility (e.g., child care, transportation, appropriate literacy level, acceptable settings)
Sheffer (2013)	Local health centres	health care providers in the community	Individual, group or telephone sessions. Group sessions consisted of 5-10 participants	Delivered weekly. Group sessions lasted an hour. Individual or telephone treatment were generally 20-30mins	CBT content delivery, covering the biopsychosocial underpinnings of tobacco dependence

Appendix 4.1: Preliminary survey

Smoking status:

1) Which of the following best applies to you?

- a) I smoke cigarettes (including hand-rolled) every day
- b) I smoke cigarettes (including hand-rolled), but not every day
- c) I do not smoke cigarettes at all, but I do smoke tobacco of some kind (eg. pipe or cigar)
- d) I have stopped smoking completely in the last year
- e) I stopped smoking completely more than a year ago
- f) I have never been a smoker (i.e. smoked for a year or more)

If you answered A,B OR C go to question 2

If you answered D, E OR F then the QUESTIONNAIRE WILL END

2) Are you currently trying to cut down on how much you smoke but not currently trying to stop?

- a) Yes
- b) No

3) Are you using any of the following either to help you stop smoking, to help you cut down or for any other reason at all?

- a) Nicotine gum
- b) Nicotine lozenge
- c) Nicotine patch
- d) Nicotine inhaler\inhalator
- e) Another nicotine product
- f) Electronic cigarette
- g) Nicotine mouthspray
- h) Behavioural counselling (e.g. group sessions, telephone support, 1-1 support)
- i) Other (specify)

These questions are to help us determine your smoking history.

4) Have you made a serious attempt* to stop smoking before (Circle 'No' or write the number of times in the space)

**Serious attempt means you decided that you would try to make sure you never smoked again*

- No
- Yes, _____ times

5) What is the longest that a quit attempt has lasted in the past? (Write the number of months, days or weeks below)

This question is to help us find out about your motivation to quit smoking

6) Which of the following describes you?

- I don't want to stop smoking
- I think I should stop smoking but really don't want to
- I want to stop smoking but haven't thought about when
- I REALLY want to stop smoking but I don't know when I will
- I want to stop smoking and hope to soon
- I REALLY want to stop smoking and intend to in the next 3 months
- I REALLY want to stop smoking and intend to in the next month
- Don't know

These questions are to help us find out about your nicotine dependence

7) How soon after you wake do you smoke your first cigarette?

- Within 5 minutes
- 6-30 minutes
- 31-60 minutes
- After 60 minutes

8) Do you find it difficult to refrain from smoking in the places where it is forbidden (e.g., in the church, at the library, in the cinema)?

- Yes
-

No

9) Which cigarette would you hate most to give up?

The first one in the morning

Any other

10) How many cigarettes per day do you smoke?

10 or less

11-20

21-30

31 or more

11) Do you smoke more frequently during the first hours after waking than during the rest of the day?

Yes

No

12) Do you smoke if you are so ill that you are in bed most of the day?

Yes

No

13) The following are some situations in which certain people might be tempted to smoke. Please indicate whether you are sure that you could refrain from smoking in each situation using one of the following answers:

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutely sure
a) When I feel nervous	<input type="checkbox"/>				
b) When I feel depressed	<input type="checkbox"/>				
c) When I am angry	<input type="checkbox"/>				
d) When I feel very anxious	<input type="checkbox"/>				
e) When I want to think about a difficult problem	<input type="checkbox"/>				
f) When I have the urge to smoke	<input type="checkbox"/>				
g) When having a drink with friends	<input type="checkbox"/>				
h) When celebrating something	<input type="checkbox"/>				
i) When drinking, beer, wine or other spirits	<input type="checkbox"/>				
j) When I am with other smokers	<input type="checkbox"/>				
k) After a meal	<input type="checkbox"/>				
l) When having a coffee or tea	<input type="checkbox"/>				

j) Smoke a cigarette in front of you	<input type="checkbox"/>				
k) Talk you out of smoking a cigarette	<input type="checkbox"/>				
l) Help you use substitutes for cigarettes	<input type="checkbox"/>				
m) Compliment you on not smoking	<input type="checkbox"/>				
n) Offer you a cigarette	<input type="checkbox"/>				
o) Express pleasure at your efforts to quit	<input type="checkbox"/>				
p) Participant in an activity that helped keep you from smoking	<input type="checkbox"/>				
q) Express confidence in your ability to quit/stay quit	<input type="checkbox"/>				
r) Congratulate you for your decision to quit smoking	<input type="checkbox"/>				
s) Mentioned being bothered by smoke	<input type="checkbox"/>				

16) **SKIP IF ANSWERED NO TO QUESTION 4.** Overall, thinking about your previous attempts to stop smoking

	Not at all	Somewhat	Moderately	Very	Extremely	Not applicable
a) How well supported do you feel you've been	<input type="checkbox"/>					

by your partner?						
b) How well supported do you feel you've been by your friends?	<input type="checkbox"/>					
c) How well supported do you feel you've been by your colleagues?	<input type="checkbox"/>					

17) To what extent do you feel that someone is relying on you to stop smoking? (<i>Circle one response</i>)	Extremely	5
	Very Much	4
	Moderately	3
	Somewhat	2
	Not at all	1

18) To what extent do you feel that you have someone to turn to if you found stopping smoking difficult? (<i>Circle one response</i>)	Extremely	5
	Very Much	4
	Moderately	3
	Somewhat	2
	Not at all	1

19) To what extent do you feel you would be competing with someone else in your attempt to stop smoking? (<i>Circle one response</i>)	Extremely	5
	Very Much	4
	Moderately	3
	Somewhat	2
	Not at all	1

20) These questions are to help us find out about your beliefs and attitudes towards smoking

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
a) Lots of doctors and nurses smoker, so it cannot be all that harmful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) The medical evidence that smoking is harmful is exaggerated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Smoking cannot be all that bad for you because many people who smoke live long lives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Smoking cannot be all that bad because some top sports people smoke and still perform well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) More lung cancer is caused by such things as air pollution, petrol and diesel fumes than smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) I would rather live a shorter life and enjoy it than a longer one where I will be deprived of the pleasure of smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) You have got to die of something, so why not enjoy yourself and smoke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Cancer mostly strikes people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

with negative attitudes					
i) They will have found cures for cancer and all other problems smoking causes before I am likely to get any of them	<input type="checkbox"/>				
j) You can overcome the harms of smoking by doing things like eating health food and exercising regularly	<input type="checkbox"/>				
k) I think I must have the sort of good health or genes that means I can smoke without getting any of the harms	<input type="checkbox"/>				
l) I think I would have to smoke a lot more than I do to put my health at risk	<input type="checkbox"/>				
m) Everything causes cancer these days	<input type="checkbox"/>				
n) If smoking was so bad for you, the government would ban tobacco sales	<input type="checkbox"/>				
o) It is dangerous to walk across the street	<input type="checkbox"/>				
p) Smoking is not more risky than lots of other	<input type="checkbox"/>				

things that people do					
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21) The following questions are to help us understand your beliefs and attitudes towards lung cancer.

a) How likely do you think it is that you will develop lung cancer in your lifetime?

1	2	3	4	5
Very Unlikely	Unlikely	Neutral	Likely	Very likely

b) Compared to others your age and sex, what do you think is your chance of getting lung cancer in your lifetime?

1	2	3	4	5
Much lower Higher	Lower	Neutral	Higher	Much

c) How worried are you about getting lung cancer in your lifetime?

1	2	4	5
Not at all	Slightly	Very	Extremely

22) Have you, your family or close friends had lung cancer?

	Yes	No	Don't know	Prefer not to say
a) You	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Partner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Close family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Other family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Close friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Other friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

g) A member of your community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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23) *The following is a list of common problems. Please indicate if you currently have the problem in the first column. If you do not have the problem skip to the next problem. If you do have the problem, please indicate in the second column if you receive medications or some other type of treatment for the problem. In the third column indicate if the problem limits any of your activities. Finally indicate all medical conditions that are not listed under “other medical problems” at the end of the page*

Problems	Do you have a problem?		Do you receive treatment for it?		Does it limit your activities?	
	No	Yes	No	Yes	No	Yes
Heart disease						
High blood pressure						
Lung disease						
Diabetes						
Ulcer or stomach disease						
Kidney disease						
Liver disease						
Anaemia or other blood disease						
Cancer						
Depression						
Osteoarthritis, degenerative arthritis						
Back pain						
Rheumatoid arthritis						
Other medical problem _____						

Appendix 4.2. Cognitive interview study advertisement

Help us to improve our questionnaire on smoking beliefs, attitudes and behaviour!

The purpose of this study is not to make you quit smoking, we simply would like your opinion on a questionnaire that we are working on. We are doing a research study to see how best to measure smoking behaviour, beliefs and attitudes. This will take around 30-45 minutes. As a thank you for your help, we will give you £10 in shopping vouchers.

The study involves doing a short questionnaire. At the end of each section you will be asked by the researcher on the study to respond to a set of questions about:

- whether you had any problems answering these questions
- wording and clarity of the questions
- any other comments you would like to mention

The aim of the study is to understand what people think of the questionnaire itself and test it before it is finalised for use in a future study.

If you are interested in taking part in this study then please contact Pamela Smith on 02920 687695 or smithp18@cardiff.ac.uk to arrange a suitable date and location for the interview to take place.

Appendix 4.3. Cognitive interview study information sheet



Dear Sir/Madam,

I am a current PhD student at Cardiff University, School of Medicine. I am doing a research study to see how best to measure smoking related beliefs and attitudes. This will take around 30-45 minutes. As a thank you for your help, we will give you **£10 in shopping vouchers**. The purpose of this study is not to make you quit smoking, we are simply interested in your opinion on a questionnaire.

The study involves doing a short questionnaire. At the end of each section you will be asked to respond to a set of questions from the researcher who will ask for your feedback on:

- whether you had any problems answering these questions
- wording and clarity of the questions
- any other comments you would like to mention

Your answers to the questionnaire will not be used for any research purpose. The aim of the study is to understand what people think of the questionnaire itself and test it before it is ready for use in a future study.

To help you decide whether or not to take part, the information sheet below tells you more about the questionnaire and the study. If you would like to take part, please fill in the consent form and give it to the researcher.

If you have any questions, you can ask the researcher.

Pamela Smith

What is the study about?

The main aim of the study is to find out the best way to beliefs about smoking such as quit motivation, social support and pre-existing health conditions. We are testing the current questionnaire before it is finalised and ready to use. While the answers you give in the questionnaire are important to us, we are mainly interested in the ways in which you arrived at those answers. We would also like to know about any problems that you might have when completing the questionnaire.

What do I have to do?

At the start of the questionnaire is a short section for you to tell us a bit about yourself. We ask you to complete this section so that we can understand a bit more about the people who have helped us improve the questionnaire. Once you have completed this section you will move on to set of questions that we want feedback on.

At the end of each section of the questionnaire you will be asked questions by the researcher about:

- whether you had any problems answering these questions
- your views on the wording and clarity of the questions
- any other comments you may have

Your interview will be audio recorded by the researcher using a Dictaphone. You can stop the interview at any point and you do not need to give us a reason.

Do I have to take part?

No. It is up to you if you decide to take part or not. If you do decide to take part, we will ask you to sign a consent form before you do the study. This is to say that you agree to take part in the study. You can stop the study at any point and you do not need to give us a reason.

What will happen after the study?

After the interview, we will type what you said and the audio recording of your interview will be deleted. This means we can let other researchers know the results of this study. Your name or anyone else's name you mention will never be typed. The results will help us understand how best to improve the questionnaire so it is fit for use in future studies.

What are the risks of taking part?

Parts of the questionnaire are about smoking and cancer. Some people don't like talking about cancer or find talking about cancer upsetting. If you do get upset, you can talk to the researcher. You can also stop the doing the questionnaire at any point without giving a reason.

If you want to talk to someone else about cancer, you can contact **Tenovus Cancer Care on 0808 808 1010**.

What are the benefits of taking part?

This is a good chance to tell us what you think about the questionnaire. Your thoughts and views are very important to us. You will help provide important information about what we need to do to improve the questionnaire. This will help us to improve how we ask questions about smoking.

If you decide to take part, we will give you a £10 shopping voucher to thank you for your help.

What will happen to my personal details?

Your name and contact details will be kept on secure, password protected university computers. Your name and contact details will only ever be seen by members of the research team. Your details will not be used for anything other than contacting you as part of this study.

If I have a question about the study, who do I contact?

If you have a question about the study you can ask the researcher. If you have any more questions, you can also contact the researcher at:

Email: smithp18@cardiff.ac.uk

Phone: 02920 687695

What do I do if I want to take part?

If you would like to take part, please contact the researcher who will arrange a suitable date and location with you to do the interview. Fill in the consent form and give it back to the researcher.

Appendix 4.4: *Cognitive Interviews Standard Operating Procedure*

- Present participant with the survey.
- Allow time to read the information provided on the first page.
- The interviewer reads the following: 'Firstly, thank you for agreeing to take part in this interview. I would like to remind you that you can stop the interview at any point, without giving a reason. This will have no impact on your healthcare. If it is ok with you, I would like to tape-record our conversation. All identifiable information will be removed to ensure that no-one will know that you have talked to us. The interview shouldn't last any longer than an hour. The focus of this interview is to see if the questions make sense and are easy to understand and respond to. We are not interested in the answers you give to the question, but we are interested in how you got to that particular answer. Are you happy to proceed?'
- If participant is happy to proceed then ask them to fill in and sign the consent form.
- The following should then be said ' I would like you to read through each question one at a time and fill in its answer. I would like you to report aloud everything you are thinking about when answering the question. I would also like you to comment on the question, for example on things like the way it's worded and how you hard or easy it was to answer it. I may then ask you what you understand by certain words in the question, how you managed to get to the answer that you have given or I may ask you to rephrase the question in your own words. There are no right or wrong answers.'

Appendix 4.5 Cognitive interview probes and think aloud techniques

PROBE ALL: Let's stop for a chat. Did you have any problems answering these questions?

What about the familiarity of the words used?

What did you think of the wording here and what do you think can anything be done to improve it?

What did you think about the clarity of the questions? What about the instructions? How were they for you?

Is there anything else you would like to mention so far?

PROBE ALL:

How did you feel answering these questions? Did you have any problems answering them? Were there any statements you didn't understand?

What about the familiarity of the words used?

What does the term "serious attempt" mean to you?

What did you think of the wording here and do you think can anything be done to improve it?

What did you think about the clarity of the questions? What about the instructions? How were they for you?

Is there anything else you would like to mention so far?

PROBE ALL: You have answered _____ to your motivation to quit smoking.

How easy or hard was it to answer the question? How sure are you of your answer?

Is there anything else you would like to mention so far?

Appendix 4.6 Content Validity Protocol

Protocol: assessing content validity of a cross sectional population based survey of factors predicting quit motivation in older, deprived smokers

Background

The current survey was developed in Cardiff University by a PhD student. The aim of this survey is to identify potential modifiable, psychosocial predictors of quit motivation. Content validity is to be conducted on the '*social support in quitting*' measure within the questionnaire. This measure was adapted from research by Burns et al (2014) who explored support from a partner or if single, the person closest to them. The adapted NCST measure is to be used in the present survey as a way to examine support from a wider social network and not just a partner or someone close to the individual.

Purpose of this protocol

Content validity helps to provide evidence of the extent to which the components of an instrument are relevant to, and represent, the construct of interest (Haynes et al., 1995). The definition of 'construct' refers to the concept or variable that is the target of the survey. 'Relevance' refers to the appropriateness of the items included in the survey, to the degree in which the items reflect and measure all dimensions of the construct.

The measure is not a comprehensive assessment of all predictors of quit motivation in older, deprived smokers. Rather, items have been selected on the basis to represent key theoretical constructs reflecting self-efficacy and social supports, that may be drivers of increasing motivation in the target population.

Content validity has taken the form of quantitatively based judgement. Experts who are asked to assess if the items in a survey reflect the area of interest and will thus, successfully meet the aims of the research often carry out this process. Content validity has similarities with face-to-face, however the process differs in the fact that face validity usually refers to more superficial validity that is based on intuitive judgements or a target audience, or other untrained observers.

The assessment of content validity is often carried out using a panel of experts who then score the questionnaire items using several different criteria (Haynes et al., 1995; Hyrkas et al., 2003; Grant et al., 1997). The proportion of raters giving high scores is known as the content validity index.

This protocol outlines the methods used for measuring content validity index for the interview measure in UK English.

Methods

Content validity of the survey questions (see Appendix 1) will be assessed for one of the items (social support for quitting) that has not been previously been validated. Raters will be asked to assess each question within the items in terms of relevance and representativeness. The content validity index will then be calculated for each item: the percentage of raters who will give a high score in regards to relevance and representativeness.

Panel of raters

The panel that will be rating the items will consist of six or more academics that have some experience in the field of measurement of health behaviours. The raters might be doctoral students, post-doctoral researchers as well as senior academics. They do not need to be experts in the field of smoking but should have awareness of some of the theoretical constructs surrounding health behaviours i.e. self-efficacy.

Scoring

Each rater will independently score each of the questions in the two items (see Appendix 1) using the scorecards that is provided in Appendix 2 according to the following criteria:

1. Relevance: the appropriateness of the items in relation to the construct and the function of the survey
2. Representativeness: whether the items cover a representative sample of the construct

Raters will score each of the items on a scale of 1 to 4 (ranging from poor to very good) based on definitions presented defined in the scorecard. Raters should also provide comments, particularly if they give a score of less than 3 for any of the items.

Analysis

For each of the items a calculation of the numbers of raters giving a rating of 3 or 4 for relevance and representativeness. This will then be divided by this total number of raters to give a content validity index for both relevance and representativeness. A low content validity index will therefore arise if the few raters score an item with 3 or 4.

Defining adequate content validity

Unfortunately there is no universal agreement for the definition of adequate content validity; content validity will be considered as adequate if the index score is greater than 78% (Schwarzer et al., 1996). This is at a level at which chance agreement is unlikely to explain the high score (Schwarzer et al., 1996).

Actions to take if the index scores <78%

If the content validity is less than 78% for any of the items on any of the measures then it will be important to improve the wording of the item and consider the following:

- Whether the item(s) in the domain are not comprehensive enough to collect data on the construct
- Whether the domain measures other constructs than the one of interest

If it is not possible to reach an agreement on the most appropriate wording of the component items then further from PPI might be necessary.

Reporting

The content validity write-up should include:

- The number of raters used
- A brief description of professional background of raters
- Content validity index for each of the items in regards to relevance and representativeness (or the copies of scorecards completed by raters)
- Summary notes on the process and the changes that come after this phase of work

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Appendix 4.7: Content validity scores and raters comments

Construct	Item	Item wording	Content Validity Index ⁴		Notes (please note why you have given a low score, and provide suggestions for improvement if possible)
			Relevance	Representativeness	
		<i>During a quit attempt how often did someone...</i>			
Social support	A	Tell the participant to stick at quitting	100%	100%	2: 'Encouraged' as opposed to 'tell' 4: Another word for 'stick at', maybe 'preserve' or 'keep at' 6: 'Keep going' instead of 'stick at it'
Social support	B	Comment on the participants lack of will power during quit period	100%	100%	5: Add 'while you were trying to quit'
Social support	C	Celebrate the quit with participant	100%	83%	
Social support	D	Leave cigarettes where participants can reach them	67%	50%	3: Given the context of the population this does not necessarily suggest a lack of social support 5: Is 'reach' the correct word? Maybe 'leave their cigarettes in sight/view' 5: Seems more about social context than social support 6: Is this social support? If someone else smokes within same household they are likely to leave cigs within 'reach'
Social support	E	Express doubt about the participants ability to quit/stay quit	100%	100%	5: Simplify wording? 'Think/ believe/say you were going to start smoking again?'

⁴ Content validity index is the number of raters giving a rating of 3 or 4 divided by the total number of raters (n=6). Cut-off for adequate content validity is 78%.

Construct	Item	Item wording	Content Validity Index ⁴		Notes (please note why you have given a low score, and provide suggestions for improvement if possible)
			Relevance	Representativeness	
Social support	F	Help the participant think of substitutes for smoking	83%	83%	1: Maybe find a different word for 'substitutes'? 3: Not clear about what this means 4: Is substitutes clear or could some examples be provided? 5: Simplify wording? i.e. substitute is hard to read 'take your mind off smoking/distract you from smoking' 6: Could do with rephrasing?
Social support	G	Calm them down when feeling stressed or irritable	83%	100%	4: Is this directly relevant to smoking? 6: Due to stopping smoking? A bit generic
Social support	H	Criticise any weight gain the participant had	83%	83%	4: Is this directly relevant to smoking? 5: Does this commonly happen? No option for n/a 6: Due to stopping smoking? Too generic
Social support	I	Comment that smoking is a dirty habit	67%	67%	2: Item relates to social norms that could influence someone not smoking in specific circumstances as opposed to having an impact during a quit attempt 5: Is this relevant? More so if they continued to smoke, rephrase to 'say that...'
Social support	J	Smoke a cigarette in front of the participant	50%	50%	3: Given the context of the population this does not necessarily suggest a lack of social support 6: Not sure. Smoking in front of an individual who is quitting does not necessarily mean not supporting
Social support	K	Talk the participant out of smoking a cigarette	100%	100%	2: 'provide helpful advice' as opposed to 'talk out' 5: Rephrase to 'Persuade you to not smoke'
Social support	L	Help the participant use substitutes for cigarettes	100%	83%	1: Maybe find a different word for 'substitutes'? 4: Could examples be provided for substitutes?

Construct	Item	Item wording	Content Validity Index ⁴		Notes (please note why you have given a low score, and provide suggestions for improvement if possible)
			Relevance	Representativeness	
					5: Too similar to item F 6: To help them to actually 'use' them or to choose a substitute?
Social support	M	Compliment them on not smoking	100%	100%	1: Change 'compliment' to 'praise them for' 5: Or 'congratulate you...'
Social support	N	Offer the participant a cigarette	100%	100%	
Social support	O	Express pleasure at the efforts of the participant quitting	83%	83%	1: 'express pleasure at' could be re-phrased. This item is similar to item M. 5: Too similar to item M 6: Re-word 'pleasure'
Social support	P	Participate in an activity that helped keep the participant from smoking	83%	83%	3: Not clear about what this means 5: Rephrase to 'do an activity with you to keep you from smoking'
Social support	Q	Express confidence in the participants ability to quit/stay quit	100%	100%	5: Rephrase to 'say they were confident that you would quit'
Social support	R	Congratulate the participant on their decision to quit	83%	83%	1: Items M, O, Q and R seem to be overlapping 5: Too similar to M
Social support	S	Mentioned being bothered by smoke	17%	17%	2: Same as item I 5: Not too sure what this item means 6: Not sure about this item. It feels a bit like shaming the individual about smoking



SASH: Study of Attitudes towards Smoking and Health

Page 1

I am a current PhD student at Cardiff University. *SASH: Study of Attitudes towards Smoking and Health* is a research study that aims to understand smoking beliefs, attitudes and behaviours in current smokers who are aged 50 years and older and living in the UK. **The purpose of this study is not to make you quit smoking.**

Before starting the full questionnaire you will answer a few 'about you' questions to see if you are eligible to take part. If you are eligible, the questionnaire will take around 15-20 minutes to complete. Your time and input into this research is important and I would be very grateful. Therefore, as a thank you, you have the choice to be entered into a **prize draw with the chance to win a £50 shopping voucher.** Even if you are not eligible you still have the chance to win a £50 shopping voucher.

What do I have to do if I am eligible?

We would like you to fill out a short questionnaire to tell us what about your beliefs, attitudes and behaviour around smoking and lung cancer.

What will happen after the study?

We will look at the questionnaire to see what people's beliefs, attitudes and behaviours are. The results will help us to understand more about smoking and help us to understand what smokers might need in the future if they want to quit smoking.

What are the risks of taking part?

Parts of the questionnaire are about smoking and cancer. Some people don't like talking about cancer or find talking about cancer upsetting. If you do get upset you can stop the doing the questionnaire at any point. If you want to talk to someone about cancer, you can contact **Tenovus Cancer Care on 0808 808 1010.**

What are the benefits of taking part?

Your thoughts and views are very important to us and this survey will help to further understand smoking. If you decide to take part, you will have the chance to be entered into a prize draw with the opportunity to win a £50 shopping voucher. Please leave your contact details at the end of the questionnaire.

What will happen to my personal details?

Your name, contact details and postcode will be kept on secure, password protected university computers. Your name, contact details and postcode will only ever be seen by members of the research team at Cardiff University. Your details will not be used for anything other than contacting you as part of this study.

If I have a question about the study, who do I contact?

If you have a question about the study or would like to complete **a paper version of the questionnaire** you can contact the researcher (Pamela Smith) at:

Email: smithp18@cardiff.ac.uk

What do I do if I want to take part?

By starting the survey this means that you have consented and agreed to the following:

1. I have read and understood the present information
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I agree to take part in the study.

About you!

Before we get started we would like to understand a little bit more about you to see if you're eligible to take part in the study. Please tick one option for the following questions.

I am Required

- Female
- Male
- Other

If other, please specify

What is your postcode? Required

Which of these best describes your current relationship? Please tick one option.

- Married or in a civil partnership
- Living with my partner

- Single (never married and not living with a partner)
- Divorced or separated and not living with another partner
- Widowed and not living with another partner
- Prefer not to say

I am aged... Required

- less than 50 years old
- between 50 and 64 years old
- 65 years or older

Where did you hear about this questionnaire? Required

- Facebook
- Twitter
- A community event
- Word of mouth (i.e. from a friend, family member)
- HealthWise Wales
- The Cwm Taf Hub
- Other

Please specify

About you!

Which of the following best applies to you? Please tick one answer. Required

- I smoke cigarettes every day
- I smoke cigarettes, but not every day
- I do not smoke cigarettes at all, but I do smoke tobacco of some kind (eg. pipe or cigar)
- I have stopped smoking cigarettes completely in the last year
- I stopped smoking cigarettes completely more than a year ago
- I have never been a cigarette smoker (i.e. smoked for a year or more)

Education

What is your highest level of education? Please tick one option. Required

- Finished school at or before age of fifteen
- No qualifications/ left school at 16
- O Level or GCSE equivalent (Mostly grade A-C)
- O Level or GCSE equivalent (Mostly grade D-G)

- Completed A levels or equivalent
- Completed further education but not degree
- Completed a Bachelors degree/masters/PHD

Employment

Please think about the **highest income earner** in your household or immediate family unit. This could be someone you live with. What kind of job do they do? *If the highest income earner is retired, please indicate the kind of job that they used to do before they retired. Please select one answer.*

- Casual labourer, pensioner, student, unemployed (e.g. pensioner without private pension and anyone living on basic benefits)
- Semi-skilled and unskilled manual worker (e.g. assembly line worker, refuse collector, messenger)
- Skilled manual worker (e.g. electrician, carpenter)
- Supervisory/ clerical/ junior managerial/ professional/ administrative (e.g. shop floor supervisor, bank clerk, sales person)
- Intermediate managerial/ professional/ administrative (e.g. middle management, bank manager, teacher)
- Higher managerial/ professional/ administrator (e.g. Chief executive, senior civil servant, surgeon)
- No previous or current employment within the household

Home ownership

Please tick a box that best describes your home/living arrangement: Required

- Own outright
- Own mortgage
- Rent from local authority/housing association
- Rent privately
- Living with family or friends

Name:

Telephone number

You are eligible to take part!

Based on the information you have provided, you are eligible to take part in the questionnaire. Thank you for your interest so far. Please answer the questions below and then we can get started.

If you would like to be entered into a prize draw with the chance to **win a £50 shopping voucher** please leave your name and telephone number below!

Name:

Telephone number:

Would you like to be contacted for future related research?

- Yes
 No

Please leave your name:

Please leave your telephone number:

Motivation to stop smoking

Which of the following describes you? Please tick one answer. Required

- I don't want to stop smoking
 I think I should stop smoking but don't really want to
 I want to stop smoking but haven't thought about when
 I REALLY want to stop smoking but I don't know when I will
 I want to stop smoking and hope to soon
 I REALLY want to stop smoking and intend to in the next 3 months
 I REALLY want to stop smoking and intend to in the next month
 Don't know

Smoking status

Are you currently trying to cut down on how much you smoke but not currently trying to stop?

- Yes
 No

Are you using any of the following either to help you stop smoking, to help you cut down or for any other reason at all? Please tick all that apply.

- Nicotine gum
 Nicotine lozenge

- Nicotine patch
- Nicotine inhaler\inhalator
- Another nicotine product
- Electronic cigarette
- Nicotine mouth spray
- Behavioural counselling (e.g. group sessions, telephone support, 1-1 support)
- I am not using anything to help me stop smoking
- Other (specify)

Please specify what you are using:

Smoking history

Have you ever made a serious attempt* to stop smoking before? **a serious attempt means you decided that you would try to make sure you never smoked again*

- Yes
- No

How many times have you made a serious attempt to stop smoking?

What is the longest that a quit attempt has lasted in the past? (Write the number of days, weeks or months below)

The next set of questions asks about how supported you have felt in your attempt to previously stop smoking. For each statement tick the box that corresponds to your experience. Please tick one box in each row. **DURING A PREVIOUS QUIT ATTEMPT, HOW OFTEN DID SOMEONE YOU KNOW:**

Please don't select more than 1 answer(s) per row.

	Never	Almost never	Sometimes	Fairly often	Very often
Encourage you to keep at quitting	<input type="checkbox"/>				
Comment on your lack of will power	<input type="checkbox"/>				
Celebrate your quitting with you	<input type="checkbox"/>				
Say you were going to start smoking again	<input type="checkbox"/>				
Help to calm you down when you were feeling stressed or irritable	<input type="checkbox"/>				
Persuade you not to smoke	<input type="checkbox"/>				
Help you think of/use replacements for smoking i.e. nicotine patches, stop smoking services	<input type="checkbox"/>				

Congratulate you on not smoking	<input type="checkbox"/>				
Offer you a cigarette	<input type="checkbox"/>				
Do an activity with you to keep you from smoking	<input type="checkbox"/>				
Say they were confident that you could quit/stay quit	<input type="checkbox"/>				

Overall, thinking about your previous attempts to stop smoking please let us know how well supported you feel you were. Please tick one box in each row.

Please don't select more than 1 answer(s) per row.

	Not at all	Somewhat	Moderately	Very	Extremely	Not applicable
How well supported do you feel you were by your partner?	<input type="checkbox"/>					
How well supported do you feel you were by a family member?	<input type="checkbox"/>					
How well supported do you feel you were by your friends?	<input type="checkbox"/>					
How well supported do you feel you were by your work colleagues?	<input type="checkbox"/>					
How well supported do you feel you were by your GP or other healthcare professional?	<input type="checkbox"/>					

Social Support

To what extent do you feel that you have someone to turn to if you found stopping smoking difficult? Please tick one answer Required

- Extremely
- Very Much
- Moderately
- Somewhat
- Not at all

Smoking behaviour

How soon after you wake do you smoke your first cigarette? Please tick one answer. Required

- Within 5 minutes
- 6-30 minutes
- 31-60 minutes
- After 60 minutes

Do you find it difficult to refrain from smoking in the places where it is forbidden (e.g., in the church, at the library, in the cinema)? Required

- Yes
- No

Which cigarette would you hate most to give up? Required

- The first one in the morning
- Any other

How many cigarettes per day do you smoke? Please tick one answer. Required

- 10 or less
- 11-20
- 21-30
- 31 or more

Do you smoke more frequently during the first hours after waking than during the rest of the day? Please tick one answer. Required

- Yes
- No

Do you smoke if you are so ill that you are in bed most of the day? Required

- Yes
- No

Temptation to smoke

The following are some situations in which people might be tempted to smoke. Please indicate whether you are sure that you could **refrain from/ resist smoking** in each situation using one of the following answers. Please tick one box in each row.

Please don't select more than 1 answer(s) per row.

	Not at all sure	Not very sure	More or less sure	Fairly sure	Absolutely sure
When I feel nervous I could refrain from smoking	<input type="checkbox"/>				
When I feel depressed I could refrain from smoking	<input type="checkbox"/>				
When I am angry I could refrain from smoking	<input type="checkbox"/>				

When I feel the urge to smoke I could refrain from smoking	<input type="checkbox"/>				
When having a drink with friends I could refrain from smoking	<input type="checkbox"/>				
When celebrating something I could refrain from smoking	<input type="checkbox"/>				
When I am with smokers I could refrain from smoking	<input type="checkbox"/>				
When having coffee or tea I could refrain from smoking	<input type="checkbox"/>				

Confidence to quit smoking

How confident are you that you could quit smoking for good if you wanted to? Please tick one answer. Required

- Extremely
- Very much
- Moderately
- Somewhat
- Not at all

Smoking beliefs and attitudes

These questions are to help us find out about your beliefs and attitudes towards smoking. Please tick one box in each row.

Please don't select more than 1 answer(s) per row.

	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree
The medical evidence that smoking is harmful is exaggerated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smoking cannot be all that bad for you because many people who smoke live long lives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would rather live a shorter life and enjoy it than a longer one where I will be deprived of the pleasure of smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You have got to die of something, so why not enjoy yourself and smoke	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I think I must have the sort of good health or genes that means I can smoke without getting any of the harms	<input type="checkbox"/>				
I think I would have to smoke a lot more than I do to put my health at risk	<input type="checkbox"/>				
Everything causes cancer these days	<input type="checkbox"/>				
Smoking is not more risky than lots of other things that people do	<input type="checkbox"/>				

Lung cancer

How likely do you think it is that you will develop lung cancer in your lifetime?

Required

- Very likely
- Likely
- Neutral
- Unlikely
- Very unlikely

Compared to others your age and sex, what do you think is your chance of getting lung cancer in your lifetime? Required

- Much higher
- Higher
- Neutral
- Lower
- Much lower

How worried are you about getting lung cancer in your lifetime? Required

- Extremely
- Very
- Moderately
- Slightly
- Not at all

Have you, your family or close friends had lung cancer? Optional

Please don't select more than 1 answer(s) per row.

	Yes	No	Don't know	Prefer not to say
You	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A partner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Close family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Close friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other friend	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A member of your community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pre-existing health conditions

The following is a list of common problems. Please indicate if you currently have the problem. If you do have the problem, please indicate if you receive medications or some other type of treatment for the problem. Finally, please indicate if the problem limits any of your activities.

Do you have heart disease?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have high blood pressure?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have lung disease?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have diabetes?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have an ulcer or stomach disease

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have kidney disease?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have liver disease?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have anaemia or other blood disease?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have cancer?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have depression?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have osteoarthritis or degenerative arthritis?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have back pain?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have rheumatoid arthritis?

Yes

No

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Do you have any other medical problem?

Yes

No

Please type what your other medical problem is

Do you receive treatment for it?

Yes

No

Does it limit your activities?

Yes

No

Final page

Thank you!

Thank you for participating in this research- your input is really important and valuable. Please feel free to contact the researcher if you have any questions using the details below:

Pamela Smith

smithp18@cardiff.ac.uk

Appendix 5.1 Online study information sheet



Dear Sir/Madam,

I am a current PhD student at Cardiff University, School of Medicine. **The purpose of this study is not to make you quit smoking.** I am doing a research study to measure smoking beliefs, attitudes and behaviours in current smokers who are aged 50 years or older. This will take around 15-20 minutes. Your time and input into this research is beneficial and I would be very grateful. Therefore, as a thank you for your help, you will be entered into a prize draw with the chance to win a £50 shopping voucher.

To help you decide whether or not to take part, the information sheet below tells you more about the questionnaire and the study. If you would like to take part, please fill in the consent form and give it to the researcher.

If you have any questions, you can ask the researcher.

Pamela Smith

What is the study about?

The main aim of the study is to find out the best way to beliefs about smoking such as quit motivation, social support and pre-existing health conditions. We are testing the current questionnaire before it is finalised and ready to use. While the answers you give in the questionnaire are important to us, we are mainly interested in the ways in which you arrived at those answers. We would also like to know about any problems that you might have when completing the questionnaire.

What do I have to do?

We would like you to fill out a short questionnaire to tell us what you think about your belief, attitudes and behaviour around smoking and lung cancer.

Do I have to take part?

No. It is up to you if you decide to take part or not. If you do decide to take part, we will ask you to sign a consent form before you do the study. This is to say that you agree to take part in the study. You can stop the study at any point and you do not need to give us a reason.

What will happen after the study?

We will look at the questionnaire to see what people's beliefs, attitudes and behaviours towards smoking are. The results will help us to understand more about

smokers and help us to see what these people need for any potential future quit attempts.

What are the risks of taking part?

Parts of the questionnaire are about smoking and cancer. Some people don't like talking about cancer or find talking about cancer upsetting. If you do get upset, you can talk to the researcher. You can also stop the doing the questionnaire at any point without giving a reason. If you want to talk to someone else about cancer, you can contact **Tenovus Cancer Care on 0808 808 1010**.

What are the benefits of taking part?

Your thoughts and views are very important to us and this survey will help to further understand the needs and preferences of older smokers. If you decide to take part, you will be entered into a prize draw with the chance to win a £50 shopping voucher.

What will happen to my personal details?

Your name and contact details will be kept on secure, password protected university computers. Your name and contact details will only ever be seen by members of the research team. Your details will not be used for anything other than contacting you as part of this study.

If I have a question about the study, who do I contact?

If you have a question about the study you can ask the researcher. If you have any more questions, you can also contact the researcher at:

Email: smithp18@cardiff.ac.uk

Phone: 02920 687695

What do I do if I want to take part?

By starting the survey this means that you have consented to the following:

1. I have read and understood the present information
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I agree to take part in the study.

Appendix 5.2: Overview of study

Are you a current smoker? Over the aged of 50?

Answer our questionnaire about smoking behaviour, beliefs and attitudes!

The purpose of this study is not to make you quit smoking, we would like to know more about your smoking history, beliefs, attitudes and behaviours. This will take around 15-20 minutes and as a thank you will be entered into a raffle prize with the chance of winning a £50 shopping voucher. Click the below link to begin the survey.

[INSERT HYPERLINK TO ONLINE SURVEY]

If you are interested in taking part in this study but would like to complete it via post (in paper form) then please contact Pamela Smith on 02920 687695 or smithp18@cardiff.ac.uk. For further information about the research study please feel free to contact Pamela Smith.

Appendix 5.3: Example of Facebook study page logo, banner and advertisement



Chance to win £50 worth of shopping vouchers! Are you a current smoker, aged 50 years or older? Help to contribute towards important research about smoking by doing a questionnaire that will take around 15-20 minutes to complete. We aren't trying to make you quit, we would just like to know what you think. Please click the link below for more information.

<https://t.co/traUmzJqvG> ✓



Appendix 5.4 *Items used to measure determinants of quit motivation in older, deprived smokers*

Variable	Item/s in questionnaire and response options
Motivation to stop smoking	<p>Which of the following describes you?</p> <p><i>1= I don't want to stop smoking, 2=I think I should stop smoking but don't really want to, 3= I want to stop smoking but haven't thought about when, 4= I REALLY want to stop smoking but I don't know when I will, 5= I want to stop smoking and hope to soon, 6= I REALLY want to stop smoking and intend to in the next 3 months, 7= I REALLY want to stop smoking and intend to in the next month</i></p>
Nicotine dependence	<p>How soon after waking do you smoke your first cigarette? <i>1) within 5 minutes 2) 5-30 minutes or 3) 31-60 minutes</i></p> <p>Do you find it difficult to refrain from smoking in places where it is forbidden? E.g. church, library, etc. <i>1) Yes or 2) No</i></p> <p>Which cigarette would you hate to give up? <i>1) First in the morning or 2) Any other</i></p> <p>How many cigarettes a day do you smoke? <i>1) 10 or less, 2) 11-20, 3) 21-30 or 4) 31 or more</i></p> <p>Do you smoke more frequently in the morning? <i>1) Yes or 2) No</i></p> <p>Do you smoke even if you are sick in bed most of the day? <i>1) Yes or 2) No</i></p>

Smoking history	<p>Have you ever made a serious attempt* to stop smoking before? *a serious attempt means you decided that you would try to make sure you never smoked again 1) Yes or 2) No</p> <p>How many times have you made a serious attempt to stop smoking? [FREE TEXT BOX]</p> <p>What is the longest that a quit attempt has lasted in the past? [FREE TEXT BOX]</p>
Social support during a previous quit attempt	<p>During a previous quit attempt how often did someone you know:</p> <p>Encourage you to keep at quitting 1= Never, 5= Very often</p> <p>Comment on your lack of will power 1= Never, 5= Very often</p> <p>Celebrate your quitting with you 1= Never, 5= Very often</p> <p>Say you were going to start smoking again 1= Never, 5= Very often</p> <p>Help to calm you down when you were feeling stressed or irritable 1= Never, 5= Very often</p> <p>Persuade you not to smoke 1= Never, 5= Very often</p> <p>Help you think of/use replacements for smoking i.e. nicotine patches, stop smoking services 1= Never, 5= Very often</p> <p>Congratulate you on not smoking 1= Never, 5= Very often</p> <p>Offer you a cigarette 1= Never, 5= Very often</p>

	<p>Do an activity with you to keep you from smoking 1= <i>Never</i>, 5= <i>Very often</i></p> <p>Say they were confident that you could quit/ stay quit 1= <i>Never</i>, 5= <i>Very often</i></p> <p>Overall, thinking about your previous attempts to stop smoking please let us know how well supported you feel you were.</p> <p>How well supported do you feel you were by your partner? 1= <i>Not at all</i>, 5= <i>Extremely</i></p> <p>How well supported do you feel you were by a family member? 1= <i>Not at all</i>, 5= <i>Extremely</i></p> <p>How well supported do you feel you were by your friends? 1= <i>Not at all</i>, 5= <i>Extremely</i></p> <p>How well supported do you feel you were by your work colleagues? 1= <i>Not at all</i>, 5= <i>Extremely</i></p> <p>How well supported do you feel you were by your GP or other healthcare professional? 1= <i>Not at all</i>, 5= <i>Extremely</i></p> <p>To what extent do you feel that you have someone to turn to if you found stopping smoking difficult? 1= <i>Extremely</i>, 5=<i>Not at all</i></p>
<p>Smoking self-efficacy</p>	<p>Please indicate whether you are sure that you could refrain from/ resist smoking in each situation using one of the following answers.</p> <p>When I feel nervous, I could refrain from smoking 1= <i>Not at all sure</i>, 5= <i>Absolutely sure</i></p> <p>When I feel depressed I could refrain from smoking 1= <i>Not at all sure</i>, 5= <i>Absolutely sure</i></p> <p>When I am angry I could refrain from smoking 1= <i>Not at all sure</i>, 5= <i>Absolutely sure</i></p>

	<p>When I feel the urge to smoke I could refrain from smoking 1= <i>Not at all sure</i>, 5=<i>Absolutely sure</i></p> <p>When having a drink with friends I could refrain from smoking 1= <i>Not at all sure</i>, 5=<i>Absolutely sure</i></p> <p>When celebrating something I could refrain from smoking 1= <i>Not at all sure</i>, 5=<i>Absolutely sure</i></p> <p>When I am with smokers I could refrain from smoking 1= <i>Not at all sure</i>, 5=<i>Absolutely sure</i></p> <p>When having coffee or tea I could refrain from smoking 1= <i>Not at all sure</i>, 5=<i>Absolutely sure</i></p> <p>How confident are you that you could quit smoking for good if you wanted to? 1=<i>Extremely</i>, 5= <i>Not at all</i></p>
<p>Self-exempting beliefs</p>	<p>The medical evidence that smoking is harmful is exaggerated 1=<i>Totally disagree</i>, 5= <i>Totally agree</i></p> <p>Smoking cannot be all that bad for you because many people who smoke live long lives 1=<i>Totally disagree</i>, 5= <i>Totally agree</i></p> <p>I would rather live a shorter life and enjoy it than a longer one where I will be deprived of the pleasure of smoking 1=<i>Totally disagree</i>, 5= <i>Totally agree</i></p> <p>You have got to die of something, so why not enjoy yourself and smoke 1=<i>Totally disagree</i>, 5= <i>Totally agree</i></p> <p>I think I must have the sort of good health or genes that means I can smoke without getting any of the harms 1=<i>Totally disagree</i>, 5= <i>Totally agree</i></p> <p>I think I would have to smoke a lot more than I do to put my health at risk 1=<i>Totally disagree</i>, 5= <i>Totally agree</i></p> <p>Everything causes cancer these days 1=<i>Totally disagree</i>, 5= <i>Totally agree</i></p>

	Smoking is not more risky than lots of other things that people do 1= <i>Totally disagree</i> , 5= <i>Totally agree</i>
Lung cancer risk perception	How likely do you think it is that you will develop lung cancer in your lifetime? 1= <i>Very likely</i> , 5= <i>Very unlikely</i> Compared to others your age and sex, what do you think is your chance of getting lung cancer? 1= <i>Much higher</i> , 5= <i>Much lower</i> How worried are you about getting lung cancer in your lifetime? 1= <i>Extremely</i> , 5= <i>Not at all</i>
Lung cancer experience	Have you, your family or close friends had lung cancer? You? 1) Yes, 2) No, 3) <i>Don't know</i> , 4) <i>Prefer not to say</i> A partner? 1) Yes, 2) No, 3) <i>Don't know</i> , 4) <i>Prefer not to say</i> Close family member? 1) Yes, 2) No, 3) <i>Don't know</i> , 4) <i>Prefer not to say</i> Other family member? 1) Yes, 2) No, 3) <i>Don't know</i> , 4) <i>Prefer not to say</i> Close friend? 1) Yes, 2) No, 3) <i>Don't know</i> , 4) <i>Prefer not to say</i> Other friend? 1) Yes, 2) No, 3) <i>Don't know</i> , 4) <i>Prefer not to say</i> A member of your community? 1) Yes, 2) No, 3) <i>Don't know</i> , 4) <i>Prefer not to say</i>
Comorbid condition	The following is a list of common problems. Please indicate if you currently have the problem. If you do have the problem, please indicate if you receive medications or some other type of treatment for the problem. Finally, please indicate if the problem limits any of your activities.

	Heart disease 1) Yes or 2) No
	High blood pressure 1) Yes or 2) No
	Lung disease 1) Yes or 2) No
	Diabetes 1) Yes or 2) No
	Ulcer or stomach disease 1) Yes or 2) No
	Kidney disease 1) Yes or 2) No
	Liver disease 1) Yes or 2) No
	Anaemia or other blood disease 1) Yes or 2) No
	Cancer 1) Yes or 2) No
	Depression 1) Yes or 2) No
	Osteoarthritis or degenerative arthritis 1) Yes or 2) No
	Back pain 1) Yes or 2) No
	Rheumatoid arthritis 1) Yes or 2) No
	Other medical problem 1) Yes or 2) No

Appendix 6.1: East Midlands - Derby Research Ethics approval



**Health Research
Authority**

East Midlands - Derby Research Ethics Committee

The Old Chapel
Royal Standard Place
Nottingham
NG1 6FS

26 July 2019

Ms Angela Shone
Research and Innovation, University of Nottingham
East Atrium, Jubilee Conference Centre
Triumph Road, Nottingham
Derby Road
Nottingham
NG8 1DH

Dear Ms Shone,

Study title:	The effect of adding a personalised smoking cessation intervention to a lung cancer screening programme (The Yorkshire Enhanced Stop Smoking Study).
REC reference:	18/EM/0199
Protocol number:	18046
Amendment number:	3
Amendment date:	05 June 2019
IRAS project ID:	240975

The above amendment was reviewed by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Discussion

The Sub-Committee questioned the suitability of the sub-section but accepted that the inclusion of such was considered approved as part of the original application.

Approved documents

The documents reviewed and approved at the meeting were:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Notice of Substantial Amendment (non-CTIMP)	3	05 June 2019
Participant information sheet (PIS) [YESS Sub-section 1 & 2 Participant Information Sheet]	v1.0	17 May 2019

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

Working with NHS Care Organisations

Sponsors should ensure that they notify the R&D office for the relevant NHS care organisation of this amendment in line with the terms detailed in the categorisation email issued by the lead nation for the study.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

HRA Learning

We are pleased to welcome researchers and research staff to our HRA Learning Events and online learning opportunities– see details at: <https://www.hra.nhs.uk/planning-and-improving-research/learning/>

18/EM/0199: Please quote this number on all correspondence

Appendix 6.2: Interview consent form



University of
Nottingham

UNIVERSITY OF LEEDS
UK | CHINA | MALAYSIA



CARDIFF
UNIVERSITY
PRIFYSGOL
CARDIFF



NHS
The Leeds
Teaching Hospitals
NHS Trust



Yorkshire Stop Smoking Study Sub-Section Consent Form

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Study ID

Date: _____

Principle Investigator: Dr Rachael Murray

Please initial each box

1	I confirm that I have read the information sheet (version 2, 18/07/2018) for the above study. I have had the opportunity to consider the information, ask questions, and have had these answered satisfactorily.	<input type="checkbox"/>
2	I understand that participation in this study is entirely voluntary, and that I am free to withdraw at any time without giving any reason, and without my future medical care or legal rights being affected.	<input type="checkbox"/>
3	I understand that authorised individuals from the University of Nottingham, and the wider research group, with appropriate permission, may look at data collected in the lung health check, and information collected during this study relating to me to check that the trial is being conducted ethically and safely. I give permission for these individuals to have access to my information.	<input type="checkbox"/>
4	I agree to take part in interviews with a member of the research team. I understand that these interviews may be conducted over the telephone, and will be recorded and that direct quotes (anonymised) could be used in publications.	<input type="checkbox"/>
5	I agree to take part in the sub-section of the Yorkshire Stop Smoking Study.	<input type="checkbox"/>
6	I would like to be made aware of the results of the study.	<input type="checkbox"/>

Please complete **ONE** of the following boxes only: **EITHER A) face-to-face OR B) Telephone**

A. FACE-TO-FACE		B. TELEPHONE	
Participant Name	Signature	Participant Name	Date
Researcher Name	Signature	Researcher Name:	Signature

When completed: 1 copy for the Participant, 1 copy for Investigator Site File and 1 copy for Medical Records

Appendix 6.3: Interview information sheet



Title of Project: Yorkshire Enhanced Stop Smoking Study

Chief Investigator: Dr Rachael Murray

Sub-section 1 & 2 Participant Information Sheet (Version 1.0: 17/05/2019)

We would like to invite you to take part in an interview (an informal chat) to find out why you did not want to take part in the Yorkshire Enhanced Stop Smoking Study. This sheet will tell you more about the study. This is to help you decide whether or not to take part. If you have any questions about what is on this sheet please contact us and ask us if anything is not clear.

What is the purpose of the interview?

We would like to talk with you about why you did not want to take part in the study. This is so we can improve our studies in the future and have a better understanding of what might put people off stop smoking support and taking part in research. We will not be talking to you about stopping smoking, we would just like to find out your opinions.

Why have I been invited?

We are inviting around 30 people who decided not to take part in the study to take part in an interview. If you would like to take part, you will be asked some questions in an interview (an informal chat).

Do I have to take part?

No. It is up to you to decide whether to take part or not. Your decision will not affect the valuable contribution you have already made. If you decide to take part you are still free to stop at any time and without giving a reason. This will not affect your legal rights.

What does the interview involve?

The interview will be carried out either in your home or over the telephone. It will be with a member of our research team. The interview will last up to an hour. The questions will focus on why you did not want to take part in the study, and what might have put you off. There are no right or wrong answers to the questions. We are just interested in what you think.

If you agree, we would like to audio record the interview. This is so we don't miss anything you say. This will help us with our analysis.

Expenses and payments

As a thank you for taking part we will send you a shopping voucher. After the interview the researcher will check your address details and will send the voucher to you in the post.

What are the possible risks of taking part?

It is possible that some people may find it upsetting talking about their experiences and opinions. If you want to stop the interview at any time please let us know.

What are the possible benefits of taking part?

You will have the opportunity to talk about your experiences of why you did not want to take part in the study. Your valuable input will allow us to understand your experiences, and help us improve our study, and may benefit others in the future.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions. The researchers' contact details are given at the end of this information sheet. If you remain unhappy and wish to complain formally, you can do this by contacting the Patient Advice Liaison Service on 0113 2066261 or by emailing patientexperience@leedsth.nhs.net

In the event that something does go wrong and you are harmed during the research and this is due to someone's negligence then you may have grounds for a legal action for compensation against the University of Nottingham but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

Will my taking part in the study be kept confidential?

We will follow ethical and legal practice and all information about you will be handled in confidence.

If you join the study, we will use information collected from you and information gathered as part of the Yorkshire Lung Screening Trial during the course of the research. This information will be kept **strictly confidential**, stored in a secure and locked office, and on a password protected database at the University of Cardiff. Under UK Data Protection laws the University is the Data Controller (legally responsible for the data security) and the Chief Investigator of this study (named above) is the Data Custodian (manages access to the data). This means we are responsible for looking after your information and using it properly. Your rights to access, change or move your information are limited as we need to manage your

information in specific ways to comply with certain laws and for the research to be reliable and accurate. To safeguard your rights we will use the minimum personally – identifiable information possible.

You can find out more about how we use your information and to read our privacy notice at:

<https://www.nottingham.ac.uk/utilities/privacy.aspx>.

The data collected for the study will be looked at and stored by authorised persons from the Universities of Nottingham and Cardiff who are organising the research. They may also be looked at by authorised people from regulatory organisations to check that the study is being carried out correctly. All will have a duty of confidentiality to you as a research participant and we will do our best to meet this duty.

Information about you which leaves the 'Screening Van' will have your name and address removed and a unique 'study' code will be used so that you cannot be recognised from it. Your contact information will be kept by the Universities of Nottingham and Cardiff for 12 months after the end of the study so that we are able to contact you about the findings of the study and possible follow-up studies (unless you advise us that you do not wish to be contacted). This information will be kept separately from the research data collected and only those who need to will have access to it. All other data (research data) will be kept securely for 7 years. After this time your data will be disposed of securely. During this time all precautions will be taken by all those involved to maintain your confidentiality, only members of the research team given permission by the data custodian will have access to your personal data.

In accordance with the Universities of Nottingham and Cardiff, the Government's and our funders' policies we may share our research data with researchers in other Universities and organisations, including those in other countries, for research in health and social care. Sharing research data is important to allow peer scrutiny, re-use (and therefore avoiding duplication of research) and to understand the bigger picture in particular areas of research. Data sharing in this way is usually anonymised (so that you could not be identified) but if we need to share identifiable information we will seek your consent for this and ensure it is secure. You will be made aware then if the data is to be shared with countries whose data protection laws differ to those of the UK and how we will protect your confidentiality.

Although what you say to us is confidential, should you disclose anything to us which we feel puts you or anyone else at any risk, we may feel it necessary to report this to the appropriate persons.



After the interview, everything will be typed. This means that I can let other researchers know the results of this study. Anything which can identify you like your name or where you live will never be typed.

We hope to publish the results of the study in medical journals and at conferences. This will include some quotes from people who have taken part in interviews. Any names or anything that can identify people will be taken out.

What will happen if I do not want to carry on with the study?

You can stop doing the study at any time, without giving a reason. We may ask you why you have decided to stop, but you don't have to give any reasons.

Who is organising and funding the research?

This research is being organised by the Universities of Nottingham, Leeds and Cardiff and is being funded by Yorkshire Cancer Research.

Who has reviewed the study?

All research in healthcare is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by East Midlands – Derby Research Ethics Committee.

Further information and contact details

Chief Investigator

Dr Rachael Murray, University of Nottingham, UK Centre for Tobacco and Alcohol Studies, Room C114 Clinical Sciences Building, Nottingham City Hospital, Hucknall Road, Nottingham, NG5 1PB, Phone: 0115 823 1389, Email: Rachael.murray@nottingham.ac.uk

Trial Manager

Rebecca Thorley, University of Nottingham, UK Centre for Tobacco and Alcohol Studies, Clinical Sciences Building Nottingham City Hospital, Hucknall Road, Nottingham, NG5 1PB, Phone: 0115 823 1361, Email: Rebecca.thorley@nottingham.ac.uk

Appendix 6.4: Topic guide version 1.0

YESS Decliners- Topic Guide

BACKGROUND

- Welcome and thanks; introduce self
- Give a brief background on the purpose of the interview (understand their attitudes towards quitting smoking, reasons for declining smoking cessation support and any factors they feel impacts their quit motivation and/or previous quit attempts)
- Explain what will happen in the interview (their right to withdraw and ensure that they are comfortable)
- Check that pp's understand the reason for meeting and the role of the researcher, plus give opportunity for any questions

Rationale: to gain views on:

(a) Reasons why the participant declined to see the SCP for the YESS study

(b) Their views on stopping smoking and their current motivation to stop smoking

(c) Confidence/ self-efficacy around quitting smoking

(d) Their previous quit attempts

(f) Impact of their social network on smoking/quitting

(g) Any comorbid conditions that may impact their motivation to quit/ previous quit attempts

On [insert date] you had a lung health check at [insert location]. During this lung health check you said that you:

DECLINE 1: did not want to take part in a study about stopping smoking with a stop smoking practitioner

DECLINE 2: were happy to see a smoking cessation practitioner on the van as part of a study but did not want any continued support after you left that day

If it is OK with you, today I would like to find out a bit more about you: your smoking habits, smoking history and why you did not want to take part in the study. This means that most of the interview will be about smoking. I am not here to tell you to stop smoking today, I'm just interested in your experiences of smoking. However, if you do decide you would like some help to stop smoking, I can tell you where you can get help from but that's completely up to you.

Reasons for declining

1. Can you tell me about why you decided:

- **DECLINE 1- not to see the smoking cessation practitioner after your lung health appointment?**
- **DECLINE 2- not to continue seeing the smoking cessation practitioner after you were finished on the van?**

Previous quit attempts/ use of smoking cessation service and NRT

2. If it is OK with you, I'm now going to ask you some questions about times when you have tried to stop smoking. Have you made a serious attempt to stop smoking before? Could you please tell me about times when you seriously tried to stop smoking? (meaning you decided that you would try to make sure you never smoked again)

- IF YES- Can you tell me more about your quit attempt(s) i.e. how many times have you made a serious attempt to quit smoking?
- What is the longest that a quit attempt has lasted for you? Why would you say this/these quit attempts did not last?
- Have you ever used nicotine replacement products in the past?
 - i. IF YES- how did you find using nicotine replacement products?
- Have you ever used an e-cigarette?
 - i. IF YES-What did you like about using an e-cigarette? What did you not like about using an e-cigarette?
- Have you ever been to behavioural counselling to help you quit smoking (i.e. a local stop smoking service group, community versus primary care support)?
 - i. IF YES- What did you think about it? What did you like about the behavioural support? Was there anything you didn't like about the support? If so, what did you not like?
- What do you know about local Stop Smoking Services in your community?
 - i. Have you ever used them? Would you ever consider using them if you decided to quit smoking?
- How have your previous attempts to stop smoking influenced how you think about stopping smoking now?

Motivation to Stop Smoking/ Quitting self-efficacy

3. Facilitate the participant to complete the Motivation to Stop Smoking Scale

(Appendix 1) and use this to elicit discussion around motivation to quit:

- IF 1- Why do you not want to stop smoking?
- IF 2- Why do you not want to stop smoking?
- IF 3- Why do you want to stop smoking? Why do you think you haven't thought about when you would like to stop smoking?
- IF 4- Why do you really want to stop smoking? Why do you think you're unsure of when you will quit?
- If 5- Why do you want to quit smoking?
- If 6 or 7- Why do you really want to quit smoking?
- If 8- Why do you think you are unsure about whether you want to quit smoking?

4. How do you feel about stopping smoking?

- What would make it difficult or easy for you to quit smoking?
- What impact do you think stopping smoking could have on your health?
- Can you think of any benefits to you personally if you gave up smoking?
- Can you think of any negatives if you gave up smoking?
- What (if anything) would make you attempt to stop smoking?

5. How important is stopping smoking to you?

6. How confident are you that you could quit smoking?

Social networks and their impact on smoking/ quitting smoking

7. *During rapport building gauge whether the participant have family/friends*

Smoking and social influences- I'm interested to know about smokers in your social circle. Do many of the people who are closest to you i.e. your family and friends smoke? (if they do not then re-frame to explore how they feel the lack of social support impacts their smoking behaviour)

- How do you feel this affects your smoking? Could you tell me a bit about how often you smoke with those closest to you? If they told you that they had stopped smoking, how would that make you feel/ what would your reaction be? How do you think they would feel if you quit smoking and/or what would they say if you wanted to stop smoking?

- How supported by your family and friends would you feel if you decided to quit smoking? [if a previous quit attempt has been made] How much support did your family and friends provide during a quit attempt?
- Do any of your friends/family use e-cigarettes? What would your friends/family think of you using an e-cigarette?
- Tell me about any social situations (or experiences) that make quitting difficult? Or any situations that have helped you to make a quit attempt?
- *Tailor this according to what (if any) close social network they describe earlier in the interview-How do you feel your close social network/community affects your smoking behaviour?*

Health conditions that may impact quitting smoking

8. Do you have any health conditions? If so how do you feel these impact you and your smoking habits?

- How has this issue affected your previous quit attempts?
- How does smoking impact your pre-existing health issue?

Debrief

- Summarise the interview and address any questions or concerns.
- Thank them for their time and give them gift voucher incentive
- Check that it is ok if you contact them after listening to the conversations back and need to clarify anything

Appendix 1

Assessment of Motivation: Motivation to Stop Smoking Scale

Which of the following describes you?

- I don't want to stop smoking
- I think I should stop smoking but really don't want to
- I want to stop smoking but haven't thought about when
- I REALLY want to stop smoking but I don't know when I will
- I want to stop smoking and hope to soon
- I REALLY want to stop smoking and intend to in the next 3 months
- I REALLY want to stop smoking and intend to in the next month
- Don't know

Kotz D, Brown J, West R. Predictive validity of the Motivation To Stop Scale (MTSS): a single-item measure of motivation to stop smoking. Drug and alcohol dependence. 2013;128(1-2):15-9

Appendix 6.5: Topic guide version 2.0

YESS Decliners- Topic Guide

BACKGROUND

- Welcome and thanks; introduce self
- Give a brief background on the purpose of the interview (understand their attitudes towards quitting smoking, reasons for declining smoking cessation support and any factors they feel impacts their quit motivation and/or previous quit attempts)
- Explain what will happen in the interview (their right to withdraw and ensure that they are comfortable)
- Check that pp's understand the reason for meeting and the role of the researcher, plus give opportunity for any questions

Rationale: to gain views on:

(a) Reasons why the participant declined to see the SCP for the YESS study and what could be done to encourage engagement with the study

(b) Their views on stopping smoking and their current motivation to stop smoking

(c) Confidence/ self-efficacy around quitting smoking

(d) Their previous quit attempts

(f) Impact of their social network on smoking/quitting

(g) Any comorbid conditions that may impact their motivation to quit/ previous quit attempts

On [insert date] you had a lung health check at [insert location]. During this lung health check you said that you:

DECLINE 1: did not want to take part in a study about stopping smoking with a stop smoking practitioner

DECLINE 2: were happy to see a smoking cessation practitioner on the van as part of a study but did not want any continued support after you left that day

If it is OK with you, today I would like to find out a bit more about you: your smoking habits, smoking history and why you did not want to take part in the study. This means that most of the interview will be about smoking. I am not here to tell you to stop smoking today, I'm just interested in your experiences of smoking. However, if you do decide you would like some help to stop smoking, I can tell you where you can get help from but that's completely up to you.

Reasons for declining

4. Can you tell me about why you decided:
 - **DECLINE 1- not to see the smoking cessation practitioner after your lung health appointment?**
 - **DECLINE 2- not to continue seeing the smoking cessation practitioner after you were finished on the van?**
5. How did you feel being approached about giving up smoking on the van?
6. What did you think of the conversation you had with the smoking cessation practitioner on the van?
 - How did talking about stopping smoking on the van make you feel?
 - Did you feel listened to?
 - Did you feel you were being told what to do?
7. Was there anything that you did not like about your experience on the van?
 - How do you think could this be improved?
8. What, if anything, do you think could have encouraged you to:
 - **Part 1 decliner- see the smoking cessation practitioner on the day of your lung health check?**
 - **Part 2 decliner- continue seeing the smoking cessation practitioner after your lung health check?**

Previous quit attempts/ use of smoking cessation service and NRT

9. If it is OK with you, I'm now going to ask you some questions about times when you have tried to stop smoking. Have you made a serious attempt to stop smoking before? Could you please tell me about times when you seriously tried to stop smoking? (meaning you decided that you would try to make sure you never smoked again)
 - IF YES- Can you tell me more about your quit attempt(s) i.e. how many times have you made a serious attempt to quit smoking?
 - What is the longest that a quit attempt has lasted for you? Why would you say this/these quit attempts did not last?
 - How have your previous attempts to stop smoking influenced how you think about stopping smoking now?
 - **What do you think would have helped you to be successful during your previous quit attempt/attempts?**

- i. **If something would have motivated you to continue not smoking, what do you think it would have been?**
 - ii. **Did you ever feel you needed more to help you quit when you previously tried? What do you think would have helped?**
 - Have you ever used nicotine replacement products in the past?
 - i. IF YES- how did you find using nicotine replacement products?
 - Have you ever used an e-cigarette?
 - i. IF YES-What did you like about using an e-cigarette? What did you not like about using an e-cigarette?
 - Have you ever been to behavioural counselling to help you quit smoking (i.e. a local stop smoking service group, community versus primary care support)?
 - i. IF YES- What did you think about it? What did you like about the behavioural support? Was there anything you didn't like about the support? If so, what did you not like?
 - What do you know about local Stop Smoking Services in your community?
 - i. Have you ever used them? Would you ever consider using them if you decided to quit smoking?
2. What would you like to see in your community that may help you make an attempt to stop smoking?
- How do you think your local stop smoking services could help you make an attempt to stop smoking?
 - What support would like to have available to you if you decided to stop smoking?

Motivation to Stop Smoking/ Quitting self-efficacy

10. Facilitate the participant to complete the Motivation to Stop Smoking Scale

(Appendix 1) and use this to elicit discussion around motivation to quit:

- IF 1- Why do you not want to stop smoking?
- IF 2- Why do you not want to stop smoking?
- IF 3- Why do you want to stop smoking? Why do you think you haven't thought about when you would like to stop smoking?
- IF 4- Why do you really want to stop smoking? Why do you think you're unsure of when you will quit?

- If 5- Why do you want to quit smoking?
- If 6 or 7- Why do you really want to quit smoking?
- If 8- Why do you think you are unsure about whether you want to quit smoking?

5. How do you feel about stopping smoking?

- What would make it difficult for you to quit smoking?
- What would make it difficult for you to stop smoking?
- What impact do you think stopping smoking could have on your health?
- Can you think of any benefits to you personally if you gave up smoking?
- Can you think of any negatives if you gave up smoking?
- What (if anything) would make you attempt to stop smoking?

7. How important is stopping smoking to you?

8. How confident are you that you could quit smoking?

9. What do you think could increase your motivation to stop smoking?

- a. **Is there anything that could assist you in feeling more motivated to quit smoking?**

Social networks and their impact on smoking/ quitting smoking

8. *During rapport building gauge whether the participant have family/friends*

Smoking and social influences- I'm interested to know about smokers in your social circle. Do many of the people who are closest to you i.e. your family and friends smoke? (if they do not then re-frame to explore how they feel the lack of social support impacts their smoking behaviour)

- How do you feel this affects your smoking? Could you tell me a bit about how often you smoke with those closest to you? If they told you that they had stopped smoking, how would that make you feel/ what would your reaction be? How do you think they would feel if you quit smoking and/or what would they say if you wanted to stop smoking?
- How supported by your family and friends would you feel if you decided to quit smoking? [if a previous quit attempt has been made] How much support did your family and friends provide during a quit attempt?
- Do any of your friends/family use e-cigarettes? What would your friends/family think of you using an e-cigarette?
- Tell me about any social situations (or experiences) that make quitting difficult? Or any situations that have helped you to make a quit attempt?

- *Tailor this according to what (if any) close social network they describe earlier in the interview-How do you feel your close social network/community affects your smoking behaviour?*
2. If you could have any support to help you stop smoking or feel more motivated to stop smoking, what would it be?
 - Why do you feel this form of support would help you?
 - How do you think family/friends, members of the community or NHS could help you quit smoking?
 - How do you think emotional support would help you? i.e. congratulating you on giving up
 - How do you think physical support would help you? i.e. not smoking around you
 3. How easily available/accessible do you feel stop smoking services in your local area are?
 - What do you think could be done to improve stop smoking services?

Health conditions that may impact quitting smoking

9. **Do you have any health conditions? If so how do you feel these impact you and your smoking habits?**
 - How has this issue affected your previous quit attempts?
 - How does smoking impact your pre-existing health issue?

Debrief

- Summarise the interview and address any questions or concerns.
- Thank them for their time and give them gift voucher incentive
- Check that it is ok if you contact them after listening to the conversations back and need to clarify anything

Appendix 1

Assessment of Motivation: Motivation to Stop Smoking Scale

Which of the following describes you?

- I don't want to stop smoking
- I think I should stop smoking but really don't want to
- I want to stop smoking but haven't thought about when
- I REALLY want to stop smoking but I don't know when I will
- I want to stop smoking and hope to soon
- I REALLY want to stop smoking and intend to in the next 3 months
- I REALLY want to stop smoking and intend to in the next month
- Don't know

Kotz D, Brown J, West R. Predictive validity of the Motivation To Stop Scale (MTSS): a single-item measure of motivation to stop smoking. Drug and alcohol dependence. 2013;128(1-2):15-9