

Development of a theory and evidence informed  
intervention to promote smoking cessation during  
pregnancy using narrative, text-messages and  
images as modes of delivery.

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## **Abstract**

**Background:** Cigarette smoking is a leading preventable factor associated with complications in pregnancy including preterm birth and low birthweight. Past interventions have raised cessation rates by approximately 6% overall (Lumley et al. 2009).

**Methods:** A three-part literature review, two qualitative studies with a total of 36 participants, and the development of an intervention to promote smoking cessation during pregnancy were completed. Central to the design of the research was the creation of the theoretical basis which was developed in line with recommendations from the MRC Framework for Complex Interventions (Craig et al. 2008, Campbell et al. 2000).

For part one of the literature review, 24 qualitative and 44 quantitative studies were re-analysed to complete a mixed-methods secondary analysis of the active ingredients in interventions to promote smoking cessation during pregnancy. Part two consisted of an exploration of psychological models and constructs which are likely to predict or influence smoking behaviour during pregnancy. The final part was a discussion regarding the modes of delivery by which an intervention could feasibly be delivered.

Qualitative interviews were carried out with participants from stakeholder groups to fill in gaps in literature and determine the acceptability and feasibility of the proposed intervention. The intervention was created using the theoretical basis developed from the findings. Further qualitative interviews, a focus group, and heuristic evaluation were used to determine the acceptability and usability of the intervention for the target group of pregnant smokers.

**Results and Conclusions:** Findings from this work are potentially relevant for a wide range of behaviours and behavioural interventions. An intervention which has a strong grounding in theory and evidence, and is acceptable and feasible for the target group and in clinical practice was developed using evidence gathered in this thesis.

## **Executive Summary**

The purpose of the work in this thesis was to develop an intervention to promote smoking cessation during pregnancy with a robust theoretical basis to optimise its effectiveness. This summary provides a brief outline of how and why this was achieved.

## **Background**

Smoking tobacco is the leading cause of preventable diseases worldwide (WHO 2013). If a woman smokes during her pregnancy there is an increased risk of complications including preterm birth and low-birthweight babies (Cnattingius 2004). Although there is a general decline in smoking rates in Britain today, some sub-groups of the population continue to smoke at higher rates (ONS 2011). In 2010 in Scotland, 13% of all pregnant women smoked throughout their pregnancy (McAndrew et al. 2012) although evidence of underreporting shows that this figure may be higher (Shipton et al. 2009). This figure was much higher in women from low socio-economic backgrounds and women under the age of 24 (McAndrew et al. 2012).

Pregnant women display different quitting behaviour to the general public (Morasco et al. 2006, Ockene et al. 2002). A higher quit rate during pregnancy, alongside the increased contact with healthcare professionals during this period make pregnancy an ideal 'teachable moment' for smoking cessation. Past interventions to promote smoking cessation during pregnancy have had limited success, demonstrating the need to look at methods of maximising intervention effectiveness.

## **Methods**

A pragmatic epistemological approach was taken to the work in this thesis, and the MRC Framework for complex interventions (Craig et al. 2008, Campbell et al. 2000) is explored and followed throughout. Central to the design of the work is the 'theoretical basis' which encompasses not only psychological and behavioural theory, but other interrelated issues such as: mode of delivery, Behaviour Change Techniques (BCTs)

(Michie et al. 2012), and barriers to smoking cessation identified by pregnant women themselves. A three part literature review, a qualitative empirical study, and the development and feasibility testing of an intervention were completed.

### **Literature review: Part 1**

The first part of the literature review was a mixed-methods secondary analysis which combined qualitative (24 studies) and quantitative (44 studies) evidence to both determine and test the active ingredients in interventions to promote smoking cessation during pregnancy. Firstly, a systematic review of qualitative evidence of women's experiences of smoking cessation during pregnancy (Graham et al. 2011) was re-analysed to determine the barriers to, and facilitators of, smoking cessation during pregnancy. Results of this analysis indicated that there were 6 'elements' which, if present, would provide an ideal set of circumstances under which a pregnant woman would be able to quit smoking. After the 'elements' had been identified, quantitative papers included in a Cochrane review of interventions to promote smoking cessation during pregnancy (Lumley et al. 2009) were located. Each of these papers was coded for the presence or absence of the 6 'elements'. Controls were also coded, and any 'element' present in the control was subtracted from the intervention. Overall results indicated that the presence of these 'elements' would be likely to increase the likelihood of a successful quit attempt. However, the quality of intervention descriptions in the quantitative literature was insufficient to be able to prove this. This study highlighted the importance of detailed intervention descriptions in papers reporting trials of interventions. It also demonstrated the value of coding controls as well as interventions, adding to the reliability of the methodology.

### **Literature review: Part 2**

The second part of the literature review was an exploration of existing psychological and behavioural theory. This was carried out to determine which theoretical models and constructs have an evidence base of effectiveness, or likely effectiveness in smoking

cessation or smoking cessation during pregnancy. They two key concepts that evidence showed were likely to be important in encouraging smoking cessation were: raising risk perceptions and increasing self-efficacy (Bandura 1995). It also emerged that central to the effectiveness of these constructs was the method by which they are achieved. Risk perceptions are likely to be most effectively raised by addressing cognitive dissonance (Festinger 1962) and creating concrete/experiential risk representations (Cameron 2001). Self-efficacy may be most effectively achieved through vicarious experience (Ashford et al. 2010) (e.g. the use of: coping models or self-modelling), positively framed messages, and inducing a positive mood (Kavanagh and Bower 1985). Importantly, raising risk perceptions has only shown to have a positive effect on behaviour when combined with a strong self-efficacy message (Witte and Allen 2000).

### **Literature review: Part 3**

Three key modes of delivery were identified due to strong evidence that they may be effective in the context of the intervention. These are: text messages, images, and narrative. Firstly, the ubiquity of mobile phones (ONS 2012) and potential for automaticity suggests text-messages have the potential to reach a large audience, and at a relatively low cost while ensuring intervention fidelity. Additionally, past text-messaging interventions have shown promise, especially in smoking cessation (Vodopivec-Jamsek et al. 2012). Secondly, evidence suggests that images can influence emotions (Humphris and Williams 2013, Ito et al. 1998, Freeston et al. 1996) which in turn have the potential to influence behaviour (Williams et al. 2012). They are also not dependant on language or literacy skills and are more accessible to recall than text-based messages. Finally, there is evidence that suggests narrative may be an effective method of communicating health information (Jensen et al. 2013, Howe et al. 2002). This is likely to be due to its capacity for presenting information an engaging and accessible manner without the need for negative instructional elements.

### **Qualitative study 1**

A qualitative study was then carried out to determine the feasibility of the proposed intervention in clinical practice, and to further explore women's visualisation and conceptualisation of their fetus during pregnancy. Qualitative semi-structured interviews were carried out with 18 participants. A thorough conceptual analysis of the data showed that women tend to 'protectively visualise' the fetus meaning that they create an abstract visualisation of the fetus or future baby due to an irrational fear that the outcome is more likely to be negative if it is concretely visualised. Midwives in an antenatal clinic reported that time pressures and other priorities meant that an intervention delivered outside of clinical practice would be desirable. They were also supportive of an intervention which would help them approach and discuss the sensitive subject of smoking cessation with pregnant women.

### **Intervention development**

Evidence gathered was collated to inform: the development of the intervention, the predicted mechanisms of behaviour change, and expected outputs. Drawing together the theoretical basis, and advice from storytelling and design literature, a prototype intervention was created. This consisted of an automated text messaging system. Frequent text messages were sent to participants from a fictional character, 'Megan', who was designed as a coping model (Bandura 1995). Megan details her struggles and triumphs with pregnancy, general life, and smoking cessation over the course of the participant's pregnancy. Some text messages invited replies from participants, and tailored responses to the replies were sent. Images consisting of healthy babies alongside images of fruit or vegetables corresponding to the current size of the fetus and information about the development of the fetus were sent weekly. The description of the intervention and the theoretical rationale embedded in its components were thoroughly and transparently reported.

## **Qualitative study 2**

To test the feasibility and usability of the developed intervention, semi-structured qualitative interviews were carried out with 12 members the target group (pregnant smokers), and a focus group was carried out with 6 non-pregnant women. Women were also given an additional heuristic evaluation questionnaire. Overall feedback was positive. The images were liked by all women, with many reporting that they made the fetus feel more 'real' and that they developed more protective feelings towards it. Women also engaged well with the storyline. They reported that it was realistic, the language was of a suitable level, and they identified well with the protagonist. They felt that receiving advice and information from a character who they perceived to be in a similar situation to themselves was preferable to receiving information from a health professional. All women said that they would sign up to the intervention if offered to them. The text-message format was popular, and women particularly liked the idea of an interactive element to the intervention. Results indicated that the intervention was feasible, acceptable and usable for the target group. It could be further improved by tailoring further by age, number of existing children, and employment status and maximising the interactive capabilities of the automated text messaging system.



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## **LIST OF ABBREVIATIONS**

BCT	Behaviour Change Technique
HBM	Health Belief Model
MRC	Medical Research Council
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NRT	Nicotine Replacement Therapy
ONS	Office for National Statistics
PBC	Perceived Behavioural Control
RCT	Randomised Controlled Trial
SRM	Self-Regulation Model
TPB	Theory of Planned Behaviour
WIDER	Workgroup for Intervention Development and Evaluation Reporting
WHO	World Health Organisation

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# **1 Chapter 1: Epidemiology of tobacco use and the implications of smoking during pregnancy**

This chapter presents an overview of the tobacco related behaviour of pregnant and non-pregnant individuals and the danger to health this poses. Current knowledge and understanding of the typical behaviour and socioeconomic status of smokers and pregnant smokers is reviewed. An overview of existing interventions to promote smoking cessation during pregnancy is provided.

## **1.1 Background**

A link between tobacco smoking and lung cancer was discovered around 1950 (Doll and Hill 1956). Since then, extensive research has revealed the serious health consequences of tobacco smoking that make it a leading cause of preventable morbidity and mortality. In Britain, there has been an overall decline in the prevalence of cigarette smoking since data were first collected for the Office for National Statistics (ONS) in 1974. 21% of adults smoked in 2009 compared with 45% in 1974 (ONS 2011) although this may be underestimated due to the unreliability of self-reporting. An estimated 10 million people smoke in Britain today. Scotland has the highest smoking prevalence rate in Britain with 25% compared to the lowest, England with 21% (ONS 2011).

Results of an infant feeding survey (McAndrew et al. 2012) showed that 26% of mothers in the UK smoked before or during pregnancy, and at least 12% continued to smoke throughout their pregnancy despite 88% of mothers who smoked before pregnancy receiving information about the negative health consequences.

## **1.2 Health consequences and cessation benefits**

Smoking is a leading cause of preventable deaths worldwide. It is estimated that half to a third of all long term smokers will die from tobacco related diseases (Sasco et al. 2004, Peto et al. 1996). A World Health Organisation (WHO) report (WHO 2008) on the global

tobacco epidemic found that there are approximately 5.4 million deaths globally from tobacco every year. If this trend continues, there will be more than 8 million deaths every year by 2030 (Mathers and Loncar 2006). Tobacco related diseases make up six of the eight leading causes of death in the world today (WHO 2008).

Lung cancer is the leading cause of cancer death (HHS 2004, Ezzati and Lopez 2003). Around 90% of all lung cancer cases have been shown to be caused by smoking (Sasco et al. 2004). Other cancers attributable to smoking include: mouth, bladder, and oesophageal cancer (HHS 2004).

Smoking is also a leading cause of chronic obstructive pulmonary disease (Pauwels et al. 2012, Donaldson et al. 2002, Scanlon et al. 2000) and heart disease (Neaton and Wentworth 1992, Hjermmann et al. 1981). It can cause circulatory problems (Quillen et al. 1993) and several other conditions, some life-threatening (Yanbaeva et al. 2007).

Smoking related diseases can also affect non-smokers. There is a causal link between second hand smoking (i.e. when tobacco smoke is inhaled by a person other than the smoker) and mortality and morbidity in non-smokers (Öberg et al. 2011). Each year in Scotland, as many as 1,500 to 2000 deaths among lifelong non-smokers and ex-smokers could be related to exposure to environmental tobacco smoke (ONS 2011).

Smoking cessation can greatly reduce or, if achieved early enough, eradicate the increased likelihood of developing these health conditions (Taylor Jr et al. 2002, Lightwood and Glantz 1997). Health benefits of cessation can be noted as little as 20 minutes after the last cigarette smoked (NHS Smokefree 2014). A reduction in the amount of cigarettes smoked has shown no clear health benefits except as a precursor to complete cessation (Lancaster and Stead 2005).

### **1.2.1 Health consequences of smoking during pregnancy**

In addition to the risk to the health of the mother, smoking during pregnancy poses a significant risk to the fetus (Cnattingius 2004). Adverse pregnancy outcomes such as;

pre-term birth, low birthweight for gestational age (Jaddoe et al. 2008, Li et al. 1993) and stillbirth (Gray et al. 2009, Cnattingius and Stephansson 2002) can be attributed to smoking during pregnancy (see Table 1 for definitions of these outcomes). An influential review by Cnattingius (Cnattingius 2004) for each of these outcomes shows that the relative risk (of smokers vs non-smokers) is between 1.5-2.9 for babies born small for their gestational age, 1.2-1.6 for preterm birth and 1.3-1.8 for stillbirth. Other outcomes such as placental abruption (Ananth et al. 1999), and spontaneous abortion (Harlap and Shiono 1980, Kline et al. 1977), are also shown to be related to smoking during pregnancy.

**Table 1: Definitions of adverse pregnancy outcomes associated with smoking during pregnancy**

<b>Pregnancy Outcome</b>	<b>Definition</b>
Small for gestational age	A low birthweight relative to gestational age.
Preterm birth	A birth occurring at least 3 weeks before the estimated date of delivery.
Stillbirth	Fetal death occurring at 20 gestational weeks or later.
Low birthweight	A low birthweight is defined as < 2500g. Babies who are born <1500g are defined as very low birthweight (Lumley et al. 2009). This can be caused by preterm birth or intrauterine growth retardation (IUGR) (babies which are small for their gestational age (Kramer 1987).
Placental abruption	Placental abruption occurs when the placenta separates prematurely from the uterine wall. This a common cause of maternal and perinatal (later than 28 weeks or in the first week of life) death.
Spontaneous abortion	The loss of pregnancy before 20 gestational weeks.



Evidence reported in this section is mainly based on self-reported smoking. Evidence (Shipton et al. 2009) indicates that significant under-reporting of smoking is likely. This means that it is hard to define a clear causal relationship between smoking and many of the outcomes discussed, although the potential under-estimation of the effects of smoking does not hinder the certainty that they exist. Adding to this, pregnant women who smoke may also engage in other behaviours such as drinking alcohol and illegal drug use which are also associated with adverse pregnancy outcomes (Virji 1991). This potential confounding factor can pose challenges for research design and analysis in observational studies.

Smoking may also be related to childhood health conditions (Cnattingius 2004). Babies born with low birth weight are more likely to develop coronary heart disease and type II diabetes. They are also more likely to be overweight in adulthood (Lumley et al. 2009). Smoking in pregnancy can also lead to behavioural difficulties in children in later life and an increased risk of developing asthma. There is also a strong link between smoking and Sudden Infant Death Syndrome (SIDS) (RR 2.0-3.0) and a proven increase in the likelihood that the infant will be hospitalised during their childhood (RR 1.5-2.0) (Cnattingius 2004). There are also significant health consequences for the child if the mother continues to smoke after birth. These include increased risk of respiratory infections, middle ear infections and asthma and severity of symptoms (IARC 2009, SCOTH 2004).

Smoking before pregnancy (Jaddoe et al. 2008) and smoking before 15 weeks gestation (McCowan et al. 2009) have not been shown to have adverse effects on the fetus.

### **1.3 Financial consequences**

Additional to the health consequences of smoking during pregnancy, a report by Godfrey et al (2010) shows that NHS costs relating to smoking during pregnancy are between £20 and £88 million per year. They suggest that a conservative estimate of a £13.60-

£37 spend per pregnant smoker on smoking cessation interventions is likely to be cost effective for the NHS. Further money will be saved if the mother remains a non-smoker after pregnancy, and therefore reduces the likelihood of her children becoming future smokers and any subsequent medical costs.

## **1.4 Regulation**

Awareness of the problem of cigarette smoking is rising worldwide. The WHO has set out six policies in its MPOWER package (WHO 2004) to combat the global tobacco epidemic:

- **Monitor** tobacco use and prevention policies
- **Protect** people from tobacco smoke
- **Offer** help to quit tobacco use
- **Warn** about the dangers of tobacco
- **Enforce** bans on tobacco advertising promotion and sponsorship
- **Raise** taxes on tobacco

In 2013, the WHO reported (WHO 2013) that one third of all countries had implemented one or more MPOWER measures at a high level. They also found that progress had been made chiefly in low to middle income countries over the last 5 years, whereas progress in high-income countries has slowed down.

In March 2006, the Smoking, Health, and Social Care bill was introduced, prohibiting smoking in workplaces and enclosed public places in Scotland. This was followed by similar smoke-free legislation in England in July 2007. These sought to protect non-smokers from the harmful health effects of exposure to second hand smoke and provided opportunities for a smoke-free environment for smokers who want to quit. These bills have prompted significant increases in quit attempts (Hackshaw et al. 2010). Non-smokers exposure to second hand smoke was reduced, especially in those who live in non-smoking households (Haw and Gruer 2007). There have also been reductions

in hospital admissions for conditions such as myocardial infarction (Sims et al. 2010), acute coronary syndrome (Mackay et al. 2010, Pell et al. 2008), and childhood asthma (Mackay et al. 2010). A retrospective cohort study showed that significant reductions in pre-term birth and small for gestational age babies (Mackay et al. 2012) were achieved as a result of the Scottish legislation.

Additional regulation regarding the selling and packaging of tobacco products includes verbal and visual health warnings on cigarette packets. Current UK law states that a person must be 18 or over to purchase cigarettes and that cigarettes must not be sold in quantities of less than 10. Laws governing the display of tobacco products in shops are also being implemented. Legislation involving the mandatory plain packaging of tobacco products has been implemented in Australia, and is being considered for implementation in the UK.

## **1.5 Demographics**

Smoking is a complex behaviour which can be influenced by biological factors, psychological factors and external pressures. Despite an overall reduction in the number of smokers in Britain, some subgroups of the population continue to smoke at a high rate. Factors such as: gender, socio-economic status, relationship status, and age relate to smoking behaviours. Most of the data used to illustrate this in this section was extracted from the 2011 General Lifestyle Survey undertaken by the Office for National Statistics (ONS 2011) and the 2010 Infant feeding survey carried out by the NHS (McAndrew et al. 2012).

In Britain, more men than women smoke cigarettes. The gap between the sexes has narrowed considerably over the years. In 1974, 51% of men and 41% of women smoked. In 2009, 22% of men and 20% of women were cigarette smokers (ONS 2011). The trend for both sexes is downwards, but smoking is no longer a male dominated habit.

Married people are less likely to smoke than single people, with 27% of single people in Britain smoking in 2009 compared to 16% of married people.

People in a low socio-economic group are more likely to smoke (Jaddoe et al. 2008, Beck et al. 2002, Kleinschmidt et al. 1995). In Britain, the gap between socio-economic groups and smoking status is widening (Hiscock et al. 2012). In the General Lifestyle Survey, this can be observed by looking at households where the main occupation is manual or non-manual. 16% of people living in non-manual households are smokers. This compares to 26% in manual households. This is further broken down into Managerial and professional (15%), intermediate (19%) and routine and manual occupations (28%) (ONS 2011).

Age is also a factor in smoking behaviour (Beck et al. 2002). Women are most likely to smoke between the ages of 20-24 and men are most likely to smoke between the ages of 25-34. A high number of smokers were under the age of 16 at onset of regular smoking (39%) This is broken down to 41% in men and 36% in women. The age of smoking initiation is also related to socio economic status; 33% of smokers from managerial and professional households started at under the age of 16, compared to 47% from routine and manual households (ONS 2011).

### **1.5.1 Factors influencing smoking during pregnancy**

Results of an infant feeding survey (McAndrew et al. 2012) show that in 2010, 13% of all pregnant women (around 7481) in Scotland were recorded as smoking throughout pregnancy. This was an improvement from 20% in 2005. Despite this, there are still subgroups of the population which include high rates of smokers. In Figure 2, we can see that 31% of mothers under 20, and 25% of mothers under 24 smoked throughout pregnancy. Figure 1 shows that 24% of women who worked in a routine or manual occupation compared to 4% of women in managerial and professional occupations smoked throughout pregnancy.

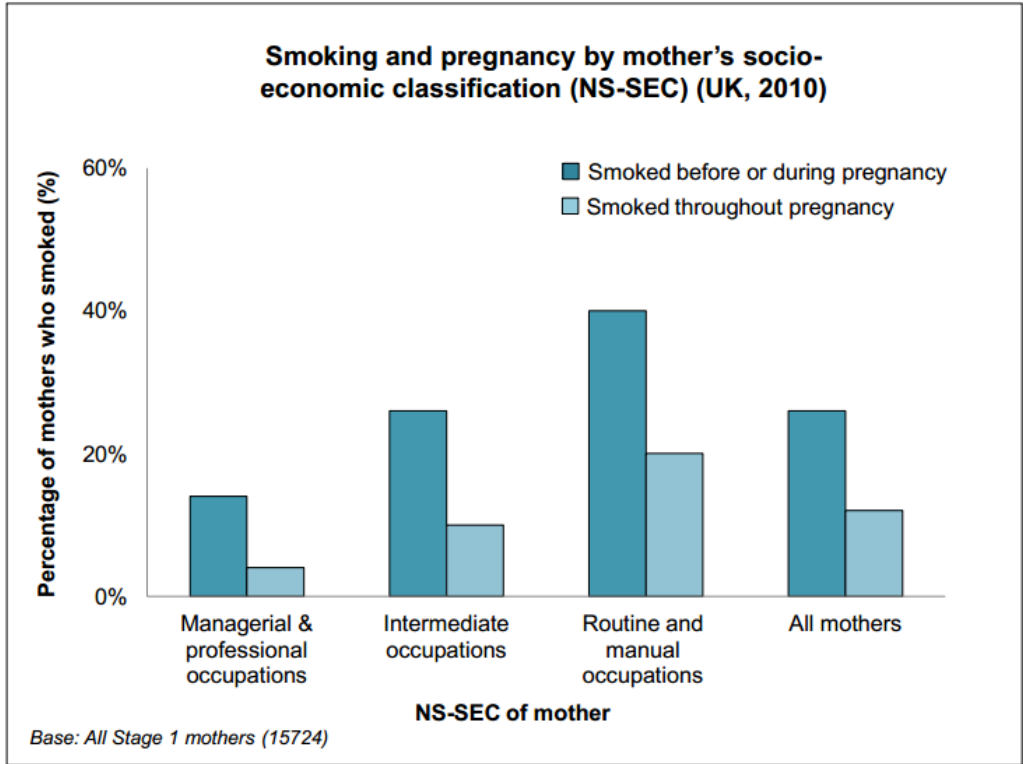


Figure 1: Smoking and pregnancy by mother's socio-economic classification (McAndrew et al. 2012)

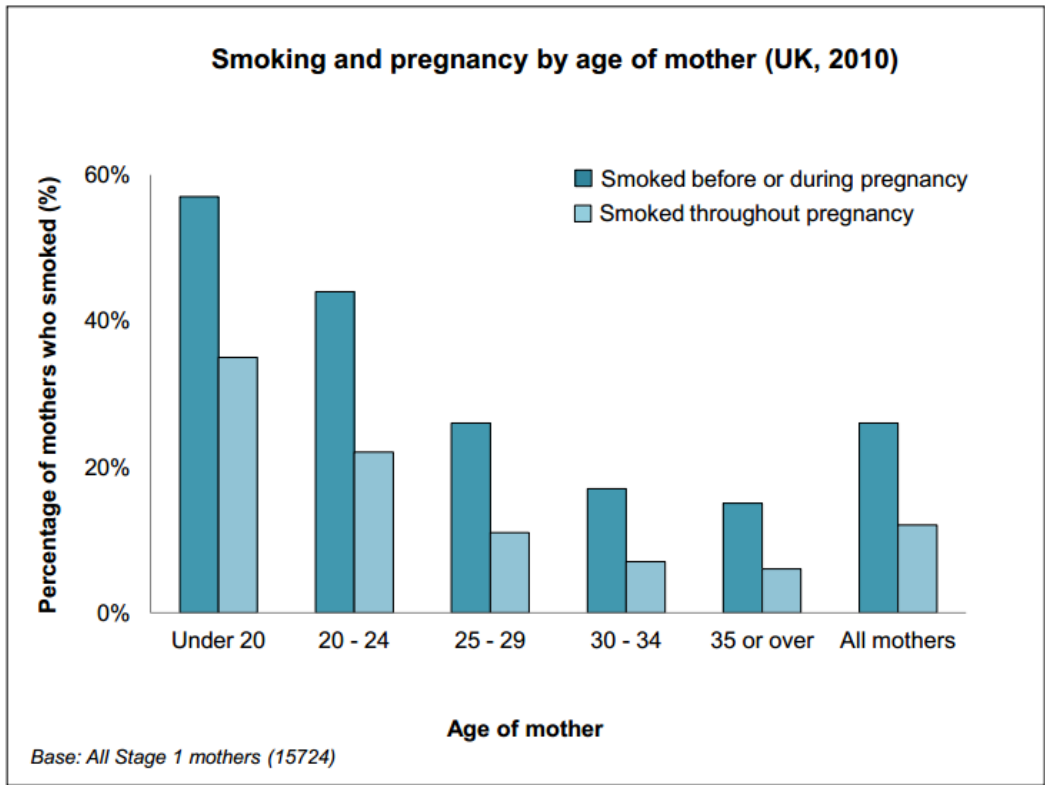


Figure 2: Smoking and pregnancy by age of mother (McAndrew et al. 2012)

Numbers of women smoking during pregnancy may be significantly higher as demonstrated by Shipton et al (Shipton et al. 2009), who found that reliance on self-reporting smoking status underestimated true smoking. Their projected figures suggest that, in Scotland, more than 2400 pregnant smokers each year are undetected. The findings reinforce the need for biochemical verification of smoking habit to identify all smokers who can then be offered advice and support to quit. This is now happening in Scotland.

## **1.6 Smoking and smoking cessation: intentions and behaviour**

The Office for National Statistics report 'Smoking and Drinking among Adults, 2009' (Robinson and Harris 2009) found that 63% of current smokers in Great Britain have expressed a desire to quit, and that 25% intend to give up within the next year. Health concerns are the most commonly mentioned reasons for smoking cessation. 83% of potential quitters mentioned at least one health reason. The next most commonly mentioned reasons are; costs (31%), the effect on children (22%), and family pressure (16%) (Robinson and Harris 2009). Additionally, the price of cigarettes is often increased through taxation as a health measure (WHO 2004). Despite these reported intentions to quit, and prominent health warnings in the media and on cigarette packets themselves, a large number of people continue to smoke. In order to understand why, it is important to investigate reasons the reasons why they continue to smoke.

Many studies (Dani et al. 2001, Balfour et al. 2000, Di Chiara 2000, Dani and Heinemann 1996, Schelling 1992, Stolerman and Shoaib 1991) have shown that the major addictive component of tobacco is nicotine, leading to continued use despite the many negative consequences. When inhaled, nicotine activates nicotinic acetylcholine receptors within the central nervous system of the smoker. This then induces a release of dopamine, which usually helps reinforce rewarding behaviours (Dani and De Biasi 2001). However, the addictive nature of cigarette smoking cannot be explained by its pharmacological properties alone – cultural, personal and social factors also play an important role.

Although smoking cessation provides many positive health benefits, a possible side effect is weight gain (O'Hara et al. 1998, Klesges et al. 1997, Williamson et al. 1991). In the long term, most people who stop smoking gain, on average, 7 kg (Parsons Amanda et al. 2009). For some people, this is a reason for continued smoking (Clark et al. 2004, Klesges and Shumaker 1992).

Most successful cessation attempts are reported to be preceded by several unsuccessful attempts (Fiore et al. 1990). Gilpin et al (Gilpin et al. 1997) found that self-reported smoking cessation for 3 months or more predicted success in long-term smoking cessation.

### **1.6.1 Pregnancy-specific smoking behaviour**

There are trends in smoking cessation that are specific to pregnancy. Spontaneous quitting (women who quit smoking during pregnancy without intervention) has been observed in previous research (Morasco et al. 2006, Ockene et al. 2002) which estimates that around 20-40% of all pregnant women do this. This quit rate is much higher than the general population. Women who are able to spontaneously quit are more likely to have stopped in the past, have a non-smoking partner, have support and encouragement at home, be less seriously addicted and have stronger beliefs about the dangers of smoking (Lumley et al. 2009). The high numbers of spontaneous quitters suggests that pregnancy is a time where the motivation to quit smoking is raised and therefore presents a good 'teachable moment' where extra support and advice delivered via a smoking cessation intervention may provide the extra push needed for those women who have not spontaneously quit.

Women have more contact with healthcare professionals during pregnancy than at any other time and are likely to be routinely offered smoking cessation advice and support during pregnancy appointments. Those who are willing may be offered the chance to participate in a cessation program.

Additional stress of coping with pregnancy can compound reasons why many smokers find it difficult to quit. This may be even more of a challenge for many socio-economically disadvantaged women who may face a disruptive home environment or the prospect of unsupported parenting challenges and isolation. These women report smoking to relieve anxiety and depression (Ebert and Fahy 2007).

It is estimated that at least 40% of women who quit smoking before or during pregnancy will relapse within the first 6 months postpartum (McBride et al. 1992, Fingerhut et al. 1990). Postpartum relapse rates are much higher than relapse rates of the general public, especially given that most of these women have passed at least 3 months cessation, suggesting that the reason for cessation is primarily the health of the fetus. Around two thirds of spontaneous quitters relapse within a year of giving birth (Lumley et al. 2009). A study (Edwards and Sims-Jones 1998) of smoking relapse during pregnancy and postpartum noted that some women expressed surprise at their own relapse. A prolonged cessation period may have lured them into thinking that they were not vulnerable to relapse. Women who relapse early tend to have quit smoking later on in pregnancy and have not passed six months of abstinence (Lumley et al. 2009).

Evidence shows that duration of breastfeeding is shorter in women who smoke (Suplee 2005). A study of 44 low-income postpartum women (Goldade et al. 2008) showed that the women perceived that a strong risk of harming the baby was posed by smoking while breastfeeding. This factored into reasons why women weaned their infants from breastfeeding much earlier than the recommended 6 months.

### **1.6.2 Pregnancy as a ‘teachable moment’**

A ‘teachable moment’ is described by McBride et al (McBride et al. 2003) as a ‘naturally occurring health event thought to motivate individuals to spontaneously adopt risk-reducing health behaviours’. A concept analysis by Lawson and Flocke (Lawson and Flocke 2009) showed that the term is most commonly used to describe an ‘opportunity’.



Two less common definitions are; a situation leading to higher than expected behaviour change, and an event that cues specific emotional and cognitive responses. Pregnancy fits in to all three of these definitions. The opportunity for health professionals is the increased contact they have with the women through antenatal appointments. The higher than expected behaviour relates to the phenomenon of 'spontaneous quitting' during pregnancy. Finally, the specific emotional and cognitive responses relates to the protective feelings that mothers experience towards the fetus are well documented, especially around the time of the ultrasound scan (Dykes and Stjernqvist 2001, Eurenus et al. 1997, Langer et al. 1988).

A study of qualitative interviews with pregnant women by Lumley (Lumley 1980) showed that women often significantly underestimated the size and development of their fetus, with descriptions of the fetus in early pregnancy including 'formless' and 'unattractive'. 9 out of 30 women interviewed reported conceptualising the baby as a real person. These women showed more affection and reported protective feelings towards the fetus. This suggests that an earlier bond could be formed if the perceived stage of development of the fetus was correct, and the concreteness of the fetus as a person strengthened. The ultrasound scan, as well as pregnancy as an event, could be seen as a teachable moment in itself.

## **1.7 Current interventions to promote smoking cessation**

Interventions to promote smoking cessation in the general public (i.e. not specifically for smoking during pregnancy) have had varying degrees of success. A systematic review of 23 reviews (Lemmens et al. 2008) found that; group behavioural therapy, bupropion, intensive physician advice, Nicotine Replacement Therapy (NRT), individual counselling, telephone counselling, nursing interventions, and tailored self-help interventions all showed evidence of effectiveness (effect sizes are shown in Table 2). Interventions can be divided into two rough categories; pharmacological and behavioural.

**Table 2: Intervention categories, types and effectiveness (Lemmens et al. 2008)**

<b>Intervention category</b>	<b>Intervention type</b>	<b>Effectiveness (in favour of treatment) [odds ratio (OR) confidence interval (CI)]</b>
Pharmacological interventions	NRT	(OR 1.77, CI: 1.66–1.88)
	Bupropion	(OR 2.06, CI: 1.77–2.40)
Behavioural interventions	Intensive physician advice	(OR 2.04, CI: 1.71–2.43)
	Group behavioural therapy	(OR 2.17, CI: 1.37–3.45)
	Individual counselling	(OR 1.56, CI: 1.32–1.84)
	Telephone counselling	(OR 1.56, CI: 1.38–1.77)
	Nursing interventions	(OR 1.47, CI:1.29–1.67)
	Tailored self-help interventions	(OR 1.42, CI:1.26–1.61)

Pharmacological interventions use drugs to alter problem behaviour. Overall, these have been shown to achieve significantly greater sustained cessation than behavioural methods alone. There are several pharmacological interventions available to smokers, Nicotine replacement therapy (NRT) is the most common. The aim of NRT is to replace the nicotine from cigarette smoke and eliminate cravings. Side effects are mild and include dry mouth and skin irritation. Nicotine levels can then be reduced gradually. NRT is available to buy without a prescription, making it accessible for those who do not wish to see a healthcare professional.

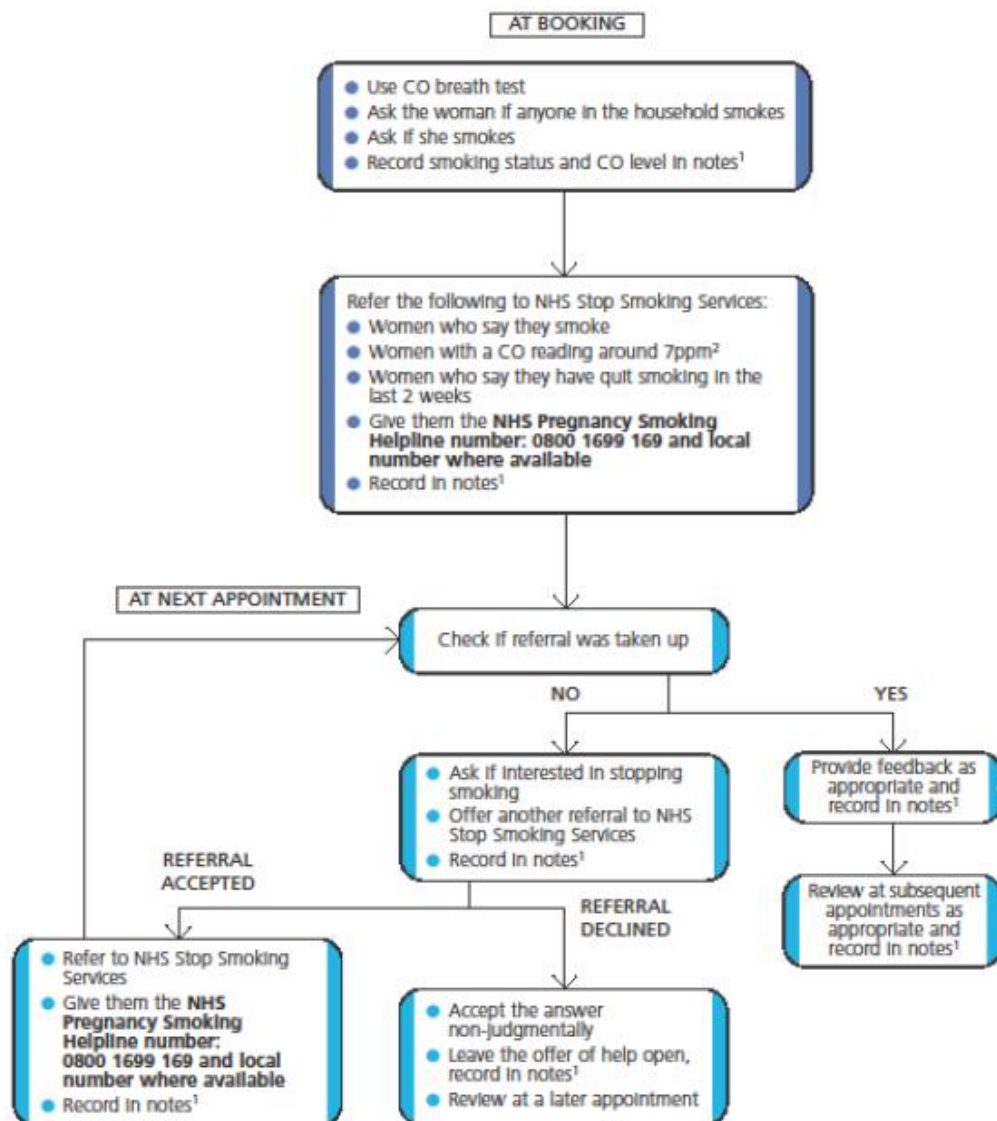
Behavioural interventions use non-pharmacological methods to modify problem behaviour with varying degrees of success.

In their role as a primary method of prevention of disease, smoking cessation interventions can be cost-effective and have better economic value than many life-preserving medical interventions. Evidence suggests that a combination of different methods would be more effective than one intervention alone (Miller and Wood 2003). More research needs to be undertaken to establish effective combinations.

### **1.1.1 Interventions for smoking cessation in pregnancy**

Interventions to promote smoking cessation during pregnancy normally compare the intervention group with a 'usual care' control (Lumley et al. 2009). Usual care is commonly referred to as the steps that are routinely taken when a woman is identified as a smoker at the first maternity booking. In Scotland, a midwife is assigned to each woman to monitor her progress through pregnancy and provide advice and assistance. As part of their remit, midwives are required to provide smoking cessation advice.

This first contact with a healthcare professional is often utilised as a 'teachable moment'. This advice is given in addition to any interventions. Figure 4 shows the guidelines as specified by the National Institute for Health and Care Excellence (NICE). Evidence (Beenstock et al. 2012, Baxter et al. 2009) shows that there are a number of barriers to midwives effectively providing smoking cessation advice, with the most prominent being time constraints.



**Figure 3: National Institute for Health and Clinical Excellence (NICE) guidelines for smoking cessation advice during pregnancy.**

Due to the complex nature of smoking cessation behaviour during pregnancy, spontaneous quitting for example, interventions have been specifically designed to aid cessation. These can take advantage of the increased contact that pregnant women have with healthcare professionals, or take into account the typical quitting behaviour of pregnant women.

A Cochrane review (Lumley et al. 2009) of 72 studies of interventions for promoting smoking cessation during pregnancy, showed that overall, cessation techniques helped

6% (RR 0.94, 95% CI 0.93 to 0.96) of smokers to quit at some point during pregnancy. Incentive based interventions were most successful, with 24% of women quitting during pregnancy. These interventions vary in content and include; provision of advice and counselling (either verbal or written); advice and counselling tailored to individual smoking behaviour; feedback on the health of the fetus or biochemical measurement of smoking status; pharmacological intervention (most commonly NRT); social support; and rewards or incentives.

Most interventions showed small but statistically significant results in favour of intervention conditions. Incentive based interventions show higher effect sizes (RR 0.76, 95% CI 0.71 to 0.81 in the outcome of continued smoking in late pregnancy) than other interventions successful in raising cessation rates during pregnancy than any other type of intervention used alone. A randomised controlled trial (Tappin et al. 2014) also demonstrates the efficacy of financial incentives. However, research involving incentive based interventions suggests that they may be viewed as undermining participant autonomy and therefore may not enhance intrinsic motivation (Johnston and Sniehotta 2010, Fiszbein et al. 2009). Therefore, although incentives may be effective for smoking cessation for the duration of pregnancy, more intervention is needed to deal with underlying issues which may lead to relapse.

While nicotine intake is not recommended during pregnancy, where the alternative is smoking, then NRT can be used as an aid for smoking cessation (2010). This eliminates the dangers from other dangerous chemicals found in cigarette smoke such as carbon monoxide and tar. If the nicotine intake is not increased, then NRT is a safer option than smoking.

Postpartum relapse is common in women who give up smoking before or during pregnancy (see Section 1.6.1). 10 studies examined in a Cochrane review of smoking cessation interventions (Lumley et al. 2009) measured postpartum relapse rates. Those

who received an intervention while pregnant were more likely to have continued cessation into the early postpartum period than those in the control groups (RR 1.65, 95% CI 1.22 to 2.24). However, there was no difference in relapse rates in the 8 trials that measured 6-12 month cessation rates (RR 1.39, 95% CI 0.82 to 2.38). There has been no significant evidence found of the success of interventions designs specifically to prevent relapse in non-pregnant quitters. More research needs to be done in this area.

Fang et al (Fang et al. 2004) suggest that, to maximise effectiveness, future interventions to promote smoking cessation during pregnancy should acknowledge and address 'stresses particular to postpartum women, should be part of routine health care and should involve the woman's social support network, including her partner'. Lumley et al (Lumley et al. 2009) conclude that 'victim blaming' must be avoided. Interventions to promote smoking cessation during pregnancy should aim to encourage and assist patients without compounding feelings of guilt.

## **1.8 Summary**

Smoking can cause significant and potentially fatal health issues for both the smoker and the fetus during pregnancy. It can also have health implications for the child later in life, both through damage caused during pregnancy and passive smoking implications of the mother continuing to smoke. Although declining, smoking and smoking during pregnancy is still prevalent within certain groups within the population of Scotland. Women aged under 24, and from a low-socio-economic background are the group most likely to smoke during pregnancy.

The quit rate during pregnancy is higher than the general population with many women spontaneously quitting and women have increased contact with health professionals over this time. Past interventions to promote smoking cessation, and smoking cessation during pregnancy have only shown limited effectiveness.

## **1.9 Conclusions**

This introductory chapter has; outlined the problem of smoking and smoking during pregnancy; identified a target group who are at risk of smoking during pregnancy; and examined past and current interventions and their effectiveness.

To develop a successful intervention to promote smoking cessation during pregnancy and in the postpartum period, a number of conclusions can be drawn from this chapter. Firstly, there is a clear target group who are vulnerable to smoking during pregnancy. Any intervention should be tailored to this group. Secondly, pregnancy is an ideal 'teachable moment' to encourage smoking cessation. Finally, past interventions have not provided adequate results, demonstrating that there is a need to look into methods of maximising intervention effectiveness.

## **2 Chapter 2: Methodological approach for the development of a complex intervention**

### **2.1 Introduction**

This chapter explains the approach taken in this thesis to complex intervention development. It demonstrates methodological considerations and principles and possible choices at each stage of the research process. The specific details and justification for the research are explained alongside the description of each stage in the research process. An overview of the study is as follows:

- A three part literature review comprising:
  - A cross-study synthesis which extracted a list of facilitators to smoking cessation as described by pregnant women. These facilitators were tested to determine whether they were a) typically addressed in existing interventions and b) found to be effective.
  - An overview of models and concepts in behavioural theory which are likely to predict or influence smoking behaviour during pregnancy and an exploration of the modes of delivery which are likely to work best for delivering an intervention.
  - A discussion of the optimum mode of delivery by which an intervention could feasibly be delivered using evidence gathered in part 1 and 2 of the literature review and an exploration of the literature relevant to each mode of delivery.
- A three phase empirical study comprising
  - A qualitative study eliciting views of pregnant women and health professionals
  - The development of an intervention to promote smoking cessation during pregnancy based on expert opinion and evidence from the research.



- A study eliciting opinion and feedback on the acceptability and feasibility of the intervention for the target group including a heuristic evaluation questionnaire.

## **2.2 Philosophical orientation**

In the context of research, the philosophical orientation or 'paradigm' is a system of ideas, a set of assumptions, or a world view used by researchers to generate knowledge. Paradigms typically share research strategies and criteria for rigour (Fossey et al. 2002). The beliefs of the researcher about what reality is (ontology) and in what way we can learn about it (epistemology) drive the design of the research.

In this thesis, the epistemological stance is best described as that of pragmatism. Pragmatism supports the use of both qualitative and quantitative research methods in the same research study and within multistage research programs. It rejects the argument that the two are incompatible.

The approach of 'whatever works' taken by pragmatists considers the research question to be more important than either the method they use or the paradigm that underlies the method. Pragmatism works well with mixed methods research and suits a researcher with a diverse background. In this case, the researcher was unexperienced in research but experienced in design and information technology. A pragmatist looks at a problem with 'fresh eyes' and bring whatever experience or expertise they have to work towards building a solution.

Johnson et al (Johnson and Onwuegbuzie 2004) identify some potential criticisms of pragmatism. These include the tendency of pragmatism to promote incremental change rather than more fundamental change, and researchers adopting pragmatism as a method of avoiding traditional philosophical and ethical disputes.

In regard to the research questions posed in this thesis, the paradigm of pragmatism is appropriate because the proposed intervention addresses a real world problem. According to Flick (Flick 2014: 2), the primary focus of applied research is on 'collecting and generating data to further our understanding of real-world problems'.

### **2.3 What is a theoretical basis?**

Central to the development of the intervention described in this thesis is the 'theoretical basis'. The Medical Research Council (MRC) framework for complex interventions (Craig et al. 2008) suggests that, in order to identify and develop theory for an intervention, a theoretical understanding of the likely processes of change should be developed by drawing on existing evidence and theory. It also states that this should be supplemented, if necessary, by new primary research. These recommendations demonstrate that the theoretical basis or underpinning of an intervention does not necessarily mean the use of a single, or even multiple existing theories, but can encompass a new set of ideas drawing from different sources.

The Workgroup for Intervention Development and Evaluation Research (WIDER) aim to improve the scientific reporting of behaviour change interventions with a set of recommendations (WIDER 2008) including the clarification of assumed change process and design principles. The purpose of this is to facilitate replication and adoption of the findings. WIDER recommends that to achieve this, researchers should report: the intervention development; the change techniques used in the intervention; and the causal processes targeted by these change techniques (Albrecht et al. 2013). This is emphasised by Michie et al (Michie 2009), who suggest that, as well as establishing the active ingredients of an intervention, an understanding of how interventions work and the mechanisms by which they cause behaviour change should be reached.

To meet recommendations, the purpose of Chapters 3 to 6 of this thesis were designed contribute towards the development of a robust theoretical basis which is clearly outlined

in Chapter 7. To avoid ambiguity, it is important to outline we mean by a theoretical basis in the context of this thesis. Not only does the theoretical basis as we define it encompass established psychological and behavioural theory but also contains a set of intertwined components. In the case of this thesis, these include:

- Active ingredients shown to work in past interventions.
- Behaviour Change Techniques (BCTs) with an evidence base for promoting smoking cessation during pregnancy.
- The modes of delivery with an evidence base of potential effectiveness.
- Empirical findings about women's visualisation and conceptualisation of their baby.
- Issues surrounding acceptability and feasibility in clinical practice.

## **2.4 Research methods**

'Research methods refer to the kinds of tools used to collect data in studies, whereas methodologies are the more comprehensive designs and frameworks used in investigations.' (Lapan et al. 2011).

In this section, a methodological overview and explanation of the research methods used throughout this thesis is provided. This is designed to complement the more specific details which are outlined in each study as it is described in each later chapter.

The complex intervention described in this thesis was developed using a systematic, empirically informed approach. Theoretical frameworks were identified and modifiable behavioural concepts that have the potential to predict a woman's intended and actual smoking behaviour during pregnancy were identified. These concepts were mapped onto evidence-based behaviour change techniques and intervention components were operationalised in a format suitable for initial feasibility testing. This is a causal modelling approach. The MRC (Campbell et al. 2000, Craig et al. 2008) framework for complex interventions explains that the explicit choice of intervention points and associated

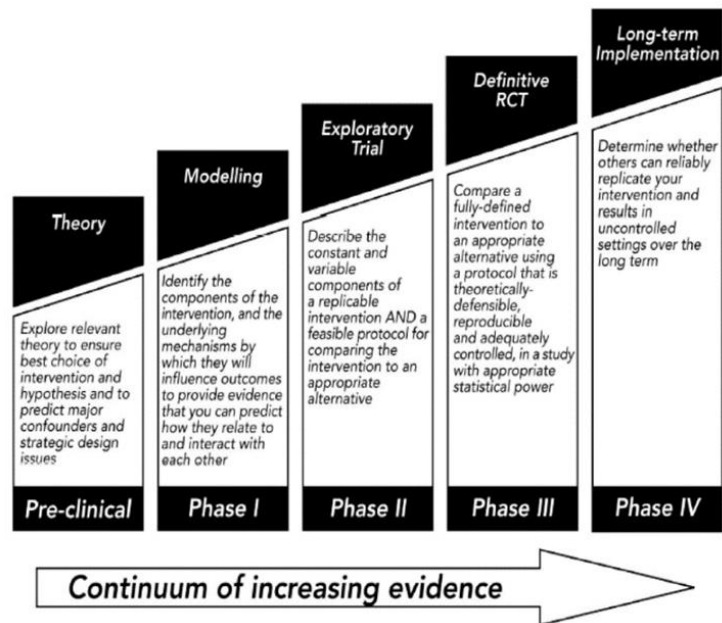
measures along the causal pathway allows future research to assess why interventions are effective, how they are effective and allows for greater confidence in modelling long-term outcomes from short term behaviour change.

#### **2.4.1 Researching complex interventions**

There are a number of attributes which contribute towards an intervention being defined as 'complex'. The MRC framework defines these as:

- Number of and interactions between components within the experimental and control interventions.
- Number and difficulty of behaviours required by those delivering or receiving the intervention.
- Number of groups or organisational levels targeted by the intervention.
- Number and variability of outcomes.
- Degree of flexibility or tailoring of the intervention required.

Generally, the development and evaluation of complex interventions can be problematic. A wide range of factors, including behaviours and organisational structures, act and interact with each other to achieve a range of outcomes. The MRC framework has been internationally influential and successfully used to develop many interventions. It is a pragmatic framework which is useful for researching these interventions. The framework outlines the purpose of each stage in the research process. It recommends that the research questions can be derived from the purpose and the method chosen should reflect the best possible approach to answering the question.



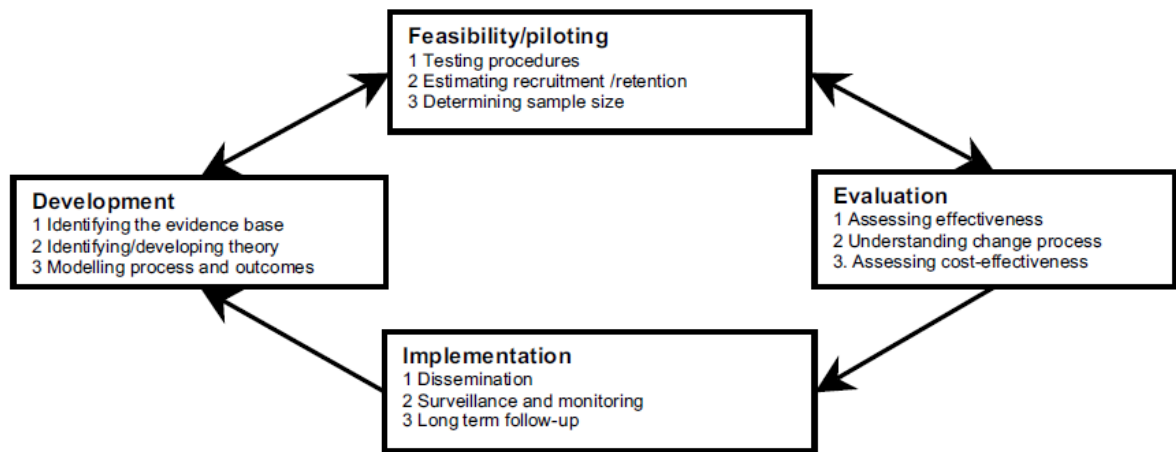
**Figure 4: Schematic representation of the 2000 MRC framework for complex interventions**

Figure 4 shows the 2000 version of the MRC framework and Figure 5 shows the key elements of the revised 2008 version. The 2000 version demonstrates a clear linear progression through five distinct phases. Due to a number of criticisms of the 2000 framework an updated 2008 version was developed. These criticisms included:

- Weaknesses in the early phase piloting and development work.
- A linear progression which does not reflect the iterative process often required in developing complex interventions.
- A template which best fits the process of conventional clinical trials (e.g. the evaluation of new drugs).
- A lack of tailoring to local contexts.
- The value of systematic reviews is overlooked.
- A lack of evidence to support the recommendations (Craig et al. 2008).

The 2008 version has been adapted to reflect the iterative process often required for developing complex interventions. This varies from project to project and is not necessarily linear or cyclical. The guidance recognises the need for flexibility, stating

that strict fidelity to a protocol may be inappropriate in some cases where tailoring or adaption to a local setting would potentially increase effectiveness. In this project, both versions are considered.



**Figure 5: Key elements of the development and evaluation process (Craig et al. 2008)**

This thesis comprises four linked studies, which map onto the phases of the MRC framework (2000) and the key elements of development and feasibility/piloting in the 2008 version. In line with guidance from the revised framework, the studies do not follow a linear pattern.

The ‘Implementation’ and ‘Evaluation’ elements of the MRC framework typically involve a randomised controlled trial and the long term implementation of the intervention. This is beyond the scope of this PhD. However, the recommendations for the long term implementation of the developed intervention are discussed in Chapter 9.

#### **2.4.2 Key elements of the MRC framework**

The key elements of the MRC framework that relate to the work described in this thesis are explained here.

### **2.4.2.1 Development**

This element is thoroughly and methodically addressed throughout this thesis. Each of the following steps to developing the intervention are considered:

**Identifying the evidence base:** When developing an intervention, the first logical step is to evaluate existing interventions for content and effectiveness (Craig et al. 2008). The MRC framework recommends that the evidence base is identified by carrying out a systematic review. For this project, systematic reviews of both the qualitative and quantitative literature were already in existence. Therefore, the evidence from these two reviews was synthesised (in Chapter 3) to further clarify the evidence base.

**Identifying/developing theory:** The MRC framework states that an awareness of relevant theory will increase the likelihood of intervention effectiveness. An understanding of the likely mechanisms of change can be developed by studying existing evidence and theory with additional empirical evidence if necessary. Expertise in the relevant disciplines is important in this stage. In this project, an exploration of existing theory likely to predict or influence behaviour in relation to smoking cessation during pregnancy (Chapter 4) and theory (inductively derived from the experiences of pregnant women (Chapters 3 and 6)) demonstrate a strong theoretical underpinning. Established theory, and its relationship to intervention effectiveness, is explored in Chapter 4.

**Modelling process and outcomes:** This stage identifies weaknesses early on before time and money is spent on a full scale evaluation. The MRC framework suggests RE\_AIM as a source for ideas at this stage. In this project, initial modelling was undertaken in the Chapter 3 and the qualitative study described in Chapter 6 to determine initial feasibility and acceptability issues. There is no standard method of modelling an intervention. The definition given in the 2000 MRC framework is to identify; intervention components, and how intervention components relate to outcomes.

The MRC framework has outlined the *purpose* of each stage which in turn determines the research questions asked. Table 3 shows the key elements of the MRC framework, the broad research questions developed from the element, and then the methods used to answer the questions.



**Table 3: Key elements of the MRC framework and the research questions relating to each element.**

<b>Key element of MRC framework</b>	<b>Research questions</b>	<b>Method</b>
Identifying the evidence base	<p>What evidence is needed for the development of this intervention?</p> <p>Who are the main stakeholder groups for delivering/receiving the intervention?</p> <p>What evidence already exists?</p> <p>Are there any relevant systematic reviews?</p>	<p>Identification of the target group, reviewing the presence and effectiveness of existing interventions (Chapter 1). Identifying relevant systematic reviews (Chapter 3)</p>
Identifying/developing theory	<p>What theory would be most likely to provide an effective underpinning for the intervention?</p> <p>Is there empirical evidence to support this?</p> <p>Would the theoretical underpinning benefit from new evidence?</p>	<p>Identifying existing theory with evidence that it is relevant to smoking cessation during pregnancy (Chapter 4). Identifying gaps in knowledge and undertaking qualitative research to fill these (Chapter 6)</p>
Modelling process and outcomes	<p>What works/does not work in existing interventions?</p> <p>Why does it work/not work?</p>	<p>Reviewing the effectiveness of existing interventions (Chapter 3) by carrying out a mixed-methods secondary analysis to identify the active ingredients.</p>

#### **2.4.2.2 Feasibility/piloting**

The beginning stages of testing the feasibility of the proposed intervention are undertaken within the remit of this project. Pilot or feasibility studies are often undertaken as a method of providing information for planning and justifying a RCT which is much more costly (Lancaster et al. 2004).

**Testing procedures:** The acceptability of procedures involved in delivering the intervention should be tested on the stakeholders involved in delivering and receiving the intervention. Even the best theory-based interventions are of no use if they are not feasible to implement in real world clinical practice. Enthusiasm and compliance from those professionals involved in delivering the intervention are key to its success. If the target group find the intervention unacceptable, they simply will not engage with it.

In this project, the initial idea for an intervention was developed from the literature review and discussion with a steering group which included midwives. The idea was refined and taken to the health professionals interviewed in Chapter 6. Some basic procedures were adjusted based on this feedback. The revised proposal was suggested to the pregnant women interviewed in Chapter 6. Their feedback was taken into consideration when developing the intervention. Intervention components were trialled in Chapter 8.

**Estimating recruitment/retention:** The number of potential participants who will agree to participate should be estimated at an early stage. If participants cannot be recruited to take part in an intervention, it is futile. Consideration must also be given to the likelihood of participants completing the entire intervention. In this project, the intervention was not considered ready for evaluation or implementation until feedback from stakeholders was that the intervention was engaging and interesting.

**Determining sample size:** When estimating a sample size, the feasible recruitment rate, cost and time effectiveness should be considered. Primary outcomes should be

determined before a sample size can be decided on. Dependant on the study type, specific sample size is needed if meaningful results are to be provided (Krejcie and Morgan 1970).

#### **2.4.2.3 Evaluation and Implementation**

The MRC framework recommends that, where appropriate, a randomised trial should be implemented to evaluate effectiveness *and understand processes*. Understanding why an intervention works or does not work is key to the intervention adding to the evidence base, allowing for robust conclusions to be drawn about the specific processes. This should be conducted to high methodological standards.

The elements of evaluation and implementation are not operationalised within the remit of this thesis: however, it is important to outline the process of this stage to develop recommendations for the future implementation of the intervention.

Figure 6 shows the outline of the research in this thesis, and how the project maps onto these key elements of the MRC framework. This is explained further in Table 4, with the stages of the 2000 MRC framework and the key elements mapped onto the specific aims of each chapter.

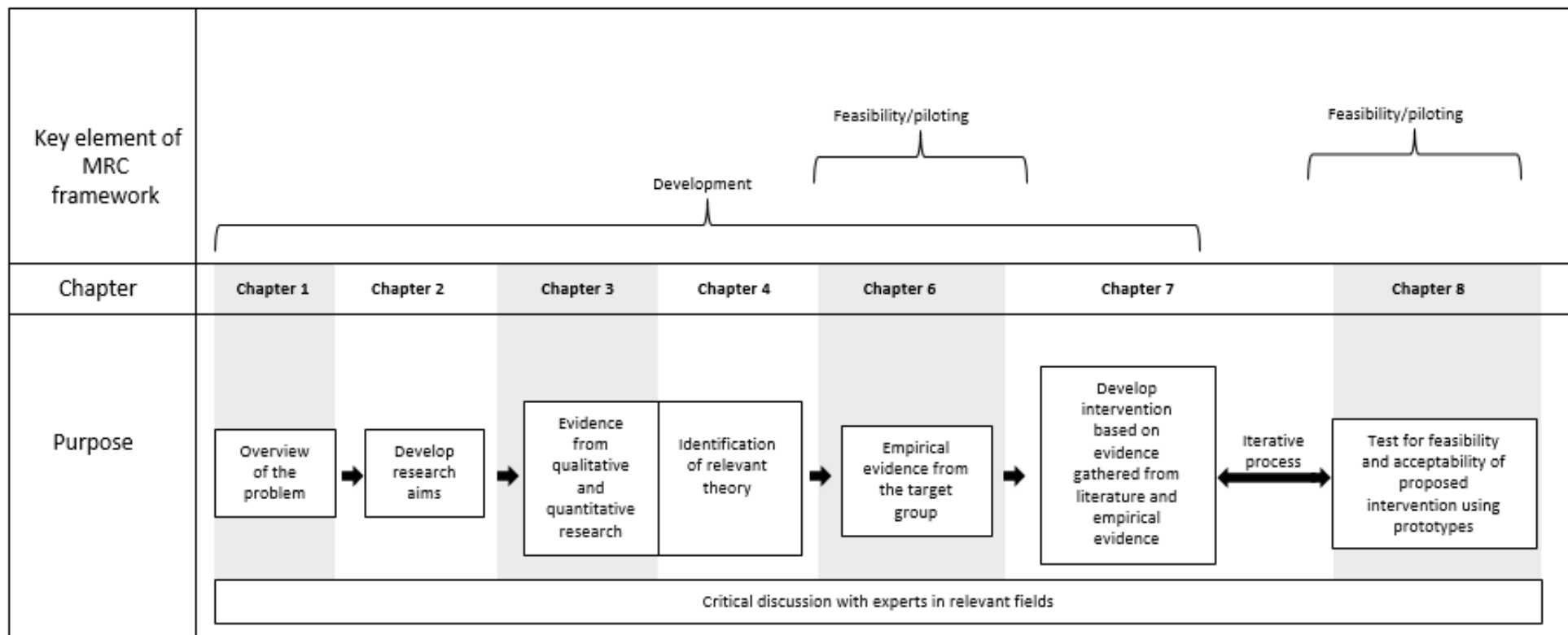


Figure 6: Overview of chapter structure and phase of MRC framework for complex interventions (Craig et al. 2008)

### 2.4.3 The RE-AIM framework

It is better to consider more than just effectiveness in the developmental stages of an intervention to maximise achievement of other outcomes. As recommended in the modelling phase of the MRC Framework, the RE-AIM framework (Glasgow et al. 1999) was consulted for guidance. RE-AIM is a 'model for the planning, evaluation, reporting and review of translational research and practice.' In this thesis, it is used as a method of systematically considering the strengths and weaknesses of the developed intervention in the design stages. This is in order to maximise achievement of the desired outcomes at later stages.

- **Reach** the intended target population
- **Efficacy** or effectiveness
- **Adoption** by target staff, settings, or institutions
- **Implementation** consistency, costs and adaptations made during delivery
- **Maintenance** of intervention effects in individuals and settings over time

## 2.5 Research aims and questions

The first chapter of this thesis outlined the background of the problem and demonstrated the need for more effective interventions to promote smoking cessation during pregnancy. The aims of the intervention were developed from these findings and have also been formulated to follow the MRC framework for complex interventions and the RE-AIM framework.

Overall aims:

1. To ascertain what might constitute an effective intervention to promote smoking cessation during pregnancy.
2. To identify the conditions in which this intervention should be delivered.

3. To develop an intervention to promote smoking cessation during pregnancy with a strong theoretical basis.

Specific aims were developed for each chapter as the project progressed. These are outlined in Table 4 and explored in more depth within each chapter. The table also maps the stages of the project with the corresponding phase of both the 2000 MRC framework and the revised version.

**Table 4: An outline of the chapter structure with the aims and stage of MRC Framework for Complex Interventions**

Stage of MRC Framework (2000)	Stage of MRC Framework (2008)	Chapter	Title	Aims	Method
Theory/modelling	Development (Identifying the evidence base, Identifying/developing appropriate theory, modelling process and outcomes)	3	A cross study synthesis of qualitative and quantitative evidence of women's experiences of smoking and smoking cessation during pregnancy.	Determine the barriers to and facilitators of smoking cessation during pregnancy	Review qualitative evidence of women's experiences of smoking and smoking cessation during pregnancy and from this, develop a list of 'elements' which are likely to promote smoking cessation during pregnancy.
				Explore the extent to which the barriers and facilitators have been addressed in existing interventions to promote smoking cessation during pregnancy and the effectiveness of each one.	Locate papers describing existing interventions and assess the descriptions for the presence or absence of these elements. Assess how this has affected the outcome.
Theory	Development (Identifying/developing appropriate theory)	4	Behavioural theory and mode of information delivery: A discussion in	To identify models and concepts from behavioural theory which have potential to influence or	Review relevant literature

			relation to smoking cessation	predict smoking behaviour during pregnancy.	
Modelling	Development (modelling process and outcomes)			To determine a mode of delivery that has optimum impact on cognitive processes which motivate behaviour change	
Theory/ Modelling	Development (identifying/developing appropriate theory and modelling process and outcomes)	6	Exploring the views and experiences of smoking cessation during pregnancy: a qualitative study of pregnant women and healthcare professionals	To evaluate the way in which women visualise or conceptualise their pregnancy, and the subsequent effect on behaviour and emotions  To check for supplementary barriers and facilitators not identified in the cross-study synthesis described in Chapter 3.	Qualitative semi-structured interviews with target group.
Modelling	Feasibility/piloting (estimating recruitment/retention)			To explore issues surrounding the feasibility and acceptability of an intervention to promote smoking cessation during pregnancy, both for the target group and in clinical practice	Qualitative semi-structured interviews with target group and health professionals



Modelling	Development (modelling process and outcomes)	7	Developing a theory-informed intervention to promote smoking cessation during pregnancy using technology, storytelling techniques and images.	To develop a prototype intervention which can be tested for feasibility	Create a set of aims
				To lay out the predicted mechanisms of behaviour change	
				Development of the intervention	
Modelling	Feasibility/piloting (Testing procedures, estimating recruitment/retention)	8	A qualitative study of pregnant and non-pregnant women's opinions on the acceptability and feasibility of the proposed intervention	To test the feasibility and acceptability of components of the proposed intervention.	Qualitative interviews with the target group for intervention feedback

These research questions were then designed to fulfil the aims:

1. What psychological concepts and models of behaviour are most appropriate for predicting and influencing smoking behaviour during pregnancy? (Chapters 3 and 4)
2. What are the barriers to, and facilitators of, smoking cessation during pregnancy?(Chapters 3 and 6)
3. What psychological factors have been addressed by the interventions most effective in reducing smoking in pregnant women? (Chapter 3)
4. How do pregnant women understand and/or visualise their unborn child and the processes which happen when they smoke? (Chapter 6)
5. What are clinical staff attitudes and the practical issues around the delivery of an intervention? (Chapter 6)
6. What are the acceptability and feasibility issues surrounding the delivery of lifestyle interventions during pregnancy? (Chapters 6 and 8)
7. What mode of delivery would have the optimum impact on cognitive processes which motivate behaviour change? (Chapter 5)

### **2.5.1 Research design**

From the research questions, the parameters for the design of the research can be outlined. The research consists of a three-part literature review (Chapters 3, 4 and 5), two qualitative studies (Chapters 6 and 8) and the development of an intervention to promote smoking cessation during pregnancy (Chapter 7). The design of each chapter is briefly outlined below:

**Chapter 3:** A 'cross-study synthesis' to identify the active ingredients of interventions to promote smoking cessation during pregnancy. 'Elements' likely to promote smoking cessation during pregnancy were extracted from the qualitative literature. These were

tested by scoring each element as present or absent in papers describing RCTs of past interventions to promote smoking cessation during pregnancy. Conclusions were then drawn about the elements.

**Chapter 4:** An exploration of existing behavioural theory informed by expert opinion. In discussion with the research team, concepts and predictive models from psychological theory which had an evidence base for influencing smoking cessation behaviour during pregnancy were identified and discussed. Conclusions about the best theory to inform an intervention were drawn.

**Chapter 5:** A discussion of the optimum modes of delivery to deliver an intervention. Three modes of delivery were selected because of their likely effectiveness in the intervention developed in this thesis. The theoretical rationale for each mode of delivery is outlined, and conclusions are drawn regarding the optimum use of each.

**Chapter 6:** Qualitative interviews were carried out with health professionals and the target group (pregnant smokers). Health professionals were primarily consulted about the acceptability and feasibility of an intervention in clinical practice. Pregnant women were asked in-depth questions about their visualisation or conceptualisation of the fetus and their experiences of smoking and smoking cessation. Data was analysed using framework analysis.

**Chapter 7:** The intervention was developed using the theoretical basis generated by Chapters 3 -6. This was thoroughly and transparently reported.

**Chapter 8:** Interviews with pregnant smokers were carried out to determine the acceptability and feasibility of the intervention for the target group. Participants were shown the intervention and asked for their feedback. They were also given a questionnaire designed using heuristic evaluation principles to evaluate the usability of the intervention. Data was analysed using framework analysis.

### **2.5.2 Literature reviewing**

While there are a number of possible ways of gathering the required data, the initial approach should be to identify information already written on the subject. The literature review of this thesis is divided into two chapters. The first is the cross-study synthesis described in Chapter 3 and the second is an exploration of behavioural literature.

Literature reviewing is an important part of research. A literature review collates a specific body of research and provides an analysis. Its purpose is to provide an unbiased overview of the body of research (Aveyard 2010:6). Literature reviews take several forms. The most detailed type of review is usually referred to as a systematic review. This type of review ensures that all available relevant information is analysed. Strict protocols are followed and rigorous and explicit methods are required for this type of review. This type of review is often beyond the means, timescales and skills of many researchers and is not always necessary for the research question.

During the literature review process, the researcher planned a meta-analysis of qualitative evidence of women's experiences of smoking and smoking cessation during pregnancy. Prior to beginning the search for papers, a review covering the same aims was completed. The researcher was able to obtain a pre-publication copy of this review (Graham et al. 2011). Given that the intended review had already been completed, it was decided that further analysis of the review to give a more in depth exploration of women's experiences and 'what works' in existing interventions would be beneficial to the development of an intervention.

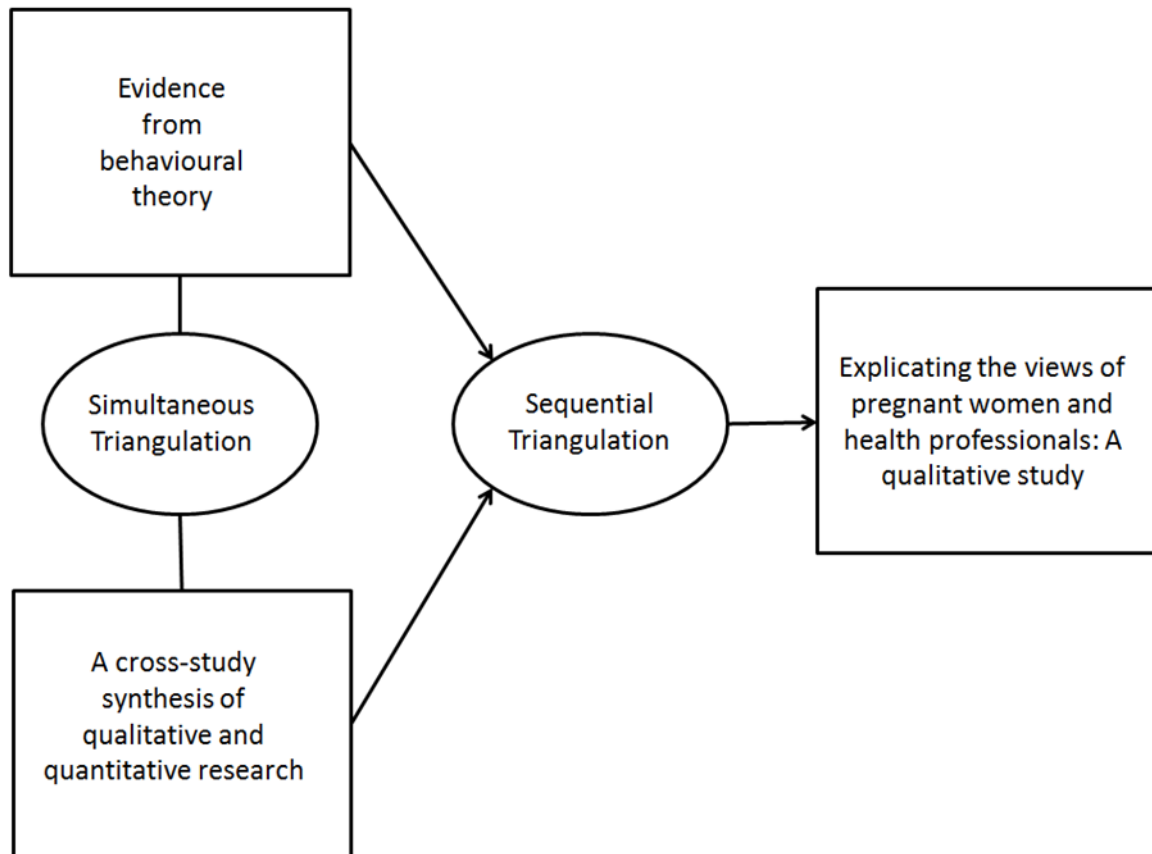
### **2.5.3 Triangulation**

In research, one method of creating a comprehensive, multi-purpose study with a low potential for bias is triangulation. Flick (2014:444) describes triangulation as 'the combination of different methods, study groups, local and temporal settings, and different theoretical perspectives in dealing with a phenomenon.' The purpose of this is

to use two or more aspects of the research to strengthen the design and increase the ability to interpret the findings (Thurmond 2001). Sequential triangulation occurs when studies are conducted 'one after another to further inquiry, with the first project informing the nature of the second project.' (Morse 2003:190). The projects do not have to use the same methods. Simultaneous triangulation is when there are 'projects conducted at the same time, with the results compared or contrasted on completion.' (Morse 2003:190).

In a discussion of comparing qualitative research with quantitative research, Morse notes that the theory used is primarily inductive. The theory inductively derived from this study is triangulated simultaneously with the conclusions drawn from behavioural theory in chapter three. The conclusions drawn from these two studies together are then sequentially triangulated with qualitative study 1 described in Chapter 6.

Figure 7 provides a schematic representation of the way in which triangulation works in this project. The evidence from behavioural theory discussed in Chapter 4 is triangulated simultaneously with the cross-study synthesis described in chapter 3. Conclusions from the two studies were compared. The research aims of the empirical work described in chapter five were developed to fill in the gaps in knowledge which could not be achieved by studying the available literature.



**Figure 7: A schematic representation of the use of triangulation in the thesis**

## **2.6 Participants and procedures**

The focus of the exploratory pilot study and the feasibility testing of the intervention demanded a qualitative methodological approach due to the focus on extracting opinion and experiences. This is due to the exploratory nature of the research questions.

The following section provides a discussion of general issues considered when undertaking the qualitative empirical phases of this thesis and a rationale for the design of the research.

### **2.6.1 Sampling and recruitment**

Developing a sampling strategy is an important stage in the research design and a number of different approaches are available. The choice of sampling is dependent on the research aims and questions.

Although much time and money has been spent on smoking cessation interventions, there is little evidence of the best method of attracting participants. A Cochrane review of 19 interventions for recruiting smokers into cessation programmes (Brusamento et al. 2011) found that a tailored method of recruitment was more likely to encourage participation, although substantial heterogeneity made it difficult to draw a firm conclusion.

Two main sampling strategies were considered for the qualitative interviews in this thesis. Firstly, theoretical sampling involves an iterative process whereby the researcher recruits initial participants, analyses their data, and then recruits subsequent participants who are likely to expand and refine the existing data. Secondly, purposive sampling can be employed. In this method, participants are chosen based on specific attributes. The intention is not to represent the population as a whole but represent as wide a range of beliefs and experiences as possible. Gilbert (2008:512) states that the focus of purposive sampling is 'on gaining insight and understanding by hearing from representatives from a target population'. The main difference between the two sampling strategies is the stage of the research process that the criteria are defined. In purposive sampling, the criteria are set prior to recruitment, whereas theoretical sampling demands that the criteria be kept open and flexible throughout the recruitment process (Ritchie et al. 2003). Other methods of sampling include snowball sampling, in which the researcher uses the first few participants to recommend or approach other potential participants. This method is primarily used for convenience and results are potentially biased because participants who know each other are more likely to hold similar viewpoints (Gerson and Horowitz 2002). The number of potential participants who do not express an interest in participating is important because it indicates a possible sampling bias. The non-responders may differ in attitude and experience from those who do participate.

Once the sampling strategy is defined, a recruitment strategy must be formulated. Gaining access to participants can be problematic and differs for every sample. Often,

gatekeepers (people who have the ability to facilitate access to the target group) are needed to aid recruitment (King and Horrocks 2010). These could be, for example, a health professional allowing the researcher to access his or her patients. Ensuring that gatekeepers are well informed and keen to aid recruitment can determine the success or failure of the recruitment process because, in many cases, the gatekeepers are known to, and trusted by potential participants. It is important, however, that no pressure is exerted on potential participants to take part. Where gatekeepers are identifying potential participants themselves, it is important that they are not likely to choose participants who are expected to take certain positions and therefore create bias.

Where the use of a gatekeeper is not feasible, recruitment can be facilitated by advertising for participants. This can include posters in public places or adverts in newspapers or on the internet. The main problem with this form of recruitment is the self-selecting nature of the sample (King and Horrocks 2010:34).

### **2.6.2 Data Collection**

Collecting qualitative data typically utilises observational or interview methods. Choosing a method requires careful consideration of the question which needs answering. Once an optimal method is chosen, the feasibility and acceptability of this method should be considered. Practical issues such as time and budget constraints must also be taken into account.

Two main types of data collection are common in qualitative research; observational and interview methods. Observational methods were reasoned to be unsuitable for data collection required in this thesis because a primary focus was to extract opinions and ask about previous experiences which are unlikely to be observed. There are three primary types of interview in research: structured, semi-structured and unstructured interviews. As the rigid approach of a structured interview is best suited to quantitative work, a qualitative researcher is most likely to choose a semi-structured or unstructured



approach. Unstructured interviewing is similar in style to a conversation (Burgess 2011), where the interviewer has, at most, a list of topics to discuss. In a semi-structured interview, all topics will be covered, and generally be asked in similar wording. This allows for clearer comparison between interviews during the data analysis process than a completely unstructured approach. The purpose of this flexible approach is that the interviewer has freedom to ask questions regarding unexpected issues raised by the participant (Bryman 2012:320-321). For these reasons, a semi-structured interview approach was chosen for all qualitative interviews undertaken within this project.

Interviews can take place in an individual or group setting. Focus groups are often used as a method of provoking in-depth discussion of a topic. This can work well but heavily depends on the dynamics of the participants. For example, the views of an introvert could easily be dominated by somebody who is very vocal, or who has strong opinions. Additionally, individual interviews are often more practical. Focus groups involve travel and effort by the participants and are often badly attended. This is not a problem in individual interviewing as the researcher can travel to meet the participant and can re-schedule if a participant is no longer available at a given time.

Respondent validation can be used to ensure rigour when interviewing (Barbour 2001). If a participant raised a topic that could prove to be an interesting finding, the researcher could ask subsequent participants about their feelings on the subject, first ensuring that they will not refer to the topic unguided.

### **2.6.2.1 Topic guides**

Once the method of data collection has been ascertained, the researcher needs to decide what participants will be asked. For the semi-structured interviews described in this thesis, each set of interviews required its own topic guide. This section will explain the process involved in creating a general topic guide. There are more specific

descriptions of the development of the individual topic guides provided in the 'methods' section of each study.

A topic guide is a structured set of topics which reflect the purpose of the interview. It is often advisable to alter the topic guide over the course of the interviews (King and Horrocks 2010). Insights gained in one interview can inform subsequent interviews. For example, an overlooked issue introduced in an early interview by a participant can be approached by the researcher in later interviews if the issue is not initiated again (i.e. respondent validation).

Topic guides were prepared for each participant group interviewed within this thesis. These listed the issues to be covered in the interviews, but the order and wording of the questions were not prescriptive. They facilitated a conversational, relaxed style of discussion with the participant. The depth and focus of the interview was guided by the researcher, allowing them to pursue unanticipated issues raised by the participant. These issues could then be raised in subsequent interviews and explored further. To create a topic guide, the researcher needs to keep in mind the original research questions. The topic guide is not fixed throughout the interview process.

When constructing a topic guide for an inexperienced qualitative researcher, Ulin et al (Ulin et al. 2004:103) suggest some guidelines for constructing a topic guide. These include the following:

**Identify topics and subtopics:** The key topics are likely to easily be extracted from the original research questions. These can then be broken down into subtopics. The subtopics may be easier to address individually and allow for more in depth answers than a question which covers whole key topic.

**Decide on a sequence:** The topics and subtopics should be arranged in a manner which directs the natural flow of the conversation. This is not prescriptive, as the nature of semi-structured interviewing allows the participant to lead the flow of the conversation if they

wish to. The sequence also allows for potentially sensitive topics to be addressed last and avoid the risk of altering the rest of the answers.

**Prepare opening and closing statements:** The opening statement ensures that each participant is given the same information. It should provide information needed for informed consent. A closing statement marks the end of the interview and assures the participant of the confidentiality/anonymity of their data.

King et al (King and Horrocks 2010:37) suggest there are three main sources that can be drawn upon to identify topics. Firstly, the researchers own personal experience in the research area (both first hand and anecdotal stories). Secondly, consultation of the research literature on the subject. Finally, undertaking some preliminary work in the area (i.e. informal chats with people who have experience in the relevant area).

### **2.6.2.2 Interviewer considerations**

A successful interview is somewhat reliant on the skill and expertise of the researcher. To prepare the researcher for an interview, it is important that they are aware of the considerations discussed in this section.

According to Bryman (Bryman 2012:325), the qualification criteria of a successful interviewer are the following:

- Knowledgeable
- Structuring
- Clear
- Gentle
- Sensitive
- Open
- Steering
- Critical

- Remembering
- Interpreting
- Balanced
- Ethically sensitive

Robson (Robson 2002:233) discusses the use of closed questions, which force the participant to choose from two or more fixed alternatives, and open questions which provide no restrictions on the reply other than the subject. The flexibility and allowance for unanticipated issues to arise were thought to be preferable for the purpose of the interviews conducted in this thesis and therefore open ended questions were used where possible.

The researcher should always avoid leading questions which suggest to the interviewee the type of response anticipated. Complicated questions or the use of confusing language are unlikely to invite a clear and considered response. Asking multiple questions at once can lead to the interviewee only answering part of what is asked. The researcher should keep their language and reactions as neutral as possible. If the participant perceives the researcher to be judging their responses and make them either defensive, or give the answers which they think are desirable to the researcher.

Listening to the participants responses carefully and using probing techniques to investigate these further is important. Probes are used to encourage participants to elaborate on an answer. Examples of probes used in interviews are; a period of silence, repetition of the participants response, or encouraging the participant to continue (e.g. 'can you tell me more about that?') (King and Horrocks 2010).

The researcher should ensure that the participant feels at ease and therefore more likely to give open and honest answers. Methods of ensuring this include paying attention to body language (i.e. nail biting or other habits which may indicate that the researcher is

nervous or anxious themselves) and using language similar to that used by the target participant group.

### **2.6.2.3 Reflexivity Considerations**

Reflexivity is the way in which contextual details can influence the data (Richards and Emslie 2000). This section reflects on two issues relating to reflexivity: the interview setting and the researcher-participant interaction.

At the time of recruitment, pregnant women were invited to choose the location and time of the interview. This was to ensure they were comfortable and relaxed in their surroundings. All women choose their own home as the interview location. Health professionals were interviewed in private rooms at their place of work. This was mainly for reasons of time and convenience for the participant.

The way the researcher themselves is perceived by the participant was considered. Both groups were told that the researcher was not a health professional. Pregnant women were assured that there would be no judgement or opinions given on any of their answers. The social standing of the researcher and participant in relation to each other is a potential influence on the generation of data. The dress of the interviewer affects the way in which they are perceived by the participant. Harding (2013:35) suggests that smart dress may inhibit participants with a lower socio-economic status.

The researcher did not provide any other information about herself or reveal whether she was a mother or a smoker. She wore casual clothes and focussed on creating a relaxed, informal style of conversation.

### **2.6.3 Ethical Considerations**

Ethical approval was sought and gained from two ethics committees; the School of Nursing, Midwifery and Health Ethics and Research Committee at the University of Stirling and the East of Scotland Research Ethics Service REC 2 (see Appendices 1 and

2). These ethics committees required evidence that the issues discussed in this section had been thoroughly considered and addressed.

The University Ethics committee accepted the application for ethical approval with no changes necessary. After asking for clarification on several issues, the NHS Research Ethics Committee gave ethical permission under the provision that the GP of each pregnant woman interviewed was sent a letter informing them of their participation in the project. An additional requirement was that all participation information sheets notified participants that they would be reimbursed for any reasonable travel expenses.

### **2.6.3.1 Informed Consent**

According to the Department of Health 'Informed consent is at the heart of ethical research' (Department of Health 2005). A participant can give informed consent if they have a clear appreciation and understanding of the facts in order to form a reasoned decision. Any impairment to reasoning or judgment may make it impossible for informed consent to be given. The Royal College of Nursing (Gelling et al. 2011) states that participants can only give true informed consent when they are in possession of the following information:

- the purpose of the research
- how long their participation will last
- who is involved in the research
- the practicalities and procedures involved in participating
- the possible benefits and risks of participation and, when appropriate, the alternative therapies
- how data about them will be managed and used
- how long and where the data will be stored
- the purpose of the consent form
- what is expected of them if they agree to participate in the research

- how information will be provided to them throughout the research
- that their participation is voluntary
- that they can withdraw from the study at any time, without giving any reason and without compromising their future treatment
- the insurance indemnity arrangements for the conduct of the research where appropriate
- that the research has been approved by a research ethics committee.

This information is therefore included in all participant information sheets (see Appendices 9 to 12). Potential participants were given the information sheets to take home with them to ensure that they had adequate time to read all of the information before giving consent. On arrival at the interview, the researcher asked if the participant had read and understood the information sheets and if she had any questions regarding the interview.

### **2.6.3.2 Confidentiality and anonymity**

It is important not to conflate the concepts of confidentiality and anonymity. Confidentiality for clinicians is complete privacy. It must be pointed out to the participant what confidentiality means in the context of research (Pope et al. 2000), namely that verbatim quotes from the participant may be used when reporting the research. Any quotes used must be anonymised. In some cases, anonymity is not assured by simply concealing the name of the participant or assigning a pseudonym. In smaller participant groups, simple details such as job title may reveal the identity of the participant. This must be considered before making a commitment of anonymity to the participant.

Anonymity is not only important in published work, but also when a team of researchers is required to analyse data. The interviewer should ensure that identifying details are removed from transcripts or recordings before allowing the research team access to these.

### **2.6.3.3 Data security**

The University of Stirling's Code of Good Research Practice was used as a guide to protecting the data. The University of Stirling has adopted the Model Publication Scheme (MPS) for Scottish Higher Education Institutions (HEIs) which has been developed by Universities Scotland. The MPS was approved by the Scottish Information Commissioner on 25<sup>th</sup> March 2004.

The results of following this code of practice were as follows:

- Participant consent forms were stored in a locked filing cabinet within the NMAHP Research Unit, University of Stirling for the duration of the project. Thereafter, they were stored in a commercial off site data storage facility.
- Interviews were recorded on a digital audio recorder. They were transferred to a password protected computer and deleted immediately afterwards.
- The research team were allowed access to the anonymised interview transcripts. This was required in order to analyse interview data. Consent was sought for this level of access.
- Data were stored securely in the NMAHP Research Unit until completion of the project and publication of resulting report and publications.
- The data will be stored for a period of 10 years in accordance with the Code of Good Research Practice which states 'The safe and secure storage of the primary data will normally be for at least 10 years, and a safe and secure method of disposal must be used after this time, all in accordance with the requirements of the Data Protection Act.'. At the end of the 10 year period the data will be destroyed in a secure manner.

### **2.6.3.4 Discussing sensitive issues**

Although no major difficulties were anticipated in the interviews described in this thesis, it was possible that discussing smoking may increase a sense of anxiety in pregnant



women. As pregnancy is a time of increased anxiety, this was given significant consideration.

In study one, the aim was to clarify women's own pre-existing beliefs and understandings of smoking during pregnancy, and therefore no potentially distressing or worrying information was given to them. In study two, women were shown components of an intervention designed, in part, to inform them about the risks of smoking during pregnancy. In order to minimise the possibility of this raising anxiety, non-pregnant women from a similar social demographic, and health professionals were first consulted on the content of this intervention. Any components which were deemed unsuitable or unnecessarily worrying or stressful by these groups were removed. Only once acceptability with this group was established were pregnant women shown the intervention components.

If women raised concerns or declared increased anxiety during or after the interview, they were provided with a contact number and name of a midwife who had agreed to clarify issues and address problems. Additionally, women who had experienced complications in their pregnancy were excluded from the study.

#### **2.6.3.5 Safety of the researcher**

The physical safety and psychological well-being of the researcher involved in the data collection is important. The majority of interviews with pregnant women took place in the participant's home which was often located in a socially deprived area. Therefore a lone-worker policy was in place and was strictly adhered to by the researcher. The standard operating procedure within the NMAHP Research unit was the provision of a contact person with the address of the interview location. Prior to entering the location, the researcher contacted the contact person. The researcher then was required to phone the contact person immediately after leaving the interview location. If no communication

had been received from the researcher after one hour from the commencement of the interview, the safety protocol was as follows:

1. The contact person would phone the researcher
2. If the researcher was still with the participant, and in the event that the researcher had concerns for her, or the participants' safety, a code word (prearranged with the contact person) would be used, after which the police would be called by the contact person who would raise their concerns and inform the police of the researcher's location
3. If the contact person was unable to make contact with the researcher when they call, then the police would be contacted as above.
4. The researcher should stop any interview in which she has concerns for her safety and inform the contact person that she has done so immediately upon leaving the interview.

#### **2.6.4 Data analysis**

In qualitative research, analysis should be ongoing throughout the data collection process (Pope et al. 2000). The researcher is constantly reviewing and forming ideas which can shape the remaining data collection. It is an iterative and continuous process (Ritchie et al. 2003:ch9).

Depending on the purpose of the research, a purely descriptive, or an in-depth conceptual analysis can be carried out. A conceptual analysis was carried out on data collected in Chapter 6 of this thesis. The data were explored to provide an in-depth analysis, grouping and conceptualising themes from interviews, and building new concepts and theory through this method. In Chapter 8, a descriptive analysis is carried out to assess acceptability. Descriptive analysis draws meaning and conclusions from the data but its aim is not the creation of new ideas or theory.

Many methods of qualitative data analysis exist. This section provides an overview of some of the most widely used methods that were considered for analysing data in this thesis, and the advantages and disadvantages of each method.

**Thematic analysis** is a flexible method, using a system of coding and is best suited to large datasets. Thematic maps are developed to provide visual overviews of the data and themes are named and defined in an iterative process. It has limited interpretative or conceptual power beyond descriptive analysis. (Braun and Clarke 2006)

**Narrative analysis** can be conducted on data in which the researcher has constructed their data collection to gather narratives from participants (i.e. asking them to tell their story).

**Grounded theory** is a systematic method which seeks to develop theory through a set of interconnected stages and procedures (Glaser and Strauss 2009). It is primarily inductive and requires that the researcher does not have any pre-conceived ideas about what will be found within the data. Grounded theory is recommended for use where a subject has not previously been explored and therefore no, or little, theory exists (Stern 1980).

**Framework analysis** is a systematic, matrix based method which uses a thematic framework to classify and organise data according to key themes concepts and emergent categories (Ritchie et al. 2003). This is an established method used by many qualitative researchers and is increasing in popularity. Framework analysis provides highly structured outputs of data. It is recommended for analysing semi-structured interview transcripts where the participants are interviewed about specific subjects (i.e. not suitable for a heterogeneous dataset) and for working in a multi-disciplinary team (Gale et al. 2013).

Framework analysis was chosen to analyse all of the empirical data in this thesis. This was so that a systematic and rigorous method could be applied, with no obligation to

undertake a purely deductive or inductive approach. In line with the pragmatic approach to this thesis, framework analysis is not underpinned by a specific epistemological approach.

Ritchie and Spencer highlight the importance of giving a clear account of the analytical process (Ritchie et al. 2003) for the purposes of quality appraisal. Framework analysis provides a methodical and rigorous framework which has five interlinked phases (Furber 2010) which facilitate transparency during the data analysis process. The phases are: Data familiarisation, developing a theoretical framework, indexing, charting and synthesizing the data.

**Data familiarisation:** This first stage involves the researcher or research team immersing themselves in the data. This is likely to involve reading over the transcripts and field notes several times. This is especially important for researchers who were not involved in the data collection process.

**Developing a theoretical framework:** Notes made from the familiarisation process often identify recurring themes which appear in the data. These can then be collated into themes and sub-themes.

**Indexing:** The indexing phase uses the theoretical framework developed in the preceding phase. The themes are identified within the data and later grouped together. The theoretical framework can be refined as necessary during this phase.

**Charting:** Once indexing is complete, the data corresponding to the themes and sub-themes is placed into thematic charts. This allows the researchers to access all of the data from one theme together. This allows them to visualise the data as a whole.

**Mapping and interpretation:** In this final phase, the researcher uses the charts to make sense of the data. Typically, descriptive summaries are first written to clarify the data. Concepts and meanings can then be drawn out of these.

#### **2.6.4.1 Bias**

Qualitative data can be particularly vulnerable to bias, both in the data collection and data analysis stage. It is important that the research team keeps in mind all potential sources of bias and reduces the potential of any bias by using rigorous and explicit methods.

Rigour in qualitative research is vital to ensure validity and reliability. Reliability in research refers to whether the same results would be achieved if a study was to be repeated, but with different participants. Validity concerns the conclusions drawn from a study, and whether they are well-founded. There is a wealth of literature about rigour can be achieved in qualitative research (Barbour 2001, Seale and Silverman 1997, Mays and Pope 1995) but no set guidelines. In this thesis, methods of ensuring rigour include; using recognised and systematic approaches to collecting and analysing data; triangulation (discussed in Section 2.5.3); dual coders analysing data; and respondent validation (discussed in Section 2.6.2).

### **2.7 Chapter Summary**

This chapter has provided an outline of the entire thesis: The underlying methodological approach is explicated, rationale and methods for creating the research design are given, and considerations involving literature reviewing and empirical qualitative research are outlined. These were carefully chosen to incorporate the needs of the research and the comfort and safety of the participants.

Chapter 1 explored the smoking related behaviour of pregnant women and identified the sub-groups of those who were most likely to engage in risky behaviour. For the purpose of creating an intervention, the next stage of the thesis will explore the reasons behind this behaviour and how this information can be used to develop the intervention.

### **3 Chapter 3: A cross-study synthesis of qualitative and quantitative evidence of smoking cessation during pregnancy**

A meta-synthesis of qualitative studies of women's experiences of smoking and smoking cessation during pregnancy was planned for this chapter. While in the process of developing a search strategy for this review, it was discovered that a similar review had recently been completed (Graham et al. 2011). The authors of this review were contacted and we were able to obtain a copy pre-publication. This has allowed a different approach to be taken, with the intention of a more in-depth analysis of the barriers to, and facilitators of smoking cessation that are commonly experienced by pregnant women. We have also explored how essential elements of these have been used to inform the development of existing smoking cessation interventions for pregnant women and the resulting outcomes. There is no clear optimum or established method of identifying the theory most suitable for an intervention. In some cases, there is a literature review or possibly a consensus exercise among experts. In this chapter, a more detailed and exhaustive approach using past qualitative studies to identify a theory of what should work, and then past RCTs to test the theory is taken. This is by no means the only effective method available for reviewing the literature, but it is one which was chosen because it may be possible to extract more detailed conceptual information than more common approaches.

England's 2011 tobacco control plan suggests that interventions should take into account of social experiences and circumstances which act as barriers and facilitators to smoking cessation. However, systematic reviews of interventions do not typically investigate whether this has been addressed. The purpose of this review was to extract this information from individual trials included in the Cochrane review of interventions to promote smoking cessation during pregnancy. Should a link be established between

the success of an intervention and its components which address the barriers and facilitators to smoking cessation in pregnancy found in a systematic review of qualitative studies of women's experiences of smoking and smoking cessation during pregnancy, this can be used to inform the developments of future interventions.

### **3.1 Background**

Randomised controlled trials (Lumley et al. 2009) indicate that interventions to promote smoking cessation during pregnancy can improve cessation rates. However, as discussed in Chapter 1, success rates are low and there is a need to look at methods of optimising intervention effectiveness. Existing interventions may not be designed to take into account the typical characteristics of a pregnant smoker and the barriers and facilitators to cessation that she faces. The effectiveness of interventions could be increased by applying theory which counteracts these factors.

Integrating qualitative and quantitative data can identify new ways to improve the development of interventions. However, as a relatively new method of synthesizing data, there are no set guidelines for this.

### **3.2 Research questions and aims**

The aim of this study is use rigorous and explicit methods to provide the answer to the research questions. Stage one of the study answers the question; 'what are the essential elements required in a successful intervention to promote smoking cessation in pregnant women?' Stage two answers; 'to what extent do interventions for promoting smoking cessation during pregnancy contain components that consider the barriers and facilitators to smoking cessation experienced by pregnant smokers?'

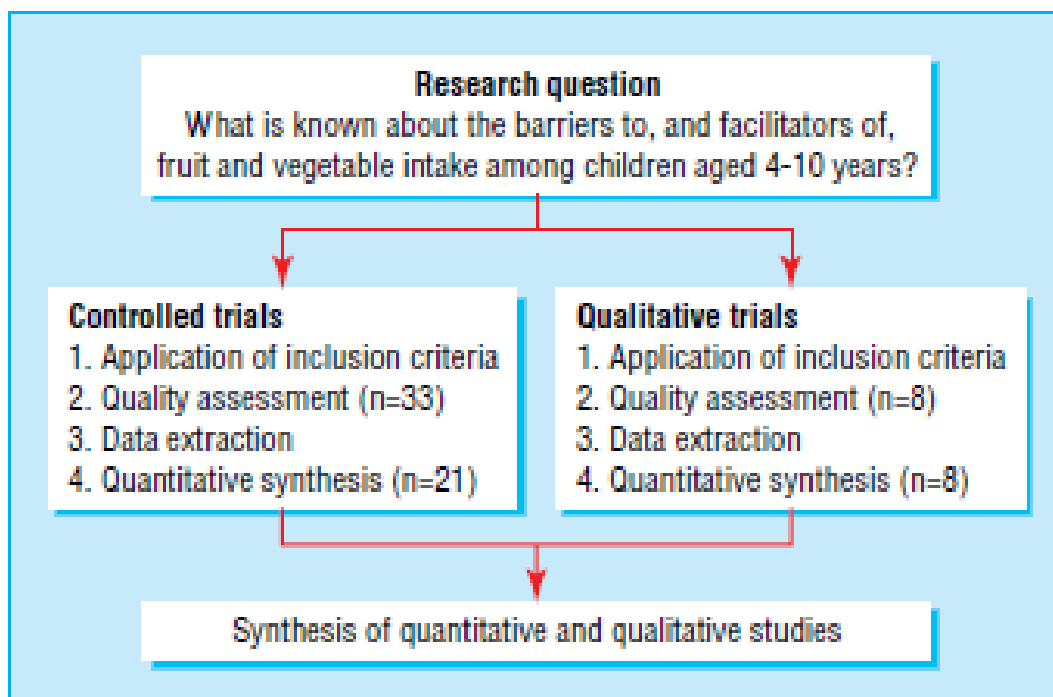
### **3.3 Rationale**

As a relatively novel method of reviewing evidence, it is important to outline why the methods were chosen in terms of their suitability for the research questions and provide

examples of how they have been effective in comparable studies. The specific methods used in this study and how we have refined the review process are also outlined.

In a review of possible methods of synthesizing qualitative and quantitative evidence, Dixon-Woods et al (Dixon-Woods et al. 2005) identify that, in order to understand barriers, policy makers need to draw on qualitative methods as well as quantitative methods. However, the review does not identify a technique suitable for such a purpose.

Creating a novel approach to combining qualitative and quantitative data, Thomas and Harden (2004) provide a worked example of a review to combine qualitative and quantitative evidence. An overview of their review process is illustrated in Figure 8. They present their method and recommend that more work is needed to develop this.



**Figure 8: Methodology for a synthesis of quantitative and qualitative studies (Thomas and Harden 2004)**

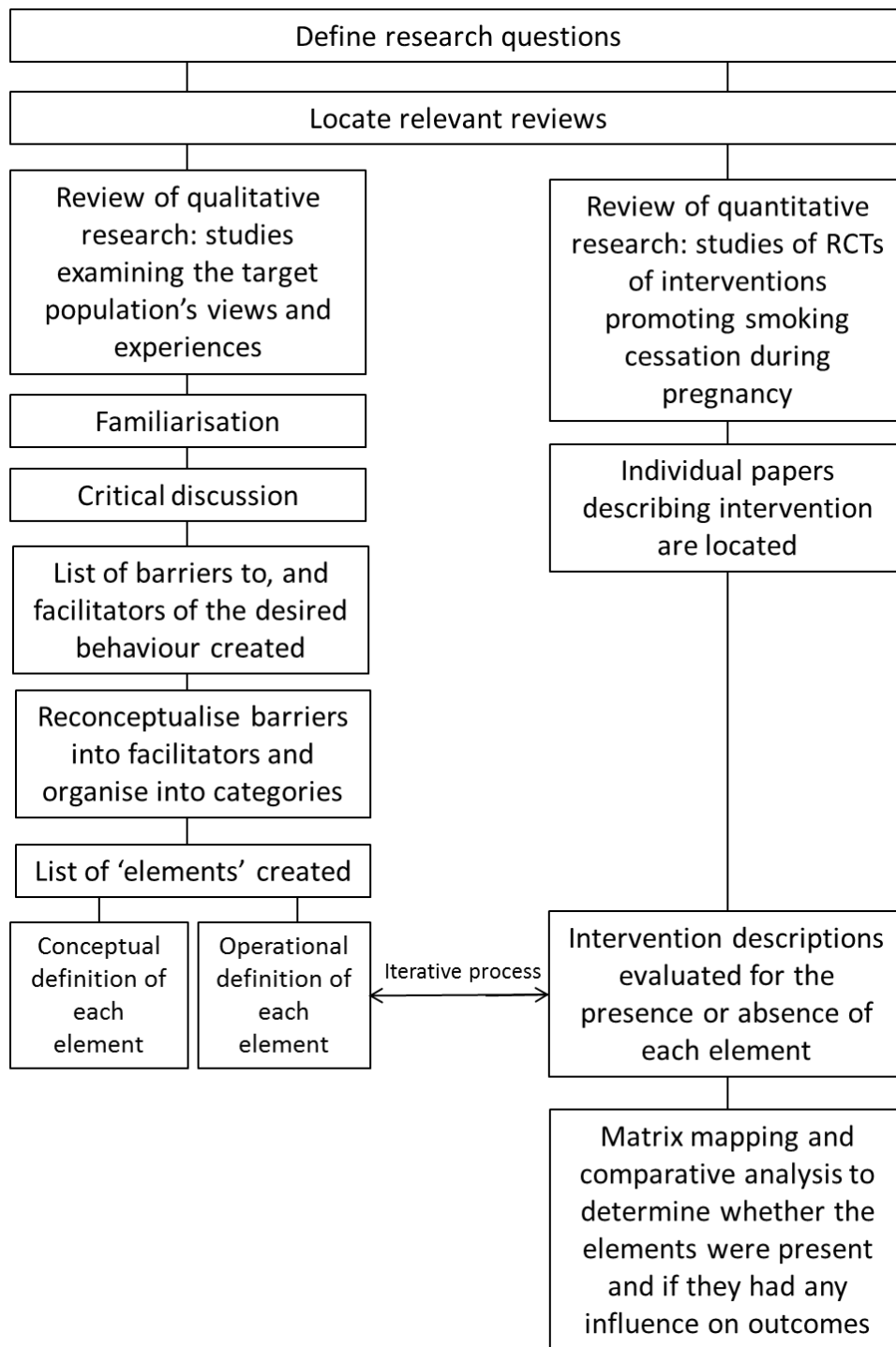
The methods described in this chapter are guided by a 'cross-study synthesis' carried out by Ring et al (Ring et al. 2012) who drew upon the principles of Thomas and Harden. They carried out a review, termed a 'cross-study synthesis' which combined evidence from randomised controlled trials and qualitative studies to provide an evidence base for



asthma action plan interventions. They firstly proposed a theoretical model of action plan implementation. This was developed by drawing out a list of 'elements' which could promote the use of asthma action plans. Secondly, they re-analysed RCTs of asthma action plans to assess the effect of the presence of each of these element on the intervention.

### **3.4 Methods**

Similar to the approach used by Ring et al (2012), we used a two-stage data extraction process. Stage one involved the critical examination of a systematic review of qualitative research and the extraction of themes. In stage two, we used these themes in a secondary analysis of RCTs of interventions. The two papers are described in detail in this section and the methods by which they were analysed are outlined. Figure 9 provides an overview of the review process.



**Figure 9: Schematic representation of the approach taken to the cross-study synthesis**

### **3.4.1 Overview of Paper One (Qualitative Review)**

Paper one (Graham et al. 2011) 'Using qualitative research to inform interventions to reduce smoking in pregnancy in England: a systematic review of qualitative studies.' located 24 relevant studies which cover the experiences of over 600 pregnant women in high-income countries. The aim of the review was to provide evidence on how women's circumstances and experiences influence their smoking and smoking cessation behaviour during pregnancy. Evidence was also synthesized to provide a more comprehensive understanding. A good continuity in attitudes and experiences across time and location was found, supporting the reliability of the results.

### **3.4.2 Overview of Paper Two (Quantitative Review)**

Paper two is a Cochrane review of interventions for promoting smoking cessation during pregnancy (Lumley et al. 2009). 72 trials are included. 56 randomised controlled trials (over 20,000 pregnant women) and nine cluster-randomised trials (over 5000 pregnant women) provided data on smoking cessation outcomes. Studies are mainly from high income countries

Smoking cessation interventions included in the review reduced smoking by late pregnancy by approximately 6% with significant heterogeneity between studies.

Interventions fitted into six broad categories:

- Cognitive behavioural therapy, educational and motivational interviewing strategies (using a range of media)
- Interventions based on stages of change
- Feedback of fetal health status or measurement of by-products of tobacco smoking to the mother.
- Provision of rewards and incentives for smoking cessation
- Provision of pharmacotherapies
- Other strategies, including hypnosis

This review does not provide an exploration of the social dimensions of smoking during pregnancy, this is an issue that Graham et al highlight in paper one as a common problem of systematic reviews of interventions to reduce smoking during pregnancy.

### **3.5 Stage One: Extracting elements from qualitative research**

#### **3.5.1 Aim**

The overall aim of stage one was to identify elements from qualitative research which are likely to be important in successfully promoting smoking cessation during pregnancy. It was essential that these elements were explicitly described in the qualitative research and inductively derived. Care was taken to conceptualise how these elements would be possible in practice.

#### **3.5.2 Methods**

A multi-disciplinary team of three researchers, Professor Brian Williams, Professor Helen Cheyne and Mary Steele carried out the review.

Two researchers (HC and MS) independently and critically examined paper one in order to identify barriers and facilitators to smoking during pregnancy which were either explicitly mentioned by women, or were implied. The themes highlighted were then compared and discussed by the whole research team until a consensus was reached. Table 5 shows the papers included in paper one, and outlines the number of participants included in each study and the method of data collection used

The list of elements was derived inductively through discussion and mapping out barriers and facilitators (Table 6) After several refinements, a consensus was reached when researchers were confident that the key components of the qualitative research had been brought together in a systematic and practical way, and that the real-world application of each element would be feasible to include within an intervention.

**Table 5: Included papers, methods and number of participants**

Study	Number of participants	Method of data collection
(Abrahamsson et al. 2005)	17	Open ended interviews following an interview guide.
(Arborelius and Nyberg 1997)	13	Individual interviews carried out by midwives.
(Bottorff et al. 2006)	28	Open ended individual interviews in person or via telephone.
(Bull et al. 2007)	38	Semi-structured face-to-face interviews.
(Cottrell et al. 2007)	50	Individual open-ended interviews with women and partners.
(Dunn et al. 1998)	57	9 focus groups
(Edwards and Sims-Jones 1998)	21	Individual face-to-face interviews
(Graham 1976)	50	Face-to-face interviews
(Greaves et al. 2007)	Three couples	Secondary analysis of open ended interviews with women and partners (separately).
(Haslam and Draper 2001)	40	Face to face interviews with women and partners
(Haugland et al. 1996)	33	Face to face interviews (7 women interviewed with partners)

### 3.5.3 Results

Firstly, the process of defining the elements is described. Then each element is described with more detail regarding the qualitative evidence which was extracted for the specific element.

#### 3.5.3.1 Barriers to, and facilitators of, smoking cessation during pregnancy

After the critical examination and following a lengthy discussion, the research team agreed on a list of barriers to, and facilitators of, smoking cessation during pregnancy.

The list is illustrated in Table 6.

**Table 6: The barriers to, and facilitators of, smoking cessation during pregnancy**

Barriers	Facilitators	Barrier and/or Facilitator
A distrust of scientific evidence	A personal and engaged approach by health professionals to smoking cessation advice.	Social disapproval leading to feelings of guilt.
A perceived lack of priority by health professionals	Consistent smoking advice from health professionals.	The role of the partner – the wider dynamics of the couple’s relationship.
Maintaining supportive social relationships while avoiding a smoking situation.	Imagining the baby in the womb. i.e. making the baby feel more real and concrete	
Personal circumstances which can worsen during pregnancy and act as a trigger to smoking.	Concrete suggestions and advice on how to quit.	
Using smoking as a coping strategy for stressful situations	Encouragement from partner and friends.	
A reliance on personal experience, e.g. having a friend who smoked throughout pregnancy and had a healthy baby.	Pregnancy as an extra motivator to quit.	
Quitting for pregnancy only.	A general awareness of the risk to the unborn baby.	
Cutting down as an alternative to quitting	Visualising the baby to increase motivation.	
Believing their own levels of smoking were not high risk		

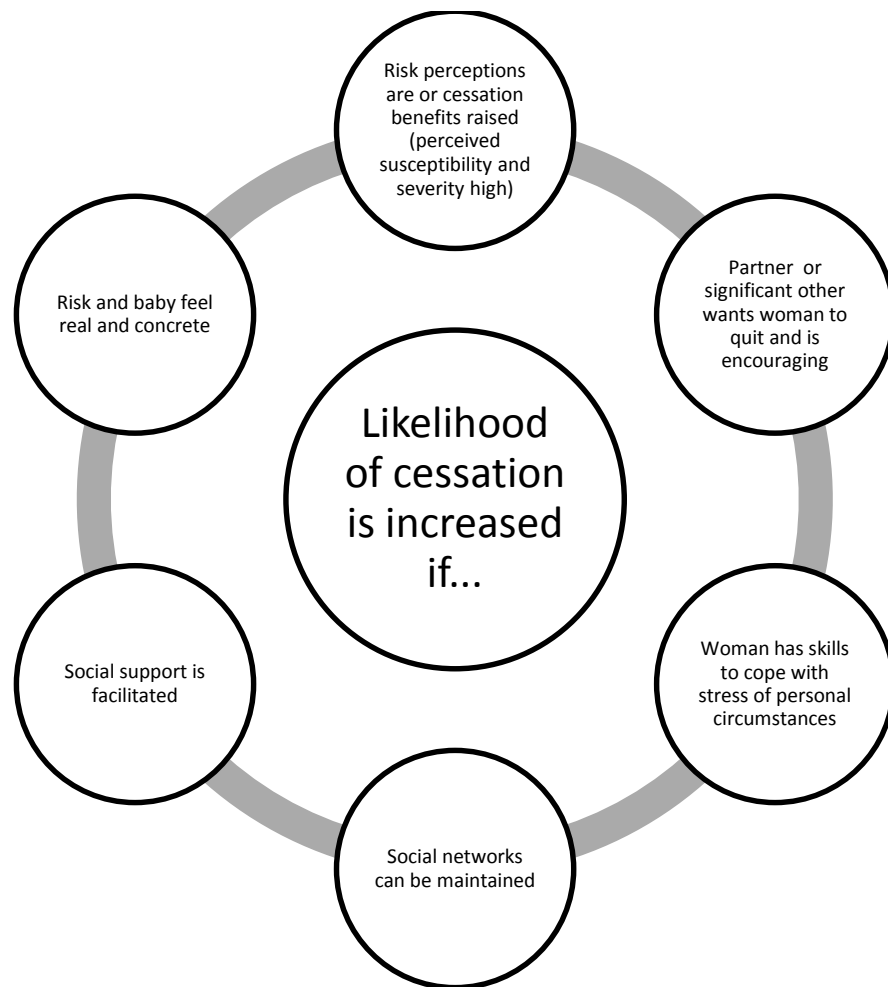
The purpose of the study was to extract elements which would be feasible to deliver within an intervention. For this reason, we re-conceptualised barriers into facilitators resulting in the following set of circumstances under which it is likely that cessation could be achieved:

If a woman

- Has a partner who is supportive
- Is in contact with health professionals who are supportive and emphasise the importance of quitting by delivering consistent, frequent and encouraging advice.  
(both pre-natal and antenatal)
- Receives accurate information
- Personal barriers are addressed
- External social support is available
- Avoid alienation from non-supportive social groups
- Can avoid smoking environments.
- Can cope with stressors without smoking
- Risk perceptions are high and real.
- Feels that the baby is real.

Then cessation is likely to be achieved.

These sets of circumstances were then further grouped and categorised into six elements. We hypothesise that an intervention which contains all of these components would give women the optimum amount of motivation and support required for her to quit smoking.



**Figure 10: A schematic representation of the 'elements' which increase the likelihood of smoking during pregnancy**

Each element is described below. First the content of the review which lead to the conceptualisation of the element is outlined, then the element is defined, and finally, examples of how the element might appear within an intervention are provided.

**3.5.3.2 Element 1: Partner motivation**

Paper one demonstrates that the partner or significant other of the pregnant women has a significant influence on her smoking status. Graham et al describe the influence as partly direct, through the smoking behaviour of the partner, and partly indirect, through the dynamics of the relationship.

The strongest finding to emerge from the review was that, if women had a partner who smoked, they reported this making it more difficult for them to quit themselves.



“The fact that my partner smokes doesn’t make it very easy at all. It’s hard being around people who smoke when you are trying to stop and that’s usually the downfall.” (Hotham et al 2002)

Women did report that partners were more receptive to providing a smoke-free environment because of their pregnancy. However, although willing to change their behaviour, many partners did not sustain this long term.

‘I think for the first wee while, he’d be great, he wouldn’t smoke around me... but eventually after two weeks that was him back to smoking around me.’  
(Thompson et al 2004)

Irrespective of the partner’s smoking status, a supportive relationship lead to easier smoking cessation for the women. Helpful behaviour included; persuading the woman not to have a cigarette; and a reinforcing or encouraging attitude.

Negative or coercive behaviour from partners was disliked by women. They reported instances of partners using controlling and intimidating tactics while continuing to smoke themselves.

**Element Definition:** Any element of the intervention which seeks to increase the partner’s or significant other’s desire for the smoker to quit.

**Examples:**

- Information given to the partner about the risks of smoking during pregnancy.
- Involving the partner in the intervention
- Explaining to the woman the importance of partner support and providing examples of how she can persuade her partner.

### **3.5.3.3 Element 2: Facilitating social support**

Influence of friends, family and in particular the woman's partner was shown to be important especially when these significant others smoke (as discussed above).

"It's always been something I have, and it's gonna be hard. You know cause my family smokes, my friends smoke... everyone's smoking... It's gonna be a challenge" (Nichter et al 2007)

Some women reported that asking others for assistance with quitting smoking became easier during pregnancy.

"I told some of the women in my office, "Look I don't want to be like a reformed bitch of smoking, but the smoke is just making me sick." They were pretty understanding about it and they stepped away from the door so I didn't have to smell it." (Nichter et al 2007)

Even when the woman's social support group are motivated to *want* her to quit, the way in which they provide their support is important. Women reported 'nagging' or disapproving behaviour as unhelpful.

"I didn't smoke around my family only because if I did that, you know, the wagging finger, and you shouldn't smoke, you have a baby. And it's hard enough dealing with trying to quit." Edwards

Sources of outside support were seen to be helpful.

"It was very useful because... I was getting these calls on a regular basis... not that they knew who I was.. but just that somebody else was interested." Nichter 2007

This element is, in part, related to element 1. Element 1 deals with motivating the partner to *want* the woman to quit. Element 2 is showing the partner (and others) *how* to effectively provide support.

**Element Definition:** Any element of the intervention which seeks to increase ability of significant others or social groups to provide effective support for the potential quitter.

**Examples:**

- Encouraging existing friends or significant others to provide support and encouragement for cessation
- Introduction of new people to the social circle (e.g. intervention delivered in peer group setting or 'buddy' systems)

**3.5.3.4 Element 3: Raising risk perceptions or cessation benefits**

Graham et al highlight a number of reasons why women's risk perceptions of smoking during pregnancy are low. One is that women simply do not trust the scientific evidence.

"No, if it did [cause low birth weight] I'd stop, wouldn't I?... I know people who have low birth weight babies and don't smoke, and people that smoke like a trooper and have 8 lb babies. All of our bodies are individual." (Oakley 1989)

Women's personal experiences were also important. Those who personally knew other women who had smoked during pregnancy drew their own conclusions from these experiences.

"A friend of ours has a son but he has a very, very bad speech impairment... his mom smoked during her pregnancy." (Kennison 2004/2009)

Other women seem to have visualised the reasons why the cigarette smoke might not harm the baby. These visualisations could be harmful if not correct.

"I thought that [smoking while pregnant] won't hurt the baby, the baby's in a sack."  
(Kennison 2004/2009)

“In the first six months of pregnancy the cigarette smoke does not affect the baby as much as the last three months and especially the last month where the lungs are actually drying, not drying out but attempting to mature.” Kennison

Advice from health professionals that women had been in contact with seemed to vary. Some women took perceived indifference or lack of pressure from health professionals to quick as a sign that the health professional did not think that quitting smoking was important. In reality, (see evidence in Section 6.7.1.) it is more likely that health professionals did not want to harm their relationship with the woman by appearing to ‘nag’.

“She [the midwife] actually said it was my decision and she said ‘I don’t want to preach to you, but here’s the leaflets and you can read them at your leisure.’ ... it might have been better if she’d been a bit more forceful with me.” (Haslam and Draper 2001)

Those women who did receive consistent and sustained advice from health professionals found it helpful.

“He’s been my doctor for a long time and he was on me every day. “Stop now you’re stopped, don’t start back.” He always encouraged me, “Don’t start back, don’t start back.”” (Kennison 2004/2009)

The above examples highlight that women need accurate and consistent advice and information. It is, however, important to recognise that raising risk perceptions may increase feelings of guilt in women who continue to smoke because this may be a barrier to quitting.

“I don’t want to hurt my child. But I haven’t quit smoking and I have such a bad conscience because I am hurting my poor child.” (Abrahamsson et al 2005)

A method of reducing this guilt is to focus on the benefits of cessation, rather than the risks of smoking.

**Element Definition:** Any element of the intervention which seeks to increase smoker's beliefs regarding the severity of, and susceptibility to, adverse outcomes from continued smoking during pregnancy.

**Examples:**

- Consistent advice from health professionals
- Health professionals demonstrating that smoking cessation is a priority
- Information about the risks of smoking during pregnancy

**3.5.3.5 Element 4: Concreteness of risk**

Graham et al found that the central motivation for those mothers who had quit for pregnancy was the health of the unborn baby.

'I felt I just had to quit for her, you know, and myself while I was pregnant, and it wasn't good for the baby so I quit.' (Kennison 2004/2009)

Women who quit showed a stronger belief that smoking would have a strong negative impact on the health of the baby.

'It [reason for stopping smoking] was mostly guilt and fear that something would happen to my baby.' (Edward and Sims-Jones 1998)

Interestingly, some mothers reported that motivation was increased with the anticipation of their own bodily changes.

'I couldn't imagine myself having a big stomach that everyone could see and smoking at the same time.' (Abrahamsson et al 2005)

Women reported that concrete evidence of the existence of the fetus, such as the ultrasound, hearing a heartbeat or feeling a kick, made their motivation to quit stronger.

‘Oh and the baby will kick when I’m smoking, it almost makes me cry because it’s just like, I shouldn’t.’ (Lendahls et al 2002)

One woman reported that imagining the baby smoking the cigarette helped her to remain abstinent.

‘When I was pregnant with him something I would do for myself sometimes would be like, okay every time you take a puff of that cigarette you just think that your baby is smoking it.’ (Kennison 2004/2009)

This evidence demonstrates that women are helped to quit or remain abstinent by feeling that the baby is real and concrete. This can either be through evidence that this is the case (e.g. Images, their own body changing, feelings or sound) or using their own imagination to create this feeling. Additionally, if the risk of harm to the baby feels strong and concrete then motivation to not smoke increases.

**Element Definition:** Any element of the intervention which seeks to increase the feeling that the baby and/or the risk to the baby is real rather than abstract.

**Examples:**

- Personalised feedback about medical results e.g. ultrasound scan, CO breath test
- Encouraging the woman to imagine her future baby
- Using images

**3.5.3.6 Element 5: Coping skills/stress management**

Women’s reasons for continued smoking included stress management, relaxation, managing frustration and relieving boredom.

“If I’m stressed out, it calms me down; it gives me a minute to think, especially at work. We get stressed, we step out to take, you know, smoke a cigarette and I’ll calm down.” (Cotrell et al 2007)

“I need to smoke less, but I know I get irritable myself if I’ve gone five hours without a cig – I can find myself getting more and more annoyed with the kids until I have a cig to calm down.” (Maclaine and Clark 1991)

In some cases, these reasons are compounded by pregnancy, therefore making it a time that they are likely to smoke more than ever.

“It’s boredom that causes it [smoking] now, with being used to working long hours I find myself getting up and nine in the morning and wandering around the house thinking ‘what can I do now?’” (Haslam and Draper 2001)

“We lived together, but he still didn’t want the baby. The situation was difficult and I smoked more then than I usually do.” (Abrahamsson et al 2005)

Element 5 deals with helping women achieve the perceived positive effects of smoking, such as relaxation or ‘getting a minute to themselves’ in other ways. It also includes anything that helps women deal with the stressors in their lives in ways other than smoking.

**Element Definition:** Any element of the intervention which seeks to increase women’s belief and/or actual ability to cope with stressful/trigger events stemming from personal circumstances and pressures while attempting to quit and maintain cessation.

**Examples:**

- Skills building
- Recognising cues and triggers to relapse
- Stress management techniques

### **3.5.3.7 Element 6: Maintaining social networks**

Element 2 involves encouraging and guiding significant people in the woman's social network on how to be supportive. However, it is important to acknowledge that there may be some people in the social group who will not provide this and will engage in behaviour which will make it difficult for the woman to maintain cessation. Element 6 deals with giving the woman the skills to deal with these situations and still retain a social group.

When women's friends and family smoked around them, it triggered their own cravings to smoke. Some women dealt with this by avoiding those people. However, this often lead to feelings of isolation.

“Basically, I would smoke if I was out with my friends... uh some of the friends I used to go smoke with you know I don't really talk to them as much, the people that I used to go outside and smoke with. So I miss that part...” (Cottrell et al. 2007)

Some women who had quit recognised, and were resigned to, the fact that they would not receive help from other people who smoke.

“Families won't support you (to quit) because they too busy smoking themselves. They encourage your smoking even more.” (Wood et al 2008)

As highlighted in the first two elements, the support of family and friends appears to be a very strong influence on whether or not a women will quit. It is therefore important to have a contingency plan for where this is not possible.

**Element Definition:** Any element of the intervention which seeks to increase women's beliefs and/or ability to maintain/retain friendships and social networks with others who may continue to smoke.

**Examples:**



- Maintaining existing friendships and support networks
- Providing examples of how to spend time with people who smoke without triggering a relapse.

Table 7 demonstrates how each of the elements maps on to the set of circumstances under which cessation is likely to be achieved.

**Table 7: The elements mapped onto a set of circumstances under which cessation is more likely to be achieved.**

<b>Element</b>	<b>Set of circumstances</b>
Partner motivation	<ul style="list-style-type: none"> <li>• Has a partner who is supportive</li> </ul>
Facilitating social support	<ul style="list-style-type: none"> <li>• External social support is available</li> </ul>
Raising risk perceptions and/or cessation benefits	<ul style="list-style-type: none"> <li>• Risk perceptions are high and real.</li> <li>• Receives accurate information</li> <li>• Is in contact with health professionals who are supportive and emphasise the importance of quitting by delivering consistent, frequent and encouraging advice. (both pre-natal and antenatal)</li> </ul>
Concreteness of the baby and/or the risk	<ul style="list-style-type: none"> <li>• Feels that the baby is real.</li> <li>• Risk perceptions are high and real.</li> </ul>
Coping skills and/or stress management	<ul style="list-style-type: none"> <li>• Can cope with stressors without smoking</li> <li>• Personal barriers are addressed</li> </ul>
Maintaining social networks	<ul style="list-style-type: none"> <li>• Can avoid smoking environments.</li> <li>• Avoid alienation from non-supportive social groups</li> </ul>

## **3.6 Stage Two: Assessing the presence or absence of the elements in past RCTs of interventions.**

### **3.6.1 Aim**

In stage two, the theory generated in stage one is tested. The elements developed in stage one of this cross study synthesis were inductively derived from qualitative evidence. The aim of stage two is to re-analyse papers describing RCTs of interventions to promote smoking cessation during pregnancy to determine whether or not each of the elements is present or absent. If this can be established, we then aim to determine the effect of the elements on the outcome of the RCTs.

The specific research questions we aimed to answer in this stage were:

Can we identify the presence or absence of the elements in trials of smoking cessation interventions?

Does the presence or absence of the elements affect the outcome of the interventions?

### **3.6.2 Methods**

This section describes the methods by which the RCTs included in this review were identified and the data were extracted and analysed.

#### **3.6.2.1 Inclusion and exclusion criteria**

All papers which met the inclusion criteria for paper two were located and considered for inclusion in the study. Two extra exclusion criteria were applied. *Studies which did not biochemically verify the smoking status of participants* were excluded. There were two reasons for this. Firstly, these studies were judged to have a high risk of bias. Secondly, the collection of the biochemical verification itself through breath tests or saliva samples had the potential to motivate women to quit. *Studies completed before 1990* were also excluded in order to ensure that the time period covered by these studies was the same

as that of qualitative studies included in paper one. See Appendix 16 for a list of excluded interventions. Additionally, it was not possible to locate a small number of the papers.

### **3.6.2.2 Data extraction**

The research team held several reviewing sessions. In these, the intervention descriptions as reported in each of the included RCTs was re-examined to determine whether or not they contained the key elements identified in stage 1. Deliberations were held over whether or not a rating scale of 'strongly present' to 'not present' could be employed (see Appendix 14 for original implementation plan). After a number of test ratings, it was decided that this would not be possible given the level of description provided.

It was also decided that controls would be analysed using the same method as the intervention arm. This adds more accuracy to the analysis, and adds to the methods described by Ring et al (2012).

At this point, some refining of the element descriptions and examples was undertaken. The elements were piloted on several intervention descriptions. This was an iterative process that involved discussion from all three researchers.

To ensure rigour, a system of dual coders was used. The researchers critically examined the intervention descriptions in groups of 5. This was organised so that each intervention description would be read by two researchers within a short timeframe. An excel spreadsheet (see Appendix 15) was used to record ratings. Where the interpretation of the data differed, a discussion was held with the third reviewer acting as mediator as necessary until a unanimous decision was made.

Once consensus was reached on the presence or absence of each of the elements on all of the included papers, the results were analysed to establish whether the presence or absence of the elements was associated with the successful implementation of the trial.

In an attempt to further strengthen the accuracy of our ratings, all living authors were contacted by email to invite them to rate their own intervention using an online survey. Although response rates were low, 7 authors responded (Table 8). All authors rated their intervention higher than our rating, confirming the likelihood of false negatives (and the true positives). However, the average difference was only 1.6 elements higher than our researcher’s ratings.

**Table 8: Authors own ratings of their intervention and the difference between the original score**

Author	Rating	Reviewer’s ratings	Difference
Cope	4	3	1
Dornelas	3	1	2
Hegaard	5	2	3
Panjari	3	3	0
Pollack	3	2	1
Tappin	2	1	1
Aveyard	5,5	4,1	1, 4
		Average	1.6

### **3.6.2.3 Analysis**

We determined that it would not be possible to achieve a meaningful statistical analysis given the quality of data arising from the papers and the heterogeneity in recorded outcome measures in paper 2. These limitations are further described later in this chapter.

Once each RCT included in the study had been examined to determine the presence or absence of each of the six elements, the findings were mapped onto a matrix. Previous reviews (Ring et al. 2012, Campbell et al. 2011, Harden et al. 2004) have successfully used this method to synthesise qualitative data. This matrix mapping allowed us to view the whole dataset, and detect any emerging patterns and identify outliers. It facilitated comparative analysis of intervention outcome and element presence.

19 different outcome measures are reported in paper two which made any meaningful analysis difficult. Outcome measures which were reported in 10 or more of our included interventions were selected. To identify any patterns emerging relating to the relationship between the presence of elements and outcomes, we only used studies in our analysis which reported one of these four outcomes. This was a total of 44 studies. We have focussed primarily on outcome 1, as it is considerably more frequently reported than the other outcome measures.

**Table 9: Outcome measures reported by 10 or more included interventions.**

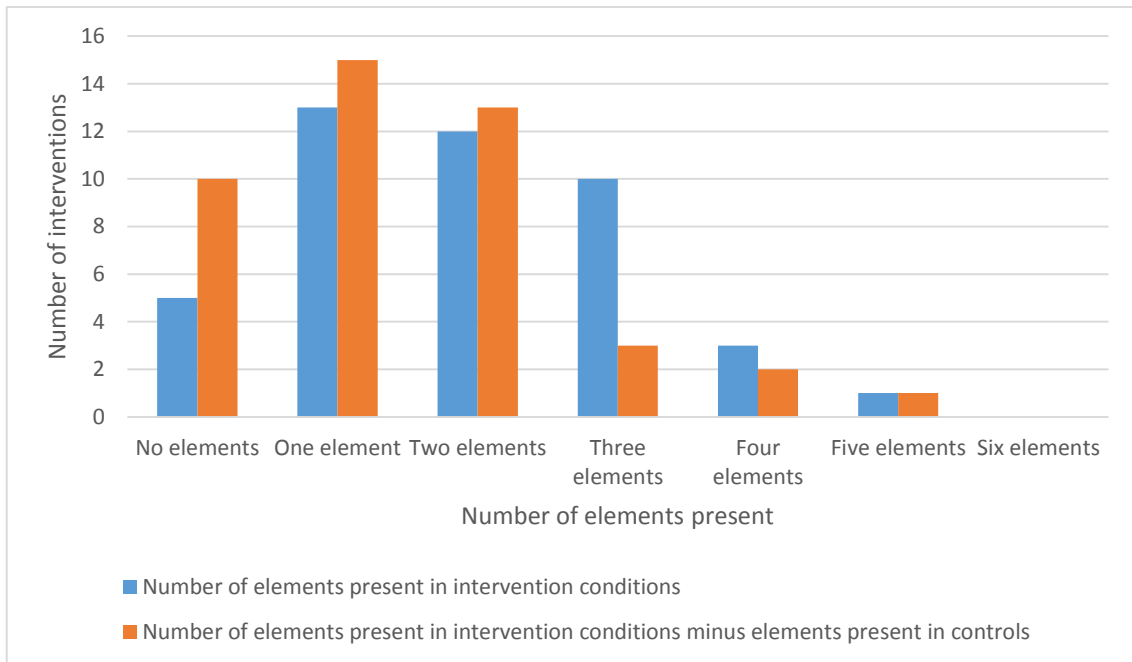
	<b>Outcome Measure</b>	<b>Number of included studies which report this outcome measure.</b>
Outcome 1	Continued smoking in late pregnancy	44
Outcome 2	Mean birth weight	14
Outcome 3	Low birth weight (under 2500g)	11
Outcome 4	Maintained smoking cessation at 1-5 months postpartum	17

### 3.6.3 Results

The results presented in this section are the interpretation of the data using matrix mapping, alongside a descriptive narrative of the findings.

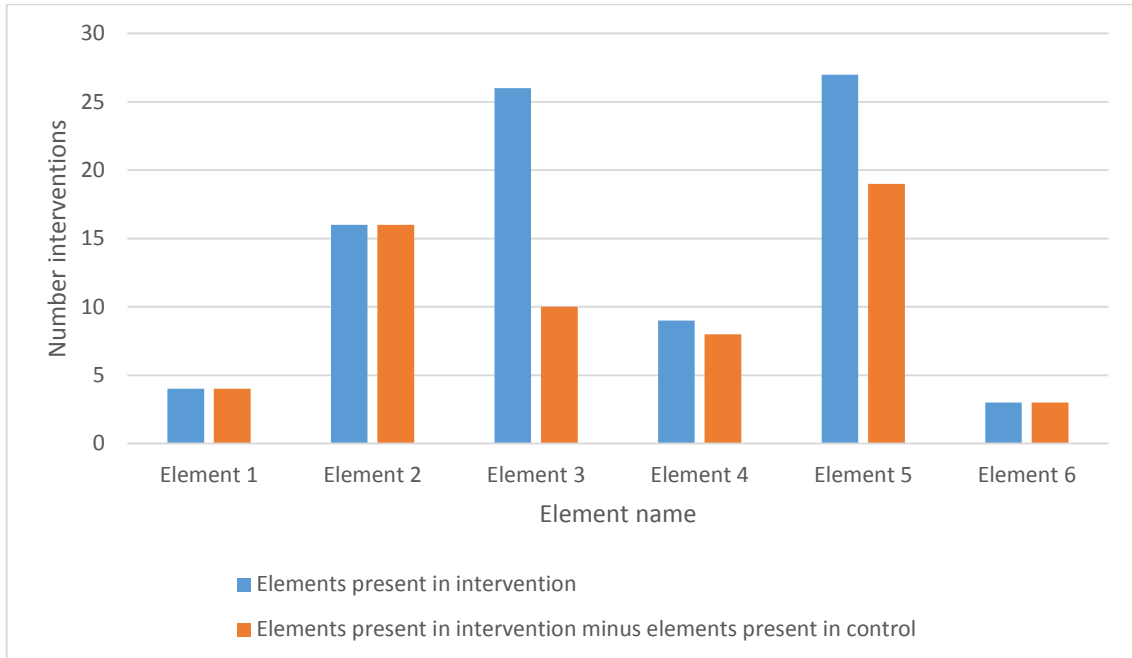
#### 3.6.3.1 Presence of elements in RCTs of interventions

The presence of elements within interventions is illustrated in Figures 11 and 12.



**Figure 11: Number of elements present within interventions**

Figure 11 demonstrates the number of elements present within interventions. None of the interventions contained all six elements. Only one intervention (Hajek et al. 2001) contained five elements. Most interventions contained under three elements.



**Figure 12: A graph demonstrating the frequency of each individual element within intervention descriptions**

Figure 12 illustrates the occurrence of the individual elements within interventions. Elements 3 and 5 each occur in over 20 interventions. When elements present in controls are subtracted, the presence of element 3 is reduced to less than half.

The less frequently occurring elements (1, 2, 4 and 6) were not common in controls.

### **3.6.3.2 Relationship between number of elements and outcome measures**

Table 10 shows the results of each of the four outcome measures (where reported) for all included studies. Those trials with a result in favour of the intervention condition are highlighted in green. Those with a no effect result, result in favour of the control or with a confidence interval indicating that this may be possible are in orange. This was ordered by number of elements to facilitate the detection of emerging patterns.

**Table 10: Included studies and outcomes ordered by number of elements**

Paper	Outcome 1* (Risk Ratio M-H, Random, 95% CI)	Outcome 2** (Mean Difference IV, Random, 95% CI)	Outcome 3*** (Risk Ratio M-H, Random, 95% CI)	Outcome 4**** (Risk Ratio M-H, Random 95% CI)	Total elements [minus control]
Campbell 2006	0.95[0.87, 1.08]				0
Heil 2008	0.66[0.50,0.88]	253.00 [-3.67, 509.67]	0.43[0.12,1.49]	9.73[1.29,73.13]	0
Higgins 2004	0.69[0.51,0.94]			16.26[1.00,263.78]	0
Hotham 2005	0.85[0.70,1.05]				0
Kapur 2001	0.78[0.58,1.03]				0
Lowe 1998b	0.91[0.82,1.01]				0
Petersen 1992	1.04[0.87,1.24]			1.02[0.75,1.38]	0
Stotts 2002	1.03[0.87,1.22]			0.98[0.50,1.92]	0
Tappin 2000	1[0.92,1.09]	-66.00[-256.01,133.01]			0
Wisborg 2000	0.97[0.87,1.08]	186.00[62.04,309.96]	0.37[0.12,1.13]	1.19[0.66,2.11]	0
Albrecht 1998	0.97[0.83, 1.14]				1
Cinciripini 2000	1.06[0.92,1.23]			0.63[0.11,3.60]	1
Dornelas 2006	0.79[0.66,0.96]				1
Gielen 1997	0.99[0.94,1.04]				1
Hartmann 1996	0.90[0.79,1.02]				1
Hegaard 2003	0.95[0.92,0.98]	-32.00[-109.06,45.06]	1.17[0.51,2.68]		1
Hjalmarson 1991	0.95[0.90,0.99]	71.00[-7.16,149.16]	0.60[0.28,1.29]	1.73[1.07,2.80]	1
Lowe 1998a	1[0.96,1.04]				1
Malchodi 2003	0.97[0.81,1.16]	28.00[-152.48,208.48]	1.00[0.33,2.99]		1
Moore 2002	1.03[0.97,1.09]				1



Secker-Walker 1994	0.98[0.92,1.05]	36.00[-41.29,113.29]	1.08[0.45,2.61]		1
Secker-Walker 1998	0.95[0.87, 1.04]	35.00[-78.09,148.09]	0.61[0.25,1.50]		1
Solomon 2000	0.96[0.83,1.11]				1
Tappin 2005	1[0.97,1.03]	30.00[-58.42,118.42]	0.90[0.63,1.29]		1
Windsor 1993	0.94[0.89,0.98]				1
Burling 1991	0.93[0.83, 1.03]				2
Donatelle 2000	0.76[0.66,0.87]			3.63[1.54,8.58]	2
Ershoff 1999	0.97[0.87,1.09]				2
McBride 1999	0.97[0.89,1.06]			1.32[0.52,3.34]	2
Pbert 2004	0.91[0.71,1.17]			0.86[0.60,1.23]	2
Pollak 2007	0.88[0.81,0.95]	-71[-282.13, 140.13]	1.64[0.64,4.24]	1.45[0.69,3.03]	2
Price 1991	0.96[0.90,1.02]				2
Rigotti 2006	0.97[0.92,1.03]			0.95[0.47,1.91]	2
Rush 1992	0.96[0.89,1.04]	44.00[-71.31,159.31]			2
Secker-Walker 1997	0.81[0.67,0.98]				2
Strecher 2000	1[0.91, 1.09]				2
Thornton 1997	1.01[0.94,1.08]	1.00[-86.95,88.95]	1.27[0.66,2.42]	0.93[0.83,1.04]	2
Walsh 1997	0.92[0.85,0.99]			12.80[1.70,96.35]	2
Cope 2003	0.90[0.84,0.96]	180.00[65.11,294.89]			3
O'Connor 1992	0.92[0.84,1.02]			2.66[0.99,7.16]	3
Panjari 1999	0.99[0.96,1.02]	84.00[2.99,165.01]	0.63[0.37,1.06]	1.33[0.93,1.91]	3
Lawrence 2003	0.97[0.94,1.00]			6.27[3.35,11.74]	4
Windsor 2000a	0.91[0.83,0.99]				4
Hajek 2001	0.98[0.91,1.05]				5

\* Outcome 1 = Continued smoking in late pregnancy \*\* Outcome 2 = Mean birthweight. \*\*\* Outcome 3 = Low birthweight (less than 2500g)\*\*\*\* Outcome 4 = Maintained smoking cessation at 1-5 months postpartum

Several studies containing no elements gave statistically significant outcomes in favour of the intervention although only two of these have a confidence interval confirming that this is the case. An examination of the content of these studies shows that three of these (Hotham et al. 2005, Kapur et al. 2001, Wisborg et al. 2000) were studies of NRT and two (Heil et al. 2008, Higgins et al. 2004) were incentive based interventions.

The group of interventions with favourable outcomes at the bottom of the table shows that interventions with three or more elements produced statistically significant results.

### **3.6.3.3 *Specific elements***

Although the possibility of a statistical analysis, such as a meta-regression to determine whether each element was effective or not, was explored, it was decided that this would not be feasible. Due to inadequate reporting of intervention description and low author response rate, we were unable to draw firm conclusions about the presence or absence of the elements. Additionally, the small number of positive outcomes (in favour of the intervention) allowed us to view emerging patterns and detect potential correlations through matrix mapping and descriptive analysis. Therefore a statistical analysis would not provide meaningful results. A discussion about the value and presence of each element is provided in this section.

#### **Element 1: Partner motivation**

This element was only present in four interventions and in no controls. All four interventions reached statistical significance in favour of the intervention condition, although we cannot be certain of these due to the confidence interval (see Table 11). Although there can be no definitive evidence from RCTs that this element is effective, due to the low number of interventions it is present in, we suggest that there is still a strong likelihood of effectiveness due to this result, and the strength with which this element emerged from the qualitative data. As discussed in Chapter 1, interventions to

promote smoking cessation during pregnancy in general have low effect sizes. The fact that this element is not present in many of them is a possible contributory factor to these low success.

**Table 11: Trials in which Element 1 is present and their outcomes.**

<b>Intervention</b>	<b>Outcomes*</b>
Donatelle 2000	Outcome 1: 0.76 [0.66, 0.87]
Lowe 1997	<b>Outcome 2: 0.65 [0.38, 1.11]</b>
McBride 1999	<b>Outcome 1: 0.97 [ 0.89, 1.06]</b>
Windsor 2000	Outcome 1: 0.91 [0.83, 0.99]

\* Outcome 1 = Continued smoking in late pregnancy

\*\* Outcome 2 = Mean birthweight.

\*\*\* Outcome 3 = Low birthweight (less than 2500g)

\*\*\*\* Outcome 4 = Maintained smoking cessation at 1-5 months postpartum

### **Element 2: Facilitating social support**

This Element was present in 16 interventions and no controls. As the most common of the elements which deal with support (elements 1, 2 and 6), there does not appear to be a strong relationship between this element and positive trial outcomes.

We suggest that the effectiveness of this element would be increased if it is supplemented by elements 1 and 6. This would ensure; partners/significant others *want* the women to stop smoking (element 1); the woman receives the smoking cessation support she needs (element 2); and maintains relationships with those in her social group who are unable or unwilling to support a cessation attempt (element 6).

**Table 12: Trials in which element 2 was present and their outcomes.**

Paper	Outcomes*(negative or no effect outcomes highlighted in bold)
Albrecht 1998	1: <b>0.97[0.83, 1.14]</b>
Donatelle 2000	1: 0.76[0.66,0.87] 2: 3.63[1.54,8.58]
Ershoff 1999	1: <b>0.97[0.87,1.09]</b>
Hajek 2001	1: <b>0.98[0.91,1.05]</b>
Lowe 1998a	1: <b>1[0.96,1.04]</b>
McBride 1999	1: <b>0.97 [ 0.89, 1.06]</b>
Moore 2002	1: <b>1.03[0.97,1.09]</b>
O'Connor 1992	1: <b>0.92[0.84,1.02]</b> 2: <b>2.66[0.99,7.16]</b>
Pollak 2007	1: 0.88[0.81,0.95] 2: <b>-71[-282.13,140.13]</b> 3: <b>1.64[0.64,4.24]</b> 4: <b>1.45[0.69,3.03]</b>
Price 1991	1: <b>0.96[0.90,1.02]</b>
Rigotti 2006	1: <b>0.97[0.92,1.03]</b> 4: <b>0.95[0.47,1.91]</b>

Rush 1992	<b>1: 0.96[0.89,1.04]</b> <b>2: 44.00[-71.31,159.31]</b>
Secker-Walker 1997	1: 0.81[0.67,0.98]
Solomon 2000	<b>1: 0.96[0.83,1.11]</b>
Thornton 1997	<b>1: 1.01[0.94,1.08]</b> <b>2: 1.00[-86.95,88.95]</b> <b>3: 1.27[0.66,2.42]</b> <b>4: 0.93[0.83,1.04]</b>
Walsh 1997	1: 0.92[0.85,0.99]  4: 12.80[1.70,96.35]

\*Outcome 1 = Continued smoking in late pregnancy

Outcome 2 = Mean birthweight.

Outcome 3 = Low birthweight (less than 2500g)

Outcome 4 = Maintained smoking cessation at 1-5 months postpartum

### Element 3: Raising risk perceptions

**Table 13: Trials in which element 3 was present and their outcomes**

<b>Paper</b>	<b>Outcomes*(negative or no effect outcomes highlighted in bold)</b>
Burling 1991	<b>1: 0.93[0.83, 1.03]</b>
Cope 2003	1: 0.90[0.84,0.96]  2: 180.00[65.11,294.89]

Hajek 2001	<b>1: 0.98[0.91,1.05]</b>
Hartmann 1996	<b>1: 0.90[0.79,1.02]</b>
Panjari 1999	<b>1: 0.99[0.96,1.02]</b>  2: 84.00[2.99,165.01]  <b>3: 0.63[0.37,1.06]</b>  <b>4: 1.33[0.93,1.91]</b>
Pbert 2004	1: 0.91[0.71,1.17]  <b>2: 0.86[0.60,1.23]</b>
Rush 1992	<b>1: 0.96[0.89,1.04]</b>  <b>2: 44.00[-71.31,159.31]</b>
Secker-Walker 1994	<b>1: 0.98[0.92,1.05]</b>  <b>2: 36.00[-41.29,113.29]</b>  <b>3: 1.08[0.45,2.61]</b>
Tappin 2005	<b>1:1[0.97,1.03]</b>  <b>2: 30.00[-58.42,118.42]</b>  <b>3: 0.90[0.63,1.29]</b>
Windsor 2000	1: 0.91[0.83,0.99]

\* Outcome 1 = Continued smoking in late pregnancy

\*\* Outcome 2 = Mean birthweight.

\*\*\* Outcome 3 = Low birthweight (less than 2500g)

\*\*\*\* Outcome 4 = Maintained smoking cessation at 1-5 months postpartum

Element 3 was present in 26 interventions and 16 controls, meaning that it was very common in both conditions but was only compared in a maximum of 10 studies. We estimate that this number is probably because it is likely that provision of information is common in 'usual care' conditions. This element is difficult to analyse because women were generally aware of health warnings the fact that smoking during pregnancy can have negative health consequences and therefore only provision of the facts (e.g. information delivered by the midwife or via a leaflet) may not raise risk perceptions for many women.

If any form of information provision about the health consequences of smoking during pregnancy was given to the women, then this element was coded as 'present'. In reality, methods of raising risk perceptions such as; sustained and consistent advice from health professionals, or personal experience would make risk perceptions more concrete than the provision of a self-help leaflet which provided information. This element in particular would benefit from a more detailed analysis of the mode of delivery.

#### **Element 4: Concreteness**

Element 4 was present in 9 interventions and 1 control.

**Table 14: Trials in which element four was present and their outcomes**

<b>Paper</b>	<b>Outcomes*(negative or no effect outcomes highlighted in bold)</b>
Burling 1991	<b>1: 0.93[0.83, 1.03]</b>
Cope 2003	1: 0.90[0.84,0.96] 2: 180.00[65.11,294.89]
Hajek 2001	<b>1: 0.98[0.91,1.05]</b>
Lawrence 2003	1: 0.97[0.94,1.00]

O'Connor 1992	<b>1: 0.92[0.84,1.02]</b> <b>2: 2.66[0.99,7.16]</b>
Panjari 1999	<b>1: 0.99[0.96,1.02]</b> 2: 84.00[2.99,165.01] <b>3: 0.63[0.37,1.06]</b> <b>4: 1.33[0.93,1.91]</b>
Strecher 2000	<b>1: 1[0.91, 1.09]</b>
Walsh 1997	1: 0.92[0.85,0.99] 4: 12.80[1.70,96.35]
Windsor 2000	1: 0.91[0.83,0.99]

\* Outcome 1 = Continued smoking in late pregnancy

\*\* Outcome 2 = Mean birthweight.

\*\*\* Outcome 3 = Low birthweight (less than 2500g)

\*\*\*\* Outcome 4 = Maintained smoking cessation at 1-5 months postpartum

All interventions showed statistical significance except for one (Strecher 2000) which shows no effect. The fact that this element is only apparent in 9 interventions indicates that that it has not been carefully considered as a facilitator to smoking cessation before.

This element is easy to embed within interventions without it being obvious to the participant that the reason for the intervention component is to try and persuade her to quit. She would therefore feel less 'nagged'. Increasing women's feelings of protectiveness towards the fetus is an important part of this element.

#### **Element 5: Coping skills or stress management**



This element was present in 34 interventions and 10 controls, making it the most common element. The 10 controls identified were those which provided more than what was often described as ‘usual care’ by providing control participants with a self-help leaflet or similar. It is therefore likely the scoring for this element is more accurate than others.

**Table 15: Trials in which element 5 was present and their outcomes**

<b>Paper</b>	<b>Outcomes* (negative or no effect outcomes highlighted in bold)</b>
Cope 2003	1: 0.90[0.84,0.96]  2: 180.00[65.11,294.89]
Dornelas 2006	1: 0.79[0.66,0.96]
Ershoff 1999	<b>1: 0.97[0.87,1.09]</b>
Hajek 2001	<b>1: 0.98[0.91,1.05]</b>
Hegaard 2003	1: 0.95[0.92,0.98]  <b>2: -32.00[-109.06,45.06]</b>  <b>3: 1.17[0.51,2.68]</b>
Lawrence 2003	1: 0.97[0.94,1.00]
Malchodi 2003	<b>1: 0.97[0.81,1.16]</b>  <b>2: 28.00[-152.48,208.48]</b>  <b>3: 1.00[0.33,2.99]</b>
O'Connor 1992	<b>1: 0.92[0.84,1.02]</b>

	<b>4: 2.66[0.99,7.16]</b>
Panjari 1999	<b>1: 0.99[0.96,1.02]</b>  2: 84.00[2.99,165.01]  <b>3: 0.63[0.37,1.06]</b>  <b>4: 1.33[0.93,1.91]</b>
Pbert 2004	<b>1: 0.91[0.71,1.17]</b>  <b>2: 0.86[0.60,1.23]</b>
Petersen 1992	<b>1: 1.04[0.87,1.24]</b>  <b>2: 1.02[0.75,1.38]</b>
Price 1991	<b>1: 0.96[0.90,1.02]</b>
Rigotti 2006	<b>1: 0.97[0.92,1.03]</b>  <b>4: 0.95[0.47,1.91]</b>
Secker-Walker 1997	1: 0.81[0.67,0.98]
Secker-Walker 1998	<b>1:0.95[0.87, 1.04]</b>  <b>2:35.00[-78.09,148.09]</b>  <b>3: 0.61[0.25,1.50]</b>
Strecher 2000	<b>1: 1[0.91, 1.09]</b>
Walsh 1997	1: 0.92[0.85,0.99]

	4:12.80[1.70,96.35]
Windsor 2000	1: 0.91[0.83,0.99]

\* Outcome 1 = Continued smoking in late pregnancy

\*\* Outcome 2 = Mean birthweight.

\*\*\* Outcome 3 = Low birthweight (less than 2500g)

\*\*\*\* Outcome 4 = Maintained smoking cessation at 1-5 months postpartum

### Element 6: Maintaining social networks

This element was present in 3 interventions and 0 controls. It is likely that maintaining emotional and pregnancy-related support from family and friends who continue to smoke and are unsupportive of quit attempts has been overlooked in many interventions and we do not anticipate that the number of elements actually present is higher than this figure.

**Table 16: Trials in which element 6 was present and their outcomes.**

Paper	Outcomes* (negative or no effect outcomes highlighted in bold)
Cinciripini 2000	<b>Outcome 1: 1.06[0.92,1.23]</b>
Hajek 2001	<b>Outcome 1: 0.98[0.91,1.05]</b>
Lawrence 2003	Outcome 1: 0.97[0.94,1.00]

\* Outcome 1 = Continued smoking in late pregnancy

\*\* Outcome 2 = Mean birthweight.

\*\*\* Outcome 3 = Low birthweight (less than 2500g)

\*\*\*\* Outcome 4 = Maintained smoking cessation at 1-5 months postpartum

One of these trials (Cinciripini) recorded an outcome slightly in favour of the control. However, this was a study of videos mailed to women so it is possible that they did not watch the videos.

It is possible that this element is problematic to deliver and care should be taken to develop a strong method of delivery.

### **3.6.3.4 Other findings**

The qualitative data demonstrates the effectiveness of both incentive schemes and NRT. This evidence was not present in the quantitative data, highlighting the value of this mixed-methods approach.

A theme that was consistent within the qualitative findings was that women have many underlying issues, such as a lack of support or constant stresses in their life, which lead to smoking or being unable to quit. While methods of quitting such as NRT or incentive based schemes have proven to increase quit rates, they do not deal with these underlying issues and should be supplemented by intervention components which do. Additionally, NRT is problematic because it is not advised for use during pregnancy (although it is safer than smoking). Incentive based interventions may not be cost-effective, especially if the effects are not long term.

For outcome measure one, only 8 of the 44 included studies resulted in a risk ratio of less than 0.90. These are outlined in Table 17.

**Table 17: Included studies with a risk ratio of less than 0.90**

Paper	Outcome 1 (Risk Ratio M-H, Random, 95% CI)	Total number of elements (minus control)	Elements Present (minus control)	Notes

Donatelle 2000	0.76[0.66,0.87]	2	1,2	Incentives
<b>Dornelas 2006</b>	<b>0.79[0.66,0.96]</b>	<b>1</b>	<b>5</b>	
Heil 2008	0.66[0.50,0.88]	0		Incentives
Higgins 2004	0.69[0.51,0.94]	0		Incentives
Hotham 2005	0.85[0.70,1.05]	0		NRT
Kapur 2001	0.78 [0.58, 1.03]	0		NRT
Pollak 2007	0.88[0.81,0.95]	1	2	NRT
<b>Secker-Walker 1997</b>	<b>0.81[0.67,0.98]</b>	<b>2</b>	<b>2,5</b>	

Only two of these interventions did not involve incentives or NRT, so we re-examined the papers.

Secker-Walker et al developed videotapes of lower-income women smokers aged 25-29 years who were filmed going through the process of smoking. The women explain their reasons for quitting and are followed around their daily lives encountering and overcoming barriers to quitting. The content of the videos are not explicitly described but it is likely that they contained other elements. We suggest that in showing participants role models such as the women in the videos would raise their self-efficacy. They could also be termed 'coping models' (Bandura 1995). The role of a coping model within an intervention is discussed further in later chapters of this thesis.

Dornelas et al provided intervention participants with a 90 minute one-off psychotherapy session, followed by bi-monthly phone calls from the therapist during pregnancy. The content of the psychotherapy session was designed to ensure that the patient;

experiences affective arousal; experiences interpersonal engagement with the therapist; and recognises that smoking can be a way of dealing with emotional distress.

### **3.6.3.5 Limitations**

We were unable to conduct a meaningful statistical analysis on the data for several reasons. Most interventions lacked a description that we felt was comprehensive enough to facilitate accurate scoring. For example, information was given about the mode of delivery e.g. counselling or self-help leaflets, but minimal or no information was given about the content of these. Better descriptions would have allowed a more accurate scoring rating based on the frequency of delivery and method of delivery. Where the presence of an element was unclear, the element was classed as not present. We observed that those papers which were scored for a higher number of elements contained a higher level of description than those which contained less elements. We can therefore assure accuracy for those elements described as present, but it is very likely that there are false negatives.

Descriptions of controls were mainly even less comprehensive than intervention descriptions, with few described further than 'usual care'. No assumptions were made about the content of usual care.

It is also highly likely that the mode of delivery and length of delivery of an element (e.g. a self-help leaflet, one-off counselling session or intensive counselling sessions throughout the pregnancy) would have an impact on the outcome and this was not possible to consistently measure.

## **3.7 Comparison with 'Specifying Evidence-Based Behaviour Change Techniques to Aid Smoking Cessation in Pregnancy.'**

This review was completed at approximately the same time as a review with a similar purpose 'Specifying Evidence-Based Behaviour Change Techniques to Aid Smoking Cessation in Pregnancy.' by Lorencatto et al (2012) was published. The authors also

accessed papers describing RCTs included in paper two (Lumley et al. 2009) and coded these for the inclusion of Behaviour Change Techniques (BCTs).

The definition of a BCT as developed by Michie et al (Michie et al. 2012) is that the technique is; observable, replicable, irreducible, a component of an intervention designed to change behaviour, and a postulated active ingredient within the intervention. Michie et al's BCT Taxonomy provides a comprehensive list of BCTs which may be present within interventions.

In the review, Lorencatto et al identified 11 BCTs evidence-based for behavioural support interventions during pregnancy. The condition for this was a recognised method (Michie et al. 2011). This was that they were present in at least 2 effective interventions. An intervention was classed as effective if it increased the odds of cessation by at least 50%. Differences between control and intervention conditions were also statistically significant. There were 7 effective interventions.

BCTs identified in effective behavioural support interventions are listed by Lorencatto et al, and 11 of these are identified as effective in interventions to promote smoking cessation during pregnancy. As found during analysis of phase two of the cross study synthesis described in this thesis, poor intervention descriptions and low author response rates indicate that more BCTs are potentially effective than those 11 identified in the review.

The 11 BCTs identified by Lorencatto are:

- Advise on use of social support
- Offer/direct towards appropriate written materials
- Provide information on the consequences of smoking and smoking cessation
- Measure CO
- Facilitate barrier identification and problem solving

- Facilitate action planning
- Facilitate relapse prevention and coping
- Facilitate goal setting
- Provide rewards contingent on successfully stopping smoking
- Assess current readiness and ability to quit
- Assess current and past smoking behaviour

We mapped these BCTs onto the elements from our cross-study synthesis (Table 18). The elements indicate *what* circumstances are required and those BCTs which map on to an element provide examples of *how* this could be achieved.

**Table 18: The 'elements' mapped onto behaviour change techniques (BCTs) with an evidence base for promoting smoking during pregnancy**

Elements	BCTs
Partner motivation	No BCTs
Facilitating social support	Advise on use of social support
Maintaining social networks	
Raising risk perceptions	Offer/direct towards appropriate written materials
	Provide information on the consequences of smoking and smoking cessation
Concreteness	Measure CO



Coping skills or stress management	Facilitate barrier identification and problem solving
	Facilitate action planning
	Facilitate relapse prevention and coping
	Facilitate goal setting
No Elements	Provide rewards contingent on successfully stopping smoking
	Assess current readiness and ability to quit
	Assess current and past smoking behaviour

### **3.7.1.1 Similarities**

It is reassuring that our primarily inductive approach and the primarily deductive approach of Lorencatto et al drew many of the same conclusions. The finding that intervention descriptions were not comprehensive enough is discussed in a further paper by Lorencatto et al (Lorencatto et al. 2013) which concludes that future papers should provide more description.

BCTs which help participants plan for events in the future or cope with stress such as ‘Facilitate barrier identification and problem solving’ and ‘Facilitate relapse prevention and coping’ were mapped onto ‘Coping skills or stress management’. We therefore considered that this element would be well handled if these BCTs were used.

Risk perceptions could potentially be raised by providing accurate information about the consequences of smoking and smoking cessation, including directing towards written materials. However, these BCTs do not encompass the wider range of possible ways of

raising risk perceptions such as sustained and consistent advice from health professionals.

We have categorised 'measure CO' as mapping onto the element 'concreteness' as it is likely that personalised feedback of a person's own behaviour can increase the concreteness that the risk is real. However, we code 'concreteness' as present in an intervention if the CO monitoring was present because biochemical verification of smoking is an inclusion criteria for the review. We also felt that this on its own was too weak to necessitate a positive scoring.

### **3.7.1.2 Differences**

In addition to the similarities between the review conclusions, each study identified factors that the other did not. Lorencatto et al's review methods meant that it would not have been possible for them to identify any BCTs which were not already present in interventions. Our cross-study synthesis could only identify elements which could be drawn out of the qualitative research and therefore did not address 'what works' in existing interventions. Therefore, the reviews complement each other.

We suggest that the 3 elements 'partner motivation', 'facilitating social support' and 'maintaining social networks are key to the success of an intervention. In the qualitative data, a strong finding was that women perceive quitting to be unfeasible when faced with; others regularly smoking around them, a lack of support and encouragement, and negative or coercive behaviour. The BCT 'advise on use of social support' does not adequately encompass the complexity of the three elements. In particular we did not feel that 'Partner motivation' would come under this BCT because it is specifically aimed towards making the partner or significant others *want* the woman to quit.

Three BCTs which did not map onto any of the elements were; 'provide rewards contingent on successfully stopping smoking.', 'assess current readiness and ability to quit.', and 'assess current and past smoking behaviour'.

'Provide rewards contingent on successfully stopping smoking' has a particularly strong evidence base as incentive based interventions (Lumley et al. 2009) show the highest results for stopping smoking during pregnancy. The problem with incentive based interventions is that relapse rates are high because providing rewards does not deal with the underlying issues that make it difficult for women to quit and this is perhaps why it did not emerge from the qualitative research.

'Assess current readiness and ability to quit' and 'assess current and past smoking behaviour' were also not drawn out of the qualitative research but are useful additions. Tailoring an intervention towards a target group increases its likelihood of effectiveness (Herbec et al. 2014) and therefore tailoring an intervention using these BCTs would be logical.

### **3.7.1.3 Additional analysis**

We undertook additional analysis using the guidelines specifying what BCTs can be considered 'evidence based' in the review by Lorencatto et al.

**Table 19: Interventions termed 'effective' by Lorencatto et al and the elements they contain.**

Intervention	Notes	Elements in intervention condition.	Total elements (elements in intervention minus elements in control)
Donatelle 2009	Includes incentives	1,2,3,5	1,2
Heil 2008	Incentives only	0	0
Higgins 2004	Incentives only	0	0
Hjalmarson 1991		3,5	5

Lawrence 2003		2,3,4,5,6,	2,4,5,6
Polanska 2004	Not included in cross-study synthesis (results not biochemically verified.)	3,5	5
Walsh 1997		2,3,5	2,5

Using the technique outlined by Michie et al (Michie et al. 2011), elements 2, 3 and 5 can be defined as 'evidence-based'. However, this is reduced to elements 2 and 5 when elements which are present in controls are removed.

Although only half of the elements are classed as evidence-based using this method, it is unsurprising that elements 1, 4 and 6 are absent from this as they are the least common of the elements appearing in 4 (element 1), 9 (element 4) and 3 (element 6) interventions compared to 21 (element 2), 32 (element 3), and 34 (element 5) interventions. It should also be noted that 3 of the 7 effective studies were incentive based interventions, and 1 did not have results which were biochemically verified.

### 3.8 Overall Conclusions and Summary

An important contribution to future work detected during the planning of this review is the addition of coding controls for the presence of the elements. An element or BCT cannot be said to be effective if it is also present in the control. This has implications for any study of this type.

In stage one, six elements were developed. We substantiate that these elements applied to an intervention would create an optimum set of circumstances under which smoking cessation during pregnancy would be possible.

In stage two, we found that most existing interventions to promote smoking cessation during pregnancy do not include more than 3 of these elements. A thorough analysis of the data was not possible due to; the absence of detailed information in intervention descriptions; and a large variation in the outcome measures of reported RCTs. However, enough information was possible to conclude that the more elements present, the higher the likelihood of a statistically significant outcome in 'continued smoking in late pregnancy.

Very few intervention outcomes reached statistical significance and we conclude that a reason for this may be the absence of the elements. The resulting hypothesis is that an intervention which contains all six of these elements is more likely to increase smoking cessation rates during pregnancy than existing interventions.

A comparison with the work of Lorencatto et al reinforces the findings the review due to a number of overlaps. Both the review by Lorencatto et al and this cross-study synthesis have contributed novel findings.

### **3.8.1 Implications for the development of the intervention**

Many of the elements were not frequently present in interventions. It is therefore possible that this has contributed to the low overall success of interventions to promote smoking cessation during pregnancy.

From the conclusions drawn in this chapter, it would appear that an intervention containing as many of the six 'elements' and eleven BCTs as possible would have an increased likelihood of effectiveness. A complex intervention which could incorporate all of these would need to be delivered over a substantial period of time. This review has also highlighted the need for a detailed description of the intervention and control conditions.

## **4 Chapter 4: Behavioural theory: a discussion in relation to smoking cessation during pregnancy**

In Chapter 3, the behaviour change methods necessary for altering behaviour in relation to smoking cessation during pregnancy were identified and analysed in an inductive approach. This chapter discusses existing theory and its relevance to developing an intervention to promote smoking cessation during pregnancy. Models and concepts from behavioural theory are identified because of either: past evidence of effectiveness in predicting or influencing smoking cessation or health behaviours during pregnancy ; or a strong rationale that they may be effective despite no previous reported link to smoking cessation or pregnancy. Rather than undertake a systematic review, this chapter used the researcher's own interpretation of the literature combined with an iterative process of feedback and discussion with experts to identify relevant theory.

Webb and Sheeran (Webb and Sheeran 2006) identify three key features which determine the impact of a behaviour change intervention:

- The behaviour change methods used (Chapter 3).
- The theoretical underpinning of the intervention (Chapter 4).
- The mode of delivery (Chapter 5).

In this thesis, these are all combined to create what we have termed the 'theoretical basis along with empirical evidence gathered in later chapters.

In this chapter, firstly the concept of risk is explored, and then cognitive dissonance as a potential reason why people who smoke may continue to do so despite a general awareness of the associated risks is discussed. Secondly, four predictive models of health behaviour and their likely effectiveness in predicting or influencing smoking cessation during pregnancy are outlined and examined. The third section is a discussion of the role of emotions and cognitions in changing behaviour. Finally, the discussion

draws out and links together those constructs and models which have the most potential effectiveness on smoking behaviour and can be feasibly embedded within an intervention.

#### **4.1 Behavioural theory**

Theory can be defined as 'A set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting phenomena' (Kerlinger and Lee 1999). Behavioural theory provides a basis for understanding why people engage in behaviours which cause adverse health effects in themselves and in others. Theory can also help us to understand how and why people adopt health-protective behaviours (Kerr et al. 2005).

Behavioural interventions are potentially more effective when based on relevant theory (Glanz and Bishop 2010). This is reflected in the 'Theory' stage of the MRC framework for complex interventions (Craig et al. 2008) which states that theory should be explored 'to ensure best choice of intervention and hypothesis and to predict major confounders and strategic design.' In addition, it is useful to establish which elements of theory have been incorporated into an intervention in order to ascertain the reasons for its success (Michie et al. 2008). Theory based interventions facilitate testing of the theory and can also be used to inform the developments of future interventions.

With a large number of psychological concepts and social cognition models in existence, choosing theory to base an intervention on can be problematic. The book 'Health Behaviour and Health Education: Theory, Research and Practice (Glanz et al. 2008) provides a comprehensive review of behavioural theory and its application to real-world settings. Theories and models of health behaviour are explored at individual, group and community levels. The authors found no strong evidence base for the use of one theory for a particular intervention. This suggests that theory selection should be based on the

researchers' own informed assessment of the suitability of a theory for the purpose of influencing a specific health behaviour. The researcher should explore the merits of the theory in a variety of settings, especially, if available, empirical evidence of the suitability of the theory in predicting or altering a specific health behaviour.

## **4.2 Risk**

The concept of risk and, in particular, a person's perception of their own risk to a health threat (i.e. a risk perception) is a common theme throughout this thesis. This section will therefore attempt to define the meaning of the term in the context of this work.

Literature dealing with behaviour change often uses terms such as 'risk perceptions' 'risky behaviour' and 'risk awareness' without providing a definition of what is meant by 'risk'. Unexplained differences in the definition of risk between studies may result in confusion when one study produces different results from a similar study (Jacoby and Kaplan 1972) . Descriptions vary between disciplines, so this section will outline how risk is defined throughout this study.

In an attempt to provide a definition of 'risk', Yates (Yates 1992) lists the critical elements of risk construct as:

- Potential losses
- The significance of those losses
- The uncertainty of those losses

Therefore, we can view risk as the belief that a person has about the likelihood and impact of a negative outcome. Jacoby et al (Jacoby and Kaplan 1972) divide risk into five categories; financial, physical, psychological and social risk. A sixth construct, time, was later identified (Roselius 1971)



**Table 20: The individual components of risk and their definitions**

<b>Type of Perceived Risk</b>	<b>Operational Definition</b>
Financial	The likelihood of loss of money
Performance	The likelihood that something will go wrong
Physical	The likelihood that something is harmful to your health
Psychological	The likelihood that your self-image will be harmed
Social	The likelihood that others will think about you differently
Time	The likelihood that your time will be wasted/inconvenience will be caused
Overall	Combination of all factors involved.

A meta-analysis of 34 studies (N = 15,988) assessing the association between vaccination and perceived likelihood, susceptibility, and severity of risk by Brewer et al (Brewer et al. 2007) showed that high risk perceptions (i.e. beliefs that likelihood, severity and susceptibility of a risk were high) significantly predicted behavioural outcomes. This demonstrates that risk perceptions are primary motivators of behaviour change. They are recognised in many theories of health behaviour (Rogers and Prentice-Dunn 1997, Janz and Becker 1984). The general proposal within these theories is that the higher the perceived chance of a health risk occurring, the higher the likelihood of positive behaviour change (Brewer et al. 2004). It is important to recognise that risk perception

levels in individuals are subjective and this is taken into account when assessing risk perception.

In summary, 'risk' or 'risk perceptions' referred to in this thesis are defined as the beliefs of individuals about the significance and likelihood of the negative outcomes which may occur as a result of an action. Given that the most common reasons given for intention to quit smoking are health reasons, it is likely that risk representations are a major motivating factor for smoking cessation. Studies have shown that motivation to quit can be increased by raising risk perceptions (Copeland and Brandon 2000, Maddux and Rogers 1983).

### **4.3 Cognitive dissonance**

As risk perceptions have been discussed in the previous section, it is important to look at reasons why individuals with high risk perceptions may continue to perform a behaviour which increases the likelihood of the negative outcome they perceive to be high risk. One likely explanation is the presence of cognitive dissonance.

The concept of cognitive dissonance was introduced by Festinger (Festinger 1962). Dissonance occurs when an individual holds cognitions that are inconsistent with each other. Usually, more or less successful attempts are made to rationalise them. Festinger uses smoking as a common example of dissonance. He hypothesises that a person who knows of the health risks of smoking but smokes anyway has the following beliefs; the enjoyment taken from smoking outweighs the risks; the likelihood of serious health consequences are not as serious as people say they are; not all health risks can be avoided; and the health risks which occur when gaining weight as a side-effect of smoking would be equally bad as continued smoking. Continued smoking would therefore be consistent with the beliefs of the individual in question.

There is substantial empirical evidence to support the importance of cognitive dissonance. A cross-sectional survey of French smokers' (N=939) perceptions of risk

and risk denial (Peretti-Watel et al. 2007) found that risk denial was widespread among tobacco smokers and did not reflect the knowledge of the smoker about the risks. This suggests that information given to someone who smokes is only effectual if the cognitive processes of the individual in question are influenced to raise their estimations of the risks involved in continued smoking or lower the estimations of the benefits involved in continued smoking. As the health risks involved in tobacco smoking are so widely known, it appears to defy common sense for an individual to continue to smoke. Cognitive dissonance can be used to explain the logic behind this behaviour.

More recent research on cognitive dissonance and smoking has revealed the complex nature of the relationship between the two. In a study of 186 Australian smokers, McMaster and Lee (McMaster and Lee 1991) found that, despite no difference in factual knowledge between the groups, smokers and non-smokers experienced different cognitions about smoking. The authors suggest that future interventions should focus on the rationalisations typically made by people who continue to smoke.

A study by Simmons et al (Simmons et al. 2004) aimed at reducing cognitive dissonance showed a change in attitudes and intentions of smokers. The authors theorise that there are three methods possible for smokers to reduce cognitive dissonance.

1. Quit smoking in line with beliefs that it is harmful to their health
2. Misinterpret or ignore the commonly held knowledge that smoking is harmful to their health.
3. Introduce new cognitions.

The new cognitions in the third method can take several forms, including those introduced by Festinger (as discussed above). In addition, smokers may cite quitting their addiction as impossible and 'out of their hands' (Jenks 1992). They may also rationalise smoking as not as harmful as other behaviours such as drug taking or drinking alcohol or believe that their smoking is comparatively light compared to others and

therefore they are less at risk. Wienstein et al (Weinstein et al. 2005) noted a trend of unrealistic optimism (i.e. a general awareness of the risks of health behaviour but a lack of understanding or acceptance of the severity of the consequences) in smokers who were asked to estimate their own risk of developing conditions such as lung cancer compared to other smokers.

In a systematic review of qualitative interviews with pregnant women about their experiences of smoking and smoking cessation, Graham et al (Graham et al. 2011) found that the most commonly given reasons for low risk perceptions are; a reliance on personal experience (e.g. knowing people who smoked and had healthy babies), a distrust of scientific evidence and a lack of priority given to delivering smoking cessation messages by healthcare professionals. These are examples of cognitive dissonance in women who have been informed of the health risks, but rationalise that they cannot see serious risks.

Smokers are likely to have developed expertise in reducing dissonance due to a daily need to rationalise their own behaviour which contradicts their knowledge of the risks involved (Simmons et al. 2004).

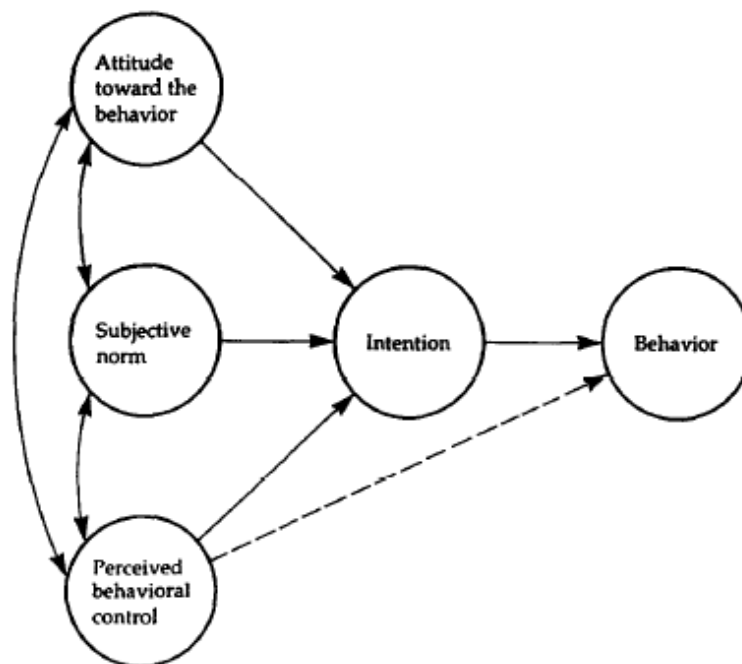
#### **4.4 Predictive models of health behaviours**

Many predictive models of health behaviour exist. They use interacting components to predict, and possibly influence health behaviours. In this section, four models of health behaviour are discussed; The Theory of Planned Behaviour (TPB), Social Cognitive Theory (SCT), the Health Belief Model (HBM) and the Self-Regulation Model (SRM). All of these are empirically supported models which have an evidence base demonstrating their suitability for predicting or influencing smoking cessation behaviour.

##### **4.4.1 The Theory of Planned Behaviour (TPB)**

The TPB proposes a representation of the relationship between beliefs, attitudes and intentions and their role in changing behaviour. The model (Icek 1991) uses attitudes

towards a behaviour, subjective norms and perceived behavioural control (PBC) to explain the formation of intentions to perform the behaviour.



**Figure 13: A schematic representation of the theory of planned behaviour (Icek 1991)**

Intentions are an important predictor of behaviour change. If intention to perform a behaviour is present, it is more likely that the required behaviour will be performed. Fishbein et al (Fishbein and Yzer 2003) divide people into two groups: those who have little or no intention to perform a required behaviour, and those who have formed an intention but not yet acted on it (possibly because they are unable to due to environmental constraints, or a lack of ability or skills). They suggest that each of these groups of people require a different intervention. Interventions designed for those who have formed an intention should focus on building skills which will aid the desired behaviour and the removal of (or additional skills to deal with) environmental factors which may act as a barrier to the desired behaviour. If no intention has been formed, the focus should be on the three key determinants of intention:

**Attitude towards performing the behaviour:** This part of the TPB assumes that a person's salient beliefs determine their attitude towards performing a behaviour (Conner and Armitage 1998). The beliefs are not always directly based on their knowledge of the subject as a degree of cognitive dissonance may be present.

**Perceived norms concerning performing the behaviour:** Normative beliefs are the result of the perceived social pressure (or subjective norm) that a person should or should not carry out a particular behaviour. These beliefs increase the motivation to perform the behaviour only if a person desires this specific social approval.

**Perceived behavioural control (PBC) with respect to performing the behaviour:** PBC is the belief that the person *can* perform the required behaviour. This belief is generally greater if the subjective norm and attitude are favorable. The concept of PBC is similar to Albert Bandura's concept of self-efficacy. Bandura suggests that the two concepts overlap, but have been given different names (Bandura 2004).

The causal relationship of intentions to behaviour demonstrated in the TBP has been verified in a meta-analysis of 47 tests of intention-behaviour relations (Webb and Sheeran 2006). The results showed that a medium-to-large change in intention resulted in a small-to-medium change in behaviour.

A meta-analysis of 185 studies by Armitage and Conner (Armitage and Conner 2001) reviewing the efficacy of the TPB found a large variation in the effect of the individual constructs of the model. PBC demonstrated a statistically significant causal relationship with intention and behaviour.

In the case of smoking cessation, Godin et al (Godin et al. 1992) attempted to verify the assumptions made by the TPB by completing two studies based on interviewing smokers and pregnant smokers about their intentions and behaviour based on the TPB constructs. They found that in general, smoker's intentions were explained by PBC, attitudes and subjective norm, whereas behaviour was explained by PBC and habit. The

study of pregnant smokers showed intentions explained by PBC and attitude, and behaviour explained by PBC only. This demonstrate that habit and subjective norm have less influence on pregnant women's smoking habits than the general population.

A study of 168 smokers with partners who completed measures of TPB variables (Dohnke et al. 2011) showed strong evidence that quitting intention is mediated by PBC and by subjective quitting norm (defined as the belief that the smoker holds that people who are important to them want them to quit smoking). Descriptive quitting norm (whether or not most people who are important to the smoker have quit smoking) was not shown to have such strong effect on intention. The effect of descriptive quitting norm may be stronger on behaviour due to the difficulties reported by women who are trying to quit but are surrounded by others who smoke (Graham et al. 2010).

#### **4.4.2 Social cognitive theory**

Another widely used predictive model which emphasizes the interaction between the person, the behaviour, and the environment is Bandura's Social Cognitive Theory (SCT).

This is a view of behaviour which assumes individuals have the capacity to influence their own environment (Bandura 2001). From the perspective of SCT, individuals have the ability to exert control over outcomes by acting intentionally, and in a self-regulating manner (Bandura 1991). Additionally, individuals can reflect upon their thoughts and actions and use this information to alter future behaviour (Bandura 1989) The core set of determinants specified by this theory include:

- Knowledge of health risks and benefits of a particular behaviour
- Perceived self-efficacy that the behaviour will achieve a desired outcome
- Outcome expectations about the costs and benefits of the behaviour
- Goals set in place to achieve the behaviour and the concrete strategies to achieve these.

- Perceived barriers and facilitators to achieving these goals

The theory also specifies the mechanism through which these determinants work and outlines the optimal ways of translating this knowledge into effective health practice (Bandura 2004).

The focal determinant of SCT is self-efficacy. This is because of its ability to affect health behaviour directly and by its influence on the other determinants. The following section outlines the definition and concept of self-efficacy, as well as Bandura's four main strategies for increasing self-efficacy.

#### **4.4.2.1 Self-Efficacy**

The concept of self-efficacy was initially derived from SCT (Bandura 1986). In the words of Bandura, Self-efficacy is 'the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations.' (Bandura 1995) In other words, it is the extent to which an individual believes that they are capable of performing a behaviour which will lead to a positive outcome. Response efficacy is closely linked to self-efficacy. This is the belief that performing an adaptive behaviour will produce the desired outcome. An underestimation of risks also applies to self-efficacy. Ultimately, an individual will perform a specific health behaviour based on their own judgment of how difficult a behaviour will be to perform and how likely they believe the behaviour is to change health outcomes.

A meta-analysis (Holden 1992) of studies using self-efficacy as a predictor of health related outcomes found that self-reported self-efficacy consistently predicted health outcomes. Many studies have shown self-efficacy to mediate smoking cessation (Cupertino et al. 2012, Elfeddali et al. 2012, Minnix et al. 2011, Schnoll et al. 2011, Shiffman 2005, DiClemente et al. 1985). For example, in a study of 643 treatment-seeking smokers, Schnoll et al (Schnoll et al. 2011) found that those participants who had a greater increase in self-efficacy were significantly more likely to have quit smoking



at weeks 15 (OR = 1.09, 95% CI: 1.02–1.16,  $p = .01$ ) and 27 (OR = 1.04, 95% CI: 1.01–1.06,  $p = .01$ ).

The prominence of self-efficacy (or similar concepts) as a key construct of behavioural theories and empirical evidence showing its effectiveness in behaviour change indicates the likelihood of its effectiveness in encouraging positive health behaviours. Unlike other theoretical concepts, which are often only used as methods to understand, explain and predict behaviour rather than to design interventions, Bandura (Bandura 1997) specifies methods of influencing self-efficacy using four techniques:

- Enactive Mastery Experience
- Vicarious Experience
- Verbal Persuasion
- Physiological and Affective states

### **Enactive mastery**

Bandura states that enactive mastery is the most authentic and therefore most influential source of efficacy information. A person's perception of their ability to perform a behaviour is heavily influenced by their past performance of this behaviour. Success in performing the behaviour provides the individual with experience in building the skills and strategies needed to overcome obstacles. Failures can undermine self-efficacy, but also serve to teach the individual that effort and persistence is required. To achieve enactive mastery over a behaviour, people not only need to be persuaded to perform the behaviour, but also that they must perform the behaviour with consistency over time.

However, self-efficacy is not exclusively based on the success or failure of past performance. According to Bandura, it is how the individual processes their past performances that shape the impact of the performance on self-efficacy. Influencing factors include:

- Preconceptions of one's ability
- Perceived difficulty of performing behaviour
- Amount of effort expended
- External aid received
- Circumstances under which the behaviour is performed
- Chronological pattern of successfully or unsuccessfully performing the behaviour
- The way in which the experience of performing the behaviour is recalled.

The importance of enactive mastery in smoking cessation is highlighted by the fact that people who have made past quit attempts more likely to go on and make a successful or long-term quit attempt (West et al. 2001).

### **Vicarious Experience**

In addition to personal experience of past performance of behaviours, people judge their own achievements in relation to their peers. Without the performance of others, they have no basis on which to appraise their own capabilities.

Self-efficacy beliefs can be strengthened when a person perceives that their behaviour is superior to that which is the norm within their social group. Conversely, comparison with others who are more successful can have the opposite effect (Testa and Major 1990). This is not always the case however, as Bandura states that 'seeing or visualizing people similar to oneself perform successfully typically raises efficacy beliefs in observers that they themselves possess the capabilities to master comparable activities.' In other words, people assume that when seeing a person with similar characteristics to themselves, their successful behaviour may be predicative of what they are capable of themselves (Suls and Miller 1977). This behaviour is known as modeling, or learning by observation and imitation of other people.

The self-efficacy appraisal of an individual therefore depends heavily on those who the individual compares themselves with. With exposure to influences outside of a community group through media such as television and the internet, people are exposed to symbolic models. Seeing a coping model (i.e. a person similar to themselves who is unsure of themselves at first but manages to perform the behaviour using a set of skills and strategies) display problem solving skills strengthens self-efficacy, and visualisation of performing these skills themselves has been shown to enhance this effect (Prussia and Kinicki 1996, Maibach and Flora 1993). Self-modeling has also been found to be effective. This is modeling ones present behaviour on a high level of performance they have achieved in the past.

A systematic review with meta-analysis of 27 physical activity intervention studies (N = 5,501) explicitly targeting self-efficacy (Ashford et al. 2010) found that, of the four components of self-efficacy, vicarious experience was associated with the highest levels of increased self-efficacy.

### **Verbal Persuasion**

Verbal persuasion or affirmation from significant people is not as powerful as the other self-efficacy techniques, but can serve as a valuable adjunct (Schunk 1991). In general, verbal encouragement or persuasion heightens self-efficacy beliefs and a negative appraisal lowers them. If an individual receives an affirmation of faith in their ability from a significant person (e.g. friend, family, health professional), this will increase their belief in their own ability. However, this must be approached with caution. Persuading an individual that they can achieve an unrealistic goal is likely to result in failure and lowered self-efficacy beliefs (Brusso and Orvis 2013). An optimal amount of persuasion is to encourage pursuit of a goal only just beyond their perceived abilities. The mastery of this goal will then further increase self-efficacy beliefs.

### **Physiological and Affective States**

For the fourth technique to alter self-efficacy, Bandura recommends enhancing physical status, reducing stress levels and negative emotions and correcting misinterpretations of bodily states.

The intensity of emotional and physical states and the way in which these states are interpreted can have a strong impact on self-efficacy beliefs. The perception that a physical symptom is caused by a behaviour is a determinant of whether or not that behaviour will be performed. Moods can also alter levels of efficacy beliefs (Kavanagh and Bower 1985). Positive moods can enhance efficacy whereas negative moods can weaken it. Intensity of mood correlates with levels of self-efficacy beliefs. Emotional reactions to potential health threats can raise stress and lower levels of coping efficacy.

#### **4.4.3 The Health Belief Model**

The health belief model (HBM) was created to explain preventative health behaviour. It is a widely used model in the field of health psychology and has been tested and refined over the years (Becker 1974).

The original HBM consists of 4 components:

**Perceived susceptibility (to the risk that *not* performing a behaviour poses):** The perceived susceptibility of an individual to a health risk is subjective and may not reflect the actual susceptibility to the risk. This is at least in part dependant on the knowledge of the individual.

**Perceived severity (of the outcome of the risk):** The perceived severity of a health risk concerns the beliefs of an individual about the way in which the outcome of the risk would affect them personally. Outcomes such as death or mental impairment would increase perceived severity more than less severe risks. The outcome may vary from person to person, for example the symptoms of an illness could prevent one person from doing their job but would have little impact on the life of another person.

**Percieved benefits (of performing the behaviour):** Once the severity and susceptibility to a health threat are percieved as high enough to necessitate action, this does not define the likely course of action. If there is more than one course of action which may be beneficial, beliefs regarding the effectiveness of the various courses of action will now determine their choice of behaviour. This is subjective and depends on the beliefs and social norms of an individual.

**Percieved barriers (to performing the behaviour):** If the desired course of action is percieved as beneficial, an individual will then consider the barriers to performing this action. The behaviour may be seen as inconvenient or unpleasant. Potential reactions to this include engaging in less inconvenient action which is not as beneficial, or a raise in fear or anxiety.

The model assumes that If the percieved severity of, and susceptibility to a risk are high, a person will form an intention to perform a preventative health action. The particular course of action is determined by the percieved benefits of, and barriers to each preventative course of action which is available to the individual.

#### **4.4.4 Self-Regulation Model**

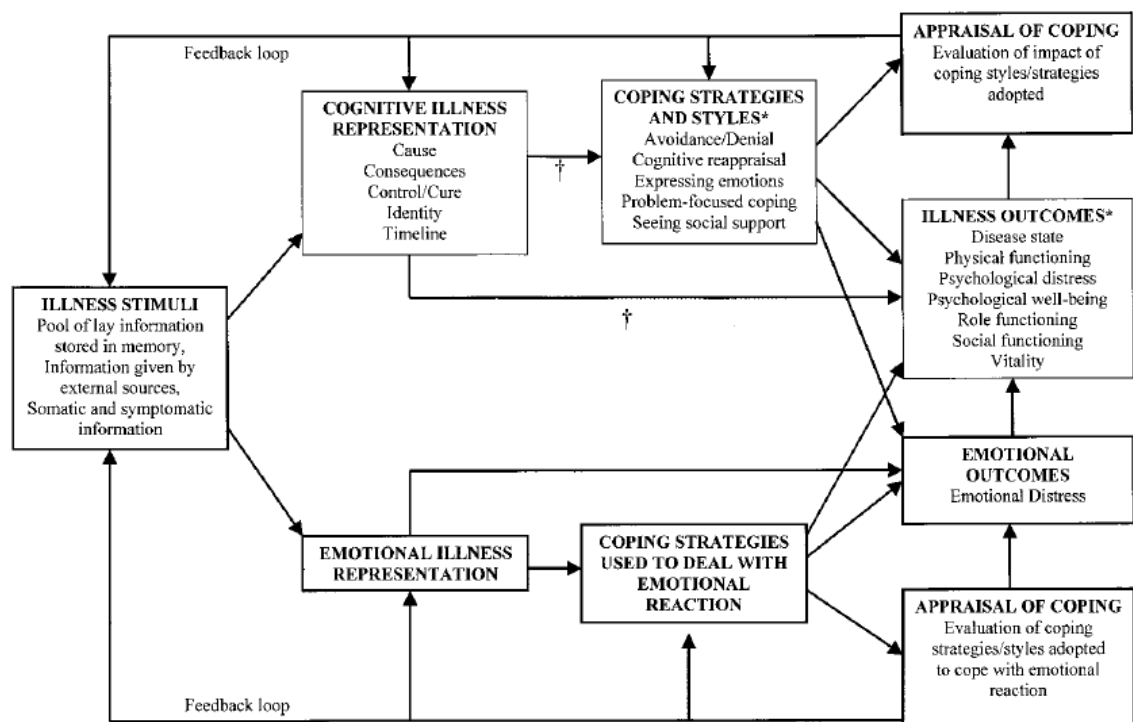
Bandura's (Bandura 1991) explanation of self-regulation:

'Most people value their self-respect and the self-satisfaction derived from a job well done more highly than they do material rewards. This self-regulation of behaviour by self- evaluative reactions is a uniquely human capacity.'

Leventhal's Self-Regulation Model (SRM) (Figure 14) aims to understand the relationship between the psychological processes which occur when a person encounters a health threat, and their consequent health behaviours. It provides a framework for understanding how internal and external stimuli experienced in relation to a health threat influence an individual's illness perceptions and subsequent coping behaviour. The SRM hypothesises that patients create mental representations of internal

illness processes. These are based on sources of information available to them and help to make sense of and manage the illness or problem. Representations are divided into 5 components: **cause** (the perceived cause of the health threat, e.g. smoking); **consequences** (beliefs about the outcome of the health threat, e.g. harm to fetus); **control/cure** (what can stop the health threat existing e.g. smoking cessation); **identity** (the label given to the health threat and it's symptoms); and **timeline** (the length of time it takes for the health threat to manifest itself). Cameron (Cameron 2008) suggests that the three components identity, cause and timeline serve as likelihood estimates and the remaining components, consequences and control/cure serve as severity estimates, demonstrating the impact of illness representations on risk perceptions.

The outcome of the model assumes that people will attempt to 'self-regulate' or maintain a sense of normality. Empirical evidence (Hagger and Orbell 2003) demonstrating the validity of the SRM is mostly based on illness or health threat representations.



**Figure 14: A schematic representation of the self-regulation model (Hagger, Orbell 2003)**

Studies (Jessop et al. 2013, O'Connor et al. 2008, Byrne et al. 2005) have shown that emotional representations are similarly important predictors of health related outcomes. Jessop et al (Jessop et al. 2013) explored the relationship of the SRM to pregnancy using the concept of emotional representations. 408 women in late pregnancy completed an online survey. Results showed that up to 39% of the variance in indicators of mental health accounted for representations of pregnancy, showing that holding stronger beliefs about the fact that outcomes of pregnancy can be controlled was associated with better mental health. This novel application of the SRM to a health related life event which does not involve illness demonstrates the likelihood that the model might provide an appropriate framework to study associations between health behaviour outcomes and pregnancy related beliefs.

Leventhal (Leventhal et al. 1998) notes the difference between behaviour when an individual is faced with an illness and behaviour when faced with the *threat* of an illness. He concludes that the disease threat is then external to the self and 'someone else's problem'. Leventhal's recommended strategy is to create a more complete conceptualisation and operational definition of the conditions that connect the threat to themselves (Leventhal et al. 1998).

#### **4.4.4.1 The Abstract/concrete continuum**

Leventhal's conceptualisation of illness representations proposes that these lie on a continuum from abstract/conceptual to concrete/experiential and the more concrete a representation, the greater chance of impact on cognition or emotion (Cameron 2001, Leventhal et al. 1980). Leventhal et al (1998) describe an abstract/conceptual level illness representation as a product of cultural information, whereas a concrete/experiential level representation is a product of the individual's perceptual processing of bodily changes. Cameron (2001) concludes that concrete/experiential risk representations are likely to be dominant predictors of behaviour.

#### 4.4.5 Integrating models of behavioural theory

Figure 15 is a schematic representation of an integrated model developed by Fishbein et al (Fishbein and Yzer 2003). The model combines the key determinants of the theory of reasoned action, the health belief model and social cognitive theory. The creation of this model intimates the possibility of developing interventions which can combine all of the predictors of behaviour outlined in the three models without the need to choose one model and therefore increase the likelihood that the desired outcome of the intervention will be achieved.

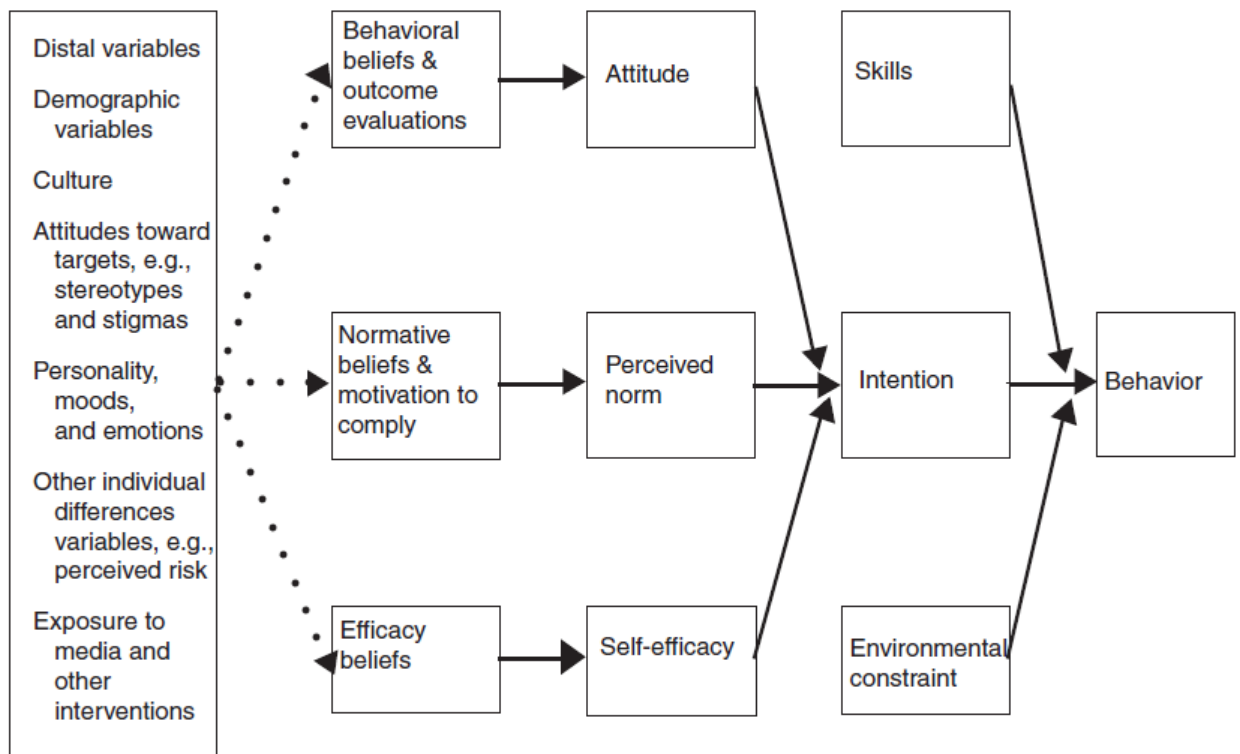


Figure 15: An integrative model of behavioural prediction (Fishbein and Yzer 2003)

#### 4.5 Emotion and Cognition

As outlined in previous sections, simply understanding facts does not guarantee that a person will perform a desired behaviour. The complex cognitions regarding smoking and smoking cessation have been outlined in this chapter. It may be that it is possible to



influence these cognitions through emotion. The role of emotion and cognition in potential behaviour change are explored in this section.

As Leventhal (Leventhal and Scherer 1987) argues, emotion and cognition are complex behavioural constructs which are the product of a changing, multi-component processing system making it problematic to provide a precise definition for either construct.

Emotion is a difficult concept to describe in simple terms, with considerable debate surrounding it (Cabanac 2002). In search of a definition of emotion, Cabanac notes that emotion is mental state, typically involving somatic signals. He proposes that emotion can be defined as 'any mental experience with high intensity and high hedonic content (pleasure/displeasure).' In comparison to emotion, there is less debate around the definition of cognition. An accepted definition is that provided by the Oxford English Dictionary (2004). That is 'the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses '.

In a study of emotion and addiction, Elster (2000:102) draws the following conclusions; complex human emotions are caused by cognition; emotion may be the object of cognition; cognition may be the effect of emotion. He summarises that these relationships occur simultaneously and interact with each other.

There are seven properties of cognitions (Krosnick and Petty 1995) which are potential moderators of cognition-behaviour relations; accessibility, temporal stability, direct experience, involvement, certainty, ambivalence, affective-cognitive consistency. As these properties have shown effect on behaviour change, it is possible that they are mediating factors on where a cognition lies on the scale of abstract to concrete.

#### **4.5.1 Emotions and behaviour**

Some emotions are intentionally evoked in behavioural interventions because of a potentially causal link to intention formation. An induced positive mood has been shown

to be a mediator of self-efficacy (Kavanagh and Bower 1985). This section focuses on the negative emotions regret and fear.

Relating to the emotional representations discussed in relation to the SRM. Michie et al (Michie et al. 2008) list emotion as one of their key determinants of behaviour change. Included in their comprehensive list of BCTs are the following:

- **Fear arousal:** induce aversive emotional state associated with the behaviour
- **Anticipated regret:** induce expectations of future regret about non-performance of behaviour.

#### **4.5.1.1 Fear**

Fear is defined as a 'negatively valenced emotion, accompanied by a high level of arousal' (Witte and Allen 2000). The arousal of fear or related emotions such as worry or anxiety are often employed in health risk communications. Increased fear or worry has been shown (Diefenbach et al. 1999) to be a motivator to behaviour change. Studies (Cameron and Diefenbach 2001) have shown the arousal of fear related emotions to impact on behaviour where raised risk perceptions alone showed no effect. However, the arousal of fear is not always a desired outcome. A meta-analysis by Witte and Allen (Witte and Allen 2000) found that strong arousal of fear with a low-efficacy message provoked defensive responses and did not lead to positive behaviour change. Strong arousal of fear, combined with a high-efficacy message produced the greatest effect on behaviour change.

A study (Dijkstra and Brosschot 2003) of the quitting behaviour of more than 700 smokers and ex-smokers measured levels of worry. It showed that increased levels of worry in combination with low self-efficacy reduces the likelihood of positive behaviour change due to defensive avoidance. Conversely, in individuals with high self-efficacy, the likelihood was increased. This clearly shows that self-efficacy is important in the case of smoking cessation, where worry or fear may be present regardless of whether an

intervention seeks to increase these emotions. Rogers and Deckner (Rogers and Deckner 1975) found that, in a study of 279 smokers, higher levels of fear appeals strengthened smoking cessation intentions and, with the addition of self-efficacy, positively influenced smoking cessation behaviour.

#### **4.5.1.2 Regret**

The cognition-based emotion of regret is experienced when an individual realises that an unpleasant event or situation could have been avoided, or that a positive outcome has been missed, had they acted differently in the past. Regret is a strong negative emotion. It is possible to anticipate regret, and act differently to avoid experiencing the emotion. The theory of anticipated regret assumes that, if a person imagines the feeling of regret they will have should a preventable negative outcome occur, they will be more likely to perform the required action to decrease the likelihood of the negative outcome. A meta-analysis of 11 studies which used the TBP to predict intentions and behaviour with an additional measure of anticipated regret (Sandberg and Conner 2008) demonstrated that anticipated regret is effective as an additional behavioural predictor in the TPB. There was a strong relationship between anticipated regret and intention ( $r=+.47$ ,  $k=25$ ,  $N=11,254$ ) and a moderate relationship between anticipated regret and behaviour ( $r=+.28$ ,  $k=8$ ,  $N=2,035$ ). Behaviours predicted by anticipated regret included the formation of intentions to; use condoms, eat unhealthy food, exercise, and initiate smoking. Anticipated regret from not quitting smoking was measured by Lazuras et al (Lazuras et al. 2012) in a study of 93 daily smokers and was found to fully mediate the effect of subjective norms, and partly mediate the effects of attitudes on smoking cessation intentions demonstrating that it could be integrated into interventions to promote smoking cessation.

## **4.6 Discussion**

This chapter has provided an overview of models and concepts in behavioural theory which have the potential to predict or influence behaviour patterns in relation to smoking

cessation and/or pregnancy or demonstrate strong potential in being able to do so. This section summarises the findings in this chapter and discusses which theory should be embedded into an intervention to promote smoking cessation during pregnancy to optimise the likelihood of effectiveness.

The ultimate goal of a model of behaviour change is to understand and therefore predict behaviour. The nature of human behaviour is too complex for these models to do this with high precision. However, broad behaviour models which are generalisable across varied behaviours and populations can be useful in establishing suitable theory.

As demonstrated by the integrated model in Section 4.4.5., although there are many models and concepts discussed in this chapter, there are a number of overlaps. Therefore, an intervention which encompasses the determinants of several models would, potentially, not be more complicated to develop and would have an increased likelihood of creating the desired behaviour change. Additionally, leaving out descriptions of all theory encompassed in an intervention could have a negative impact on future research (Michie et al. 2009). An intervention based on SCT, for example, could also unintentionally reflect the determinants of the TPB. The TBP would not be referred to in the literature involving that intervention and future systematic reviews or meta-analysis of the model would fail to benefit from the study.

Table 21 outlines the four models described in this chapter and their components in relation to smoking cessation during pregnancy. Overlaps between components demonstrate that it would be possible, and perhaps likely, that an intervention could contain all components of more than one model. Therefore, the intervention described in this thesis was not developed using one model. It contains components of all described models. Emphasis was placed on addressing those components which were supported with strong empirical evidence that they were effective in influencing behaviour in the case of smoking cessation or in pregnancy.

**Table 21: Predictive models of health behaviour and their components in relation to smoking cessation during pregnancy.**

Model	Constructs that make smoking cessation likely.
<b>HBM</b>	<ul style="list-style-type: none"> <li>• Perceived susceptibility to the risk of adverse health outcomes (both to the fetus and the mother) is high.</li> <li>• Perceived severity of the health outcomes is high.</li> <li>• Perceived benefits of smoking cessation are high.</li> <li>• Perceived barriers to smoking cessation are addressed.</li> </ul>
<b>SCT</b>	<ul style="list-style-type: none"> <li>• Knowledge of the health risks of smoking and benefits of cessation is high.</li> <li>• Perceived self-efficacy that they can quit is high</li> <li>• Outcome expectations about the costs and benefits of smoking cessation are high.</li> <li>• Goals are set in place to achieve smoking cessation and concrete strategies to achieve these are put in place.</li> <li>• Perceived barriers and facilitators to achieving cessation are addressed.</li> </ul>
<b>TPB</b>	<ul style="list-style-type: none"> <li>• Attitude towards performing the behaviour is positive.</li> <li>• Perceived norms concerning smoking cessation during pregnancy are addressed.</li> <li>• Perceived Behavioural Control with respect to performing the behaviour is high.</li> </ul>
<b>SRM</b>	<ul style="list-style-type: none"> <li>• Person believes that the risk is caused by smoking (cause).</li> <li>• Person believes that the outcome of the smoking during pregnancy is negative (consequences).</li> <li>• Person believes that they can control the outcome by performing a behaviour (control/cure).</li> <li>• Person understands the specific outcomes of smoking during pregnancy (e.g. pre-term birth) (identity).</li> <li>• Person understands the length of time it takes for the health threat to manifest (i.e. the length of pregnancy) (timeline).</li> </ul>

To use theory to create an underpinning for a behavioural intervention, we must first establish the typical behaviour of the population sub-group that the intervention is to be

aimed at. A number of other factors such as general beliefs, knowledge levels, attitudes and intentions towards the target behaviour also need to be considered and empirical evidence reviewed. The key theoretical constructs of the intervention can then be established. These should aim to influence any factors which have been identified as barriers to performing the target behaviour. Table 22 shows the issues known to be barriers to smoking cessation during pregnancy and the theoretical constructs which this chapter has demonstrated to be effective in predicting or influencing behaviour for each issue.

**Table 22: Issues known to be barriers to smoking cessation during and after pregnancy mapped on to theoretical constructs.**

<b>Issues known to be barriers to smoking cessation during and after pregnancy</b>		<b>Theoretical constructs</b>
Low Risk perceptions because of	A lack of knowledge of specific risks (despite general awareness of the dangers of smoking)	Raise risk perceptions
	A distrust of scientific evidence (Graham et al. 2011)	Cognitive dissonance
	A perceived lack of priority by health professionals (Graham et al. 2011)	Fear/worry arousal
	Believing that their own level of smoking is not high risk (Weinstein et al. 2005)	Anticipated regret
	Personal experience (i.e. knowing people who smoked and had healthy babies) (Graham et al. 2011)	Create concrete risk representations
		Perceived susceptibility to and severity of the risk and perceived benefits of performing the behaviour (components of the HBM).
		Cause, consequences, control/cure, identity, timeline (components of the SRM).
		Knowledge, outcome expectancies (components of SCT),

Personal circumstances causing stress and triggering smoking (Graham et al. 2011)	Perceived barriers and facilitator to achieving goals (SCT), Perceived barriers (HBM), Goals are set in place to achieve the behaviour and concrete strategies to achieve these are put in place (SCT). Self-efficacy.
Being surrounded by people who smoke makes cessation difficult (Graham et al. 2011).	Perceived barriers and facilitator to achieving goals (SCT), Perceived barriers (HBM), self-efficacy
Beliefs that others around them do not want them to, or do not think they should, quit (Dohnke et al. 2011).	Subjective norm
Feelings of guilt and worry leading to defensive withdrawal (Dijkstra and Brosschot 2003)	Self-efficacy
Not feeling that the baby is real and concrete (Lumley 1980).	Create concrete representations of the fetus.
Feeling unable to quit due to addiction (Jenks 1992).	Self-efficacy
Risk of weight gain (Klesges and Shumaker 1992)	Cognitive dissonance
Only quitting for pregnancy (high rates of postpartum relapse) (McBride et al. 1992, Fingerhut et al. 1990)	Theory as above tailored to specific barriers to, and facilitators of, smoking cessation in the postpartum period.



Based on evidence gathered, the theoretical basis for the intervention will be guided by a set of aims which have been developed as a result of the theory explored in this chapter. The key aims are to raise risk perceptions and increase self-efficacy. The remainder of this section provides an outline of these aims and the likely theoretical components necessary to achieve them.

#### **4.6.1 Risk perceptions**

As discussed in this chapter, high risk perceptions are important if a person is to perform a behaviour (e.g. quitting smoking). *How* we attempt to raise risk perceptions is key to the success of an intervention. It is clear that simply providing information about the adverse health outcomes that may occur as a result of smoking during pregnancy is not sufficient. We propose that, in the case of smoking during pregnancy, risk perceptions can be raised by; creating concrete/experiential risk representations, and challenging the typically held beliefs that relate to cognitive dissonance in smokers.

##### **4.6.1.1 Cognitive dissonance**

In Section 4.3., we concluded that information given to someone who smokes is only effectual if the cognitive processes of the individual in question are altered to raise their estimations of the risks involved in continued smoking. McMaster and Lee (McMaster and Lee 1991) suggest that by denying the validity of the health risks involved in smoking, smokers can reduce cognitive dissonance. Therefore this denial must be overcome. One such method of achieving this could be to focus on the short term, perceptible effects of smoking such as coughing or shortness of breath (Hansen and Malotte 1986).

Simmons (Simmons et al. 2004) proposal of three methods that smokers use to reduce cognitive dissonance suggests that those who continue to smoke either; misinterpret or ignore commonly held knowledge about the averse outcomes of smoking, or introduce

new cognitions. We propose that the following steps can be taken to reduce cognitive dissonance:

**Ensure information is not open to interpretation:** Provide information in a clear manner, tailored towards the target group. Ensure that it is not open to ambiguity.

**Ensure information is not easily ignored:** Present information in a format which the smoker wants to engage with, or is likely to engage with. Embed the smoking cessation information within other information which the user wants to read/listen to.

**Challenge misconceptions:** Identify and challenge commonly held beliefs about smoking and smoking cessation.

#### ***4.6.1.2 Concrete/experiential risk representations***

Peretti-Watel (Peretti-Watel et al. 2007) et al suggest that to raise risk perceptions among smokers, it may be necessary to change the way they process information, rather than simply providing them with facts. A clear perceptual understanding of a health threat could potentially facilitate such a change. In a study of hypertension patients' illness representations, Leventhal et al (Leventhal et al. 1998) discovered a distinct conflict between their abstract conceptualisation of hypertension and a clear, perceptual awareness of the disorder. The perceptual level was also found to determine compliance with treatment.

Emotional representations have a causal link to behaviour change. Arousing emotions can create concreteness and therefore raise concrete risk representations. Evidence surrounding the arousal of fear or worry suggests that an attempt to utilise the motivational potential of fear or worry in an intervention (Cameron and Chan 2008) would increase the likelihood of a desired behaviour change. However, it is important to note that this is only effectual if combined with a strong self-efficacy or self-regulatory message (Witte and Allen 2000). Fear appeals which advocate smoking cessation are particularly complex. In a discussion about the impact of fear appeals for smokers,

Hastings (Hastings and MacFadyen 2002) notes that repeating information about adverse health outcomes to a population who are already aware, and many of whom want to quit, may not be of value.

#### **4.6.2 Self-efficacy**

Self-efficacy is highly regarded in behavioural theory as a central determinant of behaviour change. To increase the likelihood of success, raising self-efficacy should be a primary aim of an intervention. Shahab et al (Shahab et al. 2007) show that raised self-efficacy levels are important when dealing with smoking cessation.

The techniques outlined by Bandura to increase self-efficacy which can feasibly be applied to an intervention are summarised here:

**Enactive mastery:** Self-efficacy can also be strengthened by prompting individuals to recall their own past successes in performing a behaviour (self-modelling) and process these successes in a way which makes them believe that the behaviour can be repeated. Past failures can be recalled to teach the person that effort and persistence are required. There may not be any instances of past behaviour, in which case persuading a person that they *can* perform the behaviour with consistence over time.

**Vicarious experience:** Self-efficacy can be strengthened by making a person believe that their actions are superior to others around them, or when a person with similar characteristics to themselves is seen to be struggling with, and achieving realistic goals. The introduction of a coping model to an intervention would be a useful addition.

**Verbal persuasion:** Although this is not thought to be as powerful as the other techniques outlined by Bandura, verbal persuasion is a useful adjunct to other techniques and is easy to achieve. Persuasion should be in the form of encouraging, positive messages rather than a negative appraisal of past behaviour. The source of the verbal persuasion should be perceived as reliable by the recipient.

**Psychological and affective states:** An intervention which induces a positive mood can strengthen self-efficacy. In pregnancy, such an induced mood exists at the time of the ultrasound scan. The mood of pregnant women after a healthy ultrasound scan is generally very positive (the more intense the mood, the greater its impact on efficacy states). However, coping efficacy can be lowered by raised stress, so attempts to raise negative emotions such as fear and regret should be approached with caution.

As outlined in this thesis, there are a number of barriers and facilitators to smoking cessation which make it difficult for a person to quit, even if they have formed an intention to do so. Therefore the emphasis of raising self-efficacy in this intervention should be on assuring the person that they can quit, with specific emphasis on providing strategies on *how* they can quit such as pre-empting barriers to cessation. Of the suggestions provided by Bandura, we propose that the use of a 'coping model' would fit this purpose best. Additionally, a coping model is an example of vicarious experience which has been shown (Ashford et al. 2010) to be the most effective of the four components of self-efficacy.

#### **4.6.3 Limitations**

Behaviour models tend to assume that human behaviours are formed based on a careful consideration of the consequences of performing the behaviour. In reality, human behaviour is not as structured or consistently explicable as these models seem to show. This must be taken into consideration in the design of an intervention.

##### **4.6.3.1 Specific challenges**

The recommendations above were developed not only from the theory discussed, but with the feasibility of integration into an intervention in mind. However, there are still specific challenges involved in tailoring these guidelines to the target group for the intervention.

The aim of the intervention is to increase cessation rates in all women who were smokers immediately before pregnancy. This includes women who have formed an intention, those who haven't, and those who have quit but may need help sustaining cessation. An intervention which focusses on intention formation is not always suitable for those who have already formed this intention. For example, one pregnant smoker may judge the risk to her baby as low because she does not believe that smoking can cause harm to the fetus and will continue to smoke, however another pregnant smoker may judge her risk as low because has cut down the number of cigarettes she smokes. A third pregnant smoker may believe she has a low risk because she her sister smoked throughout pregnancy and had a healthy baby.

#### 4.7 Conclusions

The conclusions drawn in this chapter are summarised in Table 23 in the form of a set of aims demonstrating how theory can be operationalised within an intervention to promote smoking cessation during pregnancy. There are 2 key aims; to raise risk perceptions and increase self-efficacy. However, we suggest it is the method by which each achieved which is crucial to adding to intervention effectiveness.

**Table 23: Key aims for the intervention derived from behavioural theory**

Aims	Method by which it is operationalised
<b>Raise risk perceptions by:</b>	
Induce cognitive dissonance	Ensuring information is not open to interpretation and is not easily ignored. Identifying and challenging commonly held misconceptions.
Create concrete/experiential risk representations	Arousal of fear/worry.  Providing a clear, perceptual understanding of the risks.
<b>Increase self-efficacy by:</b>	

Enactive mastery	Encourage recollection of past successes or failures of modelling the behaviour (self-modelling).
Vicarious experience	Using a 'coping model' who struggles with, and achieves realistic goals.
Verbal persuasion	Encouraging, positive advice and information.
Physiological and affective states	Induced positive mood.

This chapter has provided an overview of behaviour theory in relation to smoking cessation and smoking cessation during pregnancy. Specific theory with supporting empirical evidence has been highlighted and we have made recommendations about the key theoretical constructs which are likely to optimise intervention effectiveness.

Combined with theory generated in Chapter 3, there is now strong evidence regarding the content of the intervention. The next chapter provides an outline of the methods that can be used to deliver this content by exploring the mode of delivery.

## 5 Chapter 5: Mode of delivery

### 5.1 Overview

Chapters 3 and 4 have outlined the literature which is relevant to inform the theory behind the *contents* of the intervention. In this final part of the literature review, the importance of the *mode of delivery* by which an intervention is delivered is explored.

The mode of delivery of an intervention (for example face to face or visual) can influence its accessibility (Steele et al. 2007), reach, and effectiveness (Webb et al. 2010). This could be a positive influence or could potentially undermine the whole intervention. In some cases, where there is little or no difference in results between modes of delivery, it may be appropriate to choose the most cost-effective mode of delivery.

The specific modes of delivery discussed in this chapter have been divided into three; *images*, *text-messages*, and *narrative*. These were chosen in discussion with experts in intervention development and with health professionals. They were also thought to best support the theory described in previous chapters, both in their capacity to change behavior and their suitability for the target group. They are likely to be accessible and acceptable to the target group.

In this chapter, the rationale behind the decision to use these modes of delivery is provided and, for each mode of delivery, methods for how it can be optimised for maximum effectiveness are outlined. Recommendations for the development of the intervention are developed. *How* these modes of delivery are used to optimise the efficacy of the intervention is described in the next chapter.

Key to the effectiveness of the intervention is to communicate health information in a way which will aid the job of health professionals. Communication between healthcare professionals and patients can be problematic for three reasons; Firstly, patients may not understand technical terms used by healthcare professionals or more information is

given than the patient can process at one time; Secondly, the power and educational imbalance between patients and healthcare professionals can leave patients feeling reluctant to ask for clarification for fear of appearing inferior; Finally, if the patient has received particularly good or bad news, they are likely to be pre-occupied with their own emotions and less able to absorb information immediately after receiving the news (Houts et al. 2006).

To optimise the amount of information absorbed, the delivery of health information delivered must (Houts et al. 2006):

- Draw attention to the message
- Aid comprehension of the message
- Increase recall of the message
- Increase likelihood of adherence to message

A systematic review (Trevena et al. 2006) on communicating evidence to patients found that most communication tools (e.g. verbal, text, video etc.) increase the patient's understanding. This is enhanced when the information is presented in a structured format, is tailored to individuals or sub-groups, or is interactive.

## **5.2 Images**

This section will outline the growing body of evidence demonstrating that images can be effective in behaviour change interventions. Williams and Cameron (Williams and Cameron 2009) refer to an image as a complex intervention in itself; it can convey theory and narrative through its interrelated elements. Due to the complex nature of the effect of images on both information processing and emotion, the role of images in; aiding communication, development of mental images, and emotion are explored separately. Also types of images and aesthetics are discussed.



### **5.2.1 Images to aid communication**

Representing information in a visual format has advantages over verbal or text based formats. Images are potentially; more memorable than verbal or written information (McCaul et al. 2007) (David 1998, Paivio et al. 1994, Gardner and Houston 1986); able to increase the concreteness of the information given (David 1998, Paivio et al. 1994) and are more accessible to those with language or literacy issues. They can also improve comprehension of, and attention to, a message (Steele et al. 2011, Houts et al. 2006).

In a study of more than 100 smokers who were given cards with smoking cessation messages (with or without images) to read at time points throughout the day, McCaul et al (McCaul et al. 2007), found that people who had cards with images on them found the message easier to recall than those with only text.

Combining images with text or verbal information may further improve recall of the text (Houts et al. 1998). The degree to which the message of the text relates to the content of the images (also known as the visual-verbal overlap) increases the concreteness of the information absorbed by the viewer (David 1998). This is thought to have additional effect on those with lower education levels.

Images can be more easily misinterpreted than text. They are open to ambiguity and uncertainties that may require some text or verbal information to explain (Gershon and Page 2001). To minimise this likelihood of misinterpretation, images should be kept simple and be designed to convey a straightforward message (Houts et al. 2006).

The likelihood of misinterpretation is dependent on the pre-existing knowledge and visual literacy skills of the viewer. Visual literacy is the set of skills that a person possesses which enable them to understand a visual communication while at the same time integrating their other senses such as hearing (Avgerinou and Ericson 1997). With increasing use of visual media in everyday life, the visual literacy of the general population is constantly improving (Gershon et al. 1998). When creating an image, it is

important to look at the prior knowledge and typical cognitive skill level of the target audience. Prior knowledge means a viewer invests less mental effort into learning a concept and has more cognitive capacity left for other details (Poohkay and Szabo 1995). The 'imagination effect' observed within cognitive load theory (Sweller et al. 2011) shows that learners with a high prior knowledge can imagine procedures and concepts produces better instructional outcomes than simply studying worked examples. This can produce a negative effect in those with low prior knowledge (Sweller et al. 2011:186).

### **5.2.2 Mental images**

Cognitive processes which affect health behaviours, both through and independently of impact on emotion (Hagger and Orbell 2003), such as illness and risk representations may be embodied in mental images (Damasio 2004, Mabeck and Olesen 1997).

There are now several studies (Harrow et al. 2008, Reynolds et al. 2007, Broadbent et al. 2006, Broadbent et al. 2004) which have examined these representations by asking patients to draw them. Reynolds et al (Reynolds et al. 2007) asked 60 patients with heart failure to complete a written questionnaire and draw a picture of their heart. Depictions of larger hearts, and damaged hearts had significant relationships with illness severity and depression. Additionally, in a qualitative in-depth interview study of 22 cancer patients, Harrow et al (Harrow et al. 2008) found that people often create mental images of their cancer. These were based mainly on verbal metaphors used by clinicians or on diagnostic images. Results showed that mental images based on verbal metaphors were often inaccurate due to women misinterpreting the clinician's words. It may be that images have the capacity to create mental images more accurately than those mental images developed as the result of verbal or written information.

Mental images can potentially influence behaviour, therefore the content of the mental image is important. When communicating health information with the aim of creating or influencing mental imagery, using a visual method could provide more meaningful and

accurate representations which can improve understanding without the need for lengthy verbal or text based explanations.

Although the accuracy of mental images is important, it is not always necessary for them to be medically precise. For example, mental images of the fetus in early pregnancy are often negative and may prevent women performing protective health behaviours (Lumley 1980). Providing women with a clear image of the fetus in that stage of development may further enhance the reported negative emotions.

### **5.2.3 Images and emotions**

Images can arouse negative emotions such as worry (McCaul et al. 2007, Freeston et al. 1996) and disgust (Humphris and Williams 2013); arouse positive emotions (Langer et al. 1988); and arouse positive and negative emotions simultaneously (Ito et al. 1998). Due to the potential effect of emotion on behaviour (see Section 4.5.1.1.), it is likely that images can also influence behaviour through emotion.

In their study of image versus text for smoking cessation, McCaul et al (McCaul et al. 2007) noted that the negative smoking images aroused worry but did not have an effect on risk perceptions. Worry was correlated with motivation to quit smoking.

The use of graphic warning labels on tobacco packet is now internationally prevalent. Many studies (Humphris and Williams 2013, Borland et al. 2009, Fong et al. 2009, Hammond et al. 2007, Hammond et al. 2006, Hammond et al. 2004, Hammond et al. 2003) have examined the effects of these images. Generally, the evidence shows that these images have influenced positive intentions and there is evidence that mediating emotions on behaviour are not only fear, but also disgust (Humphris and Williams 2013). However, there is some evidence that emotional distress may lead to defensive withdrawal and possible increases in smoking (Hammond et al. 2004). Less well explored is the potential effect of positive images, especially in the area of smoking cessation.

#### **5.2.4 Types of images**

The type of image used in an intervention is key to the success of the image. Williams et al (Williams et al. 2012) suggest that the most important initial decision when using an image to portray health information is where it lies on a continuum from 'metaphorical' to 'realist'. They argue that a 'realist' (i.e. an image of photographic quality) image would enhance impact through concreteness. In more complex 'realist' images, this may be at the cost of conceptual clarity and coherence – in these cases a more 'metaphorical' image would have the potential to reduce complexity.

The optimal type of image varies according to its purpose. This section will discuss the advantages of static (i.e. a drawing or photograph) and dynamic imagery (i.e. animated or video-recorded imagery). Studies show conflicting results for the advantages of dynamic over static images in learning. The most effective medium depends on a number of factors, including the information conveyed, its intended audience and its purpose (Ruiz et al. 2009).

The main difference of dynamic and static imagery is the typical inclusion of more information in a dynamic image (Tversky et al. 2002). This is not always an advantage as the inclusion of irrelevant material or an overload of information can lead to confusion. Seductive details (features which are interesting to the audience but irrelevant to the objective of the image) could be unintentionally included and withdraw attention from the intended message. If dynamic imagery is to be used, it must be carefully structured to emphasise focus on one relevant parameter at a time (Kaiser et al. 1992). A simple approach, focussing on one key message at a time, and omitting any unnecessary detail is likely to be the most effective method of delivering information in this manner.

Information displayed in a dynamic mode is transient. Once the information stored in a given frame has been viewed, it is no longer available to the viewer. A large amount of information given this way can lead to increased cognitive load because of the limitations

of memory (Hegarty 2004). A static image gives a more permanent message but is limited in the amount of information it can convey without causing confusion. Dynamic images may not always be cost effective due to the amount of expertise, time, equipment and money needed for the creation of a dynamic image compared to that required for a static image. The availability of the technology required to view the dynamic image to the target viewer must also be considered.

### **5.2.5 Aesthetics**

Aesthetics refer to the principles of the nature and appreciation of beauty. Visually pleasing images can increase attraction and gain attention from their intended audience (Steele et al. 2011). Aesthetics are also associated with trust (Li and Yeh 2010). The subjective nature of judging aesthetics means that there is no 'correct' method of creating a visually pleasing image. However, a range of perceptual factors play a role in the appreciation of the aesthetic value of an image such as image sharpness, contrast, colourfulness, colour harmony and composition (Obrador et al. 2010). This section provides an overview of the basic design principles relating to each of these factors.

#### **5.2.5.1 Colour**

Perceptions of colour may have their grounding in associations stereotypical to a culture. For example, in Britain, red is often associated with anger or danger. In China, red is strongly associated with good luck. People can also be emotionally aroused by colours that have personal associations (Biggam et al. 2011). Colour has a strong influence on object recognition (Reis et al. 2006) independently of the types of image (i.e. photograph or drawing) used. This is particularly prominent in illiterate people.

When text is placed on a coloured background, high levels of contrast between the background and text colours increase readability and retention (Hall and Hanna 2004, Ling and Van Schaik 2002).

### 5.2.5.2 Composition

Basic design principles (Obrador et al. 2010) to create aesthetically pleasing images involve; the *simplicity of the scene* and the *visual balance*.

**Simplicity of the scene:** Generally, the more simple the image, the more aesthetically pleasing it is. Irrelevant objects can distract from the meaning of the image and make it less attractive.

**Visual balance:** 'The golden section' has been used in images and architecture since the Renaissance. Today, artists and photographers use a simplified version of this called the 'rule of thirds' to create aesthetically pleasing images. This rule considers the image as if it has been divided into nine equal rectangles. It states that important compositional elements in an image should either be along the dividing lines, or situated on one of the four possible intersections. See Figure 16 for examples of how the rule of thirds has been successfully applied to create aesthetically pleasing images.



**Figure 16: Examples of the 'rule of thirds' applied to images**

### 5.2.6 Summary on the potential use of images

The information in this section has demonstrated that there is a strong rationale for the use of images as a mode of delivery. It has also highlighted that there is a range of pre-existing theory and design principles that can be drawn on to aid their development.

We propose that an intervention to promote smoking cessation during pregnancy should not contain images designed to provoke negative emotions. Firstly, graphic warning

labels on cigarette packs are a compulsory intervention for anybody who purchases tobacco products, although there is evidence to show that they can lead to behaviour change, it is unlikely that smokers would choose to view these images or participate in an intervention in which they were given the images. Secondly, Women receiving the intervention are already exposed to graphic images on cigarette packets so there is no strong argument for using additional images which cause fear and/or disgust. Finally, emotional distress during pregnancy can have adverse health outcomes for the fetus (Costa et al. 2000).

Mental images that women have of their fetus may also be important because of the potential impact that mental images have on behaviour. We suggest that the best way to change mental imagery that may have a negative influence on behaviour is to present the individual with a different image that may positively influence their behaviour.

A final consideration when using images in an intervention are three criteria identified by Williams et al (Williams et al. 2012) when establishing relevant theory for an image-based intervention; sufficient empirical evidence in prior research to suggest that the theory can lead to behaviour change; operationally relevant concepts to the specific population, clinic topic and behaviour in question; and ensuring that theory and constituent concepts can be feasibly communicated in visual form.

### **5.3 Text-messages**

Although reviews (Vodopivec-Jamsek et al. 2012) have shown potential effectiveness of text based interventions for smoking cessation, their importance and usefulness in practice will depend on public access to these technological means. This section will look at; the likelihood that the appropriate technology is available to the target group; their comfort and ease in using it; the potential of mobile technology in delivering health information; and past uses of text-messaging to deliver smoking cessation advice.

### **5.3.1 Rationale for using text-messages**

Mobile phones provide an opportunity to deliver health information outside of the clinical setting. This removes the need for the time and effort of a health professional, which has been shown to be a barrier to delivering health information (Beenstock et al. 2012). An advantage of an automated text-message program to deliver an intervention is that intervention fidelity could be achieved without relying on clinicians (Bellg et al. 2004). Assurance that the entire intervention will be delivered consistently to each participant allows for more reliable and accurate results. Text-messaging interventions may also be more cost-effective than paying for the time of health professionals in clinician-delivered interventions.

Temporal issues are important when considering delivering health information. To take advantage of potential 'teachable moments' (discussed in Chapter 1) the information must be delivered close to the time where the teachable moment (e.g. the ultrasound scan in pregnancy) because it is not known how long the effects of a 'teachable moment' last (Lawson and Flocke 2009). However, delivering information too close to an event where news which is likely to evoke strong emotions occurs is likely to reduce the amount of information absorbed at the time (Trevena et al. 2006). The use of mobile technology is one possible solution to this problem. Information can be sent to the recipient close to the time of the 'teachable moment', but they can choose whether or not to process the information at the time or later. The information is portable and can be referred to at a time that is convenient to the recipient.

### **5.3.2 Are text messages practical in real-life scenarios?**

The Office for National Statistics reported (ONS 2012) that in 2012, 87% of 16 to 24 year olds accessed the internet using a mobile phone in 2012, compared to 43% in 2010. Additionally, 60% of this age group accessed the internet using a mobile phone or other handheld device every day and another 20% at least once a week. This compares to 29% using a laptop or other portable computer to access the internet every day and 16%



at least once a week. The most common internet activities for this age group were social networking (e.g. Facebook or twitter). 96% of 16-24 year olds had used a computer within the last 3 months and 99% within the last year (ONS 2012). The trajectory for these figures shows a steep rise in internet usage on mobile phones. Smartphones and text messages are heavily integrated into the lives of young adults and are therefore an ideal opportunity for delivering important health advice.

### **5.3.3 Interventions delivered via mobile technology**

A systematic review of mobile-health (m-health) technology-based health behaviour change of disease management intervention (Free et al. 2013) showed strong evidence that text messaging interventions can increase smoking cessation. The pooled effect of text messaging smoking cessation support on biochemically verified smoking cessation was (RR 2.16 [95% CI 1.77-2.62]). Similarly, a Cochrane review of mobile phone messaging for preventative health care (Vodopivec-Jamsek et al. 2012) found high quality evidence that participants of a text messaging support interventions had a significantly higher likelihood of quitting than those in the control group at 6 weeks (RR 2.20, 95% CI 1.79 to 2.70) and at 12 weeks follow up (RR 1.55, 95% CI 1.30 to 1.84). Both of these reviews found strong evidence for text messaging to promote smoking cessation, but weaker evidence in other areas of preventative health.

A Cochrane review of mobile-phone based interventions for smoking cessation shows heterogeneous results. However, the pooled effect of mobile phone interventions compared with controls is significant (RR1.71, 95% CI 1.47 to 1.99).

#### **5.3.3.1 Evidence from text-messaging interventions**

It is important to draw on existing interventions to promote smoking cessation during pregnancy. A qualitative study by Naughton et al (Naughton et al. 2013) gathered the opinions of pregnant women on a text-messaging intervention to promote smoking cessation during pregnancy.

In Naughton's study, participants liked the convenient, hassle free method of receiving advice and support. The ability to store messages and refer to them at a later date was desirable. They reported that being able to text for additional supportive messages was a helpful and discreet method of getting support in public places. They also liked the positively framed messages and lack of any confrontation. Concerns included the risk of making a participant think about smoking when they would not otherwise have done so, and the ephemeral nature of the motivating effects of a single text message. Reinforcing the value of tailoring, participants disliked receiving advice which was not suitable for their lifestyle (i.e. suggesting an activity which would not be possible if the participant had to look after her children or go to work). Participants were most likely to pay attention to, and remember, the details of a message if it invited a reply. The perceived source of the message was thought to be more trustworthy if it did not contain 'text speak' (words shortened to letters which phonetically represent the word). The use of emoticons to convey emotion provoked a positive response.

A qualitative study (Douglas and Free 2013) of a tailored text-messaging intervention (txt2stop) to promote smoking cessation among the general population reinforces many of the findings in Naughton et al's study. Additional findings included that participants liked the feeling of the personalised text messages, describing the intervention as being like someone 'holding your hand' and thought that it countered feelings of isolation. This was particularly salient when text messages used the participant's own name. They also particularly liked reminders of the physical benefits of quitting. As in Naughton's study, there was a concern that text messages may stimulate cravings, however this was not a problem initially when cravings were strong and frequent anyway. It was later in the quit attempt that text messages prompted unwanted thoughts of smoking. Messages were frequent at first but this was reduced after 3 weeks to 3 messages per week. There was a positive reaction to this, although some participants thought that the intensive support was withdrawn too soon, and others thought that it was not soon enough. Some

participants indicated that they would have liked an option to start the intervention again after a failed quit attempt and that receiving messages intended for successful quitters reinforced their sense of failure.

In a focus group (Jamison et al. 2013), people who smoke were asked their opinions on what would be constituted helpful in a text message to aid smoking cessation. The most common of these were: messages of support (75%), motivational messages (79.2%), suggested quitting strategies (70.8%), messages highlighting the risks of smoking (37.5%), messages of support from others trying to quit (66.6%), the ability to request instant support (79.1%) and two-way messaging (92%).

Qualitative interviews with 13 pregnant women who had completed an internet-based intervention to promote smoking cessation during pregnancy (Herbec et al. 2014) demonstrated that participants had a preference for; an accessible and engaging intervention, tailoring to individual circumstances; novel and comprehensive information about smoking and smoking cessation during pregnancy; progress reports of the baby's health and development; and access to a discussion forum allowing communication with other pregnant women who wanted to quit.

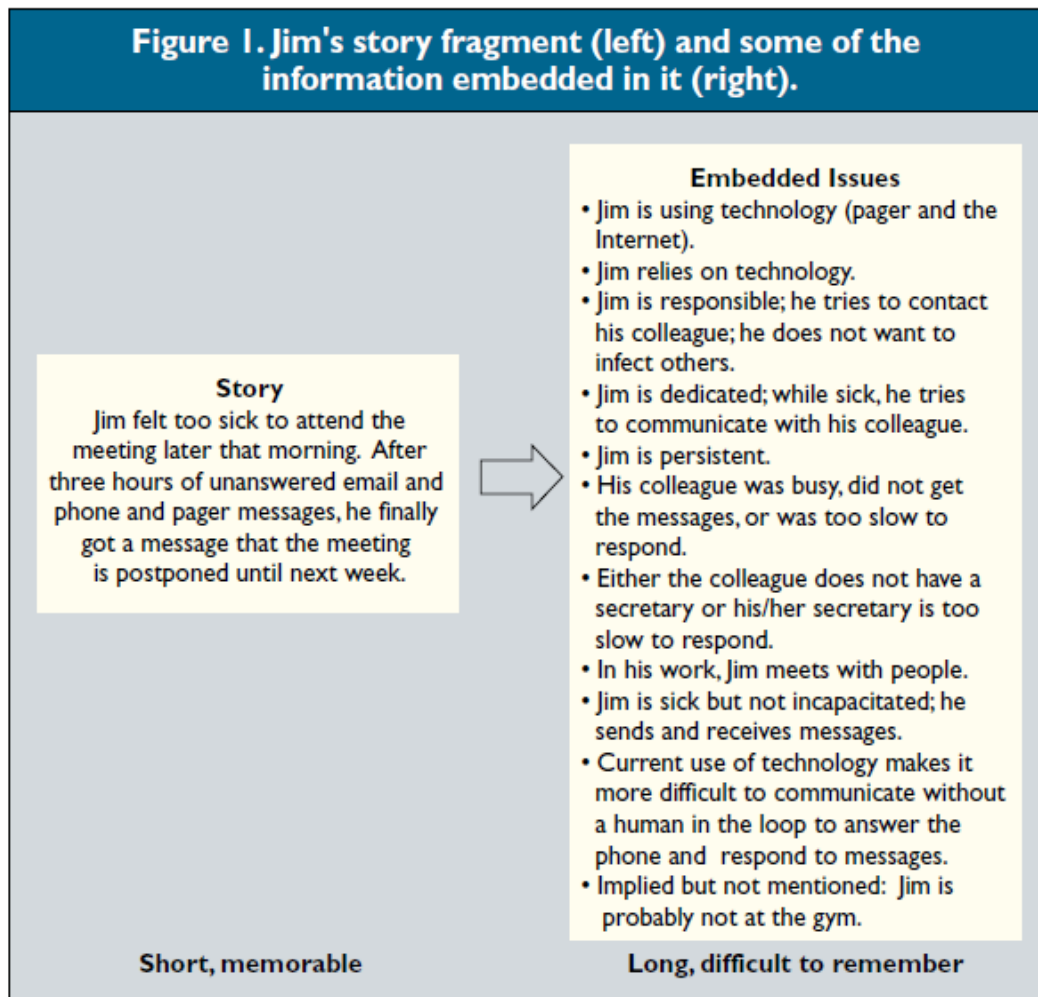
#### **5.3.4 Summary of the potential of text messages**

The collective evidence from this section suggests that text-messaging is an ideal means to deliver smoking cessation advice. It is accessible to the target group, it is acceptable in clinical practice, and there is empirical evidence of its effectiveness in interventions to promote smoking cessation during pregnancy. Using evidence from previous interventions is an important method of maximising the effectiveness of interventions.

#### **5.4 Narrative and storytelling**

There is growing evidence to indicate that storytelling techniques are an ideal method of communicating an optimal amount of information in a manner that can be easily understood, while retaining the attention of the audience by using a compelling and

appealing method of delivering a message. Giving information in the form of a story often makes it easier for people to understand. Information can be embedded or implicit in a narrative without the need for stating it outright (see Figure 17). This can create uncertainties, but if skillfully used, readers can clear them up through their own imaginations (Gershon and Page 2001).



**Figure 17: How information can be embedded into a story (Gershon and Page 2001)**

McKee (McKee 2010) identifies key constructs required for successful storytelling including:

- Structure
- Style

- Characterisation
- Substance
- Meaning

It was also important to provide an engaging and entertaining experience for the participant to optimise attention, recall and continued participation. The main challenge was to achieve this while still delivering a strong smoking cessation message. Advice was taken from storytelling and narrative literature.

Narrative and storytelling literature is explored in this section. Different genres are examined and their relevance to the development of the intervention is discussed. The purpose of exploring this literature is to ensure that the intervention is both entertaining and engaging, in addition to containing the relevant health information and theory to enable behaviour change.

#### **5.4.1 Narrative**

Narration is the action or process of telling a story. This can be through fictional or real life narratives. Narrative involves not only a description of events, but has a temporal dimension, an order or structure and a narrator to recount the story (Nash 1994:6). This four basic dimensions of all narrative: time, structure (including the plot), voice and point of view. These dimensions should be carefully considered and finalised before attempting to tell a story.

Narrative serves at least three vital functions:

- **A cognitive function:** Personal stories are fundamental constituents of human memory and new experiences are interpreted in terms of old stories

- **A social function:** Conversational personal stories have an important role in the social construction of the self from early childhood and in the creation of coherent life stories
- **An emotional function:** Storytelling has been used in very different forms of psychotherapy. The value of tales has been explored by the work of Milton Erickson in hypnotherapy and in fairy tales. A good overview of different uses of narrative in therapeutic experiences can be found.

Telling a story via text messages written by the characters falls into the genre of epistolary fiction. This means that the narrative is told via a series of documents. These are most commonly diary entries or letters but can encompass any fiction written in the style of a familiar form of communication.

Providing a narrative structure to an intervention can retain attention and aid memory (Kulkofsky et al. 2008). The ability to make causal links between sequential events in narrative is inherent in the human mind. Therefore narrative provides the opportunity for the user to construct meaning which can be implied rather than explicit within the narrative (Goncalves and Machado 1999). The potential for narrative to project into the future means the possibility of enhanced self-efficacy through emphasising that outcomes can be changed through choice (Krouse 2001, Gagliano 1988).

Mar and Oatley (Mar and Oatley 2008) note that psychological literature largely ignores the capabilities of fictional literature. They argue that fictional narrative can portray social information and simulate social interactions, leading to learning through experience.

#### **5.4.2 Narrative and health information**

Narrative is becoming an increasingly common method of communicating health information. Narratives present the opportunity to introduce characters, or models, engaged in a relevant behaviour and overcoming barriers to performing or ceasing the behaviour.

Soap operas form a part of daily life and provide a source of entertainment for millions of people in the UK. They have also shown potential to influence health behaviours: in 2001, the popular soap opera 'Coronation Street' featured a story in which a character died from cervical cancer. A retrospective analysis (Howe et al. 2002) showed a 23% increase (95% CI 21.0-21.6 pp) in people attending smear tests from the previous year. The long-term effects of this are not reported. This shows that intentions *and* behaviour can be influenced by the fate of even fictional characters. However, it should be noted that this was a popular character who had appeared in the soap opera for a number of years with whom the viewers had established a long-term connection.

A study of 210 adults invited for colorectal cancer screening showed that individuals receiving narrative messages were 4 times more likely to attend screening than those not receiving narrative messages. The mechanisms that cause this relationship between exposure to narratives and the uptake of screening were unclear, despite the examination of ten mediator variables. The authors suggest the narrative-specific constructs of; narrative transportation, narrative believability and character identification should be studied to predict effects on behaviour (Jensen et al. 2013).

#### **5.4.2.1 Narrative transportation**

Narrative transportation can be defined as the level which the reader becomes lost within the storyline and is likely to have a significant effect on the impact of the narrative (Green and Brock 2000). Green and Brock found that low narrative transportation led to low story-consistent beliefs. A reader's sense of being in the story, being absorbed by it, or transported into a fictional place and time is likely to be particularly strong where the reader is able to interact with the character. Escalas (Escalas 2007) suggests that self-referencing, where the reader relates the story to themselves or their personal experiences can increase narrative transportation.

Although the content, structure and embedded message of the story are important, the user must engage with the story or they will quickly lose interest. Therefore, the mundanity of life experienced by the characters which the reader is to identify with must be broken up by dramatic turning points which will leave the reader keen to know what happens next.

#### **5.4.2.2 Narrative believability**

Narrative believability relates to how plausible the story is. The reader is more likely to become absorbed in a narrative if he or she believes that the events of the story are possible within the world created by the story and that characters act and react to events in a believable way. Story inconsistencies and characters acting in an improbable manner would distract from the intended message of the narrative.

Arguably, the most important aspect of telling a fictional story is to make it believable. To achieve believability, a story must neither exaggerate nor underplay the action of the characters. They must act as the reader, with their given knowledge of the character's personality and motivations, would expect them to (Merchant et al. 2010). Clear motives for the actions of the characters are important because the reader will perceive events to be motive relevant even if they are outwardly commonplace (Owens et al. 1979).

According to Bates (Bates 1994), a believable character 'does not mean an honest or reliable character, but one that provides the illusion of life, and thus permits the audience's suspension of disbelief'. He states that believability can be achieved by: clearly defining the emotional state of the character; revealing the thought process, and therefore the feelings, of the character; and accentuating emotion.

Believability in epistolary fiction also centres around the structure of the document. In the case of a text message, the recipient should be addressed as they would in a text message typical of the type of person sending the message. This is also dependant on the recipient of the text message. For example, a text message to a friend would be



more informal than that sent to a parent or person of authority. Slang, colloquialisms and possibly swear words may be used.

A main challenge of interactive storytelling is to determine the real-time behaviour of characters in a way that is consistent with narrative phenomena. The duality between character and plot emphasises the difficulty of reconciling a character's perspective with the control exerted by the storyline. In addition, the psychology and feelings of characters is an essential part of most dramas (Pizzi et al. 2007).

### **5.4.3 Character identification**

The protagonist of the story is the leading character. In epistolary fiction, the protagonist is usually also the narrator of the story. The advantage of this is the insight of the reader into the mind and emotions that the protagonist wants to convey.

Character identification is the amount of empathy that the reader feels for the characters. He or she must be able to develop hope and fear in reaction to the fortune and misfortune of the fictional characters. The characters must be believable enough for the reader to suspend disbelief, but likeable or dislikeable enough to provoke empathy.

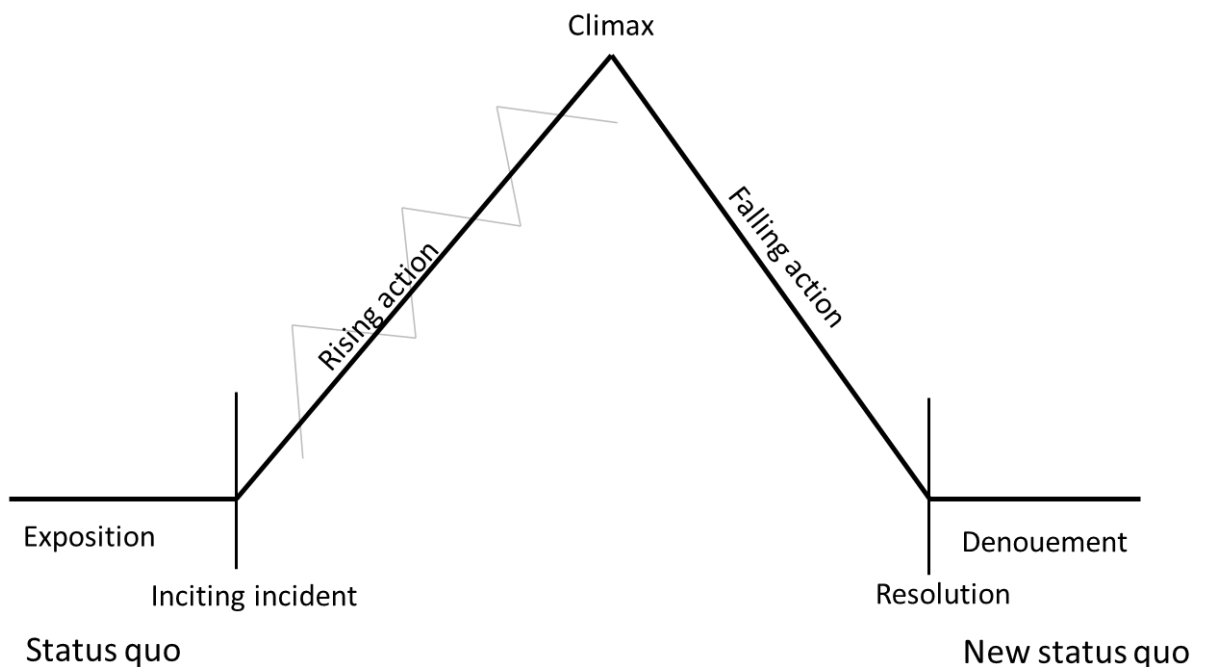
Although the protagonist must be believable, if the purpose of the story is for the reader to empathise with, and connect with, the character, it is important that he or she is not perceived to be behaving malevolently (Zillman and Cantor 1977).

Cattrysse (2007) sets out four conditions which are universally required to make a good story through all of the storytelling disciplines. These are that: the protagonist is set an objective which is known by the reader or at least perceptible to them early on in the story; the motive for the objective must be clearly understood; the objective must be particularly difficult for the protagonist to achieve; and the protagonist is utterly and irrevocably committed to achieving the objective. A good storyteller describes what it's like to deal with these opposing forces, calling on the protagonist to dig deeper, work

with scarce resources, make difficult decisions, take action despite risks, and ultimately discover the truth (McKee 2010).

#### 5.4.4 Storyline construction

The plot of most successful stories can be represented by a common story arc. This is simply represented in Freytag's pyramid (Freytag, 1894) (Figure 18). The story begins with the exposition which introduces important details about characters and situations. This is a description of the status quo. During the exposition, an inciting incident occurs. This is an event which determines the character's objective for the remainder of the story. Then comes a period of rising action, which often contains turning points in the story. The story then reaches a climax. This is the moment of greatest tension in a story. Falling action then follows the climax. These are the events following the climax which lead to the resolution of the story. The denouement ties up any loose ends and describes the new status quo which has altered as a result of the story.



**Figure 18: Schematic representation of the structure of a story based on Freytag's pyramid (Freytag, 1894)**

#### **5.4.5 Summary**

There is evidence that information delivered in a narrative format can influence positive health behaviours. In the case of delivering smoking cessation information, narrative may be an ideal method of delivering information indirectly. The information can be embedded into a storyline presented in an engaging and entertaining way. This may reduce the defensive withdrawal sometimes observed in smokers.

### **5.5 Conclusions**

This chapter has provided an overview of the three primary modes of delivery which have been chosen to deliver the intervention. It has outlined why they were chosen and how they can increase intervention effectiveness.

As outlined in this chapter, text-messaging is a tried and tested mode of delivery which has shown particular effectiveness in smoking cessation, and there are empirical examples of effective text-messaging interventions to promote smoking cessation during pregnancy. Therefore, we can conclude that it is a suitable mode of delivery for the purpose. The other forms of delivery proposed are more novel in the case of smoking cessation. Although graphic images designed to provoke negative emotions are widely used on cigarette packets and have shown effectiveness, the use of positive images to provoke feelings of affection and increase concreteness are less well explored in smoking cessation. Similarly, the use of fictional narrative in intervention design is not common. There is evidence of its effectiveness in promoting other positive health behaviours and there is therefore a strong rationale that it may be effective in promoting smoking cessation during pregnancy.

Evidence gathered from each of the modes of delivery described in this chapter has been re-conceptualised into a set of aims (see Table 24), which are designed to inform the development of the intervention.

**Table 24: Implications for the development of the intervention from the three key modes of delivery.**

<b>Mode of Delivery</b>	<b>Images</b>	<b>Text-messaging</b>	<b>Narrative</b>
<b>Recommendations for the development of the intervention.</b>	Consider the needs of the target audience (level of education, age, gender, race)	Text messages should be frequent to start with but will gradually be reduced.	Create a believable storyline with believable characters.
	Omit seductive details	The participant should be addressed by name in the text messages	Follow the format outlined in Freytag's pyramid.
	Images should be relevant	Emoticons can be used to convey emotion	Create empathy for the protagonist.
	Meaning should be clear	Text speak' should not be used within the text messages.	Storyline should be engaging and entertaining.
	Use images which have meaning in their own right (they should not be dependent on explanatory text)	Some messages sent when the intervention is less intensive may not refer to smoking at all. The purpose of these is to keep the participant engaged and remind them that help is available but will not trigger cravings.	Lessons and advice about smoking cessation should be embedded within the story rather than explicit.
	Consider the trade-off between clarity and concreteness when	Images should be sent from a different number than the text-based messages. This	The protagonist has an objective which is known to

	deciding between 'realist' and 'metaphorical' images.	is so participants can scroll through the images separately and view the progression of the baby developing.	the reader, the motive for the objective is clear, the objective is difficult to achieve and the protagonist is committed to achieving it.
Segment information where possible to reduce cognitive overload.	Participants should be able to send text messages requesting help and receive tailored support messages in reply.		
Consider colour and the emotions it can provoke	Smoking advice should be embedded rather than explicit (to reduce any perceived 'nagging').		
Dynamic imagery can clearly portray a complex narrative but is transient. Static images have more permanence but can be limited in the amount of information they can give.	The intervention should be tailored to each participant's employment status and if they have any other children. These will determine the advice they are given relating to activities to use as a distraction from smoking.		
	Messages should not assume that the participant has made a successful quit attempt unless they have stated otherwise.		

## **6 Chapter 6: Exploring the views and opinions of pregnant women and healthcare professionals: a qualitative study**

### **6.1 Overview**

The previous chapters of this thesis have comprised a literature review of the theory and evidence relating to smoking cessation during pregnancy. The purpose of this chapter is to fill in gaps in the evidence, and validate existing evidence.

The first empirical phase of this thesis was a qualitative exploratory study which serves two primary purposes. Firstly, conceptualising the way in which pregnant women visualise their fetus and the internal processes which occur during pregnancy; and secondly, to investigate the issues surrounding acceptability and feasibility of a smoking cessation intervention both for pregnant women and health professionals involved in the delivery of the intervention.

This chapter gives an account of the design, scope and conduct of the qualitative study. It provides details of the specific aims, sampling strategy, data collection and analysis process. The latter part of the chapter focusses on the description and discussion of the data analysis. It also discusses the findings in relation to existing literature and implications for the development of an intervention to promote smoking cessation during pregnancy.

### **6.2 Rationale**

Developing an effective intervention is likely to require sensitivity or tailoring to the target group for the intervention and the context within which it will be used (Noar et al. 2007) and it should be feasible in clinical practice. Therefore, two stakeholder groups were consulted about issues surrounding the content and delivery of an intervention. These were; health professionals who are likely to be involved in the delivery of the intervention and pregnant women who are the target group for receiving the intervention.

Ultrasound scans which confirm a healthy pregnancy have been shown to be a positive experience for almost all pregnant women. Within the UK there are currently two routine scans. The first is received at approximately 9 weeks after the date of conception. This is the booking scan (i.e. the first antenatal assessment appointment) and the second is at 20 weeks. Evidence from literature shows that women report increased feelings of closeness and affinity to the fetus after a scan. They describe the baby as more 'real' and 'concrete' (Langer et al. 1988) and start to think about what their future child might be like (Dykes and Stjernqvist 2001). They also become more protective of the fetus and are more likely to engage in positive health behaviours. This study will aim to explore these reactions in more depth.

### **6.3 Research aims and questions**

The overall aims of the research in this thesis and the resulting research questions are outlined in Section 2.5. As discussed throughout the literature review the research aims were, in part, answered by studying existing work. This empirical study was designed to fill in the gaps remaining. The research aims for this study and a rationale for each aim is outlined below:

**Research aim 1: To evaluate the way in which women visualise or conceptualise their pregnancy and internal processes, and the subsequent effect on behaviour and emotions**

As illustrated in Chapter 5 (Section 5.2.2) of this thesis, research to date suggests that mental images may have the potential to influence behaviour and therefore it is important that they are accurate. Externally delivered images show potential effectiveness in altering these mental images. For externally delivered images to be able to impact on behaviour in the case of smoking cessation during pregnancy, deeper understanding of the way that women understand internal processes and visualise or conceptualise their baby was needed.

**Research aim 2: To explore issues surrounding the feasibility and acceptability of an intervention to promote smoking cessation during pregnancy, both for the target group and in clinical practice**

The literature review of this thesis outlined techniques which are likely to influence behaviour and proposes the optimum methods of delivery suggested by evidence. However, it is important to establish whether these are operationally feasible and acceptable to the potential participants. Attitudes of clinical staff are also vital to the success of an intervention as well as practical issues such as time and location of intervention delivery.

**Research aim 3: To check for supplementary barriers and facilitators to smoking cessation during pregnancy not identified in the cross-study synthesis described in Chapter 2.**

Barriers to, and facilitators of, smoking cessation were identified in the literature review. These qualitative interviews provided an opportunity to check that these are relevant to the specific target group. Additionally, supplementary barriers and facilitators which could not be identified from the literature may be present.

Taking the aims into account, the following research questions were developed to guide the interview process:

***Pregnant women:***

1. How do women visualise and/or conceptualise their fetus and the internal processes which connect the mother to the fetus?
2. What is the effect that externally delivered images have on the pregnant woman?



3. What are the acceptability and feasibility issues surrounding the implementation of a smoking cessation intervention during pregnancy?

4. What are the barriers to, and facilitators of, smoking cessation during pregnancy?

***Health professionals:***

5. What are the attitudes of clinical staff to delivering smoking cessation advice?

6. What are the acceptability and feasibility issues of introducing a smoking cessation intervention into clinical practice?

## **6.4 Methods**

General considerations and issues involved in undertaking qualitative research are discussed in-depth in Chapter 2 of this thesis. This section will therefore outline only the methods and considerations specific to this particular study.

### **6.4.1 Setting and Sample**

This section discusses the issues which were taken into consideration when determining the inclusion/exclusion criteria for both groups of participants and outlines the recruitment process and any associated challenges.

The setting for the study was one large maternity unit in Scotland with diverse demographic characteristics. A total of 18 participants were interviewed. These consisted of 9 pregnant women and 9 health professionals.

#### **6.4.1.1 Pregnant women**

The sample for the study were pregnant women who either were, or had previously been, smokers.

Purposive sampling was used to select the participants. This method of sampling ensures diversity of opinion. It was not designed to be representative of the target group

as a whole, but to comprise as diverse a range of opinions as possible. The study used a sample which allowed for comparison between; women who continued to smoke during pregnancy, those who had quit smoking, and women who had quit smoking in their current pregnancy but had smoked throughout previous pregnancies.

Inclusion criteria were:

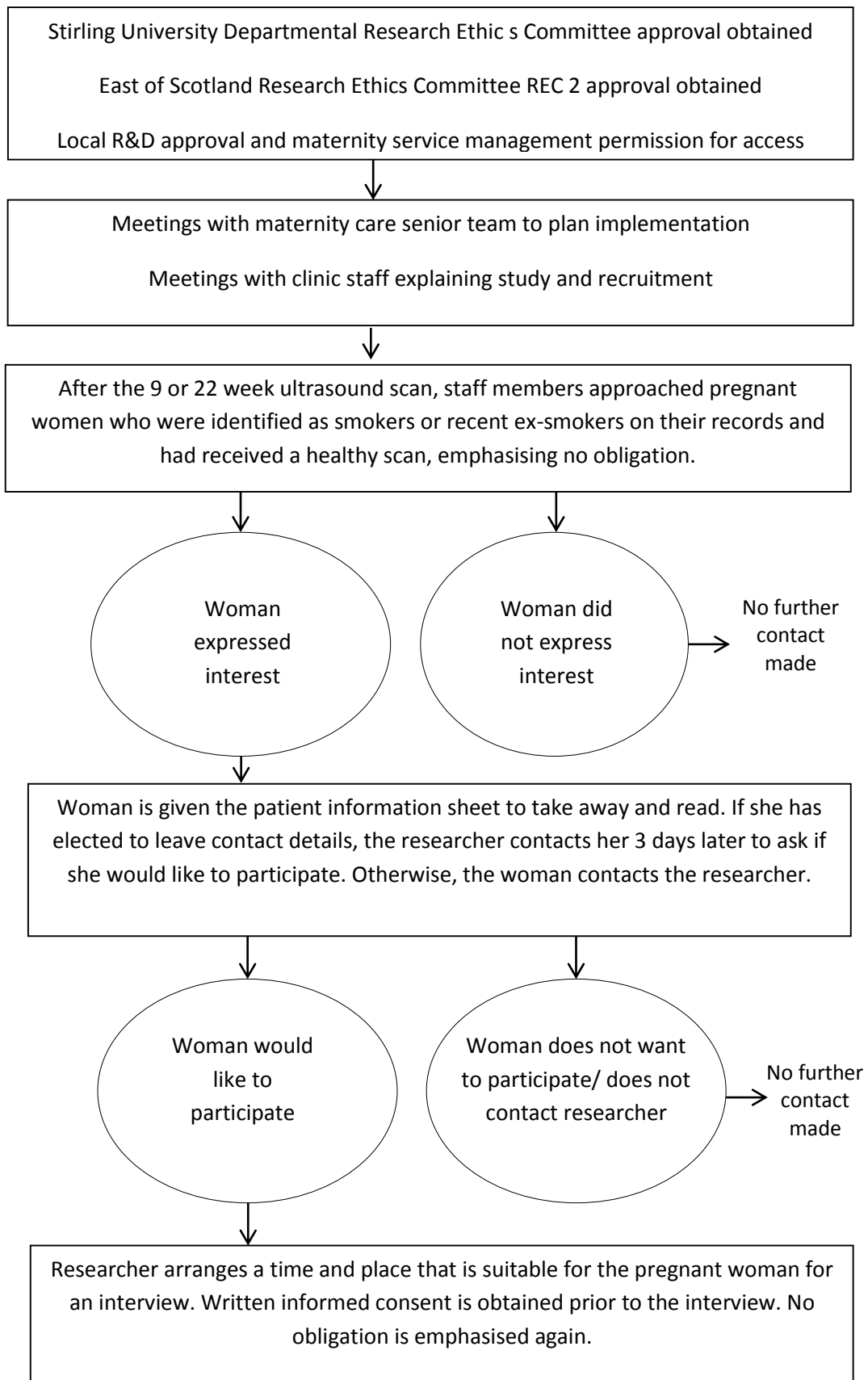
- Pregnant women (at any stage of gestation – although due to the recruitment process, they were likely to be around 9 weeks or 22 weeks pregnant)
- Adults (>18 years)
- Were smokers or had quit in the 3 months before conception

Exclusion criteria were:

- Women who had abnormalities shown on their first or second ultrasound scan
- Women who lacked capacity to informed consent
- Women who could not communicate in English

#### **6.4.2 Plan of investigation**

The method of recruitment is described in Figure 19.



**Figure 19: Recruitment process for pregnant women**

The initial inclusion criteria were only women who were continuing to smoke during pregnancy. A very low initial response rate was attributed to this group's typical avoidance of the subject of smoking (also revealed in interviews with health professionals). This was then expanded to all women who had smoked a cigarette in the 3 months prior to their 12 week scan. A benefit of widening the inclusion criteria was that women who had smoked through previous pregnancies were able to describe their experiences with the benefit of hindsight. This provided an apparently unbiased account of the reasons why they continued to smoke previously.

Once recruitment was underway, it was apparent that there would be some challenges. The initial response rate was slow. A number of meetings with staff at the ante-natal clinic revealed that issues of time and other priorities resulted in only small numbers of women being informed of the study. To identify potential participants, midwives were required to refer to notes of the women attending the clinic before they left their appointment and this was not always possible. For data confidentiality reasons, this could not be done by the researcher. A senior midwife was assigned responsibility for identifying participants on a weekly basis. Thereafter, the response rate was higher.

Nine pregnant women were recruited through Ninewells hospital antenatal clinic in Dundee after they had received their 12 week or 20 week ultrasound scan. Midwives identified women who fitted the inclusion criteria from their notes. Women were approached after their scan had shown no abnormalities. They were given a participant information sheet and were given the option of contacting a researcher if they were interested in participating in the study. A £10 supermarket voucher was offered as a thank you for their time and to aid the recruitment process. According to Seidman (Seidman 2012:75), any more than a token payment could influence participants' motivation for taking part in a study.

### 6.4.3 Sample characteristics

Nine women were recruited. They were all between the ages of 20 and 37. All women were between 12 and 28 weeks gestation. Pseudonyms are used here. Two women, Lisa and Leanne reported still smoking. Karen and Gemma had smoked through previous pregnancies. The others, Anne, Jane, Laura, and Sarah, had quit during or in the 3 months prior to pregnancy. Of the quitters, only Sarah and Jane did not use nicotine replacement therapy (NRT). Karen, Anne, Jane, Gemma, and Laura were participating in the Give it up for Baby scheme. Anne, Jane, Lynne, Leanne and Sarah had received their 20 week scan and knew the gender of the fetus. Anne and Jane had also received a 4-D scan. Laura and Sarah had experienced loss in previous pregnancies. Anne and Lisa did not have partners. Leanne, Sarah and Jane had partners who smoked.

**Table 25: Pregnant women sample characteristics (study 1)**

Participant pseudonym	Age	Gestation (weeks)	Notes
Karen	37	18	Karen quit smoking with the aid of GIUFB and NRT. This has been verified by a CO. This was her fourth pregnancy. She has a non-smoking supportive partner.
Anne	21	26	Anne quit smoking with the aid of GIUFB and NRT. This has been verified by a CO breath test. This was her second pregnancy. She does not have a partner. She had received a 4-D scan of the fetus and knew that the baby is a boy.
Jane	35	28	Jane quit smoking with the aid of GIUFB. This had been verified via a CO breath test. This was her first pregnancy. She had a supportive, non-smoking partner. She received a 4-D scan. She knew the gender of the baby did not specify.
Lisa	20	14	Lisa was still smoking during her pregnancy. She did not have a partner. This was her first pregnancy.

Lynne	25	25	Lynne had quit smoking prior to pregnancy with the aid of NRT. She had a non-smoking partner. This was her second pregnancy. She knew that the fetus was a boy.
Gemma	35	12	Gemma had quit smoking with the aid of GIUFB and NRT. This had been verified with a CO test. She had a smoking partner who was supportive of her quitting. This was her seventh pregnancy.
Laura	22	12	Laura had quit smoking with the aid of GIUFB and NRT. This had been verified with a CO test. Her partner had also quit smoking to support her. This was her second pregnancy. Her first child was stillborn.
Leanne	20	22	Leanne was still smoking during her pregnancy. She had a smoking partner. This was her first pregnancy. She knew that the fetus was a girl.
Sarah	27	21	Sarah had quit smoking. She had a smoking partner who was supportive of her quitting. This was her 3 <sup>rd</sup> pregnancy. She had miscarried one pregnancy. She knew the fetus was a boy.

### Health professionals:

Nine health professionals were recruited in Ninewells hospital antenatal clinic in Dundee. They were given a letter explaining the project and a participant information sheet. They were phoned by the researcher a week later to ask if they would be willing to participate. If the participant agreed, a date and time that was convenient for the health professional was arranged.

The pseudonyms assigned to the midwives interviewed are Jill (a project manager), Maria (a community midwife), Dawn, Ellen, Rebecca, Kirsty (midwives in the antenatal clinic) and Natalie (a sonographer). The smoking cessation specialists are Kim and Eve.

#### **6.4.4 Data collection**

Semi-structured interviews were selected as the method of collecting data in this study. As these are the primary method of data collection used in this thesis, a more detailed overview of the considerations involved in semi-structured interviewing is provided in Chapter 2 to avoid repetition.

##### **6.4.4.1 Pregnant women**

In line with reflexivity considerations discussed in Chapter 2 (Section 2.5.2.3), the researcher (Mary Steele) wore casual clothes to the interviews and utilised good interpersonal skills to build a rapport with the participants. The researcher was similar in age to the participants and was also female. Women were asked to choose a time and location that was suitable for them. 8 participants chose to be interviewed in their own homes. One chose to be interviewed in a private room in her place of work. The intention of this was to ensure that participants felt relaxed in their surroundings. All pregnant women were informed by the researcher that she was not a health professional and assured that there would be no judgment or opinion given on any of their answers. The researcher did not reveal whether she was a mother or smoker.

The interview topic guide (see Appendix 7) was designed in a semi-structured format . The content was developed using research questions 1-4 outlined in this chapter. In terms of topics, a topic guide covered participants' personal experience of visualising or conceptualising their fetus in its current stage of development and in the future as well as internal processes occurring when they eat and drink. Their reactions to the ultrasound scan and other externally delivered images were also discussed. Further topics included their experiences of pregnancy and their relationship with the midwife. Smoking was deliberately discussed last, to avoid a defensive reaction and encourage openness. A few questions were added to the interview topic guide during the course of conducting the interviews. For example, the discussion around smoking highlighted one participant's concerns about whether quitting smoking while pregnant would cause

disruption to the fetus. In subsequent interviews, other participants were asked about their beliefs on the issue.

Issues of sensitivity relating to the discussion of smoking during pregnancy are outlined in Chapter 2 (Section 2.5.3.4). These were carefully considered during the interview process. Although one of the research aims was to explore the mental imagery that women have of the effect of smoke on the baby, the research team decided that directly asking this might be upsetting to women who smoked. Instead, the researcher asked about the processes which occur when the woman ate or drank.

#### **6.4.4.2 Health professionals**

In order to interview health professionals, the researcher needed to be prepared to wait in the antenatal clinic for long periods. Once the health professional had agreed to participate, it was often difficult to specify a time that they would be available. For reasons of convenience, the interviews were held in either the health professional's own office, or an empty room in the antenatal clinic. This allowed the professional to feel relaxed in comfortable surroundings. 'Meeting in progress' signs were placed on the door to ensure privacy but the health professional could be easily contacted by phone in case they were needed. The disadvantage of this was that interviews could be interrupted or cut short at any time. This was not, however, found to be a common problem.

Health professionals were verbally reassured that the information would be kept confidential/anonymised. They were also told that the researcher was not a health professional, and were given an overview of the project to emphasise the fact that the aim of the project was to help with their own work.

The topic guide (Appendix 8) was developed from research questions 5-6 and covered health professional's experiences of delivering smoking cessation advice to pregnant women, their opinions of the content of a possible intervention to promote smoking



cessation during pregnancy and the acceptability and feasibility of the proposed intervention.

## **6.5 Rigour**

To ensure rigour in the data collection and analysis, a number of measures were taken:

**Purposive sampling** was used to ensure a range of opinions and experiences.

**Reflexivity** was considered to ensure that participants were comfortable and felt able to give open and honest answers.

A **second coder** was used to check samples of coded data.

**Respondent validation** was used to ensure that as many opinions as possible were gathered on specific subjects.

**Disconfirming evidence** was checked for as ideas and theories developed.

## **6.6 Data analysis**

This section provides an exploration of the results of the data analysis. The results from group one and group two are analysed separately. These are then summarised in answer to each research question and discussed in terms of the wider relevant literature and the implications for developing an intervention to promote smoking cessation during pregnancy. Different questions demanded a different level of analysis, some required a purely descriptive level of analysis while others required a deeper, conceptual analysis. Framework analysis (Ritchie et al. 2003) (described in Section 2.6.4) was used to analyse the data. The 5 phases of framework analysis were followed:

### **Data familiarisation:**

Once transcribed, the interviews were read over several times and listened to by the main researcher. This was for familiarisation purposes, and to verify that the transcription was correct. The research team held a meeting to read and discuss the transcripts and

begin to discuss emerging concepts. Once the research team had studied the transcripts, it was agreed that the broader themes related well to the research questions

**Developing a theoretical framework:**

Following the familiarisation phase, a thematic coding framework was identified. This was guided by the key themes identified from the research questions and sub themes emerging from the data. The initial thematic coding framework was cross checked by the research team and further refined and developed through critical discussion. Table 26 shows the final coding framework which was used to index the data.

**Table 26: Coding index**

<b>Themes and sub-themes</b>
<ul style="list-style-type: none"> <li>1. Visualising/Conceptualising the baby/effects of smoke               <ul style="list-style-type: none"> <li>1.1. Fetus</li> <li>1.2. Baby</li> <li>1.3. Internal processes/effects of smoke</li> </ul> </li> <li>2. Effects of Existing information/Knowledge               <ul style="list-style-type: none"> <li>2.1. Health professionals</li> <li>2.2. Graphic images/adverts</li> <li>2.3. Apps/trackers</li> <li>2.4. Other/general information</li> </ul> </li> <li>3. Feasibility of a mobile phone/text message intervention               <ul style="list-style-type: none"> <li>3.1. Current use of apps</li> <li>3.2. Reaction to proposed intervention</li> </ul> </li> <li>4. Barriers to, and facilitators of, smoking cessation               <ul style="list-style-type: none"> <li>4.1. Congruence with 'elements' and with literature</li> <li>4.2. New findings</li> </ul> </li> </ul>

**Indexing:**

Once the thematic coding framework was identified, it was applied systematically to the transcriptions. Data relating to themes was located, paraphrased and inserted into a table (see Appendix 17). This was conducted manually and a selection of interviews was cross checked by the research team.

### **Charting, and mapping and interpretation:**

Finally, descriptive summaries of the data were written. Critical discussion between the researcher and supervisors was used to establish associations between the themes and subthemes, and develop and refine concepts. This was an iterative process, with the researcher constantly referring back to the data and altering the mapping and interpretation of the data accordingly (see Appendix 19) The analysis went beyond descriptive, into a conceptual level.

## **6.7 Results: Pregnant women**

Results from interviews with pregnant women and interviews with health professionals are presented separately in this section. A more in-depth and conceptual analysis of the data collected from pregnant women was carried out than the analysis of the data collected from health professionals. This is due to the exploratory nature of the research questions relevant to the pregnant women. They were asked more in-depth questions than the health professionals who were asked mainly about practical issues.

This section has been ordered so that the conceptual findings from the data have been presented first. The concepts that emerged from the data are then embedded into the subsequent descriptive analysis. The purpose of this is for the reader to familiarise themselves with the definitions of the concepts before they are presented within the findings. An outline of the structure of this section is provided in Table 27.

**Table 27: How the results of the data analysis are structured**

Conceptual analysis	<ul style="list-style-type: none"><li>• Timeline of pregnancy<ul style="list-style-type: none"><li>○ Fetushood</li><li>○ Babyhood</li><li>○ Personhood</li></ul></li><li>• Types of visualisation<ul style="list-style-type: none"><li>○ Protective visualisation</li><li>○ Expressionist visualisation</li></ul></li></ul>
Descriptive analysis	<ul style="list-style-type: none"><li>• Visualising or conceptualising the fetus</li><li>• Conceptualisation or visualisation of internal processes</li><li>• Acceptability and feasibility of a mobile phone intervention</li><li>• Barriers to, and facilitators of, smoking cessation during pregnancy<ul style="list-style-type: none"><li>○ Results to support existing evidence</li><li>○ Additional barriers to, and facilitators of, smoking cessation during pregnancy</li></ul></li></ul>

### 6.7.1 Defining concepts

As will become clear in the data analysis, a number of new concepts emerged from the analysis. The key concepts described in this chapter are:

**The projected stages of development of the fetus.** This is the stage of development at which the mother *imagines or describes* her baby to be in. There were three distinct stages described by women; fetushood, babyhood, and personhood. The definitions of each of these are below:

**Fetushood:** Imagining the fetus as it currently exists in gestation. This tends to be avoided. Any description of the fetus in gestation often references size or movement.

**Babyhood:** Conceptualising the fetus as a future baby. This is still an abstract conceptualisation, with the emphasis on generic features common to all babies. For example, 'tiny hands and feet' or 'small and wrinkly'.

**Personhood:** Thinking about a concrete future person or baby. The mother starts to imagine things like the future baby looking like the mother or father, and the personality traits he or she might have.

Figure 20 outlines these projected stages of development.

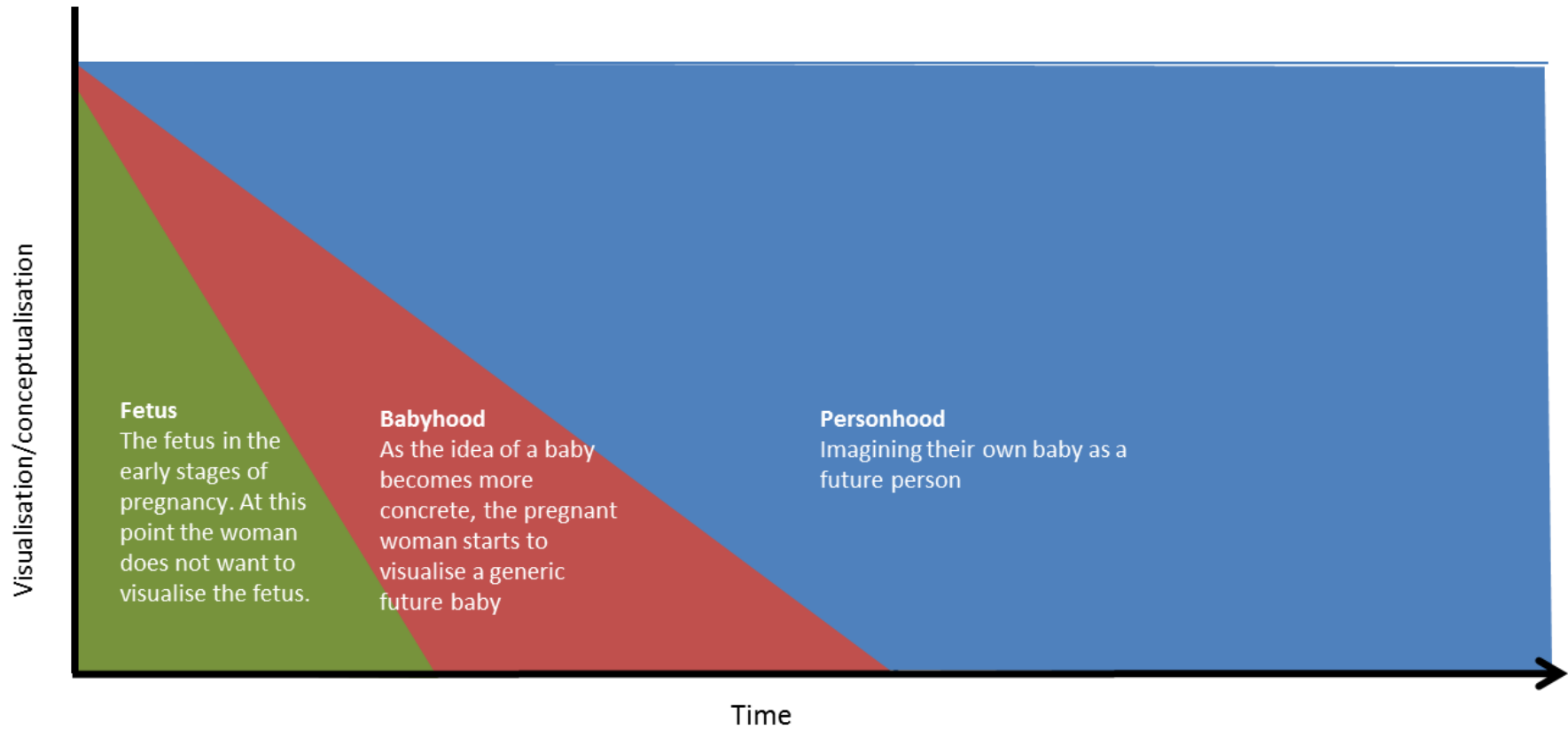


Figure 20: Projected stages of development of the fetus as conceptualised by the pregnant woman.

Different types of visualisation were observed. I have termed women's avoidance of concretely visualising the fetus throughout the projected stages as '**protective visualisation**'. This can be defined in general terms as an abstract visualisation of a positive outcome due to an irrational fear that the outcome is more likely to be negative if it is visualised.

Another observation was the way in which women visualise the fetus somewhere on a continuum of abstract to concrete. Here, I used expressionism in fine art as an analogy for the level of abstraction involved in woman's mental images of the fetus. An '**expressionist visualisation**' is defined in this thesis as using a mixture of representation and emotion to visualise a subject that an individual feels strongly about. In fine art terms, if an expressionist artist feels positive emotions towards a subject of a painting, the work is likely to be more aesthetically pleasing than the original subject. This is because the painting will only include the parts of the subject that the painter wants to 'see'. The painting is therefore open to interpretation and emotional reactions will vary from person to person. I felt that this mixture of representation and emotion was similar to that experienced by pregnant women.

## **6.7.2 Description of results**

This section presents a descriptive outline of the results of the interviews with pregnant women, with examples of the presence of the concepts described above highlighted.

### **6.7.2.1 *Visualising/conceptualising the fetus***

The word 'fetus' was not commonly used by pregnant women or health professionals, despite this being the correct technical term. Therefore, the researcher avoided using the term throughout the interviews and instead used the word 'baby' to describe the fetus.

In interviews, women were first asked to describe what they thought the baby looked like. Most women described the fetus in future **babyhood**. They described a generic baby (rather than their own baby) which they used affectionate language to describe and focused on description of features such as hands and feet. Sarah described being able to see the baby's hands and feet but not visualising the face at all.

'It's hard to picture, you can imagine a baby, you can imagine the feet and the hands and it's the same with my daughter but you can't imagine the face cause you just don't know do you, you know, I don't have a picture in my mind of his face.' Sarah

When asked specifically about what the fetus looks like in its current stage of development (i.e. **fetushood**), most women said that they had not previously thought about this. There were a number of reported reasons behind this. Some women had not thought of the fetus as anything other than an object and had therefore not thought about its appearance.

'I find that at this stage it's just, you know, baby is sort of still like a little blob so you can't really...' Laura

'I'd not really thought about it, he was just a jelly bean [laugh]' Anne

Some women preferred to stay away from any kind of verbal description of what the fetus might look like and instead referred to it in terms of size. Gemma was asked what she thought the baby looked like in its current state of development:

'It's only the size of a plum if that.' Gemma

After this, she did not elaborate further, implying that this was her only visual conceptualisation of the fetus.



Other women reported feelings of revulsion or disgust towards the appearance of the fetus, especially those in early pregnancy. They referred to the baby as 'weird' or 'alien', using **expressionist visualisation** towards the abstract end of the scale.

'You've got a picture more of an alien type thing in your belly. That's about as much as it goes I think.' Lynne

The process of a baby developing inside them was also something that women found that they had to come to terms with.

'It's weird, like, getting used to, like, obviously you've got a baby growing inside you, like, it's weird to actually get around the terms, you know what I mean.' Lisa

There was a general consensus among the women that they purposefully kept their idea of the baby in abstract terms, but most women found it difficult to accurately describe why. Here, Sarah attempts to verbalise her reasons for not visualising the fetus:

'No, no that's a bit weird [laugh]! I know this sounds really morbid but if I think about him, like what he looks like just now or think about what he would look like if he was born now and then if he was born now he wouldn't live then that would just be a bit weird cause I don't like to think about it like that.' Sarah

In avoiding visualising the future baby, some women indicated that they were protecting themselves from disappointment. This disappointment could be for several reasons. For example; miscarriage, the baby is not healthy, the baby does not look as they had imagined, or the baby is not their preferred gender.

'I'm not really getting it into my head what she could look like because she could look completely different from what we think.' Leanne

The idea of 'jinxing' the pregnancy was brought up by several women. They were worried that, if they thought too much about the future, either this would.

I don't picture holding the baby because that's the realisation of what I really want and if I picture that then it might not happen, d'you know what I mean?'

Karen

For some women, the concept of jinxing the pregnancy was mixed with the idea that, if they did not think too much about the fetus, they would not feel as bad as they would have if they had already formed a concrete bond if they were to suffer a loss. This was more pronounced in women who had previously had miscarriages.

'I don't want to kind of jinx it this time, it is quite nerve wracking this pregnancy and feel a lot more anxious than what I did than my first, so it's kind of like I don't want to think too much about the future in case it does kind of all go wrong again.'

Laura

An important finding was that it seems that women did not visualise the fetus concretely because they wanted to protect themselves from negative emotions such as disgust and fear. The delicate and non-human appearance of the fetus, and the fact that it would not survive outside of their bodies may be the cause of this. This avoidance of any type of visualisation is the first, and possibly the strongest, occurrence of **protective visualisation**.

Women who were in later stages of pregnancy, reported a different type of **protective visualisation** where they started to project **babyhood** on the fetus but were still reluctant to create concrete visualisations. After ultrasound scans, women's reported visualisation tended to be a literal description of the scan:

See when you see it on the scan he looks like a skeleton' Lisa

Women who had received a 4-D scan reported that they knew what the baby looked like.

'I actually seen the baby how it looks like because I went for a 4-D scan at 26 weeks so I saw the baby, the baby looks lovely, everything is good, healthy' Jane

The emotional effects of the ultrasound scan are discussed in detail later in this chapter, but it is important to note here that scans may be markers for the women's conceptualisation of the fetus to transition from **fetushood** to **babyhood**.

When asked about what the baby will look like when it is born, women often had not thought about it in detail.

'I can imagine something very wrinkly, very small and I don't know' Jane

They tended to focus more on their own emotions, than creating any representations of the baby's appearance.

'As soon as she's in our arms we're going to see her and it's just going to be amazing.' Leanne

Those women who showed the strongest projected **babyhood** on the fetus were later on in their pregnancy and used abstract parameters such as hair colour, family resemblance, or size to describe their visualisation or conceptualisation, demonstrating that they still did not have a concrete mental image of the fetus.

'I don't have a picture in my mind of his face I just... I love little baby feet, I can think about his little, I can look at my babygro's and see his little baby feet poking out and stuff.' Sarah

'Cause me and my boyfriend, we've both got blue eyes and blonde hair, like, naturally blonde and obviously we know that she's going to get that, she's going to get the blue eyes and the blonde hair, we know that.' Leanne

This indicated that the women were, perhaps subconsciously, beginning to form a bond with the baby and feeling affection, while simultaneously avoiding visualising the fetus before it reaches a stage in development that they are comfortable visualising. They seemed to be moving more towards the concrete end of the **expressionist**

**visualisation** scale. The more the fetus was visualised, the stronger the bond seemed to become.

None of the women interviewed were at more than 28 weeks gestation, so the development of this timeline could not be explored further. However, it seemed the later on in pregnancy a woman was, the more concretely she described the baby. I propose that it is likely that the conceptualisation of the fetus in **babyhood** and then later in **personhood** continues to become more concrete throughout the course of the pregnancy.

### **6.7.2.2 *Visualising/conceptualising internal processes***

This section deals with the way pregnant women perceived the internal processes which occur when they eat, drink, or smoke, and how this affects the fetus. It explores the way in which women understood the physical processes, the way they conceptualise the baby's emotional and physical states, and then it looks at how these beliefs affect the woman's attitude towards smoking during pregnancy.

Women had limited knowledge of the internal processes which connect themselves to the baby. The description of this was typically minimal.

'It's passed through the umbilical cord and, you know, through that way – I haven't really sort of thought about it as such like that' Laura

Some women reported the imagined connection to themselves to the baby, rather than a literal description.

'In my mind the cord is in the baby's hand constantly and the baby's kind of feeling it.' Jane

Women did appear to be aware that the umbilical cord did not provide a filter for any unnecessary or harmful substances reaching the baby, although they didn't report any visualisation of this.

'I just know, you know, everything you put into your body goes straight to your baby, but unfortunately even things that the baby doesn't need still goes straight to your baby; goes through your baby and through yourself.' Anne

Rather than trying to understand the internal processes, women tended to focus on tangible issues such as their own emotional and physical states which are unique to pregnancy.

Four women were certain that the baby could 'taste' or 'smell' food or drink that they had consumed. They describe the 'likes' and 'dislikes' of the fetus, thereby imposing personhood.

'The baby can really smell and taste from very early stages, you know, you try to find out what the baby likes and I try to eat a lot of different food to make sure that my baby will like everything.' Jane

It was not apparent what the source of the conceptualisation of 'liking' foods was. When asked how this worked, Leanne was unsure.

'I have no idea. I have really no idea. I wish I knew how but I'm trying to eat things that I would want her to eat when she gets older' Leanne

It appears that the women's own bodily reaction to certain foods may be a source of these beliefs. Women described a bad reaction as the baby's 'dislike' of the food rather than a pregnancy symptom.

'It's like at the start she never used to like anything I used to eat and it was like 'oh yum, oh, no, toilet' and everything like that it was really bad' Leanne

Another sign of the women starting to impose personhood on the baby in early pregnancy is the belief that the pregnant woman and fetus share emotional states.

‘Whatever the mother is feeling the baby’s feeling the same way; if the mother’s anxious, stressed, you know , etc. etc. then obviously the baby will be as well.’ Karen

‘The baby feels what you feel so that if you’re stressed then the baby would feel stressed’ Lynne

While they are consciously avoiding visualising the baby, women are conceptualising that the baby can feel their own states such as stress or relaxation. This could be part of forming an emotional bond with the baby and projecting the fetus into **babyhood** whilst still maintaining **protective visualisation**. However, as discussed below, this conceptualisation alongside the perception that stress is a symptom of smoking cessation could be a barrier to quitting.

As smoking during pregnancy is a sensitive subject, it has the potential to cause a defensive reaction. The researcher waited until the pregnant woman mentioned smoking herself until she asked any questions about smoking. On the occasions where women did not mention smoking themselves, the researcher brought up the subject after all other topics had been covered.

Five of the women had voiced worry about the effect that quitting smoking would have on the fetus. Four of these women thought that the stress or shock of suddenly giving up would also stress the fetus.

‘I know with smoking you’ve got so many chemicals and things that your body relies upon and taking them away I thought would cause more difficulty to the baby, you know, and more harm to the baby’ Karen

Three of these women did not give a source for this information, but the fourth said that the information had come from her doctor.

'The doctor was like it can actually do more harm to stop smoking than what it can to just continue smoking, but cut down, d'you know what I mean cause obviously your body's used to getting it, this that and the next thing, and if you just suddenly stop and take it all away, the shock can be too much.' Gemma

Here, the women are defending their smoking behaviour. The perceived costs of quitting are high, and they are also lowering the perceived benefits of quitting as a method of self-regulation.

Women who continue to smoke appeared to rationalise smoking in other ways, such as the assertion that smoking is less harmful than other health behaviours.

'If you're going away out every night drinking and taking drugs you're going to be a bad mum, but if you're having a couple of cigarettes and you're cutting yourself down on those cigarettes, do not dare think you're a bad person because you're doing that.' Leanne

Gemma, who smoked throughout six previous pregnancies, was reluctant to believe that smoking was harmful to the fetus despite the low birthweight of all six children. She cited financial reasons for quitting during the current pregnancy.

'Well all my babies bar one have been just over five pound, so I want to see how big this baby's going to be without smoking.'

'Right'

'Just to see if smoking in pregnancy does have a major factor on birth weight, d'you know what I mean?' Gemma

Despite this, she was happy to take other advice given to her by doctors and midwives.

'You've only to eat tuna once a week and all this kind of stuff, d'you know what I mean?' Gemma

Gemma seemed to be defensive of her past smoking during pregnancy. She implied that she was merely curious to find out if she will have a larger baby. Given her attitude towards limiting tuna consumption, it is possible that, if the perceived costs of quitting smoking were lower, she would be more willing to quit without questioning the evidence.

Other reasons given for doubting the safety of quitting smoking during pregnancy included Jane's concern that she would gain weight:

'If you stop smoking, like, more people say they eat more and that's putting weight on you and then that couldn't be good for the baby' Jane

Karen had recently taken a psychology module at college which she said had given her an insight into her past smoking behaviour. Here she conceptualises why she smoked through her three previous pregnancies:

'Because I never smoked around my children I was fine [laugh], it's all about justifying it and I justified it at every level.' Karen

Karen cited immaturity, selfishness for her past smoking during pregnancy rather than a belief that quitting would be harmful.

'As far as smoking goes I did have an element of guilt with my other pregnancies but because I'd tried that was good enough for me. And I know that sounds really bad, but ... I had to think of myself as well, and that sounds really selfish that at that time, as I said, I was young and naïve, I was thinking about my own feelings as well.' Karen

### **6.7.2.3 *The effect of externally delivered images***

The effect of externally delivered images on pregnant women is closely linked to the previous sections. Women's visualisation or conceptualisation of the fetus is created and influenced by externally delivered images. This section deals with the most



commonly discussed images; the ultrasound scans, mobile phone and internet apps or trackers, and graphic images relating to smoking.

As discussed, the literal description of the scan picture was often the only image of the fetus visualised by women. The scan appeared play an important role in forming early mental images of the fetus and on the women projecting **babyhood** onto the fetus.

The first scan provided feelings of excitement and reassurance. Women reported strong emotional reactions and a feeling that the baby was now 'real'.

'It just make me more excited, I mean, it's such a crazy feeling, you know, knowing that you can see what your baby looks like long before your baby's born.' Anne

'Oh that was the best, The first scan was the best because when we were going to the first scan I was very worried that I'm actually not even pregnant and I was really worried about his appointment, what if?.' Jane

The 20 week scan was also described as a positive and emotional experience. In the case of all 5 women who had reached this stage, they chose to find out the sex of the baby. This was cited as reason for starting to visualise the future baby and a projected shift to personhood, although this still appeared to be an abstract image.

'So since my 20 week scan and I've seen him and cause it's a boy, I know it's a boy, I can **make him into a little person a bit more**, you know, and I've bought my first outfit for him and now and then I'll do a little bit of shopping for him and think about names and so I can see him now, I can see myself- after the 20 week scan- I can see myself with a little boy I think, so yeah [laugh] definitely changes things.' Sarah

When asked to talk about the scan and what they had been able to see, women tended to use affectionate terminology rather than a literal description of the scan image. The language used by four of the women was similar to describing a baby or child.

‘We were able to see him moving about and blowing bubbles as well’ Lynne

‘Basically it looked like he was playing a set of drums in my stomach’ Leanne

‘It was really nice to see it floating about in the amniotic fluid and, you know, just hiccups and things like that.’ Karen

‘On the 4D scan I saw the cord and the baby’s playing with the cord.’ Jane

Here, their **protective visualisation** is starting to change over the course of the pregnancy. They are feeling more reassured and starting to concretely believe that the future baby will happen.

In addition to projecting **babyhood** or childhood on the fetus, these quotes are descriptions of movement, which is a concrete sign that the baby is alive and developing well. The descriptions also convey independence from the mother and possibly the existence of a person.

All of the women who had received their 20 week scan knew the sex of the baby. These Women seemed to have a more concrete visualisation of the baby than those in earlier pregnancy. They had started to wonder things like the resemblance of the baby to themselves or their partner, or the baby’s hair and eye colour.

Women reacted positively to concrete signs of the baby. For example, the scan image or feeling changes in their body (i.e. good or bad reactions to food) all provided reassurance, ownership and concreteness. Other external images or information are unlikely to be able to replicate these three things.

‘It’s so difficult to explain but it’s like as soon as you see this little thing your motherly instincts just come right at you and all you think about is ‘this is my baby, I have to protect this baby, this is mine.’ Leanne

Mobile phone or internet apps and baby trackers are a relatively recent resource available to pregnant women. Once signed up, the woman receives weekly information about the development of her baby as her pregnancy progresses and this is often accompanied by images. There are several of these available.

‘It was like a BabyCenter thing you sign up to, there was also one on Facebook that posted a post every week and let everybody else know about your pregnancy and how it was going... how your baby develops, when they get their eyelids and their ears and what they’re doing inside you at the moment. It’s really good.’ Anne

All of the women interviewed owned a smartphone with access to the internet and the ability to download apps. 8 of the women had downloaded the BabyCenter app which delivers weekly updates on the development of the baby. This can be run concurrently with the woman’s own pregnancy so that she can follow the development of her own baby. Some women had downloaded multiple apps.

‘Got the BabyCenter site, we’ve got Bounty, we’ve got the Baby Gaga app I think it’s called, the SMA website – they sort of like send me emails and things and let me know what’s going on sort of week by week. I like to make sure that there’s more than one because they all say something different and some have got better information than others’ Laura

The app also informs the woman of the size of her baby by comparing it to a similarly sized fruit. The size of the baby in comparison to the fruit was referred to by 2 of the women.

‘well if you look at any pregnancy sites or this that and the next thing it explains to you, you know, like in your weekly gestation and stuff, like, how it starts at like a full stop and goes to a strawberry and then a bit bigger and a bit bigger, d’you know what I mean.’ Gemma

The nature of these apps and trackers means that the women are able to follow their baby’s progress as it happens and tells them what typically will happen to their own bodies. This could provide some reassurance that their pregnancy is progressing normally, and some concreteness in being able to visualise the fetus. Although they cannot replicate the emotions of the scan, they are a popular resource for these reasons.

Public health campaigns to promote smoking cessation often use graphic images. It is unlikely that these images will be actively liked by people who smoke, but may change behaviour.

When asked about images they had seen relating to health issues and smoking, 6 women mentioned graphic images on cigarette packs. All of these women voiced disgust but said that it did not change their behaviour prior to pregnancy.

‘They used to have the pictures of, like, the wee babies with the kind of lumps coming out of them, and yeah, you would think, oh that’s disgusting, but it would never put me off because it’s the packets, they are showing me that but I need to want to stop, it’s not going to be from somebody saying, this might happen to you one day. It needs to be because I want to’ Lynne

Televised health messages involving smoking were discussed. Most women could recall at least one of these. They often justified the message as irrelevant to them because it involved a specific behaviour which they did not participate in.

‘That one where the man’s in the car smoking and the smoke goes behind him and like goes round the child’s neck, that one.’

Researcher 'How did that affect you?'

'Well we don't smoke in the car at all [laugh]' Gemma

'The advert with the baby in the bouncy chair and smoke circling around it and then you see the smoke going down into the baby's mouth, that is quite hard but that won't affect my baby cause I go outside to smoke and the baby's nowhere near me.' Karen

Graphic images do not appear to have a positive impact on women's smoking behaviour during pregnancy. Women feel angry or defensive or they justify the image as irrelevant. It can also cause the woman to feel guilty and, while this may be useful in delivering other health messages, smoking is often used to relieve guilt or stress.

#### **6.7.2.4 Acceptability and feasibility of a mobile phone intervention**

At the time of these interviews, evidence gathered in the literature review and advice from health professionals suggested that text messaging would be an appropriate mode of delivery for an intervention. Women were therefore asked questions relating to the acceptability and feasibility of such an intervention. Practical issues, such as access to technology, are also discussed.

All nine women had a smartphone which was capable of sending and receiving text messages. Eight women had signed up for apps such as the BabyCenter app. These were also capable of accessing the internet, although some were concerned about the potential cost of an intervention which might require internet access.

'You'd need to watch because usually some mobile phone networks charge you for downloading pictures and stuff, you know like if it's sent through message and that.' Gemma

Women were directly asked what they thought of a text message support service. Seven women responded positively.

'I think that would be brilliant, I really do, yeah I think that would... especially when you're having a low day cause there is plenty of them, you know, so if you're having a low day and you get a pick me up like that, that would be great.'

Karen

Lynne liked the idea of information being sent to her, rather than having to access it herself.

'Yeah, yeah because it would be easier than me accessing information that's getting sent to me! Sometimes I don't have time to go looking things up. If you were to get like sort of text messages or updates then it would be easier just to get your phone and read it as you got it.' Lynne

The two women who responded negatively were the only women who were still smoking.

'If somebody offered you text messages to give you support stopping smoking, would you sign up for it.'

'Na, I don't think I would, no.' Lisa

Leanne was concerned about receiving advice which might be upsetting.

'The only book I've got is the Ready Steady Baby book, that's all I've got but I don't really read it if I'm being honest because it scares me the way they're saying you're not allowed to do this/you're not allowed to do that, certain things can... like hinky and everything, my boyfriend works away, I actually phone him in full on tears because of it, I was saying 'I don't want to stop drinking tea' and everything like that. It was really really scary but no we don't follow it basically.' Leanne

#### **6.7.2.5 Barriers to, and facilitators of, smoking cessation during pregnancy**

This section closely relates to the cross-study synthesis described in Chapter 3 of this thesis. Issues relating to the elements developed in the cross study synthesis were discussed during interviews. The data was examined for evidence relating to each of these 'elements' in turn, and any other emerging issues which were not identified in the cross-study synthesis were explored.

#### **Results supporting existing evidence**

The *motivation of the partner* to want to help the pregnant woman quit was thought to be important. Of the seven quitters, six had partners who were encouraging of their smoking cessation attempts. Partners were supportive in a number of ways, including; making quit attempts themselves, ensuring that they did not smoke near the pregnant woman. Women described this as helpful.

'If he was still sat having a cigarette in the mornings it would be a mixture of wanting one or wanting to kill him for having one' Laura

Partners who had never smoked were less able to understand the difficulty involved in quitting, and therefore how to support and encourage cessation. The two women with such partners were still able to quit, although they stated the value of a non-smoking partner less than the others.

'Although he thinks he is being supportive, he's not, he just... He doesn't deal with it very well when I do smoke! [laugh] and he would be even worse now that I was pregnant, his attitude would be a lot stronger than it was before.' Lynne

The two women who were continuing to smoke had no partner support or encouragement. Leanne had a smoking partner who was happy for her to continue smoking. They both smoked in their home. Lisa had no partner and lived alone. She described this as making quitting more difficult.

‘I just think it’s boredom when you’re sitting in you’re smoking more than what you think you really are.’ Lisa

Evidence from the data appears to support the assertion that a partner who is motivated to give help and support to encourage a quit attempt will greatly increase the likelihood of sustained cessation.

*Facilitating social support* included the addition of new support, and ensuring existing relationships are supportive. All of the women who had quit smoking reported some degree of social support in addition to that of their partner. The type of social support which seemed the most important was that of the people they spent most of their time with. For some women this was family:

For others, this was colleagues:

‘My direct manager gave up smoking after he learned I was pregnant which was very surprising – he obviously gave up smoking for his own health but I felt it was really good support for me that he was actually no longer a smoker either.’ Jane

The women who were participating in GIUFB stated that the support received from their smoking cessation worker was very important. The job of the smoking cessation worker was to be available to chat or offer advice to the women. She typically would meet them for coffee, talk on the phone or accompany them on outings to buy baby clothes.

‘It does help to know that there is somebody at the end of the phone if I am having a really bad day and I’m going ‘right, I really do want a cigarette’ and I’m probably about ten minutes away from going down the shops to buy a packet of cigarettes, but I can phone her and go ‘what do I do?’[laugh]’ Laura

Lynne had been to a stop smoking group which she liked because she had people to talk to but was unable to attend frequently due to work commitments.



'I did like the group and going, and knowing that I was going every week and I have to stop for a group and I've got somebody to talk to if I needed to I just don't have the time to fit that in every week.' Lynne

Where face to face support was unavailable or not practical, three women reported using internet forums or social networking for support. Anne reported that the comments she received on Facebook encouraged her.

'I would update on Facebook, you know, so many days/so many weeks and it was like 'keep it up' yeah, you would have, like, 30 comments, 'that's fantastic' everybody really knows, if you're a smoker, **everyone knows how difficult it is and how easy it is to fail**, so getting all that encouragement from people helped.'

Anne

As indicated in Anne's quote, value was placed on support from either smokers or ex-smokers who could relate to the difficulty of quitting and understood the sense of achievement when time goals for cessation are reached. As discussed in the previous section, Lynne did not find her non-smoking partner's attitude helpful. This may have contributed to her attendance of a stop smoking group with other ex-smokers to talk to.

For some women, most of their family and friends were smokers and would be likely to be unwilling to offer support or change their own habits. Losing these relationships would make women feel socially isolated. Therefore, *the maintenance of these social networks* would involve the need to cope with potential smoking triggers. Women reported finding smoking difficult when people around them were smoking. Many described social outings and special occasions especially difficult. Women had different ways of coping with this. Karen balanced the negative aspects of being a non-smoker with the positives.

'We would all huddle together and have a quick puff and then back to the turkey – everybody else did that except for me, you know so there was that kind of camaraderie with other smokers that I'm not involved with anymore, you know,

and I feel quite isolated in that fact. **So that's why I had to kind of be a bit one-upmanship and say 'well I don't smoke'** Karen

Lynne did not remove herself from smoking situations. She continued to spend time with her friends, but brought along NRT in case the smoking environment triggered her cravings.

'It's when I'm with my pals and they're smoking and I smell it, and you think... oh, I still like this smell, but I know that I shouldn't do it so I stay away from it'

'so how do you get round that if all your pals are smoking?'

'I've sometimes got the inhalator in my bag and I've found that sometimes if I take that with me then at least if they're smoking and I want to do it, then I can always go into my bag and use my inhalator' Lynne

Pregnancy seemed present as a unique opportunity for some women. They described a change in attitude of family and friends who might not have been supportive of a quit attempt had it not been for pregnancy. Laura described her family situation before her pregnancy:

'A lot of my family smoke: my brother, my mum, my grandparents, they all kind of like to smoke and it's that thing of, you know, go down have a few drinks and it'll be 'oh just have a cigarette' and it'll be like 'right okay'.' Laura

Here she describes the change in her mother's attitude due to her pregnancy.

'It's that whole thing of having my grandmother go outside if she did decide to pop up and I'll feel bad [laugh] but my mum said **It's not me being funny**, you know, I'm pregnant and it'll affect baby so, you know, if they are going to get funny about it then they can stay at home [laugh]' Laura

Women's emotional reaction to seeing their own baby in the scan indicates that the mental image of their baby becomes more concrete and they feel more protective of the baby. The *concreteness of risk* may therefore be achieved by similar means.

As described previously in this chapter, feedback on the health of their own fetus, or tangible evidence of the fetus such as movement or bodily reactions unique to pregnancy all give a feeling of concreteness and that the baby is more 'real'. This need for physical evidence was also present when a lack of concrete signs of the negative effects of smoking was cited by three women as a barrier to forming an intention to quit.

'It was sort of like, you know, still smoking which obviously isn't good for you but not to the point where I thought, you know, I'm spending far too much money or I can't walk up the hill or anything like that, you know I didn't feel like it was being detrimental towards my health, but I feel so much better now I've quit, so it must have obviously been affecting my health, you know.' Laura

An effective method of increasing the concreteness of risk therefore, would potentially be one which provided something tangible that demonstrated that their own smoking behaviour was causing harm. One such method is feedback on their own levels of CO. This is routinely measured for GIUFB. Two women indicated that the clear CO test every month (with GIUFB) was as much of a motivator than the financial incentive offered.

I did attempt it with all my other three children but because there wasn't this incentive – it's not just the financial incentive, it's the going along and giving your breath every week.' Karen

'It's really difficult to stop smoking and not only that fact that, you know, you get the bonus of the Asda vouchers in the end, it's really rewarding when you've made that extra week and you take the test and you're clear again, you know, you've got your clear result, it keeps you going cause you're doing it every week.'

Anne

In addition to concreteness of risk, signs which make the benefits of smoking cessation more concrete and perceptible were mentioned.

'I'm tasting food in a new light, I'm enjoying it a lot more.' Karen

This was an unexpected benefit for Karen, but one which is tangible and valuable enough for her to talk about. The immediacy of this cessation benefit is also likely to have given Karen reassurance that quitting smoking was having a positive effect on her health. Benefits such as reducing the risk of harm to the baby are a longer term goal so these short term effects are potentially important for maintaining cessation.

Smoking was cited as a coping strategy for stressful situations and as part of habit or routine. Therefore *coping skills or stress management* may be important. Women described replacing cigarettes with other activities such as eating, walking the dog, laundry, doing the dishes.

'In general usually to de-stress I would have a cigarette, so I've found different ways: taking the dog out for a long walk, she's never walked so much in her life [laugh]; I've been very conscious about eating because I know that I don't want to put on too much weight with the pregnancy but I have been comfort eating, so every time I've wanted to have a cigarette I've been going to have a bit.' Karen

They found breaking habit and routine hard, with craving stronger at certain points of the day e.g. after meals.

'I think it's just habit more than anything else, it's the routine of sort of like getting up in the morning , pottering about, having a cup of tea and then sitting down and having a cigarette and then sort of getting up pottering about, having a cup of tea and going 'oh I want a cigarette but I can't. [laugh]' Laura

Gemma, when asked what the hardest thing about quitting smoking:

‘Probably after you’ve had something to eat, you know, once you’ve had like a meal or something.’

‘and how have you coped with that?’

‘Alright, just take the chewing gum’ Gemma

Lynne describes a relapse during a time when she needed a coping strategy to deal with stress.

‘I started smoking again at one point, I think I was about eighteen weeks I started smoking again. I was doing my degree essays and all through uni I’d used smoking as my way to cope.’ Lynne

Leanne said that she was aware of coping strategies, and had attempted some but had not found them to be successful.

‘There’s nothing that’ll help me. I’ve tried everything. I’ve tried you know, like lollipops, I’ve tried them to keep my hands busy, I’ve tried colouring in books and everything like that, keep my fingers going and everything like that, tried reading, tried daytime television, I’ve even tried cooking, you know, like just getting a cookbook out, going away, getting the ingredients, coming back and cooking but for some strange reason I’ve always just went back to having a cigarette.’ Leanne

All of the women appeared to be aware that smoking during pregnancy was not recommended. The perception that smoking was unhealthy for the baby was cited as a major motivating factor by all of the women who had quit smoking. However, they did not seem to be any better informed of the specific risks of smoking during pregnancy than those women who continued to smoke. All women were aware that smoking was not good for the baby. Women who continued to smoke or were recalling past smoking behaviour were more likely to understate these risks or were less certain of the severity of them.

'Smoking's very shun upon in pregnancy but I don't know if it's actually ever been proven that it does do damage, d'you know what I mean?' Gemma

As discussed in Chapter 3, factors which affect *risk perceptions* included; a perceived lack of priority by health professionals, a distrust of scientific evidence and a reliance on personal experience (i.e. having friends who smoke during pregnancy but had healthy babies). All three of these factors were evident in the data.

Women who were still smoking or were recalling past smoking during pregnancy mentioned knowing people who had smoked throughout pregnancy and had large babies anyway. They seemed to be less convinced of the risk to the baby's health than the quitters.

'I mean, everybody I know smoked with their pregnancy, my mum smoked with me, my partner's mum smoked with him and all her other children, my nana smoked with all her children, you know what I mean, they all smoked.' Leanne

'Cause I know loads of people that have smoked and had, like, eight/nine pound babies, d'you know what I mean.' Gemma

Leanne cited the midwife's response to her smoking status as a rationalisation for continued smoking.

'I told my midwife that I smoke and she said that that's fine, I told her that I was going to be gradually cutting down in my own time and I was going to do it myself I didn't want anybody trying to force me to do it, and she said that that was perfectly fine.' Leanne

Leanne also rationalised her smoking by comparing it to other behaviours

‘All I’m doing is smoking, now yeah fair enough I’m not saying that because I smoke that’s good, I know it’s bad, I don’t want to be doing it, but for smoking for six years it is very difficult to stop’ Leanne

Women who had quit smoking were more certain of the validity of the risks, but did not demonstrate a more in depth knowledge of the specific risks than the other women.

### **Additional barriers and facilitators to smoking cessation during pregnancy**

The women’s perceptions that they were judged negatively by society appeared to induce a defensive attitude and therefore form a barrier to cessation.

‘Some women actually look up their nose at you, like, when you’re still smoking they can see you’re pregnant and they see you smoking and they’re like ‘oh terrible mother ’’ Leanne

Lynne reflected on her feelings during the two weeks of her pregnancy when she relapsed. Given that these feelings were discussed in hindsight, the feelings of guilt that may have created a defensive attitude are no longer a factor.

‘I don’t feel like I’ve encountered anybody who’s had an attitude but then I perceive people to have the attitude. You know that two weeks that I was smoking, if I was walking down and my bump was showing, I would think, God they’re looking at me and judging me because I’m smoking but nobody’s ever said anything to me, but you feel that people are judging you but it’s probably me judging myself by putting it out there that its other people, but it’s really how I feel. I know I shouldn’t be doing it and its bad but you feel that everybody’s looking at you and feeling that same way.’ Lynne

Women conceptualised the reasons behind their decision to give up for pregnancy and why they had not done so before. Age was likely to be a factor. The two women who

were continuing to smoke during pregnancy were also the youngest of the group. 3 of the others cited maturity or emotional readiness as their reason for quitting.

'I think you've got to be emotionally ready to stop, d'you know what I mean, you can't just say 'ocht aye, I'm ready to stop, d'you know what I mean, you can't just say 'ocht aye, I'm going to stop cause I'm going to get money every week' you've got to actually want to stop' Gemma

Guilt was also a motivator.

'[guilt] is probably the biggest factor, you know, I mean nobody wants their own children or their babies to suffer or that and we always feel guilty if they do or if you think you are making them suffer in any way they shouldn't have to.' Anne

The GIUFB scheme aided sustained cessation in four different ways; the first is the support provided by the smoking cessation worker, the second is the concreteness created by the monthly CO test, the third is the financial incentive.

'There is the financial incentive and I'm not going to lie to you that that doesn't give you a boost because it does, I mean at the moment I've got £100 sitting on that gift card and I'm like [rubbing hands together sound] 'brilliant' you know.'

Karen

The fourth is the provision of NRT. Although NRT is available free of charge for all pregnant women, those who were participants in GIUFB were more likely to be aware of this. Potentially because of her lack of contact with smoking cessation workers or the GIUFB who would be able to explain that NRT is a safer alternative to smoking Leanne has discounted the use of NRT during her pregnancy because of the warnings on packets that they are not suitable for pregnancy.

'The things that are out there to help you stop smoking, they've always got not suitable for pregnant women on them. So if that's saying it's not suitable for



pregnant women you obviously can't put that patch on, or you can't take that spray or the electric cigarette or anything like that, so they're expecting you to just stop [click of finger sound] like that without using anything for help. Leanne

## **6.8 Results: Health professionals**

The data analysis for interviews with health professionals is divided into two sections. The first is the attitudes of clinical staff towards delivering smoking cessation advice. This section discusses the experiences described by midwives and smoking cessation specialists to approaching and delivering advice while maintaining a good relationship with the pregnant women. It also explores the difference between the two groups. The second section deals with practical issues relating the acceptability and feasibility of a smoking cessation intervention. This includes issues of timing and available resources.

Health professionals were asked about their experiences of delivering smoking cessation advice. This was a different experience for the midwives, who had to approach the subject with all women, compared to the smoking cessation specialists who were only dealing with women who had approached them for help.

### **6.8.1 Barriers to delivering smoking cessation information**

Midwives described a long list of issues they were required to discuss with women at their appointments. This left little time to manage any of these issues in any depth, and it was up to the midwife to prioritise the important issues on a case-by-case basis.

'It's certainly probably not the priority when you're looking at getting an obstetric history, a social history, going into mental health issues, you know, there's so much we tackle on that, I mean, we ask women to just bare their soul to us at that appointment, you know, we ask them about all their pregnancies, whether they were continuing or non-continuing, we asking them about smoking, drinking, we ask them about sexual abuse, you know....' Jill

While dealing with smoking cessation might not be a high priority issue for midwives due to time constraints, they did recognise the importance of the issue. Given more time, they would offer sustained advice and support. Three midwives suggested that smoking and negative health behaviours would be better dealt with by a dedicated health professional.

‘We’ve always said if there was a way of bringing public health back in, you know, a public health nurse or somebody, we could spend a lot more time giving women a lot more time with it and continuity maybe.’ Jill

All midwives said that they found approaching the subject of smoking easy but the follow up is more difficult, particularly if the women were resistant to discussing their smoking behaviour.

‘Oh it doesn’t bother me, no, it’s very easy. Not that they want to listen to you though. I think that’s the problem is that the minute you mention the word ‘smoking’ they’re always in a hurry to get away or they don’t particularly want to deal with the issue.’ Dawn

A common concern for midwives was the effect that offering smoking cessation advice would have on their relationship with the pregnant woman. They emphasised the importance of developing trust.

‘I mean, that’s the first time we’ve met these women, we’re trying to build up a relationship whereby there’s going to be a two-way communication, a really free and open and honest discussion at every single opportunity, you know, about these things.’ Jill

There were two distinct groups of pregnant women; those who wanted smoking cessation help, and those who did not. For those who did want help, the midwife would point them in the direction of specialised smoking cessation support. For those who did

not want help, offering support and advice was more difficult. The relationship could be potentially damaged if the midwife was perceived as judgemental or interfering. The delicate balance of delivering advice and appearing non-judgemental was considered vital.

‘I sometimes don’t want them to think that I’m criticising them or being horrible to them in a way.’ Dawn

Reactions from pregnant women who were asked about their relationship with the midwife appeared to confirm the value of the relationship. However, the non-judgemental stance of the midwife could potentially lower risk perceptions.

‘She doesn’t judge, so that’s one thing that I really do like about her, the fact that she doesn’t judge anybody for it, she doesn’t try to say ‘oh you’re terrible because you’re doing that.’ she won’t judge and that’s what I think is good about her because she won’t like, turn her nose up at you or make you feel like a terrible person because you’re doing the think that’s oh my god so bad and stuff like that, you know what I mean, so it’s good that she understands and I think a lot of midwives should be like that.’ Leanne

Health professionals favoured a positive approach to delivering advice. They worked on the assumption that pregnant women were already aware of the risks of smoking during pregnancy.

‘They already know that smoking’s bad for them, it’s bad for their baby, so I kind of like to try and keep it a positive meeting rather than going down the line of ‘you should not be doing this because of X, Y and Z and do you realise the damage that you’re giving your baby?’ I don’t think it’s giving out the right messages... not that I think are the right messages to the ladies anyway.’ Eve

‘You’re not wanting to completely scaremonger them either, you know, you’re trying to put a positive on them stopping smoking.’ Ellen

Midwives often suspected that women smoked more cigarettes than they were willing to admit to. This shows an importance placed on the number of cigarettes smoked, rather than giving up completely.

‘I think sometimes they’re maybe a bit economical with the truth as to regards how many cigarettes a day they’re smoking at any rate. ‘I’m only smoking six a day – but actually they’re probably smoking 20 – I think we always know they’re smoking more.’ Dawn

Midwives also seemed to place a lot of value on cutting down cigarette consumption themselves. Encouraging cutting down as an alternative to cessation may be problematic. Cutting down on the number of cigarettes smoked may not necessarily reduce the intake of nicotine and other harmful chemicals. Additionally, this may reduce cessation numbers if midwives promote cutting down as an alternative.

‘I think now most women will try hard to give up, the majority will try and stop smoking or at least reduce if they can’t particularly give up completely, they will definitely reduce the amount they’re smoking in pregnancy.’ Kirsty

The experience of smoking cessation specialists was different from that of midwives. Smoking cessation specialists worked only with women who were actively seeking help to stop smoking. Therefore persuading or encouraging women to quit was not required. These health professionals also advocated a positive, non-judgemental approach to delivering advice.

‘They don’t know who I am or how finger wagging I’m going to be at them, you know, to kinda say ‘ you need to stop smoking’ and I certainly don’t go in with

that approach. It's very much 'this is the options that are available to you' this is the choices you have.' Eve

In summary, midwives felt able to approach the subject of smoking and offer basic advice and information. They were, however, wary of damaging their important relationship with the women by being perceived as judgmental or 'finger wagging' and issues of time and other priorities meant that there was little time dedicated to smoking cessation. It is clear that the information typically provided by midwives alone is unlikely to be sufficient to change behaviour. Midwives attitudes to smoking cessation were encouraging, although they thought there should be a dedicated person to the problem. If midwives had a smoking cessation intervention program that they could actively discuss and encourage women to join, this would

#### **6.8.2 Acceptability and feasibility of an intervention in clinical practice**

Health professionals were asked about their opinions on the potential implementation of an intervention in the antenatal clinic setting. It became clear from midwives' opinions that this was unlikely to be a practical solution. Lack of time was often cited as a reason.

'Not in the clinic setting, not with me checking over them and dealing with it.'

Dawn

'You know, antenatally we're pushed for time, postnatally, you know, the women just want to go home.' Maria

They reported that women were often keen to leave as soon after their appointment as possible, so even an intervention which did not require input from clinical staff would be unlikely to be feasible.

'They don't always want to stay in her any longer than they are, but if they can do it at home on their mobile phone or computer, you know, there's maybe a better chance then.' Rebecca

Security was also an issue

‘You’d have to make sure you had that securely fixed to something because it would be gone in three seconds in Dundee! They steal thermometers and SonicAids from our wards, so that would be in someone’s handbag before they had switched it on!’ Jill

Four health professionals voiced concern about an intervention which would publically identify women who smoked. They thought that drawing attention to the women would not be acceptable.

‘It’s difficult because smokers feel quite stigmatised anyway so that’ll make them feel even more apart if it’s just them that have to see this DVD or whatever.’ Maria

Although an intervention delivered in the clinical setting was found to be unacceptable, midwives were generally receptive to the idea of an externally delivered intervention. They indicated that an intervention which facilitated discussion about smoking cessation would be welcomed.

‘If it was supplementary and supported them, you know, with that, I think that would be really welcomed and, I mean, they’re all going to be happy if we can reduce the rate of smoking in pregnancy, there’s no doubt about that.’

‘The midwife could ask them, you know, at the next appointment ‘what did you think of that?’ ‘did you see it?’ that might be quite good actually.’ Maria

Five health professionals independently came up with the idea of an intervention delivered via mobile phone. They conceptualised the reasons why, such as the familiarity and convenience of text messaging.

'Ladies certainly feel more comfortable with text and I think that's maybe just ease of use, you know you're not having to confront anybody on the phone, if I phone them they might not be available, so texting tends to suit everybody.' Eve

## 6.9 Summary of results

The exploration of women's visualisation or conceptualisation of the fetus showed that women experienced **protective visualisation** when imagining the fetus, both in the present and in the future. In early pregnancy, this is generally a complete avoidance of visualising the baby. After the first scan, they indicated that they have projected **babyhood** onto the fetus. This is still **protective visualisation** because they avoid a full concrete visualisation to both protect themselves, and to avoid 'jinxing' the pregnancy. Events such as the scan, or physical reactions to being pregnant were described in terms of the 'baby' reacting. Throughout the pregnancy, women reported **expressionist visualisations** of the baby, starting at the abstract end of a continuum of abstract-to-concrete, and moving towards the concrete end.

Of all of the externally delivered images discussed by women, the 3-D scan had the most impact on emotion and attitude. The woman is seeing her own baby in real time. Other commonly discussed images were those in baby trackers or apps. These were popular because the information is segmented and delivered in real time. Women tended to react defensively to graphic anti-smoking images, and did not report changing their behaviour as a result.

Evidence supporting each of the 'elements' developed in Chapter 2 was present. Supplementary facilitators included NRT, financial incentives, 'emotional readiness' or maturity. Misconceptions such as harming the fetus by quitting smoking or the safety of NRT in pregnancy were reported.

The midwife-pregnant woman relationship was found to be important. Midwives delivered smoking cessation advice but were wary of damaging their open and honest

relationship with the women if they appeared too 'pushy'. It was clear that there was no place for an intervention to be delivered within the clinical setting. Time and space issues were cited. Midwives would welcome an externally delivered intervention which would help them engage with the subject of smoking.

## **6.10 Discussion and conclusions**

In this section, the results of the data analysis are discussed in terms of their; implications for the development of the intervention; implications for future research; and the strengths and limitations of this study.

### **6.10.1 Comparison with literature**

A body of literature concerned with the mother's feelings towards, and attachment to, the fetus exist. Most of these report similar findings to this study, including the increased attachment and affection that women feel after the ultrasound scan (Dykes and Stjernqvist 2001, Eurenus et al. 1997, Langer et al. 1988). Very few studies which directly evaluate the way that the mother visualises or conceptualises the fetus exist. A 1980 study (Lumley 1980) of a series of interviews carried out with 30 pregnant women showed that 21 of the women described their fetus in negative terms such as 'formless' or 'unattractive' and tended to grossly underestimate the size of the fetus. The analysis carried out on the current study has confirmed that this is still the case over 30 years later and explored this further by conceptualising why women feel this way, and what effect it is likely to have on their protective health behaviours.

### **6.10.2 Implications for the development of the intervention**

The concepts of protective visualisation, expressionist visualisation and the projected conceptual timeline of the development of the thesis are key findings which may have an impact on the cognitive processes and emotions experienced by women in pregnancy. Encouraging an earlier concrete visualisation could influence women's intentions and behaviour. Women tended not to visualise, or want to visualise the fetus



in early pregnancy. Therefore showing a realistic image may well prove to be upsetting and inappropriate. An alternative would be to present the fetus in a state of imposed babyhood, mirroring the woman's own conceptualisation. Images of the woman's own baby are preferable to that of a generic baby, however, this would be potentially difficult to implement.

Women's preference for receiving information in real-time over the course of pregnancy could be feasibly translated into an intervention. This would firstly, increase the concreteness of the baby by enabling women to visualise the current stage of development. Secondly, it would allow women to receive and process small chunks of information, reducing extraneous cognitive load.

An incentive scheme was considered valuable by those women who had participated. The facilitators provided by this were; the financial incentive; the concreteness of benefit provided by monthly CO breath tests; and the social support facilitated. The provision of NRT was also reported to be a facilitator. Given the advice that NRT should be used in pregnancy only where the alternative is smoking (discussed in Section 1.1.1), the value of the encouragement of NRT use is contentious.

Women's reaction to graphic and shocking health messages as seen on cigarette packets and television adverts was that of disgust and avoidance. They would be unlikely to continue with a long term intervention which used these tactics.

Common misconceptions reported by pregnant women could be addressed in an intervention. Most notably, women reported the belief that the baby would suffer if the mother quit smoking suddenly. Another misconception was that, because NRT has a 'not suitable for use during pregnancy' warning, the safer alternative was to continue smoking. Providing information about these could help address cognitive dissonance.

The key findings and concepts developed in this study are outlined in Table 28 and their possible application to an intervention outline. The expected outcomes are also described.

**Table 28: Key findings and the resulting implications for the development of an intervention.**

<b>Finding or concept</b>	<b>Intervention aim</b>	<b>Expected output</b>
Protective visualisation	Enhance earlier concrete visualisation of the future baby.	Woman feels more affection for/ forms a bond with her baby earlier in pregnancy. She is therefore more likely to engage in protective health behaviours (i.e. smoking cessation) (Dykes and Stjernqvist 2001).
Expressionist visualisation		
Projecting stages of development (e.g. babyhood)		
Preference for receiving information about the fetus in real time	Information given in small chunks at the time of gestation it is most relevant.	Increase concreteness of baby. Reduction of extraneous cognitive load. Information is absorbed and retained.
Dislike of (or misunderstanding) graphic/negative images	Show only positive images.	Higher uptake of intervention and lower drop-out rate than if negative images were shown.
Value of incentive scheme/ NRT	Offer incentives. Give information about the pros and cons of NRT.	Uptake rate increases. Likelihood of short term cessation increased. NRT is used only if smoking is the only alternative.
Common misconceptions (i.e. stress caused to baby by quitting smoking)	Provide information about common misconceptions.	Cognitive dissonance is addressed leading to possible behaviour change (Kneer et al. 2012).

### **6.10.3 Implications for future research**

Results of this study may have the potential to inform, and increase the effectiveness of, interventions to promote smoking cessation during pregnancy. Interventions to prevent other negative health behaviours such as poor diet and alcohol consumption during pregnancy may benefit from some of the results from this study because much of it does not focus on smoking specifically, but on the thoughts of the women during their pregnancy. The insight into women's visualisation and conceptualisation of the fetus could have implications for many other interventions.

I would suggest that future studies about women's experiences of pregnancy focus on exploring the ideas of protective and expressionist visualisation. The findings in this study about the way in which women visualise and conceptualise their fetus may be worth further investigation with a larger sample, across a more diverse population. It would also be of value to investigate the diversity of opinion of women who are at different stages of pregnancy, particularly in later pregnancy, and explore the differences between women who did, and did not, find out the gender of the fetus after their second scan.

### **6.10.4 Strengths and limitations**

A major strength of this study is the depth to which the qualitative evidence was explored. This conceptual level of analysis allowed us to extract evidence and create concepts which may be generalisable to many interventions to promote positive health behaviour in pregnancy.

There are limitations which should be outlined. The participant sample of 9 pregnant women is relatively small. It comprised of two women who smoke and seven who had quit. However, there was a general consensus in the findings, supporting the reliability of the results. Additionally, as a result of the recruitment strategy, there were no participants in the later stages of pregnancy.

A potential with all qualitative data analysis is that it often assumes that the participants are always telling the truth. This analysis allows for the possibility that this might not be the case, and highlights specific instances where it is possible that participants have exaggerated or have given an answer which they perceive to be the most socially acceptable. The likelihood of this was minimised during the interview by assuring participants that their answers would not be judged, and that information would be kept strictly anonymised. The reflexivity considerations discussed in Section 2.6.2.3 also helped to minimise this problem because care was taken to make participants feel relaxed in their surroundings and with the researcher.

## **7 Chapter 7: Development of the intervention**

### **7.1 Outline of chapter**

The preceding chapters of this thesis have outlined a theoretical basis for developing an intervention to promote smoking cessation during pregnancy and provided a rationale for the mode of delivery that the intervention will take. This chapter describes *how* this theory was operationalised and the processes which led to the development of the intervention. The intervention and related context and theory are explicitly described, answering recent calls for more clarity in reporting (Wells et al. 2012, Michie et al. 2009, WIDER 2008).

In this chapter, first the theoretical basis and how it is embedded into the intervention is described, and then a description of the intervention itself is provided. A detailed outline of the structure of this chapter is below:

- Aims and objectives are outlined.
- A description of all of the evidence and theory gathered in this thesis provides the rationale for the intervention. This is summarised by creating a set of aims to be followed when developing the intervention.
- An overview of *how* these aims were followed to create the intervention.
- A description of the intervention and the external context under which it could be delivered to maximise effectiveness.
- Conclusions

### **7.2 Aims and objectives**

The remit of this thesis is to develop a theory-informed intervention to promote smoking cessation during pregnancy. The specific aims of the chapter are:

- To explicitly describe how the conclusions drawn in Chapters 3, 4, 5 and 6 were collated to create an explicit theoretical underpinning for an intervention to promote smoking cessation during pregnancy.
- To outline how the theoretical basis was manifest in the chosen modes of deliver: images, narrative and text messages.
- To lay out the predicted mechanisms of behaviour change within this intervention.
- To provide a thorough and transparent description of the intervention itself.

### **7.3 Translating theory and evidence**

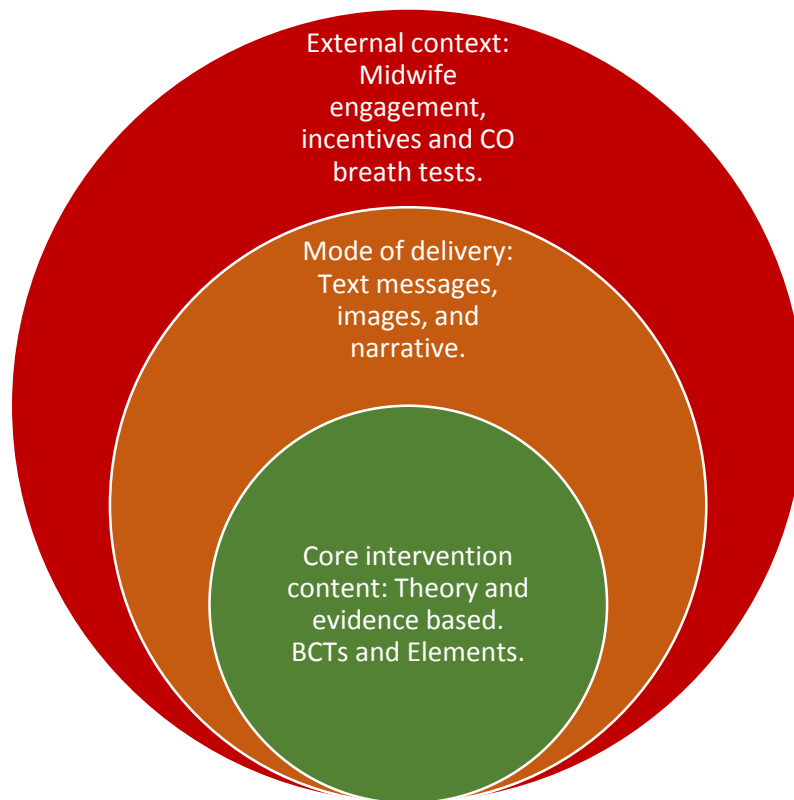
As outlined in the MRC framework for complex interventions (Craig et al. 2008), modelling an intervention before a trial can provide useful details about the design. Kessler et al (Kessler et al. 2012) propose that when descriptions of interventions outline the theoretical basis, it is very often unclear *how* this theory was actually applied and the intervention is implemented in practice. This may lead to concerns as to whether models are fully used and whether intervention fidelity is present. Fidelity, or the degree to which an intervention remains in its intended form in practice, is fundamental to both the reliability of the output, and the effectiveness of the intervention (Resnick et al. 2005, Bellg et al. 2004, Dumas et al. 2001, Orwin 2000). By outlining exactly how theory and evidence are translated into an intervention, we can demonstrate the reliability of the process of development, and the consistency with which it is delivered in practice.

### **7.4 Intervention context**

To answer the research question '*within what context is the intervention most likely to be effective?*' it is important to look not only at the intervention itself, but the external factors which may influence its effectiveness.

Figure 21 shows the constructs of the intervention. At its core, is the intervention content with embedded theory and evidence, including the six elements derived in Chapter 3

and evidence-based BCTs. Secondary to this are the modes of delivery which are; text-messages, images, and narrative. Finally, the external context under which the intervention is likely to have optimal impact.



**Figure 21: Intervention core content, mode of delivery and external context**

The context under which an intervention is delivered can interact with the intervention itself (Bisset et al. 2009). The effectiveness of an intervention can vary due to a range of contextual elements (Hawe et al. 2004). Intervention fidelity (i.e. the extent to which the core elements of the intervention is delivered as described in the intervention protocol) is necessary for accurate interpretation of outcomes (Perepletchikova and Kazdin 2005). A key strength of a text-messaging intervention is that it can be delivered with a high level of fidelity. However, there are a number of external elements which may increase the likelihood of effectiveness. Although the text-messages designed to work as a stand-alone intervention which can be delivered under most circumstances, there are a number of contextual elements which may increase effectiveness. These are: regular CO breath



tests, offering incentives, and midwife engagement. They, and the reasons why they may be effective, are outlined below.

It is recommended that participants are given monthly CO breath tests. This is firstly important for the prevention of self-report bias which is reported to be high in pregnant smokers (Shipton et al. 2009). Secondly, this was reported (Chapter 6) by women to be a motivator in itself, and may increase concreteness of risk. Finally, it also facilitates increased contact with health professionals in relation to smoking cessation, which may increase risk perceptions (Graham et al. 2011).

It is also likely that an incentive-based scheme running alongside the text messages would increase the likelihood of effectiveness. Incentive schemes may improve recruitment rates and quit rates (Cahill and Perera 1996) and are included in the 11 BCTs with an evidence base for smoking cessation during pregnancy (Lorençatto et al. 2012). There is additional benefit in that most incentive schemes are contingent on women providing a clear CO breath test, and therefore the process for breath testing would already be in place if an established incentive-based intervention agreed to take part. Initial conversations with a team running such an intervention based in a large maternity unit in Scotland indicated that the team would be happy to add an additional text-messaging component to their intervention.

The final contextual element is midwife engagement in the recruitment process and continued engagement throughout the intervention. As a trusted source of information, the endorsement of the midwife may increase uptake of, and trust in the content of, the intervention. It is also anticipated that the text messages may facilitate conversation between the midwife and pregnant women without damaging their relationship (Chapter 6).

These contextual elements may be important to the effectiveness of the intervention. However, as an important element of a trial is that the intervention is delivered with

fidelity, if the contextual elements are not possible to reliably and consistently delivered alongside the intervention, it is possible for the intervention to be delivered without these.

## 7.5 Process of intervention development

To develop the intervention itself, a multi-disciplinary group of people with expertise in midwifery, behavioural theory and storytelling was formed. Table 29 shows the area of expertise of each member of the group and the role they played in the development of the intervention.

**Table 29: Members of multidisciplinary team, areas of expertise and role in the development of the storyline.**

Person	Area of expertise	Role in development
Mary Steele	PhD student co-ordinating this project. Has studied storytelling literature and developed the theoretical underpinning of this intervention.	Writing the storyline, constructing individual text messages, creating the images.
Professor Brian Williams	Behavioural scientist with experience in developing and evaluating complex interventions.	Advising on story. Ensuring that embedded theory is likely to lead to behaviour change.
Professor Helen Cheyne	Expert in maternal and child health. Experienced midwife	Advising on story. Checking facts relating to pregnancy were accurate.
Mark Grindle	Expertise in storytelling, screenwriting and producing film and TV.	Advising on story. In particular, writing an engaging and believable story.
Dr Barbara Farquharson	Expert in the psychological aspects of health and illness.	Advising on story.

		Ensuring that embedded theory is likely to lead to behaviour change.
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The varied expertise in the group ensured that the story behind the intervention had; a theoretical underpinning which would be likely to change behaviour (BW, BF), accurate (HC), and engaging and entertaining (MG).

Monthly meetings were held to discuss the development of the intervention and the story. This was an iterative process, with MS developing the storyline and images based on monthly feedback from the group. The process can be divided roughly into three stages:

- **Stage 1: Operationalising the intervention aims:** First the theory to be embedded into the storyline was established. Characters and intervention components and their theoretical purpose were developed. Images were created based on theory.
- **Stage 2: Writing the story using advice from storytelling literature:** The story was written using expert storytelling advice and the storytelling literature discussed in Section 5.4. At this stage, the aim was to create an entertaining and engaging story using the characters and components developed in stage 1. Once the storyline was written it was critically examined by the research team to ensure the relevant theory was embedded into the text messages. This was an iterative process with the team being consulted at several points in the writing process.
- **Stage 3: Developing the intervention and process:** The intervention was assembled using the text-messages and images and the process by which it should be delivered was clarified.

The development of the intervention can therefore be said to be informed by: expert advice from a multidisciplinary team, behaviour change evidence from; inductively

derived theory (Chapter 3); existing behavioural theory (Chapter 4); empirical evidence (Chapter 6); and guidance from storytelling literature.

## 7.6 Operationalising the intervention aims

In the 'Conclusions' sections of Chapters 3, 4, 5 and 6 (Tables 18, 23, 24 and 28) the implications of the evidence gathered in that chapter for the development of the intervention are outlined. If the aims from these tables are reached, the intervention can be said to have a strong theoretical underpinning and therefore an increased likelihood of effectiveness.

How the aims were operationalised is described in this section. This is divided into five sections: how the aims were operationalised to develop the ideas for individual intervention components; how the aims were used to create the images; how the aims were used to create the text messages; how the process of interactivity and tailoring was developed from the aims; and an outline of the rationale for the storyline.

### 7.6.1 Aims embedded in individual intervention components

Within the intervention there are several components. These are; the story, the text messages, the images, and the context. Table 30 demonstrates the rationale for why each component is important for promoting smoking cessation during pregnancy.

**Table 30: How theory is embedded into the mode of delivery**

Intervention component	Description	Rationale
Images	Participants are sent relevant images throughout their pregnancy.	Using a visual method can provide meaningful and accurate representations. Images are accessible to recall and closely linked to affect (Cameron and Chan 2008). It may be possible to reverse or reduce the effects of <b>protective visualisation</b> and therefore increase the likelihood of performing

		protective health behaviours (Dykes and Stjernqvist 2001).
Story	Participants receive text messages from 'Megan' a fictional character who has characteristics similar to their own. They can follow Megan's story and see her struggling with, and overcoming, typical barriers to and facilitators of smoking cessation during pregnancy.	Storytelling techniques are an ideal method of communicating an optimal amount of information in a way which can be easily understood, while retaining the attention of the audience by using a compelling and appealing method of delivering a message. Theoretical components and BCTs can be embedded within the storyline. Characters struggling with, and overcoming barriers (i.e. a coping model) can raise <b>self-efficacy</b> (Bandura 1995). Addressing commonly held misconceptions and providing information about the health consequences of smoking during pregnancy deals with <b>cognitive dissonance</b> and <b>raises risk perceptions</b> .
Text messaging	The story and images are delivered via text message	Text messaging is becoming an increasingly popular method of communication. A high percentage of the target population own phones which are capable of sending and receiving picture messages (ONS 2012).

In Table 31, the intervention process is outlined from recruitment to receiving the text messages. The method of delivery, the key theoretical components, and the expected output are explained.

**Table 31: A theoretical explanation of the intervention process**

Process	Mode of delivery	Theory	Expected output
Pregnant woman has 12 week ultrasound scan			
Pregnant woman is invited to participate	At the first ultrasound scan, the pregnant woman is asked by her midwife if she would like to participate.	<b>Increasing perceived benefits</b> and <b>perceived subjective norm</b> increases the likelihood of them participating	Participant understands the nature and benefits of the intervention.
Pregnant woman fills in initial questionnaire form	Participant is then asked to fill in a form assessing her current smoking status	<b>Assessing current readiness and ability to quit</b> and <b>assessing current and past smoking behaviour</b> are behaviour change techniques which have demonstrated effectiveness in promoting smoking cessation during pregnancy.	Participant can receive tailored text messages based on their responses, increasing the likelihood that they will find the intervention relevant. .
Participant receives text messages			
Pregnant woman receives text messages	Participant receives text messages from a fictional pregnant woman 'Megan' who is struggling with, and overcoming, barriers to smoking cessation.	'Megan' is a <b>coping model</b> which has been shown to increase levels of <b>self-efficacy</b> . Further theory is embedded within the storyline including addressing <b>cognitive dissonance</b> and overcoming barriers to smoking cessation.	Participant believes that she can perform the desired behaviour. She learns about barriers, triggers and coping skills. She also believes that the health consequences that are relevant to her and are potentially severe.
Pregnant woman receives images via text	Images are also sent via text. They contain images of a baby and a fruit which corresponds to the size of the fetus. Text information about the stage of development accompanies the image.	Using images is likely to increase the <b>concreteness</b> of the woman's visualisation or conceptualisation of the fetus and therefore increase the likelihood of protective behaviours (i.e. smoking cessation) by reducing <b>protective visualisation</b> .	Participant starts to form a closer bond with the fetus and is more likely to engage in protective health behaviours (Dykes and Stjernqvist 2001).

### **7.6.2 Aims embedded into the images**

As outlined in Chapter 5 (Section 5.2), images may influence cognitive and emotional processes which can prompt behaviour change. We know that they can also improve understanding of a message, however it was decided that the primary purpose of these images would not be to aid understanding.

As discussed in previous chapters of this thesis, in general, women already have some awareness of the potential adverse outcomes of smoking during pregnancy. Additionally, information about these is provided within 'Megan's story'. Therefore the purpose of the images is to make the *baby* (not the risk) seem real and concrete and increasing the likelihood of her performing protective health behaviours. This was achieved by;

- a) **Providing the women with a picture of a fruit which roughly corresponds to the size of the fetus** at the specific week of development.
- b) **Providing the woman with real-time information** about the development of the fetus by adding explanatory text describing the development that the fetus has made that week relating to the photo of the baby. This information is delivered as the pregnancy progresses.
- c) **Providing the woman with images of a baby.** Where possible, only features such as hands and feet are shown in the photos so that the woman can imagine this as her own future baby which they may be reluctant to do in early pregnancy.

The development of the images in the intervention was chiefly informed by evidence gathered from the qualitative study described in Chapter 6.

#### **7.6.2.1 Images of fruit**

Using fruit or other common objects to describe the size of the fetus is common. Apps such as 'baby center' which are frequently used by pregnant women use this information.

In the qualitative interviews described in Chapter 6, several women referred to the baby as the size of a fruit. For example:

‘It’s only the size of a plum, if that.’ Gemma.

Women were more comfortable describing the fetus in terms of size than appearance which they employed protective visualisation to in the early stages of pregnancy. Therefore, the use of fruit to describe size gives women real-time information about the development of the fetus without invoking feelings of disgust or revulsion. Visually, images of fruit next to healthy babies was intended to invoke positive feelings and therefore raise self-efficacy with an induced positive mood (Bandura 1997). It is likely that participants would also associate fruit with healthy eating and a healthy lifestyle.

#### **7.6.2.2 Images of babies**

It was important that any images were acceptable to view and would not provoke a negative response. The concept of protective visualisation was carefully considered when selecting the images.

Women interviewed said that they would not like to view or imagine an image of a developing fetus in the early stages of pregnancy and avoided thinking of the baby in the future in case this ‘jinxed’ the pregnancy.

‘I don’t want to think too much about the future in case it does kind of all go wrong again.’ Laura

However, later on in pregnancy, when they did allow themselves to start to visualise a future baby – this usually took the form of imagining a generic baby rather than one that is their own baby. They also started to feel more connected to, and protective of the baby. The scan image also increased these feelings of protectiveness.

The images of the baby included in the intervention are intended to accelerate the development of protective feelings. Connecting images of a healthy baby with their own



stage of development (i.e. a picture of a baby's hand alongside information about the baby's fingernails starting to develop) is intended to motivate the woman to engage in protective health behaviours. Images of babies were deliberately kept anonymous and do not feature the face of the baby to increase the feeling that this might be the woman's own future baby.

On weeks 12 and 20, an image of a scan is sent instead of an image of the baby. This is so that the woman can connect her own experience with Megan's.

### 7.6.2.3 Creation of images

I created the images using the design principles outlined in Section 5.2.5 using InDesign and Photoshop software with photographs purchased from stock photo websites. Images were kept simple, with no distracting seductive details. Colour harmony was achieved by picking out colours from the images to use for the background and text colours. There is a strong contrast between text and background colour and the 'rule of thirds' is followed.

Figure 22: Example images



Week 15  
Your baby is  
the size of  
an apple



...and may now  
be hiccupping!

Week 17  
Your baby  
is the size  
of an onion



and can now  
hold onto  
things!

Week 19  
Your baby is  
the size of a  
mango!



Hair is  
starting to  
grow

Week 24  
Your baby is the size of  
a head of broccoli!



...footprints are  
now forming!

Week 29  
Your baby is the size of  
an aubergine



...his or her bones  
are getting  
stronger

Week 38  
Your baby is the size of a  
pumpkin



...and is getting ready to  
meet you!

### **7.6.3 Aims embedded into the text messages**

The construction and timing of the text messages was developed with the aim of creating a believable and engaging experience for the participant. The timing, frequency, tone and content of the messages are explained here.

#### **7.6.3.1 Frequency and timing**

Evidence from previous text message interventions to promote smoking cessation (Naughton et al. 2013, Douglas and Free 2013) indicate that intensive support is required while making a quit attempt, but this should be reduced in the maintenance period of a quit attempt. The optimum timing and amount of reduction is difficult to calculate because it will be different for each participant. The intervention is intensive to start with (daily text messages) to help the participant get to her quit date and through the initial stages of nicotine withdrawal. This is gradually reduced to 3 text messages a week. The intention is that a gradual reduction will not be viewed as a sudden withdrawal of support.

Text messages are sent out at different points of the day. Participants in Naughton's (Naughton et al. 2013) study found that receiving messages at the same time each day was repetitive and predictable. Additionally, this will make 'Megan' a more believable character, and allow text messages to be sent at specific time points when the participant is more likely to be experiencing a craving (i.e. early morning).

Interactive text messages, containing questions which participants could answer are sent once a week to keep the participant engaged in the intervention. Also, a weekly text message was sent summarising the steps that Megan has taken towards a successful quit attempt.

#### **7.6.3.2 Style and content**

The language and style of the text messages was carefully chosen to maintain the believability of Megan. The intention was to reflect the type of message that a friend in the target group would send. Language is kept simple. 'Text speak' is not used, although

messages are not designed to be grammatically correct. Messages start with 'hey' and end with 'xx' to reflect the type of messages normally received and sent by the target group. The text messages are written in an informal manner but, as slang is potentially very specific to geographical areas and swear words could cause offence, the use of these was not thought to be appropriate.

One limitation of using text to deliver an intervention is the lack of non-verbal cues which convey emotion such as tone of voice or facial expression. Walther and Kyle (Walther and D'Addario 2001) investigated the use of emoticons (graphic representations of facial expressions such as ☺ or :-)) to aid message interpretation. Findings indicated that, while emoticons potentially compliment text based messages, there is no evidence that they can either enhance or contradict them. Therefore, emoticons are used within the text messages, however they are not vital to the content of the messages.

#### **7.6.4 Interactivity and tailoring**

A Cochrane review of internet-based interventions for smoking cessation (Civljak et al. 2013) showed that there was a statistically significant effect (RR 1.48, 95% CI 1.11 to 2.78) in favour of interactive and individually tailored interventions compared to usual care or written self-help. Similar internet based interventions, both interactive and non-interactive did not show significant effects if they were non-tailored. A Cochrane review of self-help interventions for smoking cessation (Hartmann-Boyce et al. 2014) showed statistically significant (N=28, 189; RR 1.31; 95% CI 1.20 to 1.42) benefit for using tailored materials compared to standard materials. The difference is stronger for tailored materials compared to no intervention.

Tailoring to individuals is likely to require more time and money than tailoring to a specific group or behaviour. However, individual tailoring when dealing with smoking cessation has been shown (Herbec et al. 2014) to be desirable. An automated text messaging

system is likely provide a cost-effective method of individual tailoring compared to other methods such as those which require time and effort to individualise.

As there is some evidence to demonstrate that tailoring interventions to individuals, in addition to tailoring towards a target group, can be effective, the intervention contains some tailored elements. These are likely to be cost effective in an automated text messaging intervention.

Tailoring was undertaken in a number of ways in the intervention. These are outlined below. Some of these are tailored towards the target group, and some are tailored towards individuals.

- **Barriers and facilitators:** The typical barriers to, and facilitators of, smoking cessation during pregnancy experienced by the target group are all included within the storyline. Megan comes up against barriers, and solutions are offered for each barrier. Facilitators (such as suggestions for activities to distract from cravings) are offered when participant sends a 'help' text. These facilitators are tailored depending on if the participant has other children or if they are employed. For example, suggesting that a participant goes to the gym may not be suitable if they have young children.
- **Motivations:** At baseline the participant is asked to provide their top three reasons for quitting. When requesting help, a supportive reply may include a reminder of one of their own reasons. Other motivations typically experienced by the target group are included in the storyline.
- **Personal details:** Tailoring the intervention by using details such as the participant's name and the gender (if known) of the fetus will add to the experience of being contacted by a friend.

- **Interactive messages:** Messages which invite a reply increase the likelihood that the participant will take notice of the message. Personalised feedback is given to the response of the participant.

### **7.6.5 Rationale for the storyline**

The storyline was carefully constructed to include all relevant theory possible. To outline how theory and the aims are present within the storyline, this section has been divided into: storyline, story components and characters.

#### ***7.6.5.1 Embedding behaviour change techniques and 'elements' within the story***

As discovered in Chapter 3, the presence of all 6 elements increases the likelihood that an intervention will have a successful outcome. There are overlaps with the list of 11 BCTs which Lorencatto et al (Lorencatto et al. 2012) found to have an evidence base for promoting smoking cessation. Tables 32 and 33 show how each of the BCTs and 'elements' were operationalised within the intervention.

**Table 32: BCTs with an evidence base for smoking cessation during pregnancy and an outline of how they have been applied to the intervention.**

<b>BCTs</b>	<b>Where they are present within the intervention</b>
Advise on use of social support	Megan gains social support from new sources and tries to gain support from friends and family.
Offer/direct towards appropriate written materials	Megan sends links to online resources with information about smoking and quitting smoking during pregnancy.
Provide information on the consequences of smoking and smoking cessation	Megan's receives and relays information about the consequences of smoking and smoking cessation from various sources which are likely to be perceived as reliable (e.g. from her midwife)
Measure CO	This is recommended alongside the text messages.
Facilitate barrier identification and problem solving	Megan comes up against several barriers throughout the storyline and finds a solution to each one.
Facilitate action planning	Megan identifies typical triggers to smoking and comes up with methods of avoiding them.
Facilitate relapse prevention and coping	Megan relapses and manages to quit again with the aid of NRT.
Facilitate goal setting	Megan sets a quit date and sticks to it.

Provide rewards contingent on successfully stopping smoking	The text messages would complement an incentive scheme such as GIUFB
Assess current readiness and ability to quit	Participant will be asked if they quit and sent responses tailored to their answer.
Assess current and past smoking behaviour	At baseline, participants are asked about their smoking status and their heaviness of smoking is measured.



**Table 33: The 'elements' and how they have been operationalised within the intervention**

<b>Element</b>	<b>How it is embedded within the intervention</b>
Maintaining social networks	Megan maintains relationships with a number of characters who may not be supportive of her quitting. She uses different methods to ensure that these relationships do not trigger her to start smoking again (i.e. meeting them in an environment where they cannot smoke, avoiding talking about smoking)
Facilitating social support	Megan gains social support in a number of ways: she lets people know that she needs help, she uses social media to announce her success, she makes new relationships with supportive people and she uses pregnancy to gain support from people who would otherwise not be supportive.
Raising risk/benefit perceptions	Megan considers smoking cessation to be important to her own health and the health of the baby and reinforces this belief throughout the story. She offers links to online information. The intervention prompts consistent contact and advice from health professionals.
Concreteness	The images provoke feelings that the baby is real.
Partner motivation	Megan informs her boyfriend of the dangers of smoking while pregnant and tries to encourage him to quit himself.
Coping skills/ stress management	Megan encounters barriers and triggers. She learns how to deal with these using coping strategies and avoids situations which involve triggers.

### **7.6.5.2 Story components**

A key purpose of the story is to demonstrate the potential barriers to quitting smoking, situations that can trigger smoking and the coping mechanisms that can be put in place as solutions to the barriers and triggers. Also, the story addresses common beliefs about smoking during pregnancy that are not true. Examples of these barriers, triggers, coping mechanisms and common beliefs are outlined below.

**Barriers and triggers:** During the process of quitting, Megan identifies her own triggers to smoking and barriers to quitting which are those typical to the target group and finds methods of pre-empting and dealing with these situations. These include:

- Smoking first thing in the morning
- Smoking after meals
- Smoking when other people smoke
- Smoking when stressed
- Smoking when upset
- Smoking at work during breaks
- One cigarette leading to more cigarettes
- Feeling guilty

**Coping mechanisms for cravings:** When Megan experiences cravings to smoking, she finds something to distract herself until the craving passes. Megan's alternatives to smoking were developed, with care being taken to provide alternatives that would be suitable for the target group. These include:

- Taking three deep breaths
- Taking the dog for a walk
- Cleaning the house
- Doing the dishes
- Playing a popular smartphone game

- Phoning a friend or a quit line
- Posting on Facebook
- Waiting 5 minutes
- Having a glass of water
- Eating a lollipop
- NRT
- Reading her list of reasons why she wants to quit
- Looking at her scan picture or the list pictures she has been sent via text message

**Common beliefs:** Commonly stated beliefs of pregnant women which would make them less likely to quit are addressed in the storyline. These include:

- The safety of NRT during pregnancy
- Friends had healthy babies so the risk is not real
- Small babies are preferable because the birth will be easier
- The midwife didn't mind that they smoked so it must not be too bad
- Cutting down instead of quitting altogether is fine
- Quitting suddenly could cause the baby harm

### **7.6.5.3 Characters**

There are several characters who Megan interacts with throughout the story. Some are supportive and Megan uses this support to help her quit attempt. Some are unsupportive. Megan attempts to gain support from these people. If this is unsuccessful, she works out the best way to maintain the relationship without putting herself in a situation where she is likely to smoke. Taking advantage of pregnancy (for example antenatal class) Megan also forms new relationships with people who are likely to help her with her quit attempt.

Characters, their purpose and the 'element' which they represent are described in Table 34.

**Table 34: Characters, their purpose, and the key elements they represent.**

<b>Character/s</b>	<b>Purpose</b>	<b>Element</b>
<b>Megan</b> (The protagonist of the story)	Megan is a 'coping model' developed to increase self-efficacy. Megan has similar attributes to the target group. She will struggle with, and overcome, barriers to smoking cessation throughout the storyline.	All
<b>Ryan</b> (Megan's partner)	Ryan represents a barrier and a facilitator to smoking cessation. The role of the partner has a strong influence on the woman's own smoking status. Ryan smokes too. He and Megan go through ups and downs during the story which have an effect on her smoking status.	Partner motivation
<b>Jenny and Sarah</b> (Megan's work friends)	They smoke and represent a barrier to smoking cessation. Megan attempts to maintain her friendship with Jenny and Sarah while avoiding triggers to smoking, for example during breaks at work.	Maintaining social networks
<b>Mark and Hannah</b> (Megan's boss and his wife)	Mark quits smoking because of Hannah's pregnancy. Hannah has previously quit smoking and offers Megan advice. Megan gains valuable social support through her friendship with them.	Facilitating social support
<b>Megan's mother</b>	Megan has a difficult relationship with her mother who represents a barrier to smoking cessation. Her mother wants Megan to quit but her negative attitude and constant 'nagging' make Megan feel stressed and therefore more likely to have a cigarette.	Maintaining social networks
<b>Caitlin</b> (Ryan's sister)	She is single, has a young daughter and is pregnant. She also smokes. Caitlin represents mothers who find suggested alternatives to smoking difficult with a small child. Her attitude that her first child is healthy despite smoking	Maintaining social networks

	during the pregnancy is challenged. Caitlin has her baby pre-term. Caitlin displays cognitive dissonance by justifying her own smoking behaviour. Megan accepts that she cannot change Caitlin's views but remains friends with her anyway.	
<b>Midwife</b>	The midwife is often referred to throughout the story as a reliable source of health information. She is perceived as a non-judgemental source of advice.	Raising risk perceptions

## 7.7 Applying storytelling advice to the intervention storyline

### 7.7.1 Narrative transportation

A character created to be a coping model, such as Megan, is likely to increase the likelihood of narrative transportation by encouraging self-referencing. Interactive texts, where the participant can respond and receive a personalised response from Megan may increase the feeling of absorption into Megan's story.

### 7.7.2 Narrative believability

Narrative believability is both important and difficult to achieve in a story where the behaviour of the character must reflect behaviour typical of the target reader. For this reason, care was taken to research behaviour typical to the target group. Barriers to quitting smoking were those commonly reported by pregnant women and solutions offered are feasible. The researcher (MS) drew on her own experience of interviewing pregnant women to create plausible language and situations.

### 7.7.3 Character identification

As discussed in the previous section, Megan must be a believable character. For this reason she cannot be seen to be too good or too reasonable. She must have flaws but also retain credibility.

Using the medium of text messaging, participants can not only observe Megan's behaviour but are given an insight into her motivations. Megan's motivations for quitting smoking are that she wants to have a healthy baby and improve her own health. She wants to quit smoking to achieve this. She wants to fight her own cravings and receive supportive attitudes from those around her. These are likely to be similar to the motivations of participants, and therefore make Megan easy to identify with.

To gain empathy for Megan, she struggles with various barriers to achieving her goal of quitting smoking. The participants are likely to have experienced similar barriers.

#### **7.7.4 Storyline construction**

This section outlines how the storyline has been constructed in accordance with Freytag's pyramid.

**1: Exposition:** The status quo at the beginning of the story is that Megan is pregnant. She smokes but wants to quit. Her boyfriend, Ryan is not supportive of this.

**2: Inciting incident:** The inciting incident is Megan's scan. She feels more protective of the baby and receives advice from the midwife which makes her form an intention to quit smoking.

**3: Rising action:** A number of events occur before the climax which change Megan's situation. These are the 'turning points' of the plot and are listed below:

a. Turning point 1: Ryan stays out all night (Megan relapses)

b. Turning point 2: The second scan (Megan quits again, Ryan becomes more supportive)

c. Turning point 3: Megan finds out Ryan lied (Megan struggles but doesn't relapse)

d. Turning point 4: Caitlin goes into early labour and Ryan comes to the rescue

e. Turning point 5: Megan decides to forgive Ryan

f. Turning point 6: Megan finds out Jenny lied

These turning points mark out the relationship of Megan and Ryan, which is the main focus of the story. However, there are sub-plots which run parallel with, and sometimes interlink with, the main plot. The main sub-plots are: Ryan's sister Caitlin's pregnancy and struggle with quitting smoking, Megan's growing friendship with Mark and Hannah and Megan's friendship with Jenny and Michelle.

**4: Climax:** Although there are several smaller climaxes involved in the sub-plots, the main climax of the story is Ryan's absolution. Jenny shows her true character and the other characters become convinced of Ryan's innocence. Megan herself has already decided to trust him but is now relieved of all remaining doubts. She can re-kindle old friendships and she has new friendships which provide her with much needed support.

**5: Falling action:** After finding out that Jenny has lied, Megan's relationship with the other characters improves and her relationship with Ryan stabilises. She prepares for the birth and has her baby.

**6: Resolution:** In Megan's case the resolution is a stronger relationship with her boyfriend, friends and family and a healthy baby.

**7: Denouement:** The status quo at the end of the story is that Megan has had her baby and it is healthy. She has quit smoking and her relationship with her boyfriend has improved. He has become supportive and tried to quit himself.

## **7.8 Description of intervention and process**

As the previous sections have outlined the theory and evidence embedded within the intervention, this section provides a description of the intervention process and content.

The intervention takes the form of text messages sent to the participant three times a week. The apparent sender of the messages is 'Megan', a fictional character who is a young pregnant woman struggling to quit smoking. The text messages follow Megan's story throughout her pregnancy, starting with the 12 week scan and ending 6 weeks after she gives birth. Images also accompany some of the text messages, charting the development of the baby.

The intervention can be used by itself. However, the recommended context that it is delivered in is likely to increase effectiveness. This is; that the participant also participates in an incentive based smoking cessation scheme, is given CO breath tests on a regular basis and engages in conversation about the intervention with their midwife.

### **7.8.1 Baseline assessment**

A pregnant woman attends her 12 week booking scan. At this appointment, the midwife can identify her as still smoking or recent quitter (less than 3 months prior to the appointment) from her notes. The midwife asks the pregnant woman if she would like to participate. If she agrees, she is asked to fill out the baseline assessment.



Name							
Date of birth							
Do you have any children?							
Occupation							
Have you quit before?	No	Yes					
How long was your longest quit attempt?							
When was the date of your last cigarette?							
On the days that you smoke, how soon after you wake up do you have your first cigarette?	Within 5 minutes		6-30 minutes		31-60 minutes		After 60 minutes
How many cigarettes do you smoke on an average day?	0	1-5		6-10	11-15	16-20	21 +
What are your top 3 reasons for wanting to quit?	1.						
	2.						
	3.						
Have you stopped smoking?	No	Yes					
Do you intend to stop?	No	Yes					
Have you set a quit date?	No	Yes					

**Figure 23: Baseline questionnaire**

The information in this form will allow the intervention to be tailored to individual participants.

From the baseline assessment form, the level of addiction of those participants who were still smoking was measured using the Heaviness of Smoking Index (HSI) (Heatherton et al. 1989). This was used to tailor the intervention to the individual's level of smoking.

<p>On the days that you smoke, how soon after you wake up do you have your first cigarette?</p> <p>A. Within 5 minutes (3 points)</p> <p>B. 6- 30 minutes (2 points)</p> <p>C. 31-60 minutes (1 point).</p> <p>D. After 60 minutes (0 points)</p> <p>How many cigarettes do you typically smoke per day?</p> <p>A. 10 or fewer (0 points)</p> <p>B. 11-20 (1 point)</p> <p>C. 21-30 (2 points)</p> <p>D. 31 or more (3 points)</p> <p>SCORING:</p> <p>0-2: low addiction</p> <p>3-4: moderate addiction</p> <p>5-6: high addiction</p>
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**Figure 24: Heaviness of Smoking Index (HSI) (Heatherton et al. 1989)**

### 7.8.2 Storyline

The story is outlined below. The rationale is highlighted in bold.

Megan is having a baby with her live-in boyfriend of 6 months, Ryan. They both smoke **(Partner support)**. The baby was not planned. Ryan works full time and is often out at night so Megan spends a lot of time with her friends from work (Jenny and Michelle). Megan is friends with Ryan's sister, Caitlin, who is also pregnant. Caitlin and her boyfriend have recently split up, and she raises her daughter, Ava, alone.

At her first scan, which she attends without Ryan, Megan chats with the midwife and decides to set a date to quit smoking (**increasing the likelihood of a successful quit attempt**). Her mother scoffs and says she will never manage it because she has quit and relapsed before (**her mother represents a barrier to quitting**). After a week of cutting down and keeping a diary of the cigarettes she has smoked (**this is a coping skill**), she successfully does this. Persuaded by Megan, Ryan begrudgingly agrees to smoke outside (**partner support**).

Megan tells her work friends, Jenny and Michelle, she is quitting smoking because of her pregnancy (**by informing them ahead of time, she is more likely to quit on her quit date**). She realises that they are much more accepting than they were when she tried to quit previously (**Megan realises that pregnancy is an opportunity to quit**). Despite their apparent support, at work, the girls are constantly going on smoke breaks (**Maintaining social networks**) This makes Megan feel left out and she takes her breaks with her boss Mark – Mark is trying to quit smoking to support his pregnant wife Hannah (**facilitating social support**).

Megan is grumpy and snappy with Ryan because she is going through nicotine withdrawal and because of her pregnancy hormones (**Withdrawal symptoms as a barrier**). Ryan goes out drinking more frequently to avoid her. He also stays late at

work. Megan is very suspicious. One night Ryan doesn't come home from a night out and Megan is furious. Ryan says he stayed at a friend's house but Megan is unsure whether to believe him. Megan has a cigarette **(demonstrating how easy it is to relapse and how one cigarette will lead to more)** and then starts smoking again because she is stressed **(stress as a barrier)**

Megan feels like people are staring at her when she smokes. Because of her own guilt, she perceives that others think that she is a bad mother **(guilt leading to defensive withdrawal)**. Megan's mother tells her that her dad would have been ashamed of her. This makes her feel guilty and therefore she smokes more. Megan's work friends seem pleased that she has started smoking again and help her justify her smoking **(lack of support as a barrier)**. Mark tries to encourage Megan to quit again but she doesn't feel like she can **(low mood and self-efficacy as a barrier)**.

Megan tells Ryan that he has to come to the second scan with her. They discover that they are having a boy. Megan tells the midwife that she has started smoking again, expecting her to be angry **(reassuring that this is not the case)**. The midwife is supportive but tells Megan that it is important that she quits, rather than cutting down **(raising risk perceptions)** and discusses options with Megan which includes using Nicotine Replacement therapy (NRT). Megan quits the next day using NRT (spray plus chewing gum) **(NRT introduced as a quitting method if smoking is the only other alternative)**.

While Megan is doing well at quitting smoking, Caitlin feels that she cannot quit. As a single mother, her life is stressful and she cannot do some of the things that Megan can as alternatives to smoking (e.g. going to the gym) because she has to look after her child and refuses to listen to Megan's suggestions **(coping methods suitable for women with children)**. She justifies this **(cognitive dissonance)** by telling Megan that Ava was fine even though she smoked through that pregnancy. Megan tells her

that she is still putting her baby at risk (**raising risk perceptions**). She cuts down on her number of cigarettes and thinks that this is sufficient to protect her baby which Megan knows is not (**cognitive dissonance**).

Things seem to be going well with Ryan and Megan since the second scan. However, Ryan admits that he spent the night at Jenny's house the night he didn't come home. He hopes that by being honest, Megan will trust him again. Instead she is very angry with both Ryan and Jenny and asks him to leave to give her time to think. Through this stressful time, Megan does not relapse (**self-efficacy**).

When Caitlin and Megan are having lunch together, Caitlin's water breaks 6 weeks early (**raising risk perceptions**). Megan panics and phones Ryan even though they are not on speaking terms. Ryan takes Caitlin to hospital and impresses Megan.

Caitlin's baby spends a few weeks in hospital. He is very small and has to have special care (**raising risk perceptions**) and is ultimately allowed home. Megan and Ryan talk and Megan agrees to get back together.

Megan becomes friends with Hannah (Mark's wife who is also pregnant and does not smoke) (**facilitating social support**) and the two couples get along well.

At work, things are strained because Megan is still angry with Jenny for lying to her. Her work friends take Jenny's side until Mark tells them that she has been sending him inappropriate text messages. Everybody realises that Jenny has been lying all along. Before Megan goes on maternity leave, Michelle organises a cake and present for her and they are friends again. In a much calmer state, Megan prepares for the baby arriving and starts to think about smoking again after the birth. She realises that now she is no longer physically to smoking, it would not make sense to start again (**identifying post-birth triggers to smoking and coping mechanisms**).

Megan has her baby, Ethan. She struggles with being a new mum but is happy. Ryan tries to help (**partner support**).

### 7.8.3 Content of text messages

Table 35 shows the content of the text messages in week 1 of the intervention. Each week, participants receive text messages. At first this is daily, and then reduces to 3 text messages per week. At the end of every week, a summary of the method's Megan has used to quit smoking/remain quit is provided. One text message per week asks for a response and provides an answer-dependant reply. An image is also sent weekly. See Appendix 23 for a table containing the content of all of the text messages.

**Table 35: Text messages sent in week one of the intervention**

Day	Text message content (to participant called 'Jane')	Interactive responses
1 (12 weeks pregnant)	Hey Jane, My name is Megan and I'm 12 weeks pregnant. Had my first scan today too! My midwife gave me loads of advice on how to look after myself and the baby. I've set a date to quit smoking for three weeks today. Maybe we could help each other? Xx	
2	Hi Jane, I showed my boyfriend, Ryan, the scan photo and he thinks it looks like a potato. I'm going to cut down on cigs from today. I've never quit for longer than a month before so I'm a bit nervous! xx	
3	Hi Jane, Me and Ryan took my mum the scan pic. She wasn't happy when I told her I was pregnant but when she saw the pic she got really emotional. Still got nagged for not telling her about the scan though. <b>Do you smoke too?</b> xx	<p>If participant smokes: 'Great, we can quit together! Why don't you set the same quit date at me?'</p> <p>If participant has quit: 'Well done! I know it's not easy but we can do it together!'</p>

5	Hi Jane, I'm back at work tomorrow. Totally dreading it after a week off on holiday. I'll need to tell my boss I'm pregnant – not sure how he'll take it. I've started writing a diary of when I usually smoke during the day. It was a lot today! xx	
6	Hi Jane, Work went ok – my friends, Jenny and Michelle already knew I was pregnant and Mark, my boss, was great about it. His wife's pregnant too. Smoked 15 cigarettes today. Mostly after meals and on my work breaks with the girls. xx	
7	<p>This week Megan has:</p> <ul style="list-style-type: none"> <li>• Decided to quit</li> <li>• Set a quit date</li> <li>• Started a smoking diary</li> <li>• Recognised times she is likely to smoke (on breaks at work, after meals)</li> </ul>	



Participants can text 'stop' at any time and they will no longer receive any text messages. They can text 'help' any time they are experiencing a craving. They will then receive an automated supportive text message. Some of these are tailored to the information that they gave in the baseline assessment form. Their own top 3 reasons for quitting were used within the messages.

Example 'help' messages to a participant called Jane who indicated that she was quitting for the health of her baby and to save money. The bold text indicates a tailoring variable:

'Hi **Jane**, you can do this! Remember you are doing this because you **want to save money**. Sometimes it's a good idea to drink a glass of water and see if the craving goes away. Having plenty of fluids is good for the baby too.'

'Hi **Jane**, This craving will be over soon! Take three deep breaths. Remember you are doing this for **the health of your baby**. Phone a friend for a chat or call the Smokefree Helpline on 0300 123 1044. They are really good at answering my questions and it's free to call.'

'Hi **Jane**, if you have one cigarette it will be likely to lead to more, don't give up now! Get your washing up done, clean the oven, take the dog for a walk, – anything to keep yourself busy.'

'Its ok that you are struggling **Jane**, quitting smoking is really hard for me too. I find it helps if I wait 5 mins and then have a think about whether I really need a cigarette or not.'

## 7.9 Limitations

The approach to developing the theory and evidence for the content of this intervention could prove to be a limitation when attempting to measure individual theoretical components in a trial of this intervention. Distinguishing which components have contributed to the success or failure of the intervention without picking out components to compare is difficult. We argue that this is common to many interventions. Even though not included in intervention descriptions, many interventions have unintended content or output, and this may not be included in the intervention description. By making all theory explicit, future systematic reviews and meta-analysis of theoretical constructs and models can draw accurate conclusions.



## **7.10 Conclusions**

This chapter has outlined the development of the intervention, the predicted mechanisms of behaviour change and expected outputs. Drawing together the evidence gathered in the preceding chapters of this thesis and advice from storytelling literature, an outline of the development of a prototype intervention has been provided.

Academic research in the area of storytelling is at an early stage. In the context of combining storytelling and behavioural theory there is very little evidence available to draw on. This chapter contributes towards combining the two areas to promote positive behaviour change. Firstly, it concludes that the use of storytelling with embedded theory can indeed be an effective method of promoting desired health behaviours. A believable, engaging storyline entertains the reader, while important health information can be embedded into the story. This indirect approach allows the intervention to deliver information in a manner which is less likely to be seen as confrontational or judgemental by participants.

Implementation consistency is a key strength of the intervention. Automated text messages can be delivered with consistency and are time and cost-effective compared interventions which require the time of health professionals. Additionally, a focus on relapse prevention and dealing with underlying issues which lead to smoking relapse increases the likelihood of long-term smoking cessation maintenance.

To summarise, an intervention has been developed which is; acceptable and feasible to the target group; engaging and entertaining; and likely to promote positive behaviour change. In the next chapter, the target population is interviewed to ensure that the intervention has achieved its intended acceptability and potential effectiveness.

## **8 Chapter 8: Determining the acceptability and usability of the intervention for the target group.**

### **8.1 Outline of chapter**

Once the intervention was developed to the stage described in Chapter 7, some initial testing was carried out to evaluate the acceptability and usability of the intervention. This was completed using qualitative interviewing and heuristic evaluation. This chapter outlines the results of a focus group with non-pregnant women, *and* interviews with the target group (pregnant smokers); it then goes on to discuss the implications of these results for the intervention. It also describes issues with recruitment into the study and the implications and potential solutions of this in implementing the intervention.

### **8.2 Rationale**

The revised MRC Framework for Complex Interventions (Craig et al. 2008) advises researchers to ‘test for feasibility and acceptability of the proposed intervention using prototypes’. This is time and cost-effective because it ensures that the intervention is likely to be useful and effective without the need for a full pilot trial.

The purpose of the focus group was primarily to ensure that there was no confusing or distressing information present within the intervention before it was presented to pregnant women. The feasibility of the intervention in clinical practice was tested in Chapter 6. Therefore, the study described in this chapter will focus primarily on the acceptability of the intervention to the target group.

### **8.3 Research aims and questions**

This study is part of an iterative process of feedback, and the intervention will therefore be refined based on the results of this study. This chapter therefore seeks to answer these specific questions:

1. Do women find the proposed intervention acceptable and useable?

2. How can the proposed intervention be refined in order to increase uptake and effectiveness?

## **8.4 Methods**

This section outlines the setting and sample, recruitment strategies and issues, the sample characteristics and the data collection methods for this qualitative study. Many of these are similar to those methods described in Chapter 6 (Section 6.4). Where this is the case, the previous section in which it is described is signposted to avoid repetition.

### **8.4.1 Setting and sample**

The setting for the focus group of non-pregnant women was the family home of one of the participants.

The setting for the study involving pregnant women was in two large maternity units in Scotland. Participants were interviewed in a setting of their choosing. In most cases, this was the participants' own home. Two participants were interviewed in a meeting room within the maternity unit.

### **8.4.2 Recruitment**

To recruit non-pregnant women for the focus group, an advert was placed in the local community and snowball sampling (see Section 2.5.1) was used. 6 women were recruited for this group.

The recruitment strategy outlined in Section 6.4.2 (Figure 19) was employed for recruitment of pregnant women. Two researchers were involved in recruitment and interviewing in this study, Anne Taylor (a nurse with significant recruitment and qualitative interviewing experience) and Mary Steele. A number of barriers to recruitment were encountered, and are outlined in this section alongside possible solutions.

As in the previous study reported in Chapter 6, initial recruitment was slow. No women were recruited in the first 2 months of recruitment. Investigation showed that lack of time,

resources, and the presence of other priorities meant that health professionals in the maternity unit were unable to fully engage in the recruitment procedures, and were simply handing over written information about the study to eligible women. There were two approaches taken to solving this issue; firstly, dedicated smoking cessation workers were approached to help with recruitment; and secondly, a new research site was added to the project.

Several smoking cessation specialists agreed to help with the recruitment procedures. After speaking to researchers and viewing the intervention themselves, they were able to accurately describe the nature of the intervention to women and present the intervention as an engaging and entertaining story.

After discussion and collaboration with maternity services in Ayrshire and Arran, R&D approval was then gained to conduct the research there in addition to the original Tayside site used in the first qualitative study. This site was chosen because of the high number of pregnant women reported as smoking in the area, and specialist midwives with an interest in smoking cessation were employed in the maternity services. Several of these midwives were allocated to the project. They worked closely with the researchers to ensure that they could provide information and reassurance about the project.

After the updated recruitment strategy was employed, nine women were then recruited from Tayside, and three from Ayrshire and Arran.

#### **8.4.3 Sample characteristics**

The focus group of non-pregnant women consisted of 6 women. They were under the age of 25 and were non-smokers or ex-smokers.

The characteristics of the pregnant women interviewed are outlined in Table 36.

**Table 36: Participant characteristics**

Pseudonym	Age	Notes
Rachel	27	Rachel's second pregnancy. She was still smoking.
Steph	27	Steph's third pregnancy. She had recently stopped smoking.
Lucy	23	Lucy's first pregnancy. She was still smoking.
Jess	21	Jess's second pregnancy. She was still smoking and had both addiction and literacy issues.
Ashley	31	Ashley's second pregnancy. She smoked through her previous pregnancy and planned to quit during this pregnancy.
Heather	28	Heather's second pregnancy. She had quit smoking during the pregnancy.
Marta	25	Marta's first pregnancy. She had quit smoking. She is Polish and struggled to speak English. Her husband helps to translate throughout the interview.
Danielle	25	Danielle's second pregnancy. She attempted to quit smoking but did not succeed.
Amy	27	Amy's second pregnancy. She had quit smoking.
Emily	29	Emily's second pregnancy. She has quit smoking with the aid of the GIUFB team.
Michelle	28	Michelle's eighth pregnancy. She had attempted to quit smoking and had cut down by a quarter. The interview was challenging because she is quiet with little confidence.
Kate	29	Kate's third child. She has a complex background and was living in a hostel. She was still smoking.

#### 8.4.4 Data collection

A focus group was chosen as the method of data collection for non-pregnant women. This was a time and cost-effective method of collecting the required data. The women

recruited were a group of friends who were comfortable participating in an open and honest discussion with each other.

Semi-structured interviews were selected as the method of collecting data for pregnant women to gain more in-depth insight into what they individually liked and disliked about the intervention. As these are the primary method of data collection used in this thesis, a more detailed overview of the considerations involved in semi-structured interviewing is provided in Chapter 2 to avoid repetition.

All participants viewed the first 36 messages of the intervention as a PowerPoint presentation. They were then asked questions in a semi-structured interview based on a topic guide (see Appendix 13).

In addition to the interviews, to determine how useable and readable the intervention is, two questionnaires based on the principles of Heuristic evaluation (Nielsen and Molich 1990) were developed (see Appendix 13). Heuristic evaluation is an informal, cost-effective and simple method of evaluating the usability of an interface design.

## **8.5 Data analysis**

As in Chapter 6, results were analysed using framework analysis . Data familiarisation, the development of a theoretical framework, indexing, charting, mapping and interpretation were carried out as described in Section 6.6. Table 37 shows the final coding framework which was used to index the data.

Given that the purpose of this initial testing, and the more precise focus of the research questions, was purely to determine feasibility of the intervention, a descriptive (rather than conceptual) analysis of women's views was required.

**Table 37: Coding index**

<b>Themes and sub-themes</b>
<ol style="list-style-type: none"><li>1. Perceptions of storyline and characters<ol style="list-style-type: none"><li>a. Relating story elements to personal circumstances</li><li>b. Interest/engagement</li></ol></li><li>2. Acceptability<ol style="list-style-type: none"><li>a. Acceptability of intervention</li><li>b. Other issues</li></ol></li><li>3. Language<ol style="list-style-type: none"><li>a. Acceptability of language</li><li>b. Use of emoticons</li></ol></li><li>4. Images<ol style="list-style-type: none"><li>a. Acceptability of images</li><li>b. Other issues</li></ol></li><li>5. Interactivity</li></ol>

## **8.6 Results**

This section provides a description of the results of both the focus group with non-pregnant women, and the interviews with pregnant women in relation to the earlier stated research questions. First, the results of the focus groups are reported. Secondly, adaptations made to the intervention as a result of the focus groups are outlined. Finally, the results of the interviews with pregnant women are presented and discussed.

### **8.6.1 Results of focus group with non-pregnant women**

The primary purpose of the focus group was to test the general acceptability of the intervention and allow the removal or modification of any information or images which may cause unnecessary stress to pregnant women. These are categorised into;

acceptability; perceptions of the storyline and characters; images; language; and interactivity.

#### **8.6.1.1 Acceptability**

In general, all women liked the format of the intervention and were able to follow the storyline easily. As they read through the PowerPoint slides, they laughed at several points. They were asked what they thought of the idea in general and responded positively.

‘I think it’s a good idea ‘cause it’s like somebody to talk to.’

The focus group generally agreed that they would sign up to the intervention if they were pregnant and struggling to quit smoking.

[Interviewer asks if they would sign up] ‘yeah’

‘yeah, I would if I was finding it difficult to quit.’

‘If no-one else could help you, if all your friends were not really bothering and calling you moody.’

‘It’s something else that can help’

Women expressed concern that maybe there was not enough information about the adverse outcomes that can occur as a result of smoking during pregnancy.

‘So something like that I think would be helpful as well if you’re reminding them what stress you’ll be putting on the baby if you carry on smoking.’

They suggested that this would be best embedded within the storyline, rather than as an image.



‘Or she could even say it in a text like the midwife told her that sort of thing, like ‘I never realised this is what happens’ d’you know what I mean, rather than... it doesn’t need to be a picture.’

#### **8.6.1.2 Perceptions of the storyline and characters**

The focus group participants found the intervention interesting and engaging. They were keen to find out what happened next in the story, and referred to the characters with humour and affection.

[Interviewer asks if they found the story interesting] ‘yeah’

‘I wanted to see what happened!’

‘Old Ryan!’ [Laughter]

Megan was perceived to be a selfish and moody character. It seemed that the key cause of this perception was that the relationship between Megan and the participant was very one-sided.

‘I thought she was a bit selfish and that, she was always rambling on about herself. And six texts in she didn’t even know if I had a partner, d’you know what I mean’

‘What kind of friendship’s that?’

‘She’s a wee bit moody’

Although they did not necessarily relate well to Megan, this did not discourage engagement with the text-messages. The story prompted discussion amongst the group, who spoke about the characters as if they were real people. The characters who represented barriers to smoking cessation provoked the most conversation.

‘Aye, that Caitlin was doing my nut in!’

One participant likened the character of Caitlin to somebody she knew:

‘Who did she remind you of?’

‘Who?’

‘John’s sister!’

The character of Ryan’s unreasonable behaviour also prompted outrage and discussion.

‘He’s moaning about buying her a pizza and he buys cigarettes, d’you know what I mean.’

‘You can get pizza at Asda for a pound!’

The focus group were generally in agreement that the strongest barrier within the storyline was that imposed by the other characters.

‘Just other people really, rather than actually like the smoke itself, it was more other people’s behaviour and that.’

### **8.6.1.3 Reaction to images**

When asked about the pictures, the reaction was generally positive. Women thought that seeing the size of the baby compared to a fruit helped them understand the growth of the fetus.

‘Just cause you can visualise a size, cause it’s... like, everybody always goes ‘oh it’s nothing’ and that, but then really it’s like an onion.’

They thought that seeing an images of the baby might make it seem more real or concrete.

‘Aye, seeing an actual visual thing, it’s all very well people saying it’s like a baby and that, but you can actually see it.’

#### **8.6.1.4 Language**

When asked about the use of language participants were happy that it was written in a style that they were familiar with and would use themselves.

‘It was just text language.’

‘It was quite realistic’

‘It wasn’t like a machine sending it, it was like actual Megan.’

‘I know.’

Women liked the emoticons and kisses at the end of text messages. They said that they generally used these themselves when sending text messages to friends.

[Interviewer asks if they would use emoticons and kisses]

‘It’s how we would..’

‘I would like that. I’d be angry if I didn’t get a kiss!’

#### **8.6.1.5 Interactivity**

Women liked the idea that participants could interact with the intervention by sending a ‘help’ text or answering questions, especially for somebody who did not have other means of support.

‘I think that is quite good because if somebody, like, that has got people that are smoking around them, like, and they’ve... like, everybody they know that smokes.’

#### **8.6.1.6 Summary**

In general, the intervention was found to be acceptable and engaging. Women spoke about the characters with familiarity and even found similarities with people in their own lives. They reported that Megan appeared to be a real person sending them text

messages rather than an automated program. They were comfortable with the language used and the use of emoticons and symbols such as an 'x' at the end of a message. They clearly identified the key barriers in the storyline. The women also liked the images and stated that it helped them to visualise the size of a fetus and would make the fetus seem more real.

Issues that women outlined with the storyline were; their perceptions of Megan, and the lack of information about smoking during pregnancy. The character of Megan was written to be a flawed, but likeable character who struggles with, and overcomes, barriers to quitting smoking. However, the women perceived her as selfish because she did not ask them about their own lives, and she talked about herself a lot. Additionally, women thought that there should be more information about the risks of smoking during pregnancy to give pregnant women more motivation to want to quit.

It was also interesting to note (given that the focus group contained non-smokers) that the participants recognised that other people were the strongest barrier to Megan quitting smoking. This suggests that Megan's story may be beneficial not only for those trying to quit, but may also serve to persuade significant others that their behaviour is an important facilitator for quitting.

The next section outlines how the intervention was adapted based on this feedback before pregnant women were consulted.

### **8.6.2 Adaptions**

As a result of the focus group, the text message content was adapted. Although their apparent dislike of Megan did not stop the women from engaging with the storyline, storytelling principles (Zillman and Cantor 1977) indicate that it is important that the protagonist is likeable, and that the readers are rooting for her to achieve her goals. Megan was made a more likeable and less selfish character by; asking the participant more questions (i.e. showing interest in their lives), explicitly offering help by saying

‘Remember, you can always text HELP to me, and I’ll give you advice’. The images were not changed as a result of the focus group because of the positive reaction.

More information about the risks of smoking during pregnancy was not added to the intervention, despite the opinions of women described in the previous section. It was thought that firstly, women were already generally aware of the risks. Secondly, it may cause unnecessary worry to potentially vulnerable pregnant women and cause defensive withdrawal, leading to women not engaging with the intervention.

### **8.6.3 Results of interviews with pregnant women**

In this section, the results of the interviews with pregnant women are described. The results of the heuristic evaluation are also presented.

It was observed that in some areas, there were differing opinions between those participants who were still smoking, and those who had quit. Similarly, the age of the participant seemed to influence their answers to some questions. Because of this, quotes from participants are presented with their age and smoking status alongside their pseudonym to highlight these differences.

#### **8.6.3.1 Acceptability**

In general, women were positive about the intervention. In contrast to the women interviewed in the study described in Chapter 6, all women said that they *would* be likely to sign up for the text messages if they were offered to them.

[Interviewer asks if she would use the intervention] ‘Yeah. It would have been really good.’ Steph (quitter, aged 27)

In particular, women with little support of their own were very positive about the intervention because they thought that it would become a source of support.

**‘Support is not really something I’ve got in a way.** I’ve got my husband and my children. We don’t have any other family around us and obviously it’s just set

friends and things and, you know, everybody leads different lives.’ Michelle (smoker, aged 28)

Women liked being sent text messages from ‘Megan’ because they felt familiar with her and thought of her as a friend or acquaintance. They thought that receiving messages from someone who was going through a similar experience to themselves was comforting. This view was common to all women, regardless of their age and smoking status.

‘It makes it seem a bit more personal as well. If it’s a text message then, you know, feels like you’d be texting somebody that would be in the same situation as you, which is quite good. I quite liked it.’ Heather (quitter, aged 28)

‘Maybe if knowing somebody has kind of been through the same as what you’re going through yourself.’ Rachel (smoker, aged 27)

‘It’s good to have that there, sort of like a comfort when you’re stopping smoking, if that makes sense. Even though, if it was just a virtual person, it’s somebody that might be going through the same. Because, somebody might not have anybody to talk to about it.’ Lucy (smoker, aged 23)

[Interviewer asks what she would find helpful about the intervention] ‘Probably speaking to **someone else that’s going through the same as I’m going through** with the pregnancy and trying to stop smoking.’ Jess (smoker, aged 21)

‘Obviously you’re going through the same stages as the character. So yeah, I think that’s good.’ Steph (quitter, aged 27)

Women reported that the text message format of Megan’s story was sufficient for them to feel familiar with Megan and connect with her.

‘Even just through texts, you could find out... you could get to know someone quite well. And just be there for support.’ Amy (quitter, aged 27)

They thought that feeling comforted and supported by someone in a similar position as themselves did have the potential to help with their smoking cessation attempts. They believed that this would provide some motivation to either make a quit attempt or keep motivated in their current quit attempt.

‘Well it would maybe kind of jolt you on a wee bit, just kind of keep you, make you think there’s somebody else going through it too.’ Rachel (smoker, aged 27)

‘Getting a text and thinking, oh well, it’s alright, I can keep going. I think it is motivating, and helpful, yeah.’ Kate (smoker, aged 29)

The bulleted summary messages sent out at the end of the week were popular with women. They liked that these clarified the methods that Megan had used to help herself quit.

‘I think the bulleted text, its clearer for people to see than having like loads of writing.’ Amy (quitter, aged 27)

When comparing the intervention with a phone helpline service, women said that they would rather use the intervention. Reasons included feeling nervous or uncomfortable talking on the phone, and finding it more convenient and comfortable to send a text than make a phone call.

‘I know in myself, I tend to... it’s easier just to pick up the phone, give a quick text, and then... I’m more, I would rather text than speak on the phone, ‘cause I find it quite difficult, I wouldn’t say difficult, speaking to somebody on the phone, but sometimes to try and get my point across.’ Amy (quitter, aged 27)

'I would do text. I'm quite a nervous person on the phone, with people I don't know. I'm like, oh, and I like to get off the phone. But a text is.. you can feel comfortable.' Kate (smoker, aged 29)

Most women were comfortable receiving text messages and often used them as a primary mode of communication with friends.

'Aye, I text my pals and that, aye, I text back and forward.' Rachel (smoker, aged 27)

Women liked the idea of text messages that they could store and refer back to at a later date for reminding themselves of their motivations and methods of quitting.

'Aye, maybe flick back texts, just to kind of even think, right, I can do it. Aye, 'cause this is why I'm doing it.' Rachel (smoker, aged 27)

General perceptions of the intervention were good and women liked the fact that this was a novel and engaging method of providing help and support.

'I think everybody should be aware that this is available, because maybe you think, oh I can't quit, and then you think, oh **there's something new, I could try that**, I'll give it a go.' Kate (smoker, aged 29)

'I think it's great. Whoever came up with it, it's a fantastic idea' Steph (quitter, aged 27)

### **8.6.3.2 Perceptions of storyline and characters**

All women reported being able to follow the storyline and found it realistic and entertaining.

'Aye, it was quite entertaining because it seemed like, kind of real anyway, aye.'  
Rachel (smoker, aged 27)



Some women thought that the characters were particularly realistic because they reminded them of people they knew.

[Interviewer asks if she thought the people in the story seemed real] 'Yes, they do. Very real. **I could almost see people I knew.**' Steph (quitter, aged 27)

'I can relate to Caitlin as well, because obviously I know people who couldn't stop and carried on. My cousin was one of them. She tried and failed miserably.'  
Heather (quitter, aged 28)

Some women showed emotions such as frustration and annoyance towards some of the characters.

**'I was getting frustrated with her partner sometimes.** Sometimes it's like talking to a brick wall and it's needing the support, needing the support.' Michelle (smoker, aged 28)

'I think that was a bit inappropriate especially if [Megan]'s given up and [Caitlin] just walks in and lights up a fag, **you'd probably throw her out**' Jess (smoker, aged 21)

Women liked that the storyline acknowledged that smoking cessation was not an easy or straightforward achievement.

'It's realistic. That's definitely one of the things [I liked]. And **I like that it's not just like plain sailing**, do you 'know what I mean. Oh yeah, I've quit and this has happened, blah blah blah, 'cause that's not how it works.' Emily (quitter, aged 29)

The younger women in the group (under 27) who were still smoking found the story the most realistic and relatable to their own lives. They tended to relate to the whole storyline, rather than just parts of it.

[Interviewer asks how realistic she thinks the story is] 'Yeah, it's pretty, I'd say it's dead on near enough.' Jess (smoker, aged 21)

'It was very realistic.' Danielle (smoker, aged 25)

[Interviewer asks if she could relate to the story] 'Kind of, yeah. With the things where she's not wanting to go around people that are smoking and stuff like that. It was kind of like that when I was stopping smoking for a while.' Lucy (smoker, aged 23)

Those women aged 27 or over, or who had quit smoking, were more likely to pick out parts of the storyline which were either particularly similar to their own lives and gave examples of similar situations.

[Marta's partner translates] 'Marta's sister smoking and when Marta visits sister, it's not...she starts smoking and Marta starts thinking about smoking, yeah.'  
Marta (quitter, aged 25)

'I can relate to some of the things' [Interviewer asks what she can relate to] 'Well the smoking one, and the things around about the actual, the friends that smoke.'  
Rachel (smoker, aged 27)

'I think it's very real in the fact that partners play a big influence on it because when I was pregnant and smoked with my first and I stopped before I got pregnant and my partner still smoked.' Ashley (smoker, aged 31)

These women also highlighted some differences between their own lives and Megan's.

[Interviewer asks if she thinks the story is realistic] 'I think the thing with the boyfriend is a bit... I might just have been lucky that my partner did support!'  
Emily (quitter, aged 29)

'Well if I wasn't smoking, my friends wouldn't be like that.' Rachel (smoker, aged 27)

Although the older women and/or women who had quit smoking differed in how they related to Megan, they all found something that reminded them of their own lives or their own struggle to give up smoking.

'It is easy to relate to and things like that....you can't reach everybody with every message, you know. And I think generally, you've gonna get something for everyone.' Emily (quitter, aged 29)

Ashley conceptualised why the differences between her lifestyle (she already had one child and did not have a job) and Megan's did not matter in terms of being able to relate to the character and storyline.

'I think the generic thing is your routine. **I think regardless if you're working or you're not working you've still got a smoking routine.** So I think it's, it did mention it in there, the main focus to get across to people is changing the routine and it's really only up to the person to do that. They know when they're most likely to have a cigarette. So I think whether you're working or you're not working it's the same problems that are applying it's just in different, different areas. But that is **the main thing is to get yourself out the habit.**' Ashley (smoker, aged 31)

One possible reason for the older women identifying less with Megan than the younger woman is that many of the women aged 27 or over described Megan as 'young' or 'immature'. Although they were not told Megan's age, she was perceived as being young.

'Yeah, I'm thinking, that's quite a youngish character, so maybe somebody older than 30 would find it harder to identify with.' Steph (quitter, aged 27)

'I think, maybe the conversations, not younger, but maybe from twenties to thirties, sort of thing. So maybe, if there was an older person that was pregnant, they might not...' Lucy (smoker, aged 23)

Kate tried to conceptualise why she thought Megan was young.

'Just the way she speaks really, the way she speaks. Up until she talks about working, but it's kind of, I don't know. And the people around her as well, sometimes they are quite immature.' Kate (smoker, aged 29)

All women generally agreed with Megan's actions and were rooting for her to succeed. They did not display any irritation with, or dislike of, Megan as reported in the focus group of non-pregnant women. They acknowledged her flaws but also understood and related to them.

'I think she done very well trying to avoid situations and I think she could have dealt with the partner a bit better **but not everyone can.**' Jess (smoker, aged 21)

'**She was struggling a wee bit, but then she took the right things to do.** But yeah, she was, like you say, somebody that you could relate to.' Lucy (smoker, aged 23)

Although she identified with Megan on some issues, Kate felt that she would like to hear more about Megan's pregnancy. She pointed out that pregnancy was the one thing that all women receiving the intervention would have in common.

'I like, obviously, how you can relate... she talks about her feelings and things. And maybe you could put more... Like her pregnancy, like more details in about that, and then you can relate more, 'cause we're all pregnant.' Kate (smoker, aged 29)

Later on in her interview, Kate said she would also like to know more about Megan's motivations to quit.

'I don't know what made her want...she never talks about what made her want to quit.' Kate (smoker, aged 29)

Opinions differed on Megan's decision to set a quit date. Many women liked the fact that Megan was advocating a gradual approach to quitting.

'I think it's good that you need to – people need to know that its- they don't expect people to stop straight away. There's got to be a phased approach to it.' Ashley (smoker, aged 31)

'I liked that she kind of set a date for when she was gonna stop' Rachel (smoker, aged 27)

However, some women did not like the idea of setting a quit date. Some thought that quitting immediately was a preferable technique. Others, who had not yet quit themselves, did not like the idea of a set date on which they would be expected to quit.

'The biggest thing I don't think is good is setting a date to stop. I think you've just got to go; 'I'm stopping smoking' and just stop.' Emily (quitter, aged 29)

'I personally feel if I had a quit date I might put myself under pressure.' Michelle (smoker, aged 28)

Although they were aware that Megan was not a real person who had written the text messages herself, the perceived source of Megan was important to women. It seemed likely that they would relate better to a character who they did not believe to be entirely fictional.

'Is it just a character? Because I was confused. It's just a character, somebody that's made up?' Heather (quitter, aged 28)

'I do really like the way it is quite real to life and the things that she's doing but I just think it would be better if, if it was based on a real character or you told people it was a real character. **If you'd told me today that was a real character I would have bought into it a wee bit more.**' Ashley (smoker, aged 31)

Some women thought that Megan sending intimate details of her relationship was over-familiar and inappropriate if she was sending text messages to a person she had not met.

'I don't know if I would text a stranger that... anything like that.' Heather (quitter, aged 28)

### **8.6.3.3 Images**

In general, women liked the images. For many women, the images were the most emotive part of the intervention.

'I think the strongest parts for me are the pictures. I think that really brings it to life. The size of the fruit, the baby pictures.' Ashley (smoker, aged 31)

Women reported that the images made the idea of the baby seem more real and concrete. They liked the combination of the photos of the baby and the fruit size comparisons.

'It makes it more real as well if you're sending up to date texts of how big the baby is getting and the size of the baby. It makes it real.' Ashley (smoker, aged 31)

'You're like, oh it's a real baby and they're actually that size.' Steph (quitter, aged 27)

[Interviewer asks what she found helpful about the intervention] 'The wee pictures as it comes along, about how much bigger the baby's getting and that, it makes you think about the baby.' Rachel (smoker, aged 27)

Some women said that the images made them feel more protective of the baby and less likely to want to smoke while pregnant.

'You see what size the baby would be and you don't want... It sort of makes you think, oh I've got a... just this little delicate thing and if you smoke you damage it.' Heather (quitter, aged 28)

Some women expressed surprise or awe at the speed at which the baby grows at and thought that the pictures brought this to life for them.

'I didn't realise how quickly they grow.' Danielle (smoker, aged 25)

'I thought the pictures were... it's amazing how it starts off as nothing and progresses.' Michelle (smoker, aged 28)

Heather highlighted that the images of the baby's hands and feet made the baby pictures seem particularly real.

'and [the images seemed] real?' 'The hands and feet, yeah.' Heather (quitter, aged 28)

Emily suggested that including some images relating to smoking during pregnancy might help them stop smoking. She thought that relating the healthy images to a non-smoking lifestyle might help some women with their motivation to quit.

'Like, my son was 10 pounds when he was born, and it was like, he wouldn't have been that size if I had smoked.' Emily (quitter, aged 29)

'Like... because now you've done this, you've got more chance of your baby getting a good start, and things like that. Like things that.. I'm not maybe saying,

not pointing out all this stuff that happens to a baby. But saying, there's less chance of this happening to your child.' Emily (quitter, aged 29)

Lucy liked that the images would be sent to her for free. She had thought that some apps cost money for similar images.

'It's quite good that you get sent those pictures. Some of the apps that are pregnancy apps that have got things like that, you maybe have to pay for the app.' Lucy (smoker, aged 23)

#### **8.6.3.4 Language and writing style**

Most women found the storyline easy to follow and could understand everything.

'...straightforward, easy to follow, yeah definitely.' Amy (quitter, aged 27)

'It's all straightforward and understandable.' Emily (quitter, aged 29)

'I think it was pretty easy to follow. It was easy to follow.' Michelle (smoker, aged 28)

Heather thought that the simplicity of the language made it seem more like a friend was sending her messages.

'It's quite down to earth. It's not too complicated. It doesn't sound like some health professional is texting you. It's somebody that's on the same wavelength as you.'  
Heather (quitter, aged 28)

There were only two exceptions to the women who found the story easy to follow and understand; Marta and Jess. Marta, a non-native English speaker said that she would be able to follow the story better in her own language.

'If you would like to send the message for only in English for all people some words I think are too difficult.' Marta (quitter, aged 25)



Jess understood most of the story but found that some of the language was difficult to understand. Jess had low literacy levels and suffered with dyslexia.

'Maybe make the words a bit smaller, some of them.' Jess (smoker, aged 21)

Most women were familiar and comfortable with the use of emoticons. The younger women mostly reported using emoticons themselves.

[Interviewer asks if she uses emoticons] 'I always do that!' Danielle (smoker, aged 25)

'If you're sad they're just showing that you're sad and if you're happy they're showing that you're happy.' Jess (smoker, aged 21)

'I would, yeah, when I text and that, I tend to do a smiley face, or a kiss, yeah.'  
Amy (quitter, aged 27)

The women who did not generally use emoticons tended to be older. However, none of them reported any issues with receiving them. They were all familiar with the use of emoticons.

'I could see my friends sending me a text message like that.' Emily (quitter, aged 29)

'I don't speak like that in messages, but I've seen younger people on Facebook and they do.' Steph (quitter, aged 27)

#### **8.6.3.5 Interactivity**

Women liked the idea of being able to text and ask for help or support. They felt that this would work well in any situation, including at work when it may not be possible to make a phone call.

'If you were maybe feeling you could do with a fag, it's easy enough to just pick up your phone, text and say, this is how I'm feeling. And if you're not kind of

taking yourself away from work either, but you've still got, you know the support there...' Amy (quitter, aged 27)

'I would like to text back, if I was having a really bad day and I was struggling, if I had a craving for fags. But it would be easy to text back and get some advice. And somebody just to support you and motivate you, it's quite helpful.' Kate (smoker, aged 29)

As opposed to generic things that are being send, it's a bit more like a support text line. That would make it a bit more real for me.' Ashley (quitter, aged 27)

'I like the fact that you can just text, saying that you're feeling like you want a fag, or whatever. I think that's such a good idea, because there are times when you don't want to speak to anyone else or there's nobody else around and then you think, oh, I'll just go to the shop.' Steph (quitter, aged 27)

'It would be useful because, if you're getting those texts and you feel like that and you just think, oh, I'm just going to have a fag or something like that, then it might... because you see what she's doing to stop herself from... it might help people that way.' Lucy (smoker, aged 23)

'If you're quitting smoking and you're really struggling, then you're gonna like want to text her and she'll text you back.' Danielle (smoker, aged 25)

'If you're just getting a bog standard answer, well that's not really, that's not helpful.' Emily (quitter, aged 29)

It was apparent that some women would like a more complex text message conversation than those interactive capabilities of the proposed intervention.

‘You feel like, by the end of it, you maybe know the person, because you’re hearing those. But then, some people might feel like they want to reply to the message.’ Lucy (smoker, aged 23)

‘Sometimes if you wanted to vent, and it’s quite nice if you’ve got somebody there that you can speak to that would, like, understand.’ Heather (quitter, aged 28)

### 8.6.3.6 Results of heuristic evaluation

The results of the heuristic evaluation are outlined in tables 38 and 39 and are discussed in this section.

**Table 38: Results of the heuristic evaluation of the story.**

Heuristic evaluation of the story (number of women)					
	Strongly Agree	Slightly Agree	Neither Agree nor	Slightly Disagree	Strongly Disagree
The story was interesting	10				
The story was easy to follow	8	1		1	
There was too much information	1	1	3	2	3
The message of the story was clear	9		1		
The language was too simple	1	1	1	2	5
The language was too complicated	1		2	1	6

**Table 39: Results of the heuristic evaluation of the images.**

Heuristic evaluation of the images (number of women)					
	Strongly Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Strongly Disagree
I liked the images	9	1			
I liked the colours used	8	2			
The images were consistent	9	1			
It was clear what the images were.	9	1			

Results of the heuristic evaluation were generally favourable. Notably, all ten women strongly agreed that the story was interesting, nine strongly agreed that it was clear, and eight strongly agreed that it was easy to follow. The images were well received, with all ten women either strongly or slightly agreeing that they liked the images and colours, and found them to be clear and consistent.

There were differing opinions on whether the amount of information was too much or too little. While only two women indicated that there was too much information, these women were younger and had lower educational levels than other participants. It is therefore important that this issue is addressed in order to reach the target group for the intervention. It is re-assuring that these women still found the intervention interesting, and therefore it is possible that simplification of language would solve this issue. It is also likely that receiving the information as text messages (i.e. small chunks of information) would increase their level of understanding (Sweller et al. 2011).

A similar, and possibly related, result was observed in the answers to the statements 'The language was too complicated' and 'The language was too simple'. Five women

thought that the language was too simple, and six women thought that the language was too complicated. As discussed above, it would appear to be key to the success of the intervention within a target group of younger pregnant women, with a low socio-economic status is to simplify the language used by 'Megan'.

A participant who found the language too complicated and stated that there was too much information told the researcher that her dyslexia had caused her to lose track of characters. It is possible that this would have been less of an issue for her had she received the messages on separate days and have the opportunity to re-read messages, as a real-time version of the intervention would allow and the interview conditions did not. This highlights the need for thorough testing of the intervention in a pilot trial on people with conditions such as dyslexia. If this is found to be a general problem, a solution such as an audio version of the intervention could be made available.

#### **8.6.4 Summary and Discussion**

Overall, the intervention was positively received by women. They liked the text-messaging story format. They found the storyline to be realistic. Most women identified with Megan and found it helpful to know that there was somebody going through similar experiences to themselves. Although participants in the focus group of non-pregnant women perceived Megan as 'selfish' and 'moody', this was not reported by pregnant women. This shows that altering the text messages (as described in Section 8.6.2) to make Megan more likeable had the intended outcome.

Results indicate that the primary purpose of Megan, as a coping model for the target group, was achieved. The characteristics of a coping model are defined by Bandura (Bandura 1997) as a person with similar characteristics to themselves who is seen to be struggling with, and achieving realistic goals. Women described Megan as similar to themselves, and recognised that she found the barriers to smoking cessation difficult

and did well to overcome them, indicating that she is an ideal coping model for the target group.

Although all participants understood that Megan was not a real person sending text messages, many women questioned where the character had originated from. Those women felt that they would relate to Megan better if they were told that she was based on a real person.

All women said that they would be likely to sign up for the intervention if it was offered to them at their 12 week scan. This is encouraging due to the fact that women who were still smoking in the previous study (Chapter 6) said that they would be unlikely to sign up for a text messaging intervention. It is likely that the entertaining and engaging use of storytelling, the idea of a friend who is going through the same things as themselves, the positively-framed messages embedded within the storyline and the attractive images made this an appealing intervention. This finding reinforces the need to ensure that health professionals inform the women about these appealing elements of the intervention to maximise uptake.

Although some women pointed out parts of the story which did not correspond to their own lives and that they therefore thought were unrealistic, all women found something that they related to within the storyline. Most women thought that there was 'something for everyone', demonstrating that they did not need Megan's life to be identical to their own in order for the intervention to be acceptable and effective. More pregnancy specific content which would be relatable to all women using the intervention may increase the feeling that women could identify with Megan.

Women liked the idea of being able to interact with Megan, but may have unrealistic expectations about the capabilities of an automated system for this. Using PowerPoint slides meant that women could not test the interactive capabilities of the intervention and it is therefore unclear what their expectations were. Some women talked about a two-

way conversation with Megan which would not be possible using an automated system beyond Megan responding to either a 'yes' or 'no' answer or receiving an automated response to a message of 'help'. Further testing of women's perceptions of the interactive capabilities of the intervention would be beneficial before implementing the intervention.

Many women indicated that the strongest and most emotive part of the intervention was the images. This supports literature indicating that images can increase concreteness and influence emotions (see Section 5.2.3). They also reported feeling more protective of the fetus after seeing the images which demonstrates that these images have potentially achieved their aim of paralleling the ultrasound experience.

#### **8.6.4.1 Additional Tailoring**

Results indicate that, with some minor adaptations, the intervention would be effective in aiding smoking cessation for pregnant women aged 27 and under, and could potentially be tailored to be more effective for older women. Although it is beyond the remit of this thesis to write multiple versions of the intervention, there are a number of areas of the intervention that, results indicate, would benefit from being tailored to specific groups. Perhaps the strongest of these is the level of language used in the intervention. Mothers aged 27 and above tended to think that the language was too simple, or too 'young'. This included the use of emoticons. Although Megan's age is not stated, they perceived her as being much younger than themselves. However, younger mothers related well to the character. Those with lower levels of literacy found some of the longer words difficult to understand and would benefit from more simplified language. There is also evidence that further tailoring, such as a re-writing the storyline for women who do not have jobs, or already have children, to make Megan's circumstances more similar to their own may be beneficial. However, it is unclear how beneficial or cost-effective that this would be given that all women did report that they related to Megan in some way.

#### **8.6.4.2 Implications for intervention recruitment**

Barriers to recruitment encountered in this study were similar to those encountered by a smoking cessation programme in Sunderland. Lowry et al (Lowry et al. 2004) conducted focus groups with pregnant women and developed a list of barriers to recruitment. They then developed solutions using social marketing which improved recruitment rates and were popular with health professionals. The barriers and solutions are outlined in Table 40.

**Table 40: Barriers and solutions for recruitment of pregnant smokers (Lowry et al. 2004).**

<b>Barrier</b>	<b>Intervention</b>
Difficulty in recruiting women.	Proactive recruiting, dedicated worker, home visits.
Poor existing information.	Design and pre-test new marketing/information material with target population.
Lack of enthusiasm from health professionals.	Role-play to engage health professionals.
Nagging/making participants feel worse.	Consumer friendly cessation support (including dedicated worker).

The evidence in this section demonstrates that meaningful engagement of health professionals is key to successful recruitment. The following steps may increase recruitment:

1. Emphasise to health professionals that the intervention is designed to make their job easier. It will not take up their time, and it will facilitate conversation with the pregnant women.
2. Indicate to health professionals that the idea of a text-messaging intervention came from midwives themselves and is owned, in part, by their own profession.



3. The health professionals who are involved in recruitment should be trained to provide information about the intervention that is both accurate and appealing to potential participants. Aspects of the intervention such as; the 'soap opera' type of story; the images of the baby developing; and the fact that women can interact with the text messages should be emphasised, rather than the smoking cessation content.

An RCT by Murray et al (Murray et al. 2013) to investigate the effectiveness of the systematic default provision of smoking cessation support to smokers admitted to hospital adds further strength to this. They found that engaging with smokers in the hospital environment through discussion and description of an intervention compared to a brief attempt to recruit participants at the end of their hospital stay increased uptake of behavioural cessation support, pharmacotherapy, and uptake of stop smoking services by a statistically significant amount.

## **8.7 The final intervention**

Based on feedback gathered from women in this chapter, small adjustments were made to the intervention content. These were:

- Simplification of complex words where possible.
- Use of more recognisable fruit and vegetables (e.g. replacing the avocado with a pear.)
- Adding more of Megan's thoughts, feelings and experiences of the pregnancy itself.

Small adjustments to the storyline were made based on the feedback in this chapter. For example, simplifying some of the more complex words were made to the final intervention (see Appendix 23). We suggest that this version of the intervention would be most suitable for women aged 27 and under, and that further work on this project should include tailoring the story for women aged 28 and over.

## **8.8 Conclusions**

This chapter has demonstrated that the intervention is both acceptable and usable for the target group. Women found the story realistic and identified with Megan and her circumstances and demonstrated that they perceived her as an effective coping model. They engaged with the characters and were entertained by the messages. They thought that receiving text messages from 'Megan' (i.e. a person with similar characteristics to themselves, encountering similar barriers) was comforting and supportive. Interacting with Megan by replying to messages or sending text messages asking for help made her seem more real, and gave them the impression that they had someone to talk to who could sympathise and help them. As a result of the feedback from women in this chapter, the intervention has been refined, and recommendations for further tailoring to suit different age groups have been made.

## **9 Chapter 9: Discussion and Conclusions**

In this final chapter, the research is summarised and key findings are outlined. The strengths and limitations are explored in depth, as are the contributions to future research and clinical practice.

### **9.1 Summary of research**

The overall aim of this thesis was to develop an intervention to promote smoking cessation during pregnancy which was acceptable and feasible to its target group (pregnant smokers), and was underpinned by a robust theoretical basis demonstrating its likely effectiveness. Work towards these aims was carried out using a phased approach based on MRC guidance, and at each stage benefited from discussion and engagement with stakeholders. These included experts in the fields of behaviour change, midwifery, and storytelling, clinicians who would be delivering the intervention, and the target group of pregnant women who smoke or were making a quit attempt for their pregnancy.

Work conducted in Chapters 3-6 of this thesis gathered: inductively derived evidence from qualitative literature which was then tested on quantitative research; evidence from existing theories and psychological concepts; evidence regarding the optimum mode of delivery for an intervention; and opinion and feedback from the target group filling in gaps in the literature. Chapter 7 collates this evidence, and demonstrates how it is utilised to develop the intervention. It also outlines the predicted mechanisms of behaviour change and expected outputs.

Findings from a feasibility study reported in Chapter 8 suggest that the components of the intervention are feasible and acceptable to the target group. Potential barriers and facilitators to recruitment were identified, and recommendations for optimising recruitment procedures were made.

## **9.2 Key findings relating to the research questions**

To outline the key findings of the thesis, they are discussed in this section in relation to each of the original research questions developed in Chapter 2 (Section 2.5).

### **9.2.1 Question 1**

#### **What psychological concepts and models of behaviour are most appropriate for predicting and influencing smoking behaviour during pregnancy?**

A literature review (Chapter 4), showed that a wide range of theoretical models and concepts with an empirical evidence base for smoking cessation exist, but there was little agreement on the theory best suited to promoting smoking cessation. Models identified as possible theoretical underpinnings that were relevant were; the theory of planned behaviour (Ajzen 2011), social cognitive theory (Bandura 1986), the health belief model (Becker 1974), and the self-regulation model (Leventhal et al. 1980). It was proposed that it was possible for an intervention to be developed encompassing the determinants of all four models. This could not only increase the likelihood of effectiveness, but by making the theory explicit, would allow inclusion in future systematic reviews exploring the role of any of these models on intervention outcomes.

Raised risk perceptions and increased self-efficacy were found to be the two key concepts from theory that have the potential to change behaviour in relation to smoking cessation. However, it was found to be *how* these were achieved that would be central to the effectiveness of an intervention. It may be possible to raise risk perceptions to a concrete level by addressing; cognitive dissonance (Festinger 1962), fear/worry arousal and anticipated regret. Bandura's (Bandura 1997) recommended methods of raising self-efficacy by; enactive mastery, vicarious experience, verbal persuasion and physiological and affective states were explored. Of these methods, vicarious experience was identified as the most likely to raise self-efficacy (Ashford et al. 2010). Of the techniques suggested as vicarious experiences, the use of coping models and self-modelling to

increase self-efficacy were identified as techniques best suited to the proposed intervention as well as an induced positive mood. It is also important to note that raised risk perceptions have only been shown to positively influence behaviour when combined with a strong self-efficacy message (Witte and Allen 2000).

To summarise, we concluded that an intervention which: raised self-efficacy through the use of various techniques including coping models, self-modelling and induced positive mood; and raised risk perceptions by addressing cognitive dissonance and creating concrete/experiential risk representations would have an increased likelihood of effectiveness.

### **9.2.2 Question 2**

#### **What are the barriers to, and facilitators of, smoking cessation during pregnancy?**

The key barriers to, and facilitators of, smoking cessation are explored in the cross-study synthesis and are outlined in Table 6 (Section 3.5.3.1). Taking this a step further, re-conceptualised barriers into facilitators and looked across these to create conceptual categories. The result was a list of 'elements' which, if achieved, are likely to increase the likelihood of a successful quit attempt. The definition of each element is described below.

**Element 1 - Partner motivation:** Any element of an intervention which seeks to increase the partner or significant other's desire for the smoker to quit.

**Element 2 - Facilitating social support:** Any element of the intervention which seeks to increase the ability of significant others or social groups to provide effective support for the potential quitter.

**Element 3 - Raising risk perceptions or cessation benefits:** Any element of the intervention which seeks to increase the potential quitter's beliefs regarding the severity of, and susceptibility to, adverse outcomes from continued smoking during pregnancy.

**Element 4 - Concreteness of the baby and/or risk:** Any element of the intervention which seeks to increase the feeling that the baby and/or the risk to the baby is real rather than abstract.

**Element 5 - Coping skills/stress management:** Any element of the intervention which seeks to increase women's belief and/or actual ability to cope with stressful/trigger events stemming from personal circumstances and pressures while attempting to quit and maintain cessation.

**Element 6 - Maintaining social networks:** Any element of the intervention which seeks to increase women's beliefs and/or ability to maintain/retain friendships and social networks with others who may continue to smoke.

### 9.2.3 Question 3

**What psychological factors have been addressed by the interventions most effective in reducing smoking in pregnant women?**

After the 'elements' were inductively derived from the qualitative literature available, they were tested by re-analysing papers describing RCTs of past interventions to promote smoking cessation during pregnancy to assess the presence or absence of each of the elements. Poor intervention descriptions meant that no firm conclusions could be drawn about the effectiveness of the elements. However, it was clear that there were very few interventions which contained more than two elements. Out of 44 interventions, only 4 contained more than three elements and no interventions contained all 6 elements. Elements 3 and 5 were the most common, with each appearing in over 25 interventions. The other elements occurred less frequently. Element 1 (4 occurrences) and Element 6 (3 occurrences) were particularly rare, with Element 2 (16 occurrences) and Element 4 (9 occurrences). Although in reality, these figures are likely to be higher due to the likely presence of false negative results, we can draw the conclusion that all elements are under-used. This is likely to be a factor in the low overall success of past interventions

to promote smoking cessation during pregnancy reported by Lumley et al (Lumley et al. 2009). Particularly uncommon were interventions which; encouraged the partner or significant other to aid with cessation; sought to increase the concreteness of the baby and/or the risk to the health of the baby; and taught the women how to maintain relationships with peers who were not necessarily supportive of her quit attempt.

In additions to the elements, a study by Lorencatto et al (Lorencatto et al. 2012) located BCTs with an evidence base for promoting smoking cessation during pregnancy using a technique for defining 'evidence-based' BCT developed by Michie et al (Michie et al. 2011). BCTs which were present in at least two successful interventions to promote smoking cessation during pregnancy were:

- Advise on use of social support
- Offer/direct towards appropriate written materials
- Provide information on the consequences of smoking and smoking cessation
- Measure CO
- Facilitate barrier identification and problem solving
- Facilitate action planning
- Facilitate relapse prevention and coping
- Facilitate goal setting
- Provide rewards contingent on successfully stopping smoking
- Assess current readiness and ability to quit
- Assess current and past smoking behaviour

#### **9.2.4 Question 4**

**How do pregnant women understand and/or visualise their unborn child and the processes which happen when they smoke?**

The first qualitative study (Chapter 6) demonstrated that women's visualisation or conceptualisation of the fetus, both in its current stage of development and as a future baby, was a complex and potentially important finding. It emerged that women did not want to concretely visualise the fetus in early pregnancy because they wanted to avoid feelings of disgust about its undeveloped form. They also did not want to visualise the future baby for fear of 'jinxing' the outcome of pregnancy. This abstract visualisation of a positive outcome due to an irrational fear that the outcome is more likely to be negative if it is visualised was termed 'protective visualisation'. It seemed that this visualisation moved towards concreteness as the pregnancy progressed. This suggests that, if women created a concrete visualisation or conceptualisation of the baby in earlier pregnancy, they may feel more attached to the fetus and be more likely to engage in protective health behaviours.

Women did not report thinking much about the way in which smoke or other ingested substances were passed from themselves to the baby. Of more importance to them was to focus on tangible issues such as their own emotional and physical reactions to pregnancy. They reported their own new reactions to food as the baby's likes and dislikes. They also thought that their own emotions and stresses were passed on to the baby. In particular, many women expressed worry that stopping smoking may cause stress which would in turn be damaging for the fetus.

#### **9.2.5 Question 5**

**What are clinical staff attitudes and the practical issues around the delivery of an intervention?**

Interviews with health professionals and found that smoking cessation during pregnancy was regarded as important, but the process regarding delivering smoking cessation advice was an implicit, unstructured one. Those health professionals who did not specialise in smoking cessation reported issues of time, other priorities, and concern



about damaging an important relationship with the pregnant women by being perceived as 'nagging'. Health professionals were therefore supportive of an intervention which could be delivered outside of clinical practice and could facilitate a discussion about smoking cessation which would not cause defensive withdrawal in pregnant woman.

The two qualitative studies undertaken as part of this work demonstrated the importance of the role that clinical staff play in supporting or restricting recruitment. Many of the problems encountered seemed to relate to the opinions, available time, and priorities of clinicians and also the environment within which participants were being informed about the study. Recruitment was only possible for midwives if it fitted in with their normal practice. This highlighted the importance of the engagement of clinical staff in the recruitment process. The involvement of health professionals with a genuine interest in, and enough time for, motivating women to take part in the study was found to be key to recruiting women to the study. Recommendations were made that clinical staff involved in recruitment should be; well informed about the intervention; asked to emphasise the aspects of the intervention which are likely to appeal to pregnant women (i.e. the storytelling format and images); and aware that the intervention was designed with the help of midwives to make their own job easier.

#### **9.2.6 Question 6**

**What are the acceptability and feasibility issues surrounding the delivery of lifestyle interventions during pregnancy?**

In terms of feasibility, we found that there was no time or space for an intervention to be delivered in clinical practice. It would also not be feasible or cost-effective to provide women with technology on which to deliver an intervention. Issues surrounding recruitment and the role of clinicians are outlined in the previous section. Therefore, for this question, the focus will be on the acceptability and feasibility of the intervention for potential participants.

In the first qualitative study (Chapter 6), and in papers reporting on the effect of the ultrasound scan (Ji et al. 2005, Dykes and Stjernqvist 2001, Eurenus et al. 1997) women reported that seeing the ultrasound scan made the fetus feel more real, they developed a stronger attachment and felt more protective towards the fetus. They used language of childhood and playing, rather than a literal description of the ultrasound scan. It was therefore concluded that an intervention which provided information about how their baby is developing in real time using images of a baby could potentially mimic these positive feelings and be acceptable and liked by women. This was reinforced by women's reported use of apps and baby trackers which provide weekly information about the baby's development throughout pregnancy.

Women generally disliked the use of negative messages about the consequences of smoking. Those discussed were; advice from health professionals, television adverts, and graphic images on cigarette packets. They tended to disregard or withdraw from any information given in this manner. This indicates that the use of such graphic images and negatively-framed information would not be useful or acceptable to women. An alternative to this would be to present the benefits of smoking cessation rather than the negative effects.

### **9.2.7 Question 7**

**What mode of delivery would have the optimum impact on cognitive processes which motivate behaviour change?**

After an extensive exploration of relevant literature, the optimum modes of delivery by which the intervention be delivered were shown to be: text-messages, images, and narrative.

A high proportion of the target group have access to mobile technology (ONS 2012), and in particular smart phones. They are therefore likely to be familiar, and comfortable, with text messages as a method of communication. Text-messages are also automatically

stored on a user's phone so they can read them at a convenient time and in a suitable place, and refer back to previous messages whenever they like. Participants are unlikely to feel stigmatised, as they can privately read and receive messages, even when they are in a public setting. Text-message based interventions have shown promise in smoking cessation (Free et al. 2013) and there is qualitative evidence about women's opinions of past interventions (Naughton et al. 2013) that can be drawn on.

Images are not dependant on language or literacy skills. They can invoke emotions and may be able to influence mental images (Harrow et al. 2008), which can in turn influence behaviour. They are more accessible to recall than verbal or text-based information (McCaul et al. 2007, Houts et al. 1998, Gardner and Houston 1986) and can improve the comprehension of, and attention to, a message (Steele et al. 2011, Houts et al. 2006). Importantly for the purposes of this intervention, images can improve the concreteness of the information given (David 1998, Paivio et al. 1994).

Storytelling can be engaging and entertaining, it is commonplace in everyday life. It transcends a wide range of mediums such as conversation, television, books and radio. Information can be embedded or implicit within a storyline or narrative without the need for stating the information outright (Gershon and Page 2001). The story can be told through the perspective of the characters. This removes the need for instructional elements in information delivery which could be negatively perceived. Evidence shows that narrative can be an effective method of communicating health information (Jensen et al. 2013, Richardson et al. 2002), although there are very few past interventions which have used it as a mode of delivery.

The feasibility study carried out in Chapter 8 demonstrated that the use of all three modes of delivery were feasible and acceptable for the target group. Text messages were found to be convenient, and in particular preferable to talking on the phone. Women liked the interactive element and the fact that they could store messages to refer back

to them at a later date. The images were positively received, and women reported feeling more protective towards the developing child as a result of viewing them. They also found the story entertaining and engaging. They identified with the characters and found them believable. Women reported that idea that information coming from someone going through the same experiences as themselves, rather than from a health professional, was particularly useful.

### **9.3 Strengths and Limitations**

Considering the chapters presented within this thesis as a collective body of work, there are number of strengths and limitations, which must be taken into account when evaluating findings.

#### **9.3.1 Limitations**

The main limitation is that this research represents a preliminary stage in modelling a complex intervention and therefore it is not possible to draw conclusions regarding the efficacy of the intervention.

There are many combined theories and behaviour change techniques that are embedded within the intervention which may make measuring which of these components has contributed to the success of the intervention. It would therefore be difficult to pick out 'what works' from this single intervention and would need to be included in a future review of the individual constructs to draw conclusions.

Finally, issues relating to the sample recruited for the two empirical qualitative studies need to be addressed. Slow recruitment and a small sample mean that findings may not be generalisable to a larger population. This limitation has highlighted potential recruitment issues for the intervention which have been addressed in Chapter 8.

### **9.3.2 Strengths**

A particular strength of the overall work is the multi-method approach that has been employed throughout this thesis to construct a robust theoretical basis, incorporating: a structured mixed-methods secondary analysis; reviews of literature in multiple disciplines; and two qualitative empirical studies. The advantage of this is the combination of the individual strengths of these methods. Many chapters produced overlapping conclusions despite the different methods used in each chapter and each chapter contributed new evidence to the body of research.

A phased approach was taken to the development and evaluation of the intervention based on guidelines from the MRC framework for complex interventions. The methodology used to develop the intervention has been reported in a transparent and thorough manner. Recommendations have been made for the intervention to potentially be further modified, based on information elicited from the target group. Acceptability and feasibility have been tested in the modelling phase of the intervention development. The interactive nature of the development process means that findings from Chapter 8 can be applied to further modify and improve the intervention and study protocol prior to a pilot trial.

A further strength is that there are a wealth of interventions to promote smoking cessation and smoking cessation during pregnancy and a large body of research about smoking cessation as a behaviour including systematic reviews. As a result, there is a great deal of evidence about what works and what doesn't work from past research. It was therefore possible to conduct in-depth analyses to conceptualise why past interventions have not shown high quit rates (Lumley et al. 2009).

## **9.4 Discussion in relation to other literature**

The work in this thesis has acknowledged, and drawn upon the findings of studies with similar methods and aims. The most influential of these are discussed here.

Two systematic reviews of qualitative (Graham et al. 2011) and quantitative (Lumley et al. 2009) evidence regarding smoking cessation during pregnancy had an important influence on the design of this study. Due to the existence of these two high-quality reviews, it was possible to use novel methods to combine the findings and gain a more in-depth insight into smoking cessation behaviour and the active ingredients in past interventions than would have been possible by using a traditional systematic review or meta-analysis. This study used the methods employed by Ring et al (Ring et al. 2012) and further refined them by adding coding of controls.

A useful study which drew parallels with the cross-study synthesis described in this thesis is a study specifying evidence-based BCTs to aid smoking cessation by Lorencatto et al (Lorencatto et al. 2012). The BCTs identified in this deductive study complemented the inductively-derived 'elements' drawn from the cross-study synthesis. A number of overlaps confirmed many of the findings, and each study identified new evidence due to the contrasting techniques. Lorencatto et al also confirmed the finding that the intervention descriptions were inadequate for the purposes of further analysis (Lorencatto et al. 2013).

Studies about women's experiences of the ultrasound scan (Ji et al. 2005, Dykes and Stjernqvist 2001, Eurenus et al. 1997, Langer et al. 1988) drew close parallels with the findings of Chapter 6. It was possible to triangulate the findings to draw firm conclusions about the power of the ultrasound scan. Consequently, the images in the intervention were designed to replicate some of the emotions felt by pregnant women at the ultrasound scan. Similarly, Lumley's study (Lumley 1980) of the way in which women visualise the fetus in the first trimester of pregnancy confirmed women's abstract visualisation of the fetus observed in Chapter 6. It was then possible to study this in further depth and develop the concept of 'protective visualisation'.

Current work which closely parallels the work in this thesis is being undertaken by Naughton et al. Their 'MiQuit' intervention uses text-messages to encourage pregnant women to quit smoking. It was possible to draw on the findings (see Section 5.3.3) of a qualitative study of pregnant smokers (Naughton et al. 2013) which reported on women's experiences of using the intervention. A larger RCT (Naughton et al. 2012) recruited 207 participants and demonstrates the likely effectiveness of the intervention and potential for recruiting a substantial sample size. It is possible that the use of narrative and images and care taken to provide an entertaining and engaging intervention may remove some of the barriers encountered by Naughton et al. For example the under-use of the interactive elements of the intervention, or the fact that one-quarter of the intervention arm reported that the text messages were annoying (Naughton et al. 2012). Future comparisons of the 'MiQuit' study with a RCT of this intervention may demonstrate the advantages or disadvantages of using narrative and/or images.

## **9.5 Reflection on my role in the research**

As the author of this thesis, I designed and carried out the studies. I also created the intervention images and authored the storyline and text messages. Therefore, at this stage, I feel it is important to outline my own background and the perspective from which I approached this thesis as I feel this in itself has strengths and limitations. Prior to starting this PhD, I had not worked in research or clinical practice before. My qualifications are in Fine Art and Information Technology.

Reflecting on the advantages that background brought to the thesis, I believe this allowed me to take a truly pragmatic approach, as I was not influenced by prior experience, either in research or with the target population. Researcher biases can occur, especially in qualitative research if the researcher has a particular affinity with, or is a member of the target group being interviewed (Chenail 2011). I declare no prior interest in, or knowledge of the target group prior to this project. However, I found that designing the recruitment process was challenging. We encountered barriers to

recruitment that may have been anticipated had I been familiar with the target group or hospital setting.

## **9.6 Implications for the intervention and trial**

Overall, results show promise in exploring the effects of the intervention in a larger sample and in real time. The testing carried out indicates that the intervention is acceptable to the target group and is feasible in practice. Further research and a longitudinal study is needed to test if the intervention has the intended positive effect on self-efficacy, risk perceptions and behaviour.

Results from the feasibility testing carried out in Chapter 8 indicate that further tailoring and adapting would improve intervention acceptability. The key recommendations are:

- A version of the storyline tailored to pregnant women aged 27 and over.
- Potential tailoring of the storyline for women in different circumstances (e.g. women who are unemployed or already have children and therefore encounter different barriers to Megan).
- Explore possibilities regarding technology which supports the interactive nature of the intervention due to the importance that women placed on a two-way conversation with Megan.

Key to successful intervention recruitment is the support of gatekeepers who can facilitate recruitment. Due to issues with recruitment encountered during this PhD, importance should be placed on designing an effective recruitment strategy. Recommendations for achieving this are discussed in Section 2.6.1.

## **9.7 Implications for future research**

Future interventions can draw on the body of evidence gathered within this thesis. The evidence is not only applicable for interventions to promote smoking cessation during pregnancy, but could be relevant for a wide range of behavioural interventions. Firstly,



the use of narrative, images and text messaging, both used together and as separate modes of delivery could be applied to many health behaviours. Secondly, evidence gathered in Chapter 6 regarding women's visualisation and conceptualisation of their fetus and future baby during pregnancy, and evidence of the acceptability of an intervention for both pregnant women and clinical staff could be relevant for any behavioural intervention delivered during pregnancy. Finally, the work in this thesis represents an effective and thorough method of generating a theoretical basis incorporating evidence from various areas of literature and empirical evidence. This method could be replicated for other health behaviours.

Using a relatively new approach to reviewing qualitative and quantitative research in the cross-study synthesis described in Chapter 3 allows critical comment of the methods used. The addition of controls to the analysis is an important step in the development of the method.

Finally, the transparent and thorough reporting of both the theoretical basis and the description of the intervention allows future systematic reviews or studies such as the cross-study synthesis to be able to provide more accurate results and potentially draw firm statistical conclusions about the significance of the effect of elements within interventions.

## **9.8 Final conclusions**

In this thesis, I have: reviewed relevant literature; worked closely with a wide range of professionals with expertise in various fields; and consulted the target population in order to develop an innovative and effective intervention. Testing and exploration indicates that the developed intervention is: acceptable and entertaining for the target group; feasible in clinical practice; and supports the body of theory and evidence described in this thesis. The work also highlights the need for a robust theoretical basis which draws from evidence from different areas literature and empirical findings. It also emphasises

the importance of transparency of reporting both the theoretical basis and the description of the intervention itself.

Finally, I would like to emphasise the strengths of the intervention itself. The ubiquitous nature of mobile phones mean that they are a promising technology to deliver health information. Due to the automaticity of the text messages, the intervention has the potential to be transmitted to thousands of participants at low cost and with minimal clinician time required. Matching this with an intervention content that effectively resonates and motivates people to change and sustain healthy behaviours has great potential. The use of images has shown potential in influencing emotions and protective intentions. Additionally, the intervention demonstrates the power of narrative for not only presenting information in an engaging and entertaining way, but in delivering health information in a manner which is not perceived as negative or instructional. Importantly, the intervention is rooted in an in-depth understanding of the target group, and their needs. The success of this is summarised in the words of a participant:

‘It makes it seem a bit more personal as well. If it’s a text message then, you know, feels like you’d be texting somebody that would be in the same situation as you, which is quite good. I quite liked it.’ Heather

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## 10 Bibliography

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Development of a theory and evidence  
informed intervention to promote smoking  
cessation during pregnancy using narrative,  
text-messages, and images as modes of  
delivery.

Mary Steele

## **Appendices**

School of Health Sciences

University of Stirling

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## Appendix 1: University of Stirling letter of ethical approval

JP/SG

16 June 2012

Mary Steele  
PhD Student  
NMAHP Research Unit  
University of Stirling  
Stirling  
FK9 4LA



UNIVERSITY OF  
STIRLING

SCHOOL OF  
NURSING, MIDWIFERY  
AND HEALTH

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John Paley  
Chair  
School Research Ethics Committee

School of Nursing, Midwifery and Health  
University of Stirling  
Stirling FK9 4LA

Tel: +44 (0) 1796 466399  
Fax: +44 (0) 1796 466333  
Email: [john.paley@stir.ac.uk](mailto:john.paley@stir.ac.uk)

Dear Mary

### An intervention to promote Smoking Cessation during Pregnancy

Thank you for submitting your proposal to SREC. As you are aware, it was discussed at the meeting on Wednesday 13 June. Thank you for being prepared to attend the meeting, and let me apologise for any confusion, and for not immediately conveying the message that we didn't need to ask you any questions because the proposal would be approved.

I can now confirm that formally: the SREC approved the application.

There are, however, a number of minor points that the members of the Committee would like to draw to your attention (in no particular order):

- The title of the project is a bit misleading: "An intervention to..." normally implies that an intervention will be tested/evaluated, whereas here you are developing one.
- A60 and A76 of the IRAS form are not complete.
- It would probably be useful in the IRAS application to include some information about what sort of response will be made to women who volunteer for the study but who, in the event, are not needed.
- Phase 1 information sheet: the first sentence under "What is the purpose..." is ungrammatical.

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The University of Stirling is recognised as a Scottish Charity with number SC 011159

- Phase 2 information sheet and A13: there is some ambiguity about the selection of pregnant and non-pregnant women. For example, in A13 you say that you will seek to recruit 9-12 non-pregnant women, of whom 3-4 will be women who declare an intention to continue smoking throughout pregnancy.
- There was some discussion about where the word "intervention" was suitable in an information sheet for lay people (phase 2).
- The material on complaints in the "What are my rights?" sections of the information sheet is a little "heavy", and possibly alarming (suggesting the real possibility of a reason for complaint involving legal fees). Perhaps this bit could be toned down a little.

These are just points for consideration, and you do not need to submit any further documents to SREC.

May I take this opportunity of reminding you that a site file of *all* documents related to the research should be maintained throughout the life of the project, and kept up to date at all times. The site file template can be found on the SREC page of the School's website. Please bear in mind that your study could be audited for adherence to research governance and research ethics protocols".

Let me wish you the best of luck with this study.

Yours sincerely



John Paley  
(Chair)

School of Nursing, Midwifery and Health Research Ethics Committee

## Appendix 2: NHS Letter of ethical approval

*EoSRES*



---

### East of Scotland Research Ethics Service (EoSRES) REC 2

(formerly Fife & Forth Valley REC)  
Tayside Medical Sciences Centre (TASC)  
Residency Block C, Level 3  
Ninewells Hospital & Medical School  
George Pirie Way  
Dundee DD19SY

Miss Mary Steele  
PhD Student  
University of Stirling  
NMAHP Research Unit  
Iris Murdoch Building  
University of Stirling  
Stirling  
FK9 4LA

Date: 31 July 2012  
Your Ref:  
Our Ref: LR/12/ES/0062  
Enquiries to: Mrs Lorraine Reilly  
Extension: Ninewells extension: 83878  
Direct Line: 01382 383878  
Email: [eosres.tayside@nhs.net](mailto:eosres.tayside@nhs.net)

Dear Miss Steele

**Study title:** Developing a theory-informed, visual intervention to promote smoking cessation during pregnancy using routine ultrasound scans as 'teachable moments'.  
**REC reference:** 12/ES/0062

Thank you for your letter of 16 July 2012, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information was considered in correspondence by a sub-committee of the REC. A list of the sub-committee members is attached.

#### Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

- The Committee recommended that a letter be sent to the GP as they may be consulted if the patient becomes distressed re smoking and their pregnancy.
- Regarding the Participant Information Sheet (PIS) - under 'What are the possible benefits of taking part?' - The committee suggested that you say 'you will be reimbursed for any reasonable travel expenses'.

Please send a revised copy of the PIS and consent form with new version number and full date.

#### Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).



Non-NHS sites

#### Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

**It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).**

**You should notify the REC in writing once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. Confirmation should also be provided to host organisations together with relevant documentation.**

#### Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Advertisement	1	20 May 2012
Covering Letter		18 October 2012
Evidence of insurance or indemnity		29 May 2012
Interview Schedules/Topic Guides	1	20 May 2012
Interview Schedules/Topic Guides	1	25 May 2012
Interview Schedules/Topic Guides	1	25 May 2012
Interview Schedules/Topic Guides	1	25 May 2012
Interview Schedules/Topic Guides	2	12 July 2012
Investigator CV		10 June 2012
Investigator CV		26 April 2012
Letter from Sponsor		29 May 2012
Letter of invitation to participant	1	25 May 2012
Other: Letter from Funder		18 September 2012
Other: Summary of Protocol	1	20 May 2012
Participant Consent Form	2	11 July 2012





Participant Information Sheet: Non-Pregnant Women	2	18 June 2012
Participant Information Sheet: Pregnant Women	2	18 June 2012
Participant Information Sheet: Health Professionals	3	11 July 2012
Participant Information Sheet: Phase 1 for Pregnant Women	3	11 July 2012
Participant Information Sheet: Phase 2 for Non-Pregnant Women	3	11 July 2012
Participant Information Sheet: Phase 2 for Pregnant Women	3	11 July 2012
Protocol	1	14 June 2012
REC application	105037/334860/1/461	18 June 2012
Response to Request for Further Information		16 July 2012

### 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.

### After ethical review

#### Reporting requirements

The attached document "*After ethical review – guidance for researchers*" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

#### Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review



12/ES/0062

Please quote this number on all correspondence

Yours sincerely



Dr Fergus Daly  
Chair

Email: [eosres.tayside@nhs.net](mailto:eosres.tayside@nhs.net)

Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments.  
"After ethical review – guidance for researchers"

Copy to: Carol Johnston, University of Stirling  
NHS Tayside R&D Office



East of Scotland Research Ethics Service REC 2

Attendance at Sub-Committee of the REC meeting on 31 July 2012

Also in attendance:

Name	Position (or reason for attending)
Mrs Lorraine Reilly	Senior Co-ordinator

Written comments received from:

Name	Position
Dr Fergus Daly	Chair, Senior Research Fellow
Dr Anthony Davis	Consultant Anaesthetist
Professor Magnus Shearer	Retired



## Appendix 3: R&D management approval: Tayside



17 October 2012

Miss Mary Steele  
NMAHP Research Unit  
Iris Murdoch Building  
University of Stirling  
Stirling  
PK9 4LA

Dear Miss Steele,

### R & D MANAGEMENT APPROVAL - TAYSIDE

**Title: Developing a theory-informed, visual intervention to promote smoking cessation during pregnancy using routine ultrasound scans as 'teachable moments'**

**Chief Investigator: Mary Steele**

**Local Collaborator: Kay Forsyth**

**Tayside Ref: 2012NS04**

**NRS Ref: N/A**

**REC Ref: 12/ES/0062**

**EudraCT Ref: N/A**

**CTA Ref: N/A**

**Sponsor(s): University of Stirling**

**Funder(s): NMAHP Research Unit**

Many thanks for your application to carry out the above project here in NHS Tayside. I am pleased to confirm that the project documentation (as outlined below) has been reviewed, registered and Management Approval has been granted for the study to proceed locally in Tayside.

Approval is granted on the following conditions:-

- ALL Research must be carried out in compliance with the Research Governance Framework for Health & Community Care, Health & Safety Regulations, data protection principles, statutory legislation and in accordance with Good Clinical Practice (GCP).
- All amendments to be notified to TASC R & D Office.
- All local researchers must hold either a Substantive Contract, Honorary Research Contract, Honorary Clinical Contract or Letter of Access with NHS Tayside where required ([http://www.nihr.ac.uk/systems/Pages/systems\\_research\\_passports.aspx](http://www.nihr.ac.uk/systems/Pages/systems_research_passports.aspx)).
- TASC R & D Office to be informed of change in Principal Investigator, Chief Investigator or any additional research personnel locally.

- Notification to TASC R & D Office of any change in funding.
- As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT Security Policies, until destruction of this data.
- All eligible studies will be added to the UKCRN Portfolio <http://public.ukcrn.org.uk/>. Recruitment figures for eligible studies must be recorded onto the Portfolio every month: This is the responsibility of the lead UK site. If you are the lead, or only, UK site, we can provide help or advice with this. For information, contact Charles Weller – (01382) 383822 – [charles.weller@nhs.net](mailto:charles.weller@nhs.net) or Liz Livingstone – (01382) 383872 – [elivingstone@nhs.net](mailto:elivingstone@nhs.net).
- Annual reports are required to be submitted to TASC R & D Office with the first report due 12 months from date of issue of this management approval letter and at yearly intervals until completion of the study.
- Notification of early termination within 15 days or End of Trial within 90 days followed by End of Trial Report within 1 year to TASC R & D Office.
- You may be required to assist with and provide information in regard to audit and monitoring of study.

Please note you are required to adhere to the conditions, if not, NHS management approval may be withdrawn for the study.

#### Approved Documents

Document	Version	Date
Protocol	1	20/05/12
IRAS R & D Form	105037/336340/14/182	
SSI Form	105037/340441/168/ 154089/248107	
Sponsor letter		29/05/12
Consent Form	3	02/08/12
Letter from Sponsor		
Letter of invitation to participants		
GP/Consultant Information sheet	1	02/08/12
Phase 2 PIS non-pregnant women	4	02/08/12
Phase 2 PIS for pregnant women	4	02/08/12
Phase 1 PIS pregnant women	4	02/08/12
PIS for health professionals	4	02/08/12
Topic guide for interviews with health professionals	2	12/07/12
Cover letter for health professionals	1	25/05/12
Phase 1 topic guide for interviews with pregnant women	1	20/05/12
Phase 2 topic guide for interviews with health professionals	1	25/05/12
Phase 2 topic guide for non pregnant women	1	25/05/12
Phase 2 topic guide for pregnant women	1	25/05/12
Phase 2 poster for recruitment of non pregnant women	1	20/05/12
CV – Helen Cheyne		29/03/12
CV – Kay Forsyth		09/07/12
CV – Mary Steele		10/06/12
CV – Brian Williams		26/04/12
Funding letter		18/09/12
Insurance letter		29/05/12
REC evidence of compliance letter		14/08/12
REC favourable opinion with conditions		31/07/12

May I take this opportunity to wish you every success with your project.

Please do not hesitate to contact TASC R & D Office should you require further assistance.

Yours sincerely,

EP 

Elizabeth Coote  
R&D Manager

Tayside medical Science Centre (TASC)  
Ninewells Hospital & Medical School  
TASC Research & Development Office  
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c.c.

Kay Forsyth  
Prof Brian Williams

## Appendix 4: R&D management approval: Ayrshire and Arran



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University Hospital Crosshouse  
Kilmarnock  
KA2 0BB

Miss Mary Steele  
NMAHP Research Unit  
Iris Murdoch Building  
University of Stirling  
Stirling  
FK9 4LA

Date 18 June 2014  
Your Ref  
Our Ref AG/KLB/NM R&D 2013AA060  
Enquiries to Karen Bell  
Extension 25850  
Direct line 01563 825850  
Fax 01563 825806  
Email [Karen.bell@aaaht.scot.nhs.uk](mailto:Karen.bell@aaaht.scot.nhs.uk)

Dear Miss Steele

***Developing a theory-informed, visual intervention to promote smoking cessation during pregnancy using routine ultrasound scans as 'teachable moments'***

I confirm that NHS Ayrshire and Arran have reviewed the undernoted documents and grant R&D Management approval for the above study.

**Approved documents:**

<b>Document</b>	<b>Version</b>	<b>Date</b>
SSI form	Version 3.5	22/05/14 signed
R&D Form	Version 3.4	18/06/12 signed
Protocol	Version 1.0	14/06/12
GP Letter	Version 1.0	02/08/12
Consent Form (participants)	Version 3.0	02/08/12
Cover Letter for Health Professionals	Version 1.0	25/05/12
Interview Schedule (Phase 1 Health Professionals)	Version 2.0	12/07/12
Interview Schedule (Phase 1 Pregnant Women)	Version 1.0	20/05/12
Interview Schedule (Phase 2 Health Professionals)	Version 1.0	25/05/12
Interview Schedule (Phase 2 non pregnant women)	Version 1.0	25/05/12
Interview Schedule (Phase 2 Pregnant Women)	Version 1.0	25/05/12
PIS (Health professionals)	Version 4.0	02/08/12
PIS (Phase 1 pregnant woman)	Version 4.0	02/08/12
PIS (Phase 2 non pregnant women)	Version 4.0	02/08/12
PIS (Phase 2 pregnant women)	Version 4.0	02/08/12
Poster	Version 1.0	20/05/12

The terms of approval state that the investigator authorised to undertake this study is: -

- Miss Mary Steele, PhD Student, University of Stirling

With no additional investigator: -

- Dr Anne Taylor, Research Fellow, University of Stirling

The sponsors for this study are University of Stirling.

This approval letter is valid until 18 June 2015.

**Regular reports of the study require to be submitted. Your first report should be submitted to Dr K Bell, Research & Development Manager in 12 months time and subsequently at yearly intervals until the work is completed.**

Please note that as a requirement of this type of study your name, designation, work address, work telephone number, work e-mail address, work related qualifications and whole time equivalent will be held on the Scottish National Research Database so that NHS R&D staff in Scotland can access this information for purposes related to project management and report monitoring.

In addition approval is granted subject to the following conditions: -

- All research activity must comply with the standards detailed in the Research Governance Framework for Health and Community Care [www.cso.scot.nhs.uk/publications/ResGov/Framework/RGFEdTwo.pdf](http://www.cso.scot.nhs.uk/publications/ResGov/Framework/RGFEdTwo.pdf) and appropriate statutory legislation. It is your responsibility to ensure that you are familiar with these, however please do not hesitate to seek further advice if you are unsure.
- Recruitment figures must be submitted to R&D on a monthly basis. If recruitment figures are not received timeously you will be contacted by a member of the R&D team to provide this data.
- You are required to comply with Good Clinical Practice (ICH-GCP guidelines may be found at [www.ich.org/LOB/media/MEDIA482.pdf](http://www.ich.org/LOB/media/MEDIA482.pdf)), Ethics Guidelines, Health & Safety Act 1999 and Data Protection Act 1998.
- If any amendments are to be made to the study protocol and or the Research Team the Researcher must seek Ethical and Management Approval for the changes before they can be implemented.
- The Researcher and NHS Ayrshire and Arran must permit and assist with any monitoring, auditing or inspection of the project by the relevant authorities.
- The NHS Ayrshire and Arran Complaints Department should be informed if any complaints arise regarding the project and the R&D Department must be copied into this correspondence.
- The outcome and lessons learnt from complaints must be communicated to funders, sponsors and other partners associated with the project.



- As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collated in line with NHS Scotland IT Security Policies, until the destruction of these data. Under no circumstances should personal data be stored on any unencrypted removable media e.g. laptop, USB or mobile device (for further information and guidance please contact the Information Governance Team based at Ailsa Hospital 01292 513693 or 513694).

If I can be of any further assistance please do not hesitate to contact me. On behalf of the department, I wish you every success with the project.

Yours sincerely



**Dr Alison Graham**  
**Medical Director**

c.c.

Elaine Young, Senior Manager, Public Health Department, NHS Ayrshire and Arran  
Professor Brian Williams, Academic Supervisor, University of Stirling  
Elaine Moore, Deputy Head of Midwifery, NHS Ayrshire and Arran  
Angela Cunningham, Head of Midwifery, NHS Ayrshire and Arran  
Dr Helen Cheyne, Academic Supervisor, University of Stirling  
Carol Johnstone, University of Stirling (sponsor contact)  
Lesley Douglas, Finance, Ailsa Hospital  
Information Governance, Ailsa Hospital  
NRS Coordinating Centre, Aberdeen

[www.nhsaaa.net](http://www.nhsaaa.net)



## Appendix 5: Letter of access for research



EC/DH

17 October 2012

Miss Mary Steele  
NMAHP Research Unit  
Iris Murdoch Building  
University of Stirling  
Stirling  
FK9 4LA

Dear Miss Steele,

### Letter of Access for Research

**NRS Project ID: N/A**

**Tayside R&D Project ID: 2012NS04**

**Title: Developing a theory-informed, visual intervention to promote smoking cessation during pregnancy using routine ultrasound scans as 'teachable moments'.**

**Main REC Ref: 12/ES/0062**

**Funder: NMAHP Research Unit**

**Sponsor: University of Stirling**

**Chief Investigator: Miss Mary Steele**

This letter confirms your right of access to conduct research through NHS Tayside for the purpose and on the terms and conditions set out below. This right of access commences on 17/10/12 and ends on end of study or 17/10/15 unless terminated earlier in accordance with the clauses below.

You have a right of access to conduct such research as confirmed in writing in the letter of permission for research from this NHS organisation. **Please note that you cannot start the research until the Principal Investigator for the research project has received a letter from us giving permission to conduct the project.**

The information supplied about your role in research at NHS Tayside has been reviewed and you do not require an honorary research contract with this NHS organisation. We are satisfied that such pre-engagement checks as we consider necessary have been carried out.

You are considered to be a legal visitor to NHS Tayside premises. You are not entitled to any form of payment or access to other benefits provided by this NHS organisation to employees and this letter does not

give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

While undertaking research through NHS Tayside, you will remain accountable to your employer University of Stirling but you are required to follow the reasonable instructions of Kay Forsyth in this NHS organisation or those given on her/his behalf in relation to the terms of this right of access.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by this NHS organisation in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with NHS Tayside policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with NHS Tayside in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on NHS Tayside premises. You must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of any other contract holder and you must act appropriately, responsibly and professionally at all times.

You are required to ensure that all information regarding patients or staff remains secure and *strictly confidential* at all times. You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice (<http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf>) and the Data Protection Act 1998. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.


You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that this NHS organisation accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days' written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this NHS organisation or if you are convicted of any criminal offence. Your substantive employer is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

NHS Tayside will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

If your current role or involvement in research changes, or any of the information provided in your Research Passport changes, you must inform your employer through their normal procedures. You must also inform your nominated manager and R&D Office in this NHS organisation.

Yours sincerely



Elizabeth Coote  
R&D Manager  
NHS Tayside

pp

# Appendix 6: Consent form

Version 3, 02/08/12

Consent form for all participants

Participant Identification Number for this study:

## CONSENT FORM

**Title of Project: An intervention to promote smoking cessation during pregnancy**

This is the standard consent form that the Health Authority Ethics Committee asks people to sign when they take part in a research project. Please sign both copies and keep one for your own records. The other copy will be kept for our records.

Name of Researcher:

**Please initial box**

1. I confirm that I have read and understand the information sheet dated **02/08/2012 (Version 4)** for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
3. I agree to consent to my conversation being audio recorded
4. I understand that any part of my audio recorded conversation can be withdrawn from the study if I request it.
5. I understand that if I lose capacity to consent, any identifiable data will be withdrawn from the study.
6. I agree to consent to anonymised quotes of my interview being used in any publication or presentation of the research
7. I agree to take part in the above study.

\_\_\_\_\_  
Name of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

-----  
Researcher

-----  
Date

-----  
Signature

## Appendix 7: Topic guide for interviews with pregnant women (Study 1)

### Phase 1: Topic Guide for Interviews with Pregnant Women

Participant ID number:

Have they quit smoking?

If not, do they intend to quit?

Topic	Example Questions
Visualising the fetus	Do you ever think about what your baby looks like just now? What do you imagine your baby looks like just now? What is this based on? Ultrasound, images in media, descriptions by doctor, own imagination.
Visualising the effect of smoking on the fetus	What do you imagine happens to the cigarette smoke after you breathe it in? Do you think it has an immediate effect on the baby? What effect do you think it has? Do you think it has an effect on the baby over time? What effect do you think it has?
Visualising the future child	Do you ever think about your child will look like when he/she is born? Do you imagine what your child will be like as they grow up? What do you think they will be like?
Effect of existing healthcare information and pictures.	Have you been giving any smoking cessation advice? Did this include pictures of a baby? What did you think about this?
Generating ideas for narrative of intervention	What do you find difficult about quitting smoking? Is there anything that you think would help you with quitting?

## Appendix 8: Topic guide for interviews with health professionals (Study 1)

Version 1: 20/05/12

### Phase 1: Topic Guide for Interviews with Health professionals

Participant ID number:

Job title:

How many pregnant smokers to you have contact with in a typical week?

Do you deliver smoking cessation advice to the women yourself?

Topic	Example Questions
Typical reaction of pregnant women to smoking cessation advice	Do you find it easy to give smoking cessation advice to women? Why? How do you find women react to this advice?
Typical knowledge of pregnant smokers	In your experience, do pregnant women already know about the risks of smoking while pregnant? Can you give example of the typical questions a pregnant woman would ask about smoking?
Generating ideas for narrative of intervention	In your experience, are there any particular forms of delivering a health message that women react well to? What kind of images do you think would work well in an animated intervention?
Generating the message of the intervention	What do you think the key points of this intervention should be? What do you think the most important message for pregnant smokers is?
Acceptability of the intervention in clinical practice	How do you feel about the possible implementation of an animated intervention after the women's ultrasound scan? Do you envisage any possible barriers to implementing this intervention? Do you feel that this would be helpful?

## Appendix 9: Participant information sheet for Study 1 (pregnant women)

Version 4: 02/08/2012

### Phase 1: Participant Information Sheet for Pregnant Women

#### Invitation:

You are being invited to take part in a research study which is being undertaken as part of an educational qualification. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study if you wish.

#### What is the purpose of the study?

We are interested in speaking to pregnant women about their experiences of pregnancy and feelings towards their baby. We need to collect information from pregnant women to help us to provide helpful health advice for other pregnant women.

#### Why have I been chosen?

You have been chosen because you are a pregnant woman aged over 18. You have also identified yourself as a smoker or recent quitter.

#### Do I have to take part?

No. Taking part in the study is voluntary and it is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and we will ask you for a contact phone number so that we can arrange a suitable time to talk to you. You will be asked to sign a consent form at a later date. You are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part,

will not affect the standard of care you receive now or in the future.

#### What will happen to me if I do take part?

If you choose to take part in the study a member of the research team will contact you to arrange a time for an interview to take place, either in the hospital or at your home if you prefer. The interview will take about 60 minutes. In the interview you will be asked questions about the way which you think about your child, and the effects of smoking. You will also be asked for your opinions on existing healthcare information you have been given. Your conversation will be taped with your permission.

#### Consent

You will be asked to consent to taking part in an interview with a researcher and to your conversation being tape recorded.

#### If I agree to take part can I withdraw later from the study?

Yes, you can withdraw at any time and it will not affect your future medical care. You can withdraw by either telephoning or writing to the research team. Contact details are given at the end of this sheet. Any data collected up to that point (tape recordings or written versions of your interview) will be destroyed in a safe and secure manner.

#### Are there any disadvantages to taking part?

No.

#### What are the possible benefits of taking part?

There is no immediate health benefit involved in taking part in the study. You will be reimbursed for any reasonable travel expenses and given a £10 voucher to say thank you for your time.

#### What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak with the researcher, Mary Steele, who will do her best to answer your questions. Please see contact details at the end of this sheet.

#### What are my rights?

If you would like to pursue a complaint through the University of Stirling who are acting as the research sponsor. Details about this are available from the research team. Also as a patient of the NHS, you have the right to pursue a complaint through the usual NHS process. To do so, you can submit a written complaint to the Patient Liaison Manager, Complaints Office, Ninewells Hospital and Medical School, Dundee DD1 9SY. (Freephone 0800 0275507). Note that the NHS has no legal liability for non-negligent harm.

If you would like to speak to someone who knows about this study who is an independent advisor or if you remain unhappy and wish to complain formally please contact;

Professor William Lauder

School of Nursing, Midwifery and Health

University of Stirling

Stirling

FK9 4LA

Tel 01786 466345

Fax 01786 466333

Email: William.lauder@stir.ac.uk

It will simplify the complaint process if you have saved this sheet of paper and any consent form you signed and can provide the name of the study and the study number listed at the top of this form when making a complaint.

**Will my taking part in this study be kept confidential?**

The data collected will be used for the study only. Only selected members of the study team will have access to your information. The written record of your interview will be securely stored for a maximum of 10 year after the end of the study and will then be destroyed. The researchers will take all reasonable steps to protect your privacy.

**Will there be any attempts to contact me after the study is complete?**

No

**What will happen to the results of the research study?**

Once the study has been completed the information will be analysed and a report will be written for our funders. In addition to this, the study will be reported in academic journals and may also be presented at conferences for midwives, health visitors, other health professionals and researchers. Your own personal information will not be identified in any reports we write. In no way will anyone ever be able to identify you through our reporting of the findings.

**Who is organising and funding the research?**

The research is being carried out by

The Nursing, Midwifery and Allied Health Professionals (NMAHP) Research Unit University of Stirling

Stirling FK9 4LA

**The research has been funded by**

The Department of Nursing, Midwifery and Health, University of Stirling

**Who has reviewed the study?**

The East of Scotland Research Ethics Committee REC 2, which has responsibility for securitising all proposals for medical research on humans in Tayside, has examined the proposal and has raised no objections for the point of view of medical ethics. It is a requirement that your records in this research, together with any relevant records, be made available for scrutiny by monitors from the University of Stirling and NHS Tayside, whose role is to check that research is properly conducted and the interests of those taking part are adequately protected.

**Thank you for taking the time to read this Information Sheet and for considering taking part in this study.**

**If you have any questions please contact Mary Steele at the address below**

**NMAHP Research Unit**

**Iris Murdoch Building**

**University of Stirling**

**Stirling**

**FK9 4LA Tel: 01786 466341 Email  
mary.steele@stir.ac.uk**



## Appendix 10: Participant information sheet for health professionals (Study 1)

Version 4: 02/08/2012

### Participant Information Sheet for Health Professionals

#### Invitation:

You are being invited to take part in a research study which is being undertaken as part of an educational qualification. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study if you wish.

#### What is the purpose of the study?

The aim of the project is to deliver an intervention to promote smoking cessation during pregnancy. The intervention will be in the form of an animation.

An important part of the project is to obtain advice and feedback from health professionals. We would like to gather advice about the content and look of the intervention and gain feedback about the animation during its development.

#### Why have I been chosen?

You have been chosen because you are a midwife or smoking cessation specialist who works in the Dundee area.

#### Do I have to take part?

No. Taking part in the study is voluntary and it is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and we will ask you for a contact phone number so that we can arrange a suitable time to talk to you. You will be asked to sign a consent form at a later date. You are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part,

will not affect the standard of care you receive now or in the future.

#### What will happen to me if I do take part?

If you choose to take part in the study a member of the research team will contact you to arrange a time for an interview to take place. We would like to conduct 3 interviews with you. It is anticipated that these interviews will be at least 4 weeks apart. Each interview will take no longer than 30 minutes and can be conducted at a time and location that is convenient for you.

In the first interview, we would like to ask for your ideas and advice about the content and message of the animation. In the second interview, we will show you a storyboard which will illustrate the planned narrative for the intervention. You will then be asked for feedback on the design and content of the storyboard, and its suitability for pregnant women to view. We

will then develop an animation from these storyboards. In the final interview, you will be asked for feedback on the animation and advice on how it could be improved. Your conversation will be taped with your permission.

#### Consent

You will be asked to consent to taking part in an interview with a researcher and to your conversation being tape recorded.

#### If I agree to take part can I withdraw later from the study?

Yes, you can withdraw at any time. You can withdraw by either telephoning or writing to the research team. Contact

details are given at the end of this sheet. Any data collected up to that point (tape recordings or written versions of your interview) will be destroyed in a safe and secure manner.

#### Are there any disadvantages to taking part?

No.

#### What are the possible benefits of taking part?

You would be providing valuable input into an intervention which could potentially lower rates of smoking among pregnant women. You will be reimbursed for any reasonable travel expenses.

#### What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak with the researcher, Mary Steele, who will do her best to answer your questions. Please see contact details at the end of this sheet.

#### What are my rights?

If you would like to pursue a complaint through the University of Stirling who are acting as the research sponsor. Details about this are available from the research team. Also as a patient of the NHS, you have the right to pursue a complaint through the usual NHS process. To do so, you can submit a written complaint to the Patient Liaison Manager, Complaints Office, Ninewells Hospital and Medical School, Dundee DD1 9SY. (Freephone 0800 0275507). Note that the NHS has no legal liability for non-negligent harm

If you would like to speak to someone who knows about this study who is an independent advisor or if you remain unhappy and wish to complain formally please contact;

Professor William Lauder  
School of Nursing, Midwifery and Health  
University of Stirling  
Stirling  
FK9 4LA

Tel 01786 466345  
Fax 01786 466333  
Email: William.lauder@stir.ac.uk

It will simplify the complaint process if you have saved this sheet of paper and any consent form you signed and can provide the name of the study and the study number listed at the top of this form when making a complaint.

**Will my taking part in this study be kept confidential?**

The data collected will be used for the study only. Only selected members of the study team will have access to your information. The written record of your interview will be securely stored for a maximum of 10 year after the end of the study and will then be destroyed. The researchers will take all reasonable steps to protect your privacy.

**Will there be any attempts to contact me after the study is complete?**

No

**What will happen to the results of the research study?**

Once the study has been completed the information will be analysed and a report will be written for our funders. In addition to this, the study will be reported in academic journals and may also be presented at conferences for midwives, health visitors, other health professionals and researchers. Your own personal information will not be identified in any reports we write. In no way will anyone ever be able to identify you through our reporting of the findings.

**Who is organising and funding the research?**

The research is being carried out by

The Nursing, Midwifery and Allied Health Professionals (NMAHP) Research Unit University of Stirling

Stirling FK9 4LA

**The research has been funded by**

The Department of Nursing, Midwifery and Health, University of Stirling

**Who has reviewed the study?**

The East of Scotland Research Ethics Committee REC 2, which has responsibility for securitising all proposals for medical research on humans in Tayside, has examined the proposal and has raised no objections for the point of view of medical ethics. It is a requirement that your records in this research, together with any relevant records, be made available for scrutiny by monitors from the University of Stirling and NHS Tayside, whose role is to check that research is properly conducted and the interests of those taking part are adequately protected.

**Thank you for taking the time to read this Information Sheet and for considering taking part in this study.**

**If you have any questions please contact Mary Steele at the address below**

**NMAHP Research Unit**

**Iris Murdoch Building**

**University of Stirling**

**Stirling**

**FK9 4LA**

**Tel: 01786 466341**

**Email mary.steele@stir.ac.uk**

## Appendix 11: Participant information sheet for Study 2 (non-pregnant women)

Version 4: 02/08/2012

### Phase 2: Participant Information Sheet for Non-Pregnant Women

#### Invitation:

You are being invited to take part in a research study which is being conducted as part of an educational qualification. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study if you wish.

#### What is the purpose of the study?

We are developing an animation designed to help pregnant women stop smoking. We have developed our initial idea and would like feedback from women about the design and content of the intervention.

#### Do I have to take part?

No. Taking part in the study is voluntary and it is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and we will ask you for a contact phone number so that we can arrange a suitable time to talk to you. You will be asked to sign a consent form at a later date. You are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive now or in the future.

#### What will happen to me if I do take part?

If you choose to take part in the study a member of the research team will contact you to arrange a time for a focus group to take place. The focus group will take about 30 minutes. In the focus group you will be shown pictures or an animation designed to help pregnant women stop smoking and asked for your opinion and advice. Your conversation will be taped with your permission. You will also be invited to take part in a second focus group at a later date.

#### Consent

You will be asked to consent to taking part in a group discussion with a researcher and to your conversation being tape recorded.

#### If I agree to take part can I withdraw later from the study?

Yes, you can withdraw at any time. You can withdraw by either telephoning or writing to the research team. Contact details are given at the end of this sheet. Any data collected up to that point (tape recordings or written versions of your focus group) will be destroyed in a safe and secure manner.

#### Are there any disadvantages to taking part?

No.

#### What are the possible benefits of taking part?

There is no immediate health benefit involved in taking part in the study. You will be reimbursed for any reasonable travel expenses and given a £10 voucher to say thank you for your time.

#### What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak with the researcher, Mary Steele, who will do her best to answer your questions. Please see contact details at the end of this sheet.

#### What are my rights?

If you would like to pursue a complaint through the University of Stirling who are acting as the research sponsor. Details about this are available from the research team. Also as a patient of the NHS, you have the right to pursue a complaint through the usual NHS process. To do so, you can submit a written complaint to the Patient Liaison Manager, Complaints Office, Ninewells Hospital and Medical School, Dundee DD1 9SY. (Freephone 0800 0275507). Note that the NHS has no legal liability for non-negligent harm.

If you would like to speak to someone who knows about this study who is an independent advisor or if you remain unhappy and wish to complain formally please contact;

Professor William Lauder

School of Nursing, Midwifery and Health

University of Stirling

Stirling

FK9 4LA

Tel 01786 466345

Fax 01786 466333

Email: [William.lauder@stir.ac.uk](mailto:William.lauder@stir.ac.uk)

It will simplify the complaint process if you have saved this sheet of paper and any consent form you signed and can provide the name of the study and the study number listed at the top of this form when making a complaint.

**Will my taking part in this study be kept confidential?**

The data collected will be used for the study only. Only selected members of the study team will have access to your information. The written record of your focus group will be securely stored for a maximum of 10 years after the end of the study and will then be destroyed. The researchers will take all reasonable steps to protect your privacy.

**Will there be any attempts to contact me after the study is complete?**

No

**What will happen to the results of the research study?**

Once the study has been completed the information will be analysed and a report will be written for our funders. In addition to this, the study will be reported in academic journals and may also be presented at conferences for midwives, health visitors, other health professionals and researchers. Your own personal information will not be identified in any reports we write. In no way will anyone ever be able to identify you through our reporting of the findings.

**Who is organising and funding the research?**

The research is being carried out by

The Nursing, Midwifery and Allied Health Professionals (NMAHP) Research Unit University of Stirling

Stirling FK9 4LA

**The research has been funded by**

The Department of Nursing, Midwifery and Health, University of Stirling

**Who has reviewed the study?**

The East of Scotland Research Ethics Committee REC 2, which has responsibility for securitising all proposals for medical research on humans in Tayside, has examined the proposal and has raised no objections for the point of view of medical ethics. It is a requirement that your records in this research, together with any relevant records, be made available for scrutiny by monitors from the University of Stirling and NHS Tayside, whose role is to check that research is properly conducted and the interests of those taking part are adequately protected.

**Thank you for taking the time to read this Information Sheet and for considering taking part in this study.**

**If you have any questions please contact Mary Steele at the address below**

**NMAHP Research Unit  
Iris Murdoch Building  
University of Stirling  
Stirling  
FK9 4LA  
Tel: 01786 466341  
Email [mary.steele@stir.ac.uk](mailto:mary.steele@stir.ac.uk)**

## Appendix 12: Participant information sheet for Study 2 (pregnant women)

Version 4: 02/08/2012

### Phase 2: Participant Information Sheet for Pregnant Women

#### Invitation:

You are being invited to take part in a research study which is being undertaken as part of an educational qualification. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study if you wish.

#### What is the purpose of the study?

We are creating a mobile phone intervention designed to help pregnant women stop smoking. We have developed our initial idea and would like feedback from pregnant women about the

intervention.

#### Why have I been chosen?

You have been chosen because you are aged between 18-39 and have had your booking scan at the ante-natal clinic. You have also identified yourself as a smoker or recent quitter.

#### Do I have to take part?

No. Taking part in the study is voluntary and it is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and we will ask you for a contact phone number so that we can arrange a suitable time to talk to you. You will be asked to sign a consent form at a later date. You are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive now or in the future.

#### What will happen to me if I do take part?

If you choose to take part in the study a member of the research team will contact you to arrange a time for an interview to take place, either in the hospital or at your home if you prefer. The interview will take about 30 minutes. In the interview you will be shown pictures of an intervention designed to help pregnant women stop smoking and asked for your opinion and advice. Your conversation will be taped with your permission.

#### Consent

You will be asked to consent to taking part in an interview with a researcher and to your conversation being tape recorded.

#### If I agree to take part can I withdraw later from the study?

Yes, you can withdraw at any time and it will not affect your future medical care. You can withdraw by either telephoning or writing to the research team. Contact details are given at the end of this sheet. Any data collected up to that point (tape recordings or written versions of your interview) will be destroyed in a safe and secure manner.

#### Are there any disadvantages to taking part?

No.

#### What are the possible benefits of taking part?

There is no immediate health benefit involved in taking part in the study. You will be reimbursed for any reasonable travel expenses and given a £10 voucher to say thank you for your time.

#### What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak with the researcher, Mary Steele, who will do her best to answer your questions. Please see contact details at the end of this sheet.

#### What are my rights?

If you would like to pursue a complaint through the University of Stirling who are acting as the research sponsor. Details

about this are available from the research team. Also as a patient of the NHS, you have the right to pursue a complaint through the usual NHS process. To do so, you can submit a written complaint to the Patient Liaison Manager, Complaints Office, Ninewells Hospital and Medical School, Dundee DD1 9SY. (Freephone 0800 0275507). Note that the NHS has no legal liability for non-negligent harm.

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School of Nursing, Midwifery and Health

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Email: [William.lauder@stir.ac.uk](mailto:William.lauder@stir.ac.uk)

It will simplify the complaint process if you have saved this sheet of paper and any consent form you signed and can provide the name of the study and the study number listed at the top of this form when making a complaint.

#### Will my taking part in this study be kept confidential?

The data collected will be used for the study only. Only selected members of the study team will have access to your information. The written record of your interview will be securely stored for a maximum of 10 years after the end of the study and will then be destroyed. The researchers will take all reasonable steps to protect your privacy.

#### Will there be any attempts to contact me after the study is complete?

No

#### What will happen to the results of the research study?

Once the study has been completed the information will be analysed and a report will be written for our funders. In

addition to this, the study will be reported in academic journals and may also be presented at conferences for midwives, health visitors, other health professionals and researchers. Your own personal information will not be identified in any reports we write. In no way will anyone ever be able to identify you through our reporting of the findings.

**Who is organising and funding the research?**

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Stirling FK9 4LA

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The East of Scotland Research Ethics Committee REC 2, which has responsibility for securitising all proposals for medical research on humans in Tayside, has examined the proposal and has raised no objections for the point of view of medical ethics. It is a requirement that your records in this research, together with any relevant records, be made available for scrutiny by monitors from the University of Stirling and NHS Tayside, whose role is to check that research is properly conducted and the interests of those taking part are adequately protected.

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**If you have any questions please contact Mary Steele at the address below**

**NMAHP Research Unit**

**Iris Murdoch Building  
University of Stirling  
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## Appendix 13: Topic guide for Study 2

Describe scenario (first slide)

Say the following:

'The idea is that Megan is supposed to be like one of your friend's texting you. So after you've gone through the messages I'll ask you some questions about how you felt about it – there are no right or wrong answers at all. Please read through these messages in your own time – you can move back and forward as much as you like. You can take as long as you like, and comment as you go along if you want to.'

When they are finished viewing the intervention, ask the following questions plus any questions based on specific points they have raised during the viewing:

What did you think?

How interesting was the story?

How entertaining was the story?

Could you follow the story ok?

What did you think of Megan?

What did you think of the other people in the story?

How useful do you think the story would be in helping you give up?

What was particularly useful?

Anything you didn't like?

What did you think of the language used?

Are these anything like text messages that you would send your friends? What was different?

What did you think of the use of smiley or sad faces?

Why? What was different?

What did you think of the images?

How did they make you feel? Why?

Were there any in particular that you liked or disliked? Why?

Do you think you would sign up for something like this if it had been offered to you at your first scan?

Can you tell me some of the things that made it easier for Megan to quit smoking? And the things that made it more difficult?

Which of these things could you relate to?

Please Tick the appropriate boxes

The Story					
	Strongly Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Strongly Disagree
The story was interesting					
The story was easy to follow					
There was too much information					
The message of the story was clear					
The language was too simple					
The language was too complicated					

The Images					
	Strongly Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Strongly Disagree
I liked the images					
I liked the colours used					
The images were consistent					
It was clear what the images were.					

## Appendix 14: Plan for implementation of stage 2

### Plan for implementation

We each need to read through the systematic review (attached) and identify the four or five elements which we feel are the most important barriers to and facilitators of smoking cessation.

1. We will need to reach a consensus on a final list of these elements.
2. For each element, we will need to develop guidance on how to rate it (i.e. what defines whether it is strongly or weakly present in the intervention)
3. Rate each study included in the review for the presence of the elements.

### Organising the papers

	Brian	Helen	Mary
Stage 1	1-4	5-8	9-12
Stage 2	5-8 (Helen)	9-12(Mary)	1-4(Brian)
Stage 3	13-16	17-20	21-24
Stage 4	21-24(Mary)	13-16(Brian)	17-20(Helen)
Stage 5	25-28	29-32	33-36
Stage 6	29-32(Helen)	33-36 (Mary)	25-28(Brian)
Stage 7	37-40	41-44	45-48
Stage 8	45-48(Mary)	37-40(Brian)	41-44(Helen)

### For each paper:

Rate each element:

Very strongly present	5
Strongly present	4
Present	3
Weakly present	2
Very weakly Present	1
Not Present	0
Unclear	?

Each reviewer is given a table to fill in. Each page of the table represents a stage. There is a space for comments.

After reviewing the 4 papers on the page, enter the scores into excel. If there is another reviewer's name in the first column at the bottom left of the page, then you are reviewer 2. If there are any red boxes, you will need to discuss the reasons for this with the first reviewer.

Papers can be reviewed in any order but if possible, the order given is preferable so that the paper is still fresh in the first reviewer's mind.





## Appendix 16: Included and excluded RCTs

Table 41: Studies included in the cross-study synthesis and descriptions of intervention content.

Author and year published	Description
Albrecht 1998	Educational sessions in peer group setting.
Burling 1991	Feedback from CO tests.
Campbell 2006	Feedback, learning and support from midwives.
Cinciripini 2000	Mailing video vignettes.
Cope 2003	Urine test to provide feedback
Donatelle 2000	Incentives.
Dornelas 2006	Counselling plus follow up phone call.
Ershoff 1995	Mailed information to prevent relapse.
Ershoff 1999	Motivational interviewing/telephone support.
Gielen 1997	Skills instruction and self-help.
Hajek 2001	Counselling, self-help and feedback on CO test.
Hartmann 1996	Physician delivered goal setting.
Heil 2008	Incentives.
Hegaard 2003	Individual counselling and NRT.
Higgins 2004	Incentives.
Hjalmarson 1991	Physician delivered self-help manual.
Hotham 2005	NRT and counselling.

Kapur 1995	NRT.
Lawrence 2003	Self-help manual and computer programme.
Lowe 1997	Counselling and clinic reinforcement.
Lowe 1998a	Midwife-led motivational counselling and self-help booklet.
Lowe 1998b	Self-help booklet
Malchodi 2003	Peer counselling.
McBride 1999	Self-help, tailored letters, telephone counselling.
Moore 2002	Self-help booklets.
O'Connor 1992	Counselling, self-help and follow-up phone call.
Panjari 1999	Video and verbal information.
Pbert 2004	Counselling and follow-up.
Petersen 1992	Relaxation and self-help audio tape.
Pollak 2007	NRT and behavioural therapy.
Price 1991	Video.
Rigotti 2006	Telephone counselling.
Rush 1992	Counselling.
Secker-Walker 1994	Counselling.
Secker-Walker 1995	Counselling.
Secker-Walker 1997	Self-help plus Video tape
Secker-Walker 1998	Counselling plus physician advice.
Solomon 2000	Peer counselling.

Stotts 2002	Personal feedback plus motivational interview.
Strecher 2000	Tailored self-help guides.
Tappin 2000	Motivational interviewing by midwives.
Tappin 2005	Motivational interviewing by midwives.
Thornton 1997	Counselling and invitation to join group.
Walsh 1997	Physician advice, midwife counselling and self-help.
Windsor 1993	CBT, letter from physician, 'buddy' system, self-help.
Windsor 2000a	Incentives, self-help, phone calls
Wisborg 2000	NRT.

**Table 42: Paper, number of elements present (minus control) and specific elements present (minus control)**

Paper	Total elements	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6
Albrecht 1998	1		yes				
Burling 1991	2			yes	yes		
Campbell 2006	0						
Cinciripini 2000	1						yes
Cope 2003	3			yes	yes	yes	
Donatelle 2000	2	yes	yes				
Dornelas 2006	1					yes	
Ershoff 1999	2		yes			yes	
Gielen 1997	1					yes	
Hajek 2001	5		yes	yes	yes	yes	yes
Hartmann 1996	1			yes			
Hegaard 2003	1					yes	
Heil 2008	0						
Higgins 2004	0						
Hjalmarson 1991	1					yes	
Hotham 2005	0						
Kapur 2001	0						
Lawrence 2003	4		yes		yes	yes	yes
Lowe 1998a	1		yes				
Lowe 1998b	0						
Malchodi 2003	1					yes	
McBride 1999	2	yes	yes				
Moore 2002	1		yes				
O'Connor 1992	3		yes		yes	yes	
Panjari 1999	3			yes	yes	yes	

Pbert 2004	2			yes		yes	
Petersen 1992	0						
Pollak 2007	2		yes	yes			
Price 1991	2		yes			yes	
Rigotti 2006	2		yes			yes	
Rush 1992	2		yes	yes			
Secker-Walker 1994	1			yes			
Secker-Walker 1997	2		yes			yes	
Secker-Walker 1998	1					yes	
Solomon 2000	1		yes				
Stotts 2002	0						
Strecher 2000	2				yes	yes	
Tappin 2000	0						
Thornton	2	yes	yes				
Tappin 2005	1			yes			
Walsh 1997	2		yes			yes	
Windsor 1993	1					yes	
Windsor 2000a	4	yes		yes	yes	yes	
Wisborg 2000	0						

**Table 43: Interventions excluded from the study and the reasons for their exclusion**

<b>Excluded Intervention</b>	<b>Reason</b>
Baric 1976	Completed before 1990/Results not biochemically verified
Bauman 1983	Completed before 1990
Belizan 1995	Results not biochemically verified
Bullock 1995	Results not biochemically verified
DeVries 2006	Results not biochemically verified
Donovan 1977	Completed before 1990
Dunkley 1997	Results not biochemically verified
Ershoff 1989	Completed before 1990
Haddow 1991	Results not biochemically verified
Kendrick 1995	Trial of smoking reduction (not cessation)
Lilley 1986	Completed before 1990/Results not biochemically verified
Loeb 1983	Completed before 1990/Results not biochemically verified
MacArthur 1987	Completed before 1990/Results not biochemically verified
Manfredi 1999	Results not biochemically verified
Mayor 1990	Results not biochemically verified
Olds 1986	Completed before 1990/Results not biochemically verified
Polanska 2004	Results not biochemically verified
Radius 1995	Results not biochemically verified
Reading 1982	Completed before 1990/Results not biochemically verified
Sexton 1984	Completed before 1990
Solomon 1996	Results not biochemically verified
Thornton 1997	Insufficient information available
Valbo 1991	Results not biochemically verified
Valbo 1994	Results not biochemically verified
Valbo 1996	Results not biochemically verified
Windsor 1985	Completed before 1990

## Appendix 17: Indexing (Study 1)

Table 44: Content of interviews divided into themes (code number in bold)

	Visualising/Conceptualising the baby/effects of smoke	Effects of Existing information/Knowledge	Feasibility of a mobile phone/text message intervention	Barriers to, and facilitators of, smoking cessation
PW001	<ul style="list-style-type: none"> <li>• Afraid of thinking about what the baby looks like 8 <b>1.1</b></li> <li>• Taking chemicals away would cause difficulty to the baby 8 <b>1.3</b></li> <li>• Baby gets nutrients from umbilical cord in 2<sup>nd</sup> trimester 12 <b>1.3</b></li> <li>• You have to think of yourself because the baby takes nutrients away from you 12 <b>1.3</b></li> <li>• Baby floating about in amniotic fluid 20 <b>1.1</b></li> <li>• Baby's hiccups 20 <b>1.1</b></li> <li>• Whatever the mother feels, the baby feels too (stress/anxiety)46 <b>1.3</b></li> <li>• Small baby is a side effect of smoking during pregnancy 52 <b>1.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• Midwife gave information about smoking affecting growth - incentive to stop 6 <b>2.1</b></li> <li>• Midwife gave leaflets but no more information – wanted to tick a box 36 <b>2.1</b></li> <li>• Photos on cigarette boxes disgusting but didn't stop her smoking pre-pregnancy 44 <b>2.2</b></li> <li>• Not bothered by information about smoking unless it was about adverse effects to the baby because she would connect it to her own baby 46 <b>2.4</b></li> </ul>	<ul style="list-style-type: none"> <li>• Signed up to a phone app which sends reminders 64 <b>3.1</b></li> <li>• Thinks an encouraging message service would be good, especially on a low day 64 <b>3.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Thought smoking cessation might put pressure on the baby due to stress 2 <b>4.2</b></li> <li>• Found the breath test and people paying attention more motivating than the financial incentive 4 <b>4.1</b></li> <li>• Was told about smoking affecting the baby but didn't stop because she was heavily addicted 6 <b>4.1</b></li> <li>• Convinced herself that smoking was fine because previous children were healthy birth weights 6 <b>4.1</b></li> <li>• Had been smoking from an early age - smoking part of lifestyle and coping mechanisms 8 <b>4.1</b></li> <li>• Cigarette was a method of de-stressing 10 <b>4.1</b></li> <li>• Alternative method of de-stressing is taking the dog out for a walk 10 <b>4.1</b></li> <li>• Has been comfort eating but doesn't want to get fat 10 <b>4.1</b></li> <li>• Reason she gave up this pregnancy was maturity 24 <b>4.2</b></li> </ul>



		<ul style="list-style-type: none"> <li>• Picture of a big bouncing baby would be a good incentive to stop 52 <b>2.4</b></li> <li>• Saw TV adverts about passive smoking effects on children but justified it because she wasn't smoking in front of her children 58 <b>2.2</b></li> </ul>		<ul style="list-style-type: none"> <li>• Felt guilty in previous pregnancies but thought more about her own feelings 24 <b>4.2</b></li> <li>• In previous pregnancies she thought trying to quit was good enough for her 24 <b>4.1</b></li> <li>• The financial incentive gives her a boost 26 <b>4.1</b></li> <li>• Cessation harder when family smokes around her 26 <b>4.1</b></li> <li>• Partner tried to stop smoking 28 <b>4.1</b></li> <li>• When she is tempted to smoke she thinks about how far she has come 28 <b>4.2</b></li> <li>• Most of her friends smoke but won't smoke around her and have been supportive 28 <b>4.1</b></li> <li>• Smoking is like an emotional crutch 30 <b>4.1</b></li> <li>• It helped that she had smoking cessation workers and pharmacists who she could contact when struggling 30 <b>4.1</b></li> <li>• The first few weeks were a struggle and she was grumpy 30 <b>4.1</b></li> <li>• Told herself it was because she was coming down from all the chemicals 30 <b>4.2</b></li> <li>• Felt unprepared for the psychological effects 30 <b>4.1</b></li> <li>• Had an internal struggle with herself with an 'angel and devil' telling her what to do 30 <b>4.1</b></li> <li>• Would have liked more support and encouragement from midwife 32 <b>4.1</b></li> </ul>
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				<ul style="list-style-type: none"> <li>• Would like to be rewarded for her achievements 32 <b>4.2</b></li> <li>• Felt conscious of people seeing her when smoking outside 36 <b>4.1</b></li> <li>• Psychology course has helped her understand her own behaviour and would have started smoking again otherwise 38 <b>4.2</b></li> <li>• Uses breathing exercises to de-stress as an alternative to smoking 38 <b>4.1</b></li> <li>• Previously had a 'this isn't going to happen to me' attitude. 44 <b>4.2</b></li> <li>• Saw images of dirty lungs but because she couldn't see her lungs she thought they were fine 44 <b>4.2</b></li> <li>• Thought she was fine because she could climb stairs without getting out of breath 44 <b>4.1</b></li> <li>• Important to be calm and understand the stages of smoking cessation 46 <b>4.1</b></li> <li>• Reassurance that stages are normal would be helpful 46 <b>4.2</b></li> <li>• Quit through her own 'sheer grit and determination' 48 <b>4.1</b></li> <li>• Justified her smoking behaviour 58 <b>4.1</b></li> <li>• Used cigarettes to de-stress, as food replacement, and socially – i.e. in every aspect of her life 58 <b>4.1</b></li> <li>• Understanding her own behaviour helped her 58 <b>4.1</b></li> </ul>
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				<ul style="list-style-type: none"> <li>• Understanding that feelings and stages of smoking cessation will pass helped 60 <b>4.1</b></li> <li>• Recognising achievements (e.g. one week with no cigarettes) 60 <b>4.1</b></li> <li>• Birthdays, Christmas and New year especially difficult 60 <b>4.2</b></li> <li>• Missed the camaraderie with friends and family smoking outside 60 <b>4.1</b></li> <li>• Used one-upmanship to make herself feel better about being left out 60 <b>4.2</b></li> </ul>
PW002	<ul style="list-style-type: none"> <li>• Hadn't thought about what baby looks like 18 <b>1.1</b></li> <li>• Baby like a jelly bean 18 <b>1.1</b></li> <li>• Keeps track of when features are developed 24 <b>1.1</b></li> <li>• 3-D scan looks like a 'blobby gummy bear' 30 <b>1.1</b></li> <li>• Everything you put in your body goes straight to the baby, even the things you don't need 36 <b>1.3</b></li> <li>• Everything you breathe in goes straight through baby and affects their lungs 64 94 <b>1.3</b></li> <li>• Baby has 'tiny tiny' lungs 64 <b>1.1</b></li> <li>• Strong feelings after seeing the scan that stay with you 80 <b>1.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Couldn't recall any pictures 48 <b>2.2</b></li> <li>• Feels awful seeing adverts on TV about smoking 52 <b>2.2</b></li> <li>• Found that awareness of smoking dangers helped her quit, but she didn't learn anything new 56 <b>2.4</b></li> <li>• Liked pictures of a baby showing its size in relation to the mother's belly 72 <b>2.3</b></li> <li>• Adverts with smoke choking the baby affected her 98 <b>2.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Signed up for pregnancy updates 20 <b>3.1</b></li> <li>• Signed up to a Facebook app which updated everyone on the baby's progress 22 <b>3.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Felt guilty about smoking which motivated her to quit 42 <b>4.1</b></li> <li>• Found the financial incentive encouraging and rewarding 44 <b>4.1</b></li> <li>• Found the clear CO test each week kept her going 44 <b>4.1</b></li> <li>• Found that people were generally encouraging of her smoking cessation 60 <b>4.1</b></li> <li>• Getting Facebook likes and positive comments on status updates helped 62 <b>4.1</b></li> <li>• Used food to replace cigarettes 70 <b>4.1</b></li> <li>• When she felt the baby move it motivated her more to quit because it felt more real 70 <b>4.1</b></li> <li>• Being pregnant was an extra motivator to quit 98 <b>4.1</b></li> </ul>

	<ul style="list-style-type: none"> <li>• Afraid of thinking about what the baby might look like 92 <b>1.2</b></li> <li>• Liked seeing the 3D scan rather than the 2D which looks like an 'x-ray of a baby'78 <b>1.1</b></li> <li>• Knowledge of internal processes not based on any information 96 <b>1.3</b></li> </ul>			
PW003	<ul style="list-style-type: none"> <li>• Imagines that the baby would inhale the smoke 11 <b>1.3</b></li> <li>• Baby can feel what the mother feels (relaxed/stressed) 13 <b>1.3</b></li> <li>• Imagines the baby can smell and see what she sees 13 <b>1.3</b></li> <li>• At 26 weeks the baby has developed its features 13 <b>1.1</b></li> <li>• Amazing to see the nose and lips in 3d scan 15 <b>1.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Actively tried to educate herself about pregnancy 21 <b>2.4</b></li> <li>• Felt more comfortable knowing what is normal and what is not 21 <b>2.4</b></li> <li>• Health professionals didn't give her any smoking cessation advice because they</li> </ul>	<ul style="list-style-type: none"> <li>• Uses 'baby centre' app which sends tips or advice daily 25 <b>3.1</b></li> <li>• Read all of the tips in advance and is no longer interested 27 <b>3.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to break her daily routine which involved smoking 4 <b>4.1</b></li> <li>• Gave up because she was having difficulty getting pregnant 4 <b>4.1</b></li> <li>• 2 main incentives to quit – healthy baby and extra financial support 5 <b>4.1</b></li> <li>• Pharmacy and smoking cessation worker helped a lot 5 <b>4.1</b></li> <li>• Difficult when people around her are smokers 7 <b>4.1</b></li> </ul>

	<ul style="list-style-type: none"> <li>• Felt strange and happy seeing the baby playing with the cord 15 <b>1.1</b></li> <li>• Was very worried she wasn't pregnant before first scan 19 <b>1.1</b></li> <li>• Baby likes and dislikes certain foods 35 <b>1.3</b></li> <li>• Imagines the cord constantly in the baby's hand 35 <b>1.1</b></li> <li>• Imagines the baby as very and wrinkly and small when it is born 37 <b>1.2</b></li> </ul>	<p>saw her determination 23 <b>2.1</b></p> <ul style="list-style-type: none"> <li>• Photos on cigarette boxes disgusting but wouldn't have stopped her pre-pregnancy.23 <b>2.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Her partner reads the updates and it has helped his understanding of the development of the baby and her moods 27 <b>3.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Partner doesn't smoke and wanted her to give up 7 <b>4.1</b></li> <li>• Her manager gave up smoking when she was pregnant which helped break the routine at work 7 <b>4.1</b></li> <li>• People were generally very supportive 7 <b>4.1</b></li> <li>• Being considered a low risk pregnancy was encouraging 21 <b>4.1</b></li> <li>• Was determined not to smoke right from the start of the pregnancy 23 <b>4.1</b></li> <li>• Was initially counting the days until she could smoke again but her attitude changed after the first scan 23 <b>4.1</b></li> </ul>
PW004	<ul style="list-style-type: none"> <li>• Doesn't imagine the baby's face 8 <b>1.2</b></li> <li>• Could see his spine, body and face from scan 16 <b>1.1</b></li> <li>• Baby looked like a skeleton on the scan 24 <b>1.1</b></li> <li>• Knowing the sex makes the baby feel more real 32 <b>1.1</b></li> <li>• Never thinks about internal processes 46<b>1.3</b></li> <li>• Worried about passive smoking 108 <b>1.3</b></li> <li>• Weird coming to terms with a life growing inside you 122 <b>1.1</b></li> <li>• Thinks about herself growing stronger for the baby 126 <b>1.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• She had been given leaflets but couldn't remember anything specific 76 <b>2.4</b></li> <li>• Has seen pictures of the baby developing its features 90 <b>2.3</b></li> <li>• Felt scared seeing the advert with the smoke going round the baby's neck 104 <b>2.2</b></li> <li>• Has read information from the nurse about baby's brain development 154 <b>2.1</b></li> <li>• Has read a book about pregnancy 158 <b>2.4</b></li> </ul>	<ul style="list-style-type: none"> <li>• Uses a Facebook baby tracker on her phone which gives updates on the development of the baby 89 <b>3.1</b></li> <li>• Would not sign up to a text message support service 120 <b>3.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Smokes more than usual because she is bored sitting in the house 56 <b>4.1</b></li> <li>• Works 5 days a week so can't find the time to sign up for financial incentive scheme 62<b>4.1</b></li> <li>• Doesn't have a partner 68 <b>4.1</b></li> <li>• Worries that if she stops smoking she'll put on weight which will not be good for the baby 98 <b>4.1</b></li> <li>• Feels scared about risks of smoking 104 <b>4.1</b></li> <li>• Is annoyed with family and friends pushing her to stop smoking 118 <b>4.1</b></li> <li>• Feels like midwives are trying to help by keeping her from harming her baby 140 <b>4.1</b></li> </ul>

PW005	<ul style="list-style-type: none"> <li>• Worried that pregnancy wasn't real until she saw scan 18 <b>1.1</b></li> <li>• Saw baby moving around and blowing bubbles on scan 28 <b>1.1</b></li> <li>• Wonders which parent the baby will look like 32 <b>1.3</b></li> <li>• Doesn't picture the baby as it is often but has an idea of an 'alien type thing' 34 <b>1.1</b></li> <li>• Baby gets nutrients through umbilical cord 65 <b>1.3</b></li> <li>• Didn't worry about stopping smoking affecting the baby 95 <b>1.3</b></li> <li>• Baby feels what mother feels (stressed) 97 <b>1.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• Reads 'ready steady baby' book sometimes 38 <b>2.4</b></li> <li>• Doesn't look for information – asks midwife or reads 'ready steady baby' 42 <b>2.1</b></li> <li>• Was given a smoking leaflet 67 <b>2.4</b></li> <li>• Thinks pictures on cigarette boxes are disgusting but would never have made her stop 109 <b>2.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Has a ready steady baby app as it is easier to access on the go than her book 54 <b>3.1</b></li> <li>• Would like text messages because she doesn't always have time to look things up herself 58 <b>3.2</b></li> <li>• Couldn't attend smoking group because of time issues so would like phone help 87 <b>3.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Didn't stop for the baby, quit for health and money reasons 73 <b>4.1</b></li> <li>• Started smoking again briefly as a way of coping with writing essays 75 <b>4.1</b></li> <li>• Would not have quit again if it wasn't for the baby 77 <b>4.1</b></li> <li>• Used inhalators to quit 75 <b>4.1</b></li> <li>• Fighting cravings is the hardest thing 79 <b>4.1</b></li> <li>• Easier because her partner doesn't smoke 79 <b>4.1</b></li> <li>• When with friends, it's hard because they all smoke and she likes the smell 79 <b>4.1</b></li> <li>• Takes her inhalator with her when with friends just in case 81 <b>4.1</b></li> <li>• Found patches irritating on her skin, Champix gave her migraines and lozenges tasted disgusting 85 <b>4.1</b></li> <li>• Used to go to a stop smoking group but couldn't go regularly because of working commitments 87 <b>4.1</b></li> <li>• Liked going to stop smoking group because she had someone to talk to 87 <b>4.1</b></li> <li>• Partner has strong attitude towards her smoking which she doesn't find helpful 89 <b>4.1</b></li> <li>• Perceives people to have a negative attitude towards her smoking while pregnant even though nobody has ever said anything to her 91 <b>4.1</b></li> <li>• Recognises that her willpower is the main thing needed for quitting 93 <b>4.1</b></li> </ul>
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				<ul style="list-style-type: none"> <li>• Not worried about quitting smoking damaging the baby 95 <b>4.1</b></li> <li>• Previous postpartum relapse triggered by nights out (pre-smoking ban) 105 <b>4.1</b></li> <li>• Wouldn't smoke when baby is born because she would have to go outside 107 <b>4.1</b></li> <li>• Doesn't want to start smoking again because she can't leave the baby on her own in the house while she goes outside 107 <b>4.1</b></li> </ul>
PW006	<ul style="list-style-type: none"> <li>• Doesn't think about baby much 10 <b>1.1</b></li> <li>• Baby size of a plum 24 <b>1.1</b></li> <li>• Baby starts at full stop and grows into a strawberry 26 <b>1.1</b></li> <li>• Scan makes baby feel more real – seeing heartbeat 56 <b>1.1</b></li> <li>• Nutrients go through umbilical cord – body breaks food down to give to the baby 62 <b>1.3</b></li> <li>• Whatever I eat the baby eats 62 <b>1.3</b></li> <li>• Quitting cold turkey can do more harm to the baby than good 112 <b>1.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• Keeps track of gestational stage using websites 26 <b>2.3</b></li> <li>• Still reads up on baby's stage of development despite having 6 children 30 <b>2.3</b></li> <li>• Recalls adverts on passive smoking affecting children 114 <b>2.2</b></li> <li>• Says that an advert about passive smoking a car with children didn't affect her because they don't smoke in the car 118 <b>2.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Has baby centre app on her phone with weekly up dates 35 <b>3.1</b></li> <li>• Uses a Facebook countdown app (baby gaga) 48 <b>3.1</b></li> <li>• Thinks a text message service would be good but links and downloading would cost her money 52 <b>3.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Child will breathe in fumes anyway (e.g. car fumes) so can only protect them so much 11 <b>4.1</b></li> <li>• Finds it hardest to not smoke after a meal 74 <b>4.1</b></li> <li>• Uses nicotine chewing gum 76 <b>4.1</b></li> <li>• Finds support from smoking cessation worker helpful 80 <b>4.1</b></li> <li>• Is unconvinced that smoking is a factor on birthweight (has 6 children who were small and smoked throughout those pregnancies) 87 <b>4.1</b></li> <li>• Isn't convinced that smoking affects birthweight but will believe it if she has a large baby(smoked through last 6 pregnancies and had small babies 85 <b>4.1</b></li> <li>• Stopped because of pregnancy and didn't want to get gestational diabetes again 85 <b>4.1</b></li> <li>• Knows people who have smoked and had 8/9 pound babies 95 <b>4.1</b></li> </ul>

				<ul style="list-style-type: none"> <li>• Thinks that there is a stigma attached to smoking during pregnancy 96 <b>4.1</b></li> <li>• Has found quitting easy and hasn't had many cravings 100 <b>4.1</b></li> <li>• Partner has attempted to quit and smokes outside 106 <b>4.1</b></li> <li>• Doctor told her it would cause more harm to quit completely than just cut down 112 <b>4.1</b></li> <li>• Thinks the shock of quitting immediately would damage the baby 112 <b>4.1</b></li> <li>• Unaffected by passive smoking adverts featuring smoking in a car because she doesn't smoke in the car 118 <b>4.1</b></li> <li>• Hard to suddenly stop because she has been smoking for a long time 124 <b>4.1</b></li> <li>• Found the financial incentive scheme helpful but thinks you have to be emotionally ready to stop 128 <b>4.1</b></li> <li>• Was shocked at the amount she and her partner were spending on cigarettes – motivating factor 135 <b>4.1</b></li> </ul>
PW007	<ul style="list-style-type: none"> <li>• Baby looked like a blob on 8 week scan 8 <b>1.1</b></li> <li>• Doesn't want to jinx pregnancy by thinking about what baby looks like 14 <b>1.2</b></li> <li>• Relief at scan – just to know there was a baby and a heartbeat 18 <b>1.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Has seen videos of babies developing but gestational stage too early to be more than a blob and therefore not very interesting 34 <b>2.3</b></li> <li>• Bombarded with leaflets, has read a lot of them 52 <b>2.4</b></li> </ul>	<ul style="list-style-type: none"> <li>• Has multiple apps. Some update her with baby development weekly (baby centre, bounty, baby gaga, sma) 30 <b>3.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• Quit because of pregnancy 56 <b>4.1</b></li> <li>• Set a quit date and built up to it 58 <b>4.1</b></li> <li>• Found breaking habit/routine hard 62 <b>4.1</b></li> <li>• Has used NRT 62 <b>4.1</b></li> <li>• Enjoyed smoking too much to quit pre-pregnancy 62 <b>4.1</b></li> </ul>



	<ul style="list-style-type: none"> <li>• Feels guilty when she eats chips because fruit would be more beneficial to the baby 24 <b>1.3</b></li> <li>• Nutrients pass through umbilical cord – hasn't really thought about it 26 <b>1.3</b></li> <li>• Glad she's quit because she's not poisoning the child 70 <b>1.3</b></li> <li>• Cut down to quit so that the lack of nicotine wouldn't be a shock 76 <b>1.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• Recalls adverts – quit kit packs, one with a teddy bear and one with arteries clogging up but didn't have any effect pre-pregnancy 78 <b>2.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Likes to sign up for more than one service because they all say something different 32 <b>3.1</b></li> <li>• Uses a Facebook app 42 <b>3.1</b></li> </ul>	<ul style="list-style-type: none"> <li>• A lot of her family smoke which makes her think she might start again 64 <b>4.1</b></li> <li>• Lives with in-laws who smoke outside because of her pregnancy 66 <b>4.1</b></li> <li>• Partner has quit and been supportive 66 <b>4.1</b></li> <li>• Worried about elderly grandmother having to smoke outside 68 <b>4.1</b></li> <li>• Mother more helpful with getting people to smoke outside only because of pregnancy 68 <b>4.1</b></li> <li>• Saving money is a motivating factor 70 <b>4.1</b></li> <li>• Not poisoning child is a motivating factor 70 <b>4.1</b></li> <li>• Having smoking cessation advisor readily available to give advice when she is tempted to buy cigarettes is helpful 70 <b>4.1</b></li> <li>• Now dislikes the smell of smokers 70 <b>4.1</b></li> <li>• Distracts herself when having a craving e.g. nicotine gum, dishes, laundry, taking dog for a walk 72 <b>4.1</b></li> <li>• Worried about mood swings with nicotine withdrawal and pregnancy hormones 76 <b>4.1</b></li> <li>• Pre pregnancy barrier – thinking 'well something's got to kill you' <b>4.1</b></li> <li>• Pre-pregnancy barrier – didn't feel that she was smoking excessively and could walk up a hill so didn't think it was having an adverse effect on her health 78 <b>4.1</b></li> </ul>
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				<ul style="list-style-type: none"> <li>• Struggled with quitting in first pregnancy because she didn't have the same support she does now 80 <b>4.1</b></li> <li>• If partner smoked in the mornings she would either want a cigarette or want to kill him for having one 82 <b>4.1</b></li> </ul>
PW008	<ul style="list-style-type: none"> <li>• Can feel the baby moving like bubbles popping in belly 2 <b>1.1</b></li> <li>• Strange that baby is kicking in scans but she can't feel it yet 2 <b>1.1</b></li> <li>• Baby looked like she was playing drums in her stomach 14 <b>1.1</b></li> <li>• Scan was a relief to see the baby move 14 <b>1.1</b></li> <li>• Scan made her feel protective of her baby 14 <b>1.1</b></li> <li>• Wonders which parent she is going to look like 16 <b>1.2</b></li> <li>• Doesn't want to imagine the baby as it looks just now 20 <b>1.1</b></li> <li>• It's good for baby to hear her voice so she reads to it a lot 38 <b>1.3</b></li> <li>• Wants baby to recognise her boyfriend's voice 40 <b>1.3</b></li> <li>• Nutrients go through umbilical cord 42 <b>1.3</b></li> <li>• Baby likes and dislikes food that she eats 42 <b>1.3</b></li> </ul>	<ul style="list-style-type: none"> <li>• Only has ready steady baby book but doesn't read it because it scares her 22 <b>2.4</b></li> <li>• Looks at scan pictures but other than that wants a 'surprise' 22 <b>2.4</b></li> <li>• NRT packs say 'not suitable for pregnant women' so she doesn't feel she can use them 54 <b>2.4</b></li> </ul>	<ul style="list-style-type: none"> <li>• Is not very good with technology 26 <b>3.1</b></li> <li>• Doesn't often access the internet 24 <b>3.1</b></li> <li>• Thinks that there is nothing that would help her give up smoking 56 <b>3.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Has been smoking for a long time 54</li> <li>• Feels guilty about smoking 54 <b>4.1</b></li> <li>• Wanted to quit for pregnancy but found it too difficult 54 <b>4.1</b></li> <li>• Justifies her smoking as not as bad as mothers who drink, take drugs or get tattoos 54 <b>4.1</b></li> <li>• Won't use NRT because the packets say they are not suitable for pregnant women 54 <b>4.1</b></li> <li>• Thinks that stopping immediately would stress your body and therefore the baby out 54 <b>4.1</b></li> <li>• Feels that cutting down is an achievement 54 <b>4.1</b></li> <li>• Currently smokes in her flat but is moving soon and doesn't plan to smoke in the new house – thinks this will help her stop when it is too cold to smoke outside 54 <b>4.1</b></li> <li>• Everybody she knows smoked with their pregnancy –including her mum and her grandmother 54 <b>4.1</b></li> <li>• Thinks people are too protective of children and 'wrap them up in cotton wool – doesn't see why 54 <b>4.1</b></li> </ul>

	<ul style="list-style-type: none"> <li>• Tries to eat things she wants the baby to eat when she is older 44 <b>1.3</b></li> <li>• Quitting smoking would stress her body and therefore the baby's 54 <b>1.3</b></li> <li>• Thinks with cutting down the baby won't feel distress 54 <b>1.3</b></li> </ul>			<ul style="list-style-type: none"> <li>• Nothing will help her quit – she has tried lollipops, keeping her hands busy, reading, cooking, TV. 56 <b>4.1</b></li> <li>• Family and partners family won't judge her for smoking during pregnancy because they did it too 58 <b>4.1</b></li> <li>• Perceives that strangers are looking at her thinking that she is a terrible mum 58 <b>4.1</b></li> <li>• Happy that midwife said that her cutting down her smoking was fine 60 <b>4.1</b></li> <li>• No point in putting your body through stress just because people are saying you are a bad mum 60 <b>4.1</b></li> <li>• Wishes she has never started smoking because she didn't know how difficult it would be to stop 60 <b>4.1</b></li> <li>• Thinks that financial incentive scheme is bribery 64 <b>4.1</b></li> </ul>
PW009	<ul style="list-style-type: none"> <li>• Baby looked like a baked bean on scan 10 <b>1.1</b></li> <li>• Fascinated by seeing heart, bladder and brain 12 <b>1.1</b></li> <li>• Fear of bonding with baby in case anything went wrong – started to bond more after scan 14 <b>1.1</b></li> <li>• Imagines herself carrying the baby 16 <b>1.2</b></li> </ul>	<ul style="list-style-type: none"> <li>• Was given a booklet which she didn't read because this is her second child 62 <b>2.4</b></li> <li>• Didn't look at any information about the baby's development until after 12 weeks because of a previous miscarriage 22 <b>2.4</b></li> </ul>	<ul style="list-style-type: none"> <li>• Signed up for email updates (baby centre) for her first pregnancy has less of these with this pregnancy 24 <b>3.1</b></li> <li>• Uses Facebook on her phone</li> </ul>	<ul style="list-style-type: none"> <li>• Stopped immediately when she found out she was pregnant- had cut down before then anyway 48 <b>4.1</b></li> <li>• Had been smoking for a long time 48 <b>4.1</b></li> <li>• Previously had postpartum relapse – started smoking again at a music festival after drinking alcohol 48 <b>4.1</b></li> <li>• Was trying to quit but colleagues at a new job were smokers and she got cigarettes from them 48 <b>4.1</b></li> </ul>

	<ul style="list-style-type: none"> <li>• Can't picture what his face will look like but can imagine a baby's feet and hands 18</li> <li>• Had a dream that baby had similar features to her husband 16 <b>1.2</b></li> <li>• Doesn't want to imagine what the fetus looks like because it wouldn't survive if born now 20 <b>1.1</b></li> <li>• Baby gets to taste the foods she eats 42 <b>1.3</b></li> <li>• Baby inhales amniotic fluid and can taste strong things that way 44 <b>1.3</b></li> <li>•</li> </ul>		<p>regularly 30 33 <b>3.1</b></p>	<ul style="list-style-type: none"> <li>• Found her young daughter trying to light up a cigarette which was a push for her to quit 48 <b>4.1</b></li> <li>• Doesn't think it would be too bad if she had one or two cigarettes with a pint after her pregnancy 50 <b>4.1</b></li> <li>• Partner is an occasional smoker but they both thought it was important she didn't smoke during pregnancy 54 <b>4.1</b></li> <li>• Thinks that smoking during pregnancy wasn't an option because the baby doesn't have a choice 54 <b>4.1</b></li> <li>• Used to work in a homeless hostel and has experience of trying to educate people on smoking 72 <b>4.1</b></li> <li>• A negative attitude to smoking during pregnancy is just going to make people feel worse and want to smoke 76 <b>4.1</b></li> </ul>
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## Appendix 18: Charting (Study 1)

Table 45: Charting study 1 data

Image		Source	Effect	
The baby	As fetus	Imagined	Do not want to imagine	
			Alien/weird	
		From Scan	2-D and 3-D	Language used imposed babyhood/childhood on the fetus
				Described movement
			3-D only	Relief/happiness
				Baby more concrete/real
	Post-birth	Imagined	Protective feelings	
			Fear of jinxing the outcome of the pregnancy	
			Wondering about resemblance to themselves or their partners	
		From memory	Describing specific features affectionately	
Internal processes linking mother to baby	Imagined	Remembering older children as babies		
Anti-smoking adverts	Television	Basic knowledge Nice that baby can taste food		
Graphic images	Cigarette packs	Irrelevant if not specific to own smoking behaviour No effect on behaviour, Disgust/revulsion		

**Table 46: Addressing issues of acceptability and feasibility**

<b>Acceptability</b>		<b>Feasibility</b>	
<b>Acceptable</b>	<b>Unacceptable</b>	<b>Reasons why a text-messaging intervention would be feasible</b>	<b>Reasons why a text messaging intervention would not be feasible</b>
Imposing babyhood/childhood on the fetus	Negative/graphic images	All women had smartphones	Some smokers would not sign up for a text message intervention
Describing movement	Concrete visualisation of the fetus in early pregnancy	Quitters generally receptive to text messages	Smokers upset at being told what to do
Externally delivered images of the fetus in the present	Visualising their own fetus/baby in the future	Does not add to midwives workload	
Receiving information in real time			
Visualising the size of the baby			

## Appendix 19: Mapping and interpretation (Study 1)

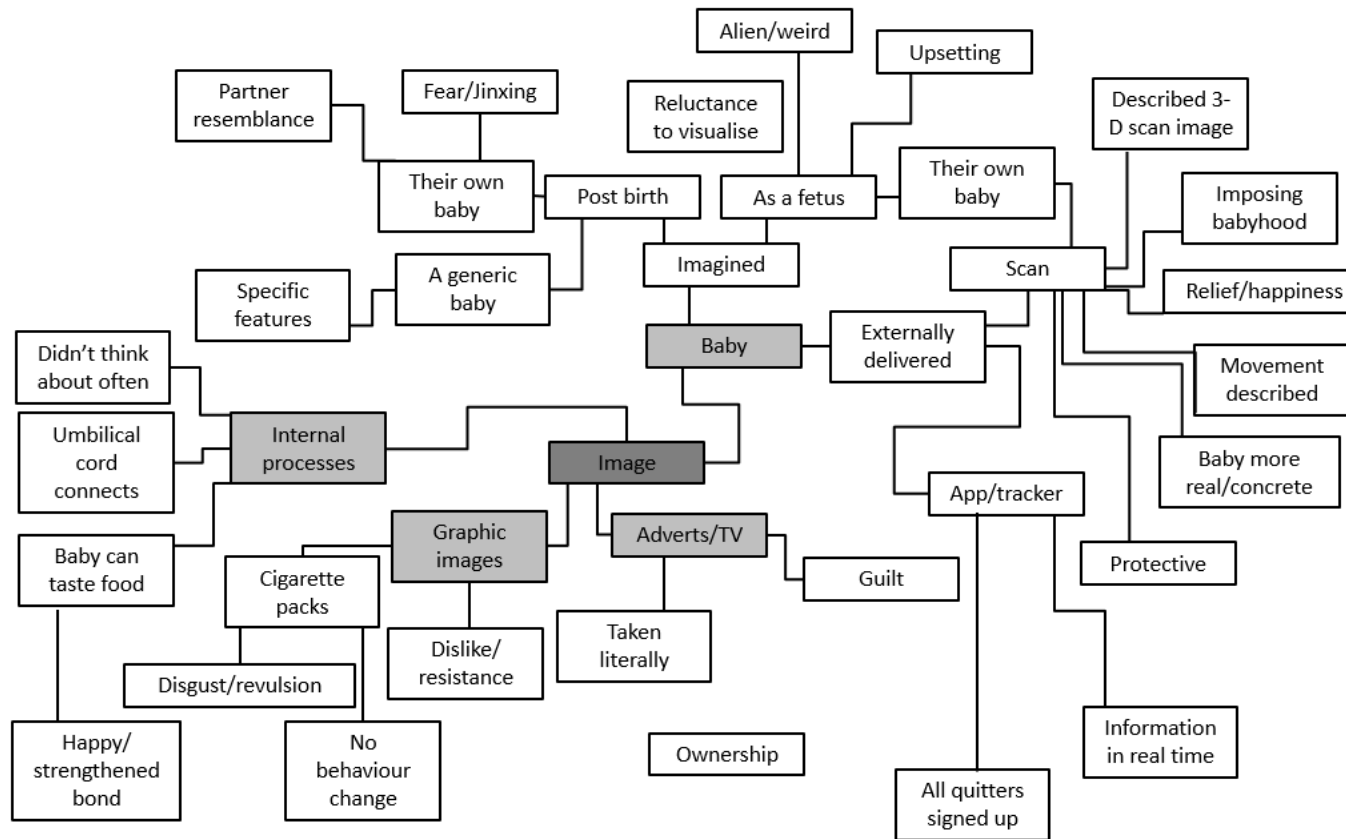


Figure 25: Connections between themes and sub-themes

Visualising the baby

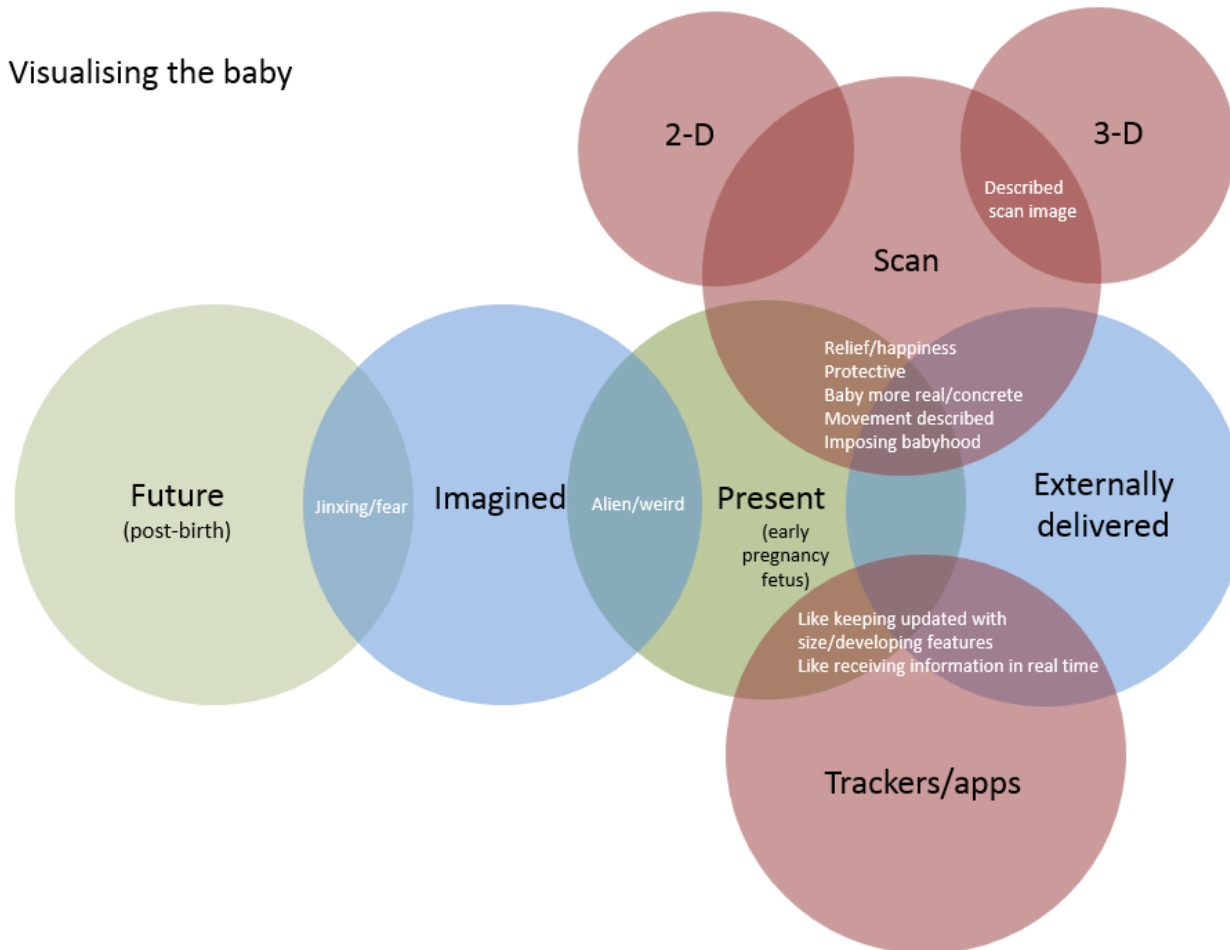


Figure 26: mapping the visualisation of the fetus (internally and externally delivered images)



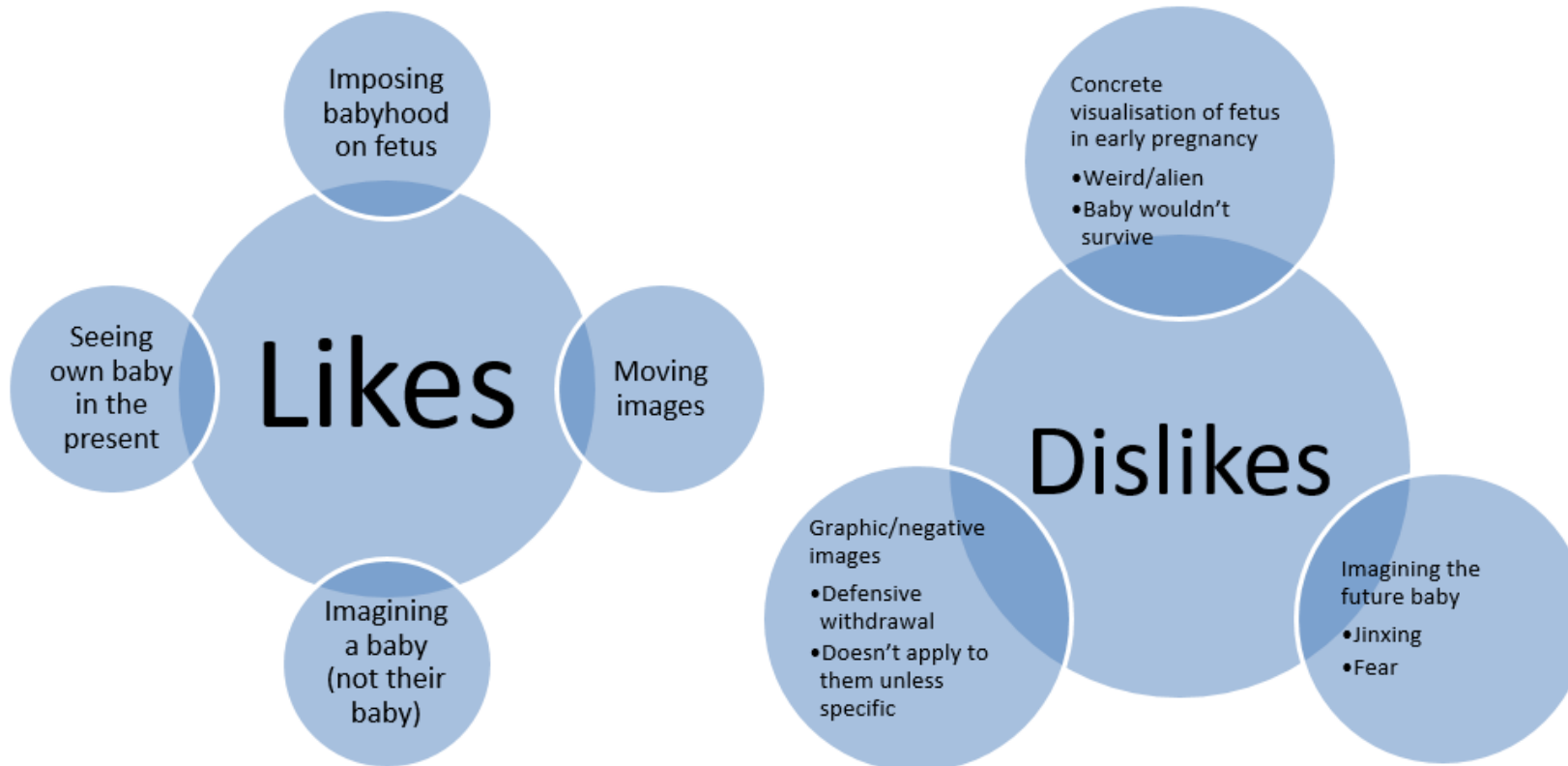


Figure 27: Likes and dislikes of participants relating to visualising their fetus/future baby

## Appendix 20: PowerPoint slides shown to participants (Study 2)

If you signed up for this project, you would get text messages throughout your pregnancy from a character called Megan. Megan will tell you about her life, her family and friends and her struggle with quitting smoking. At any point you could text 'help' and Megan would send you a message encouraging you. Megan would also ask you questions which you can reply to if you want. At the end of each week you will get a summary of the things Megan has done to help herself quit.

You would also be sent images. These include photos of fruit which is the same size as your baby and pictures of a baby with some information about how your baby is developing.

1

Hey, My name is Megan and I'm 12 weeks pregnant. Had my first scan today too! My midwife gave me loads of advice on how to look after myself. I've set a date to quit smoking for three weeks today. Maybe we could help each other? xx

2



3

I showed my boyfriend, Ryan, the scan photo and he thinks it looks like a potato. I'm going to cut down before my quit date. I've never quit for longer than a month before so I'm a bit nervous! xx

4

Me and Ryan took my mum the scan pic. She wasn't happy when I told her I was pregnant but when she seen the pic she got really emotional. Still got nagged for not telling her about the scan though. **Do you smoke too or have you quit?** xx

5

I'm back at work tomorrow. Totally dreading it after a week off. I'll need to tell my boss I'm pregnant – not sure how he'll take it. I've started writing a diary of when I usually smoke during the day. It was a lot today! xx

6

Work went ok – my friends, Jenny and Michelle already knew I was pregnant and Mark, my boss, was great about it. His wife's pregnant too. Smoked 15 cigarettes today. Mostly after meals and on my work breaks with the girls. xx

7

This week Megan has:

- Decided to quit
- Set a quit date
- Started a smoking diary
- Recognised times she is likely to smoke (on breaks at work, after meals)

8



9

At work today, Mark said he was going to quit smoking because of his wife's pregnancy. I told him about my quit date and he's going to quit on the same day. I told the girls too so they are prepared for my moods! I'm always grumpy the first 3 days after I quit. xx

10

Told Ryan about Mark quitting for his wife. He'd never do that for me 😊. Still smoking a lot. I'm gonna make the house a no smoking zone when I quit so he'll get a shock! Down to 6 Cigarettes a day now. Proud of myself! xx

11

Ryan's sister, Caitlin was round the house today. She's just broken up with her husband and she's pregnant too – a few weeks ahead of me. Don't know how I would cope if I was her. Back up to 15 fags today because I had one every time Caitlin did 😊. xx

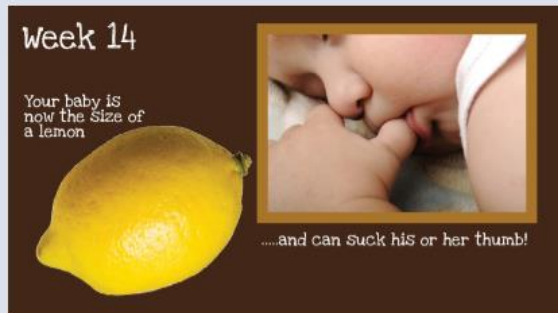
12

Caitlin reckons if I quit smoking I'll stress the baby out. Phone the midwife and she said that's not right. The baby won't have any bad effects and its nicotine withdrawal (not stress) that I'll be feeling. There's no telling Caitlin though ☹ xx

13

- This week Megan has:
- Found someone to quit with her
  - Cut down in preparation for quitting
  - Told people about her quit plans
  - Recognised cues to smoking (e.g. being with friends who smoke)

14



15

Caitlin's staying at ours so its difficult to cut down ☹.I made a list of the reasons why I want to quit today. I'll save it onto my phone so I can look at it whenever I feel tempted. Remember if you are struggling you can always text 'help' to me and I'll give you some advice. xx

16

I scrubbed the house clean today and took all the ashtrays outside when Caitlin left. Told Ryan we're not smoking inside anymore and we had a massive fight. Don't care. told him its his baby too so he's got to take some responsibility. **Do you have a partner? Do they smoke?** xx

17

Ryan's a total waste of space, I caught him and Caitlin smoking in the kitchen this morning. Was doing so well - I decided to wait til I was at work to have a smoke but needed one after dealing with him. Going to try again tomorrow. xx

18

Didn't smoke til lunch break today! Yes! Always have one after lunch and dinner- not sure how I'll break that habit. Caitlin's gone back home, so its easier to keep the house smoke free. Even Ryan says it smells a lot better. xx

19

This week Megan has:

- Recognised times when she is at risk of smoking (after meals)
- Changed her routine
- Prepared her home to be a no-smoking zone (cleaned and removed ashtrays)

20

## Week 15

Your baby is now the size of an apple



Fingernails are starting to develop

21

Quit day tomorrow ☺! I've posted on Facebook and got loads of support already. I've bought lollipops to take into work with me. I'll be at work so hope it's a busy day. I've started a quit jar too keep all the money I've saved from not smoking in it. I'll buy stuff for the baby with it. xx

22

I've done it! ☺ ☺ ☺ Nearly had one though when mum phoned work to check up on me – again! I'll keep myself busy tonight tho – the dog needs walked and Ryan has left me all the washing to do ☺! **Have you managed to quit?** just text 'help' if you need support. xx

23

Today was a nightmare. Had to keep reminding myself that I need to get through the first 3 days before it gets easier. Didn't help that the girls at work were joking that everyone should avoid me cos I'm in a mood. Thought they might be more supportive. xx

24

Jenny and Michelle are asking me why I'm being so snappy at work. They would be like that too if everyone was getting at them. Nobody's even asked how I'm feeling with the pregnancy. Been sitting in the office with Mark at break times because we're both avoiding the smokers. xx

25

This week Megan has:

- Quit on her quit date!
- Started a 'quit jar'
- Used past quitting experiences to help her
- Used distraction techniques (lollipops, cleaning, walking the dog)
- Avoided situations where people are smoking

26

### Week 16

Your baby is the size of an avocado



...his or her joints and limbs can move

27

One week without cigarettes! woohoo! Going to order a pizza tonight as a treat. I posted on Facebook that it was a week and everyone was really supportive. Not even a like from Caitlin though – think she's jealous. xx

28



Ryan is STILL moaning about having to smoke outside and that I wasted money on pizza. I've told him its his baby too and asked him how he would feel if anything happened because he wouldn't help me quit. xx

29

Work has been rubbish. Mark is ok to take breaks with but not the same as having a gossip with the girls. I've asked Jenny and Michelle to go to the cinema tonight though. Don't want to see Ryan tonight anyway, he's just annoying me at the moment. xx

30

- This week Megan has:
- Rewarded herself after a week of no smoking
  - Tried to persuade her partner to help her quit
  - Arranged to meet friends in a non-smoking environment

31



32

I hardly ever see the girls at work anymore. They are going to Jenny's house tonight but I don't want to go if they'll all be smoking. I was so tempted tonight but I called the Smokeline on 0800 123 1044 and they really helped me. A few deep breaths usually helps too! xx

33

Went shopping with Jenny today. At least she's making the effort to see me. Came home to the house stinking of cigarettes. I'm raging with Ryan! Caitlin had been round and he didn't want to tell her to go outside cos she's pregnant. What about me!?! xx

34

Phoned Caitlin today because I don't want to fall out. I think she's jealous that I've quit and it's harder for her because she's on her own looking after her daughter. I said that I'm not judging her – if she wants to smoke it's up to her but I'll help her if she wants to quit.

35

This week, Megan has:

- Phoned a smoking support line
- Avoided a situation where people were smoking

36

## Appendix 21: Indexing (Study 2)

	Perceptions of storyline and characters	Acceptability	Language	Images	Interactivity
Steph	<p>Found story interesting 8</p> <p>Thought Ryan was unsupportive 12</p> <p>Good to see how someone else (Megan) is feeling and can identify with her 12</p> <p>Thinks she will be going through the same stages as the character 16</p> <p>Characters reminded her of people she knew. Thought they were believable 28</p> <p>Related to Megan wanting a cigarette at mealtimes 64</p>	<p>Would be good to know that help was available doesn't know if it would make her stop 32</p> <p>Would interact with the intervention 34</p> <p>Liked that it was current (e.g. mention of Facebook in story) 36</p> <p>Thinks the intervention is a great idea 74</p>	<p>Language was quite basic but it doesn't matter because she understands it needs to be appropriate for everyone 38</p> <p>Language used is similar to that she sees younger friends using on Facebook 66</p>	<p>Liked the images, thought they were encouraging 18</p> <p>Thought the images made the baby and size of the baby seam more real 20</p>	<p>Likes that you can text for help when there is nobody around or tempted to buy cigarettes. 1 5</p>
Danielle	<p>Thought the story was very realistic 8</p> <p>Thought the way that Megan dealt with things and learned was interesting 22</p> <p>Had not thought of keeping a diary before 32</p>	<p>Thought the intervention was good 2</p> <p>Didn't dislike anything 58</p> <p>Would never phone a Smokeline but would like to text Megan for help 76</p>	<p>Language is similar to how she would text and is appropriate 36</p> <p>Sends emoticons/smiley faces all the time 38</p>	<p>Hadn't realised how quickly a fetus can grow 42</p> <p>Thought images were interesting 44</p> <p>Didn't realise how much a fetus grew in a week 46</p>	<p>Would want to text Megan back and receive a reply 68</p>

				Has seen the fruit size comparison before 52  Thinks images could be helpful 49	
Lucy	Thought the story seemed real 10  Related to Megan not wanting to be around other people smoking 12  Followed the storyline and it was realistic 14  Megan was somebody you could relate to. She struggled and then worked out the right thing to do 20  Thought there were things in the story that had happened to her e.g. finding it hard when people went on smoke breaks at work 22  Messages were comforting even though Megan is a virtual person. Good to have someone going through the same things as her.64	Thought the intervention was quite good 2  Liked the summary messages particularly 18  Thought the messages would be useful because Megan is demonstrating how to avoid having a cigarette 24  Thought even the summary messages on their own would be useful 32  Nothing that she disliked 58  Thought it would be good for someone who didn't have anyone to talk to 64	Uses emoticons 52  Thought the language was find for her but women in their 30s might not be as interested 62	Liked the images. Has looked at similar images in past pregnancy. Was good to know size of baby. 54  Good to have images that you don't need to pay for 56	Wondered if it would be a conversation 2  Felt that she would want to reply to the messages 6  Might want to have a conversation 8  Some of Megan's messages seem like they should be replied to 40  Should be a two way conversation 44  Feel like you should respond 48  Messages should be a two way thing 78
Jess	Thought the story was good 22	Found the whole story a bit much but thought that the images and bulleted	Thinks that it would be helpful for people who	Found the pictures helpful, has seen them before 14	Not sure that she would interact with

	<p>Thought that Megan's partner and friends were poisoning her situation by smoking around her 22</p> <p>Thought the story was dead on (i.e. true to life)</p> <p>Could follow the story well 30</p> <p>Thought that Megan had done well to avoid smoking situations but could have dealt with Ryan better – understands that not everyone can deal with situations well 34</p> <p>Thinks the story is true to life 54</p> <p>Thinks that she would throw Caitlin out if she came into her house and lit a cigarette 58</p> <p>She doesn't relate to Megan working because she just lazes around the house 85</p> <p>Would relate better if Megan didn't work 87</p>	<p>summaries on their won would have been good 40</p> <p>How the intervention would help her stop is though speaking to someone else who is going through the same things as her 70</p> <p>Thinks the intervention could work 74</p>	<p>didn't have problems with reading and writing 2</p> <p>Would be more readable some of the words were shorter 4</p> <p>Most words were ok, there were a few that were difficult to understand 8</p> <p>Sometimes uses emoticons depending on who she is texting 48</p> <p>Thinks there are no problems with the age of the language used 76</p>		<p>Megan because she is a quiet person 44</p>
Ashley	<p>Thinks it would be better with a real-life story 5</p>	<p>Thinks it's a good idea, especially for younger people 2</p>		<p>Strongest part for her is the pictures, they bring</p>	<p>Thinks it would be a good idea to have a live chat situation 8</p>

	<p>Is unsure whether it is based on a real life story 6</p> <p>Thinks it is true-to life because she relates to the influence of the partner – gives example of situation similar to Megan’s 6</p> <p>Likes how true to life the story is but thinks it would be better if Megan was based on a real person or people were told that she was. 12</p> <p>Would have bought into it more if she was told Megan was real 12</p> <p>Megan would be more powerful if she was based on a true story 14</p> <p>Only reason she didn’t think Megan was real was because she had an idea at the start that she was a caricature 16</p> <p>Thinks Megan’s scenarios were realistic e.g. partners not being supportive, being around smokers, taking herself out of situations 16</p> <p>Could relate to all of the story but thinks it needs to be based on a real life story 18</p>	<p>People have their phones with them all the time so it’s a good way of reaching them 2</p> <p>Thinks she would need very powerful messages to make her stop 10</p> <p>Probably would have signed up for the intervention if offered 32</p> <p>Liked the summaries – especially because they helped people take things step by step in a phased approach 44</p> <p>Overall a good idea. 54</p> <p>Likes that it is a test message and liked overall idea 54</p>		<p>it to life. The size of the fruit and the baby. 2</p> <p>Likes that the pictures are real as opposed to caricature 2</p> <p>Pictures are very strong for her 8</p> <p>Thinks some negative images such as premature babies would help her stop 10</p> <p>Thinks pictures on cigarette packets are powerful and something similar to these should be sent 12</p> <p>All very well telling someone until you can visualise it – so the pictures of the baby progressing are powerful 12</p> <p>Makes it more real if you are getting up to date texts of how big the baby is getting 71</p> <p>Baby sucking thumb image made her thing ‘oh god, you know, I</p>	<p>Thinks it should be more like a support text-line as opposed to generic text messages 8</p> <p>Thinks receiving texts back would make the character seem more real 8</p> <p>Thinks it is a great idea that someone can text for help or having a help button 24</p> <p>Thinks replies from Megan would ‘bring her to life’ 42</p>
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	<p>Doesn't matter that she doesn't have the same circumstances as Megan (doesn't work) because they think she relates to is the breaking of the smoking routine 28</p> <p>Thought the story was realistic for most mums – would just need to tell them it is real 36</p>			<p>need to stop smoking' 73</p>	
Heather	<p>Confused about whether Megan is a made up character or not 2</p> <p>Liked that messages were from someone in the same situation as her 6</p> <p>Related to issues with partner continuing to smoke 6</p> <p>Thought the story was interesting 12</p> <p>Story sounds like something she has gone through – especially the relationship with her partner 16</p> <p>Relationship with partner is realistic 16</p>	<p>Liked the intervention because it seemed personal – like she was texting someone in the same situation as her 6</p> <p>Would have found the intervention beneficial 14</p> <p>Nothing that she disliked or she could think of to make it better 56</p>	<p>Thought language was appropriate because it was down to earth and not too complicated 41</p> <p>Liked language because it wasn't like a health professional texting – it was someone on the same wavelength as her. 42</p> <p>Would use emoticons 44</p>	<p>Liked images, thought they were cute 58</p> <p>Thought the hands and feet specifically seemed real 60</p> <p>The images made her realise how little and delicate the fetus is and feel more protective 62</p>	<p>Some interaction between her and Megan would be better so she has someone to vent to and speak to who would understand 50</p>

	<p>Could relate to Caitlin because she knew people who had failed to give up smoking 20</p> <p>Wonders if she would text a stranger intimate details of her personal life with partner 48</p>				
Marta	<p>Thinks the smoking status of the partner is important 15</p> <p>Relates to wanting to smoke around other smokers 23</p> <p>Thought that the story could be real 141</p> <p>Wasn't sure she could relate to the story as she was no longer smoking 143</p>	<p>Thinks that every day might be too often for a message because pregnant women are busy 3</p> <p>Thinks that a weekly message might be better 7</p> <p>Thinks the weekly summary is helpful 46</p> <p>Thinks that everybody is different so the amount of text messages that should be sent will differ 137</p> <p>Thought the intervention was far too long 171</p>	<p>Uses emoticons in text messages 29</p> <p>Thinks the story would be good if translated into other languages – but the words are too difficult to understand for non-native English speakers 157</p> <p>The names should be changed to more international names 159</p>	<p>Thinks that the pictures are good because when she starts thinking about the baby and its size she also starts thinking about the effect of smoke on the baby 13</p> <p>Thinks the pictures are definitely a good idea 135</p>	<p>Would be good to interact with other women in a similar situation – suggests a live chat 94</p>
Rachel	<p>Related to some of the story 6</p> <p>Related to Megan smoking and her friends who also smoke 8</p> <p>Thought it was quite entertaining 14</p>	<p>Liked the intervention 2</p> <p>Thinks the story would be helpful for people giving up 46</p> <p>Helpful to know that somebody has been though the same things as her 48</p>	<p>Followed the story no problem 22</p> <p>Thought the language was fine and understandable and modern enough 67</p> <p>Thought that the language might be made younger for younger people 74</p>	<p>The images make her think more about the baby 54</p> <p>Nothing upsetting about the images, she has seen similar images in books 92</p>	



	<p>Thought the story seemed quite real 16</p> <p>Thinks Megan is alright 24</p> <p>Some of the story made her laugh e.g. Megan getting stressed 28</p> <p>Can relate to the relationship with Ryan because her partner smokes but not in the house 32</p> <p>Thought that her friends wouldn't react the same way as Megan's – they smoke outside 62</p> <p>Liked that Megan set a date for quitting 94</p> <p>Relates most to Megan smoking when stressed 118</p>	<p>Liked the weekly summary 99</p> <p>Thinks that setting a quit date would work for herself 102</p> <p>Would probably participate in the intervention if it was offered 106</p> <p>Uses text messaging a lot anyway 110</p> <p>Receiving the messages would give her a jolt and make her think there is someone else going through it too 112</p> <p>Liked that she could flick back through texts to motivate herself 124</p> <p>Best to use her phone rather than be given a phone because everyone has their own phone anyway 130</p> <p>Liked the summaries 142</p> <p>Couldn't think of anything she didn't like 144</p>	<p>Didn't notice the emoticons, doesn't use them herself (speculates it is because she is older) 84</p>		
Amy	<p>Story was good for getting tips from and realising that other</p>	<p>Thought the intervention was quite useful 6</p>	<p>Thought it was clear and easy to understand. 4</p>	<p>Has seem similar images, enjoyed</p>	<p>Thinks it would be better to have a proper</p>

	<p>people are going through similar situations 8</p> <p>Related to friends smoking around her and adjusting to new status as non-smoker 8</p> <p>Thought Megan was realistic 10</p> <p>Related to Megan's situation with Ryan 10</p> <p>Related to Megan trying to break habits and found suggestions like using a lollipop helpful 24</p> <p>Liked the whole context of Megan deciding to quit, setting a date, following through and dealing with her work colleagues – thinks it is similar to what most people go through 112</p>	<p>Would never use a Smokeline – much more comfortable with texting 49</p> <p>Liked the mix of text and images 56</p> <p>Would definitely want to participate in the intervention if it was offered to her 64</p> <p>Finds it easier to text than pick up the phone, finds it difficult to speak on the phone and thinks texting is a good way of giving support 86</p> <p>Easy to text for help during the day and not take herself away from work 88</p>	<p>Thought the bullet summaries were easier to read than a lot of text 28</p> <p>Thought the way the messages were put together was really really good. 30</p> <p>Thought it was straightforward to follow and easy to understand 30</p> <p>Thought language was straightforward and easy to follow 100</p>	<p>looking at the baby progressing in size throughout the pregnancy 54</p>	<p>conversation and build up a relationship with Megan 42</p> <p>Just though texting Megan she feels that she could get to know her well and have support 42</p>
Emily	<p>The excuses Megan makes remind her of the excuses she made herself e.g. smoking because of a particular situation. 2</p> <p>Discussed various situations where she had made excuses 6</p>	<p>Thought it was good – like getting someone to come in and help you quit smoking. 52</p> <p>Realises you can't reach everybody with every message but there is generally something for everyone 90</p>	<p>Language straightforward and understandable 90</p> <p>Does not use emoticons or 'text talk' herself but gets emoticons from her friends 98</p>	<p>Visualising the stage of the baby drives you forward 74</p> <p>Negative images would make it seem more real 74</p> <p>Suggests that there should be some indication that the fetus</p>	<p>Doesn't know whether she would reply to text messages herself because she already has a friend she messages about quitting 102</p> <p>If she didn't have the luxury of a friend to text she might want to</p>

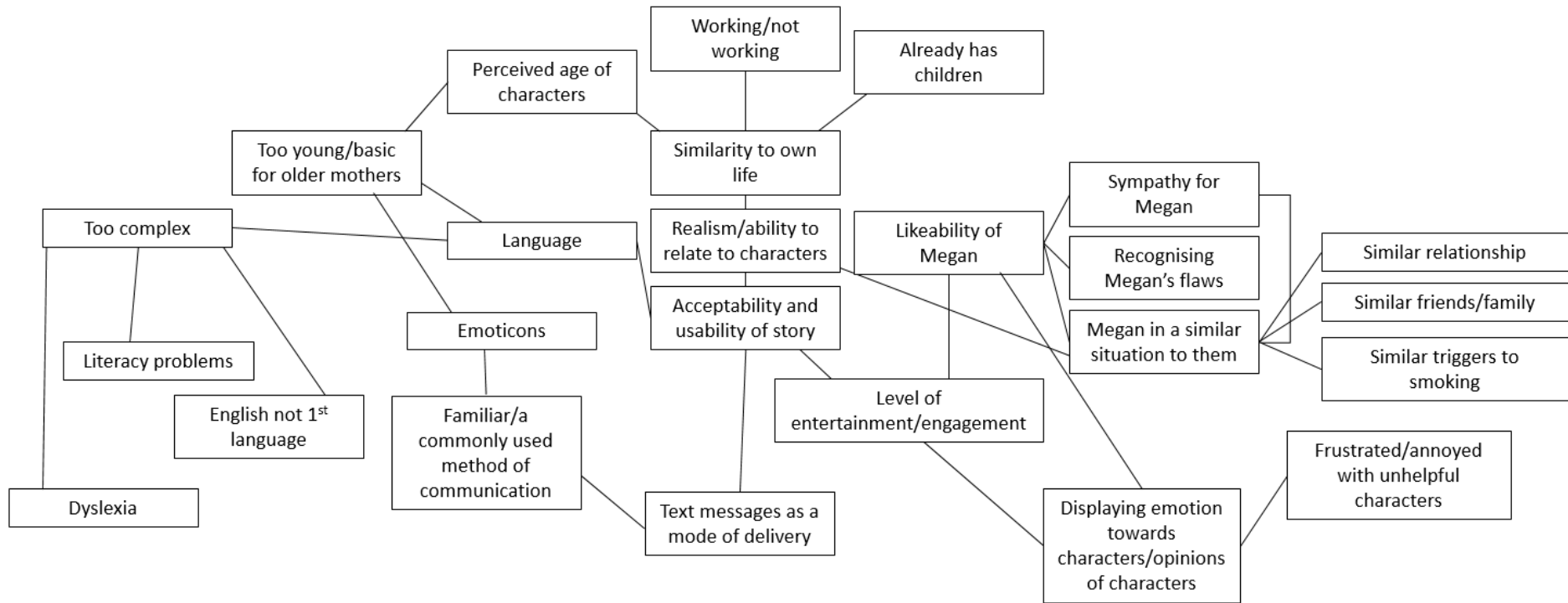
	<p>Related to the story 8</p> <p>Discussion in relation to Ryan – made her feel lucky that her partner was supportive &amp; compared her life to Megan’s (e.g. she already has children) 10</p> <p>Related to some of Megan’s triggers to smoking 16</p> <p>Didn’t agree with setting a quit date – thought you should just stop 15</p> <p>Storyline is realistic 118</p> <p>Likes that it is not plain sailing 118</p> <p>Relates to it being difficult to be around your friends 118</p> <p>Her experiences were different but she can still relate to Megan. 118</p> <p>Could see her friends sending her similar text messages to Megan’s 98</p>			<p>will only be that size if it is healthy and the mother does not smoke 76</p> <p>Should give information about how smoking affects the size of the baby 80</p> <p>Should say ‘because you have quit smoking, your baby is this size’ 85</p> <p>Images are the kind of things you see in baby books and are not enough for some people. Should be more indication that it is what she is working towards 108</p> <p>More motivating to say ‘If I wasn’t doing this there is a chance that something negative would happen to the baby 112</p>	<p>text Megan for support 104</p> <p>Wonders how a text response would work because she would want a personal response to her reply 134</p> <p>Would not want a ‘bog standard’ reply to her message because it wouldn’t be helpful if someone wants support or someone to listen to them 138</p> <p>Smokeline effective because they can respond to individual problems 140</p>
Michelle	Megan struggled but there were times when she had	Thought the intervention was like a support system 4	Could follow the story well 48	Amazing how fetus starts off as nothing and	

	<p>people to contact for help and support 6</p> <p>Liked suggestions of speaking to someone, taking a few deep breaths and using helplines 32</p> <p>Related to Megan getting frustrated with her partner. Sometimes its like talking to a brick wall 36</p> <p>Felt that Megan could have had more support from ryan and work colleagues could have been more interested. Megan should have had more support overall 68</p> <p>Could relate to the story in a way 70</p> <p>Thinks it could be a real story 72</p> <p>Megan personally managed to quit, was cutting down and set a date to quit. 91</p>	<p>Thought she might feel under pressure with a quit date 46</p> <p>Would sign up for the intervention 73</p> <p>Hasn't got support because no family around and only has husband and children. Friends lead different lives 78</p> <p>Wouldn't personally want to set a quit date in case she didn't meet her target 91</p> <p>Liked the summary text 101</p>	<p>Story easy to follow 58</p> <p>Nothing she didn't understand 60</p> <p>Uses emoticons herself depending on the conversation 62</p>	<p>progresses into a child 50</p> <p>Good to know roughly whats going on as the weeks progress 52</p>	
Kate	<p>Wanted a list of reasons to quit smoking 1</p> <p>Wanted to hear about the benefits to the baby – the things that would improve if she stopped smoking 15</p>	<p>Likes that you have the option if you want to text or not 128</p> <p>Getting a text during the day and feeling like you can</p>	<p>Emoticons and kisses are for younger people 78</p>		<p>Would like to text back if she was having a bad day and struggling – it would be easy to text and get advice to support and motivate you. 132</p>

	<p>Megan seems like a young mum because of the way she speaks and the people around her are immature. 72</p> <p>Relates to people discouraging Megan 98</p> <p>Liked the positive things that work e.g. distraction techniques, phoning Smokeline etc 116</p> <p>Thinks Megan could talk about her pregnancy more so that she could relate to her better – because the thing the women all have in common is that they are pregnant 138</p> <p>Megan doesn't talk about what makes her want to quit 162</p> <p>Thinks Megan should explain that she didn't realise how dangerous it was to smoke when pregnant until the midwife told her. Information about the risks of smoking during pregnancy should be included in the storyline. 166</p> <p>Thinks the story is relatable, and information about the risks would increase the success of this. 170</p>	<p>keep going is motivating and helpful 130</p> <p>Is a nervous person and doesn't like phoning but feels comfortable with text messaging 134</p> <p>Thinks all pregnant women should be offered the intervention and made aware of it – because they might think they can't quit and then find out there is something new and they will try it. 158</p>			
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	The first three pages made her think Megan was immature 176				
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## Appendix 22: Mapping and interpretation (Study 2)



Images	
Positive	Negative
Some women liked seeing the progression in size	One woman did not know what an avocado was
Some women thought the images made the fetus seem more real	Some women thought that negative/graphic images would send out a more motivating/strong message.
Some women reported feeling more protective towards the fetus.	One woman suggested that demonstrating the healthy size of a fetus should be linked to the fact that the mother is not smoking.
Some women felt that the images helped them visualise the fetus.	



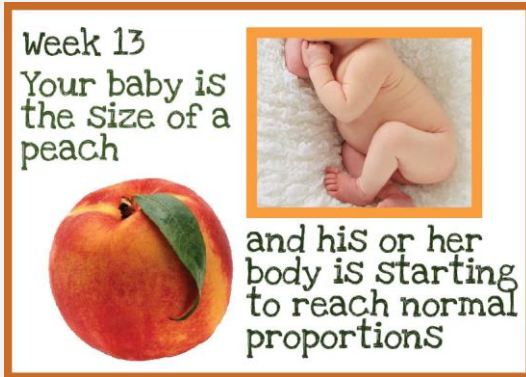
## Appendix 23: The final intervention content

Week of intervention Week of Pregnancy	Text message content (to a participant called Jane)	Interactive response.
<p><b>Week 1</b> <b>12 weeks pregnant</b></p> <ul style="list-style-type: none"> <li>• Pregnancy information               <ul style="list-style-type: none"> <li>○ Breasts bigger.</li> </ul> </li> </ul> 	<p>Hey Jane, My name is Megan and I'm 12 weeks pregnant. Had my first scan today too! My midwife gave me loads of advice on how to look after myself and the baby. I've set a date to quit smoking for three weeks today. Maybe we could help each other? Xx</p>	
	<p>Hi Jane, I showed my boyfriend, Ryan, the scan photo and he thinks it looks like a potato. I'm going to cut down on cigs from today. I've never quit for longer than a month before so I'm a bit nervous! xx</p>	
	<p>Hi Jane, Me and Ryan took my mum the scan pic. She wasn't happy when I told her I was pregnant but when she saw the pic she got really emotional. Still got nagged for not telling her about the scan though. Do you smoke too? xx</p>	<p>If yes: 'Great, we can quit together! Why don't you set the same quit date at me?'</p> <p>If no: 'Well done! I know it's not easy but we can do it together!'</p>
	<p>Hi Jane, I'm back at work tomorrow. Totally dreading it after a week off on holiday. I'll need to tell my boss I'm pregnant – not sure how he'll take it. I've started writing a diary of when I usually smoke during the day. It was a lot today! xx</p>	
	<p>Hi Jane, Work went ok – my friends, Jenny and Michelle already knew I was pregnant and Mark, my boss, was great about it. His wife's pregnant too. Smoked 15 cigarettes today. Mostly after meals and on my work breaks with the girls. xx</p>	
	<p>This week Megan has:</p> <ul style="list-style-type: none"> <li>• Decided to quit</li> <li>• Set a quit date</li> <li>• Started a smoking diary</li> <li>• Recognised times she is likely to smoke (on breaks at work, after meals)</li> </ul>	

**Week 2**

**13 weeks**

- Pregnancy information
  - Feeling less sick



Hey Jane, At work today, Mark said he was going to quit smoking because of his wife's pregnancy. I told him about my quit date and he's going to quit on the same day. I told the girls too so they are prepared for my moods! I'm always grumpy the first 3 days after I quit. xx

Hey Jane, Told Ryan about Mark quitting for his wife. He'd never do that for me ☹️. Still smoking a lot. I'm gonna make the house a no smoking zone when I quit so he'll get a shock! Down to 6 Cigarettes a day now. Proud of myself! Hope you are doing well too. Remember to text 'help' if you need some support. xx

Hey Jane, Ryan's sister, Caitlin was round the house today. She's just broken up with her partner and she's pregnant too – a few weeks ahead of me. Don't know how I would cope if I was her. Back up to 15 fags today because I had one every time Caitlin did ☹️. Have you set a quit date? xx

If yes: I think it's a really good way to quit. Plenty of time to prepare for it too. Hope we can help each other! xx

If no: There are lots of different ways to quit. You've got to find the way that's best for you. The midwife said lots of pregnant women just stop suddenly. xx

Hi Jane, Caitlin reckons if I quit smoking I'll stress the baby out. Phoned the midwife and she said that's not right. The baby won't have any bad effects and its nicotine withdrawal (not stress) that I'll be feeling. There's no telling Caitlin though ☹️ xx

This week Megan has:  
Found someone to quit with her  
Cut down in preparation for quitting  
Told people about her quit plans  
Recognised cues to smoking (e.g. being with friends who smoke)

**Week 3**

**14 weeks**

- Pregnancy information
  - Mother feeling a little forgetful.



Hey Jane, Caitlin's staying at ours so it's difficult to cut down ☹️. I made a list of the reasons why I want to quit today. I'll save it onto my phone so I can look at it whenever I feel tempted. Remember if you are struggling you can always text 'help' to me. xx

Hey Jane, I scrubbed the house clean today and took all the ashtrays outside when Caitlin left. Told Ryan we're not smoking inside anymore and we had a massive fight. Don't care. Told him its his baby too so he's got to take some responsibility. Do you have a partner? xx

If yes: I hope he's better at helping you than Ryan! If not, tell him that you can't quit without his help and you are quitting for the good of his child! xx

If no: Things can be hard if you are going through pregnancy alone. I hope you've got lots of support from friends and family but if not, you can always text 'help' or speak to your midwife about ways to get more support. xx

Hey Jane, Ryan's a total waste of space, I caught him and Caitlin smoking in the kitchen this morning. Was doing so well - I decided to wait til I was at work to have a smoke but needed one after dealing with him. Going to try again tomorrow. xx

Jane, I didn't smoke til lunch break today! Yes! Always have one after lunch and dinner- not sure how I'll break that habit. Caitlin's gone back home, so its easier to keep the house smoke free. Even Ryan says it smells a lot better. xx

This week Megan has:

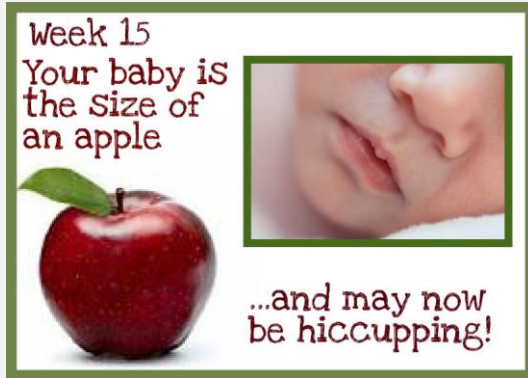
Recognised times when she is at risk of smoking (after meals)

Changed her routine

Prepared her home to be a no-smoking zone (cleaned and removed ashtrays)

**Week 4**

**15 weeks**



Hey Jane, Quit day tomorrow ☺! I've posted on Facebook and got loads of support already. I've bought lollipops to take into work with me. I'll be at work so hope it's a busy day. I've started a quit jar too keep all the money I've saved from not smoking in it. I'll buy stuff for the baby with it. xx

Jane I've done it! ☺☺☺ Nearly had one though when mum phoned work to check up on me – again! I'll keep myself busy tonight tho – the dog needs walked and Ryan has left me all the washing to do ☹! just text 'help' if you need support. xx

Hey Jane, Today was a nightmare. Had to keep reminding myself that I need to get through the first 3 days before it gets easier. Didn't help that the girls at work were joking that everyone should avoid me cos I'm in a mood. Thought they might be more supportive. Have you managed to quit? xx

If no: That's ok, it really is hard but you will be through the worst in only 3 days! The earlier you quit the better it is for your baby but its never too late!. xx

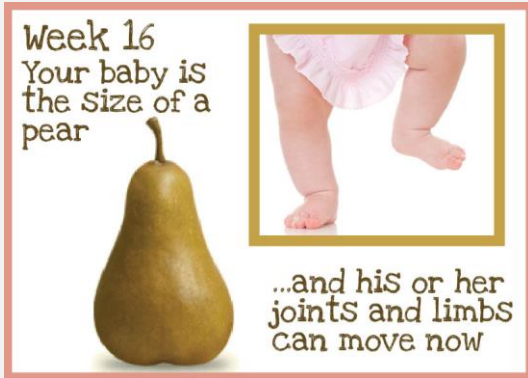
If yes: Yay!! Well done! We can do this together. I'm so proud of us ☺ xx

Hi Jane, Jenny and Michelle are asking me why I'm being so snappy at work. They would be like that too if everyone was getting at them. Nobody's even asked how I'm feeling with the pregnancy. Been sitting in the office with Mark at break times because we're both avoiding the smokers. xx

This week Megan has:  
Quit on her quit date!  
Started a 'quit jar'  
Used past quitting experiences to help her  
Distracted herself from smoking (lollipops, cleaning, walking the dog)  
Avoided situations where people are smoking

**Week 5**

**16 weeks**



Hey Jane, One week without cigarettes! woohoo! Going to order a pizza tonight as a treat. I posted on Facebook that it was a week and everyone was really supportive. Not even a like from Caitlin though – think she’s jealous. xx

Hey Jane, Ryan is STILL moaning about having to smoke outside and that I wasted money on pizza. I’ve told him it’s his baby too and asked him how he would feel if anything happened because he wouldn’t help me quit. Do you post about your quitting on facebook or anything like that? xx

If yes: It’s a great way of getting a lot of support really quickly Isn’t it?! Its so hard to give up smoking xx

If no: Its fine if you don’t want to but I always feel great about myself when everyone says well done! xx

Hi Jane, Work has been rubbish. Mark is ok to take breaks with but not the same as having a gossip with the girls. I’ve asked Jenny and Michelle to go to the cinema tonight but they were busy. Don’t want to see Ryan tonight anyway, he’s just annoying me at the moment. Remember to text ‘help’ if you need some support. xx

This week Megan has:  
Rewarded herself after a week of no smoking  
Tried to persuade her partner to help her quit  
Asked to meet friends in a non-smoking environment (cinema)

**Week 6**

**17 weeks**



I hardly ever see the girls outside work anymore. They are going to Jenny's house tonight but I don't want to go if they'll all be smoking. I was so tempted tonight but I called the Smokeline on 0800 123 1044 and they really helped me. A few deep breaths usually helps too! Xx

Hey Jane, I text Michelle earlier and we went shopping. At least she's making the effort to see me. Came home to the house stinking of cigarettes. I'm raging with Ryan! Caitlin had been round and he didn't want to tell her to go outside cos she's pregnant. What about me!? I've told both of them I don't want it happening again. Does anyone smoke in your home?  
xx

If yes: It makes it harder trying to quit doesn't it? Could you ask them to go outside because you are pregnant? If you can't get them to stop things will be harder but you are stronger than them and you can quit! xx

If no: That's great that you have a place to relax without the smell of smoke around! Makes it a bit easier to quit when you know you would have to go outside to smoke! xx

Hi Jane, Phoned Caitlin today because I don't want to fall out. I think she's jealous that I've quit and it's harder for her because she's on her own looking after her daughter. I said that I'm not judging her – if she wants to smoke it's up to her but I'll help her if she wants to quit. Remember to text 'help' if you need some support. xx

This week, Megan has:  
Phoned a smoking support line  
Made sure her house is a smoke free zone  
Avoided a situation where people were smoking

**Week 7**

**18 weeks**

**Week 18**

**Your baby is the size of a Sweet potato!**



**and is now yawning!**

Hey Jane, It's been three weeks now! Not even one cigarette. I counted the quit jar money and it's loads more than I thought – maybe you could count yours too if you have one? Midwife said the baby would start moving any time from now but it might not be for a few weeks. Caitlin's been round today too – she's still smoking and I'm not giving her a hard time for it but wish I knew how to help her quit. xx

Hey Jane, Huge fight with Ryan again today. Apparently I'm a nightmare. I'm pregnant and I've just given up smoking – for the good of HIS baby! I'd like to see him do that. Phoned Jenny and ranted down the phone at her for ages. Poor girl – but I feel a bit better! Do you have someone you phone when you are stressed? xx

If yes: Its really good to get your feelings out – otherwise you might find you get more stressed by bottling them all up and end up having a cigarette! xx

If no: Its good to get your feelings out – you will be surprised how much better you feel! Call a friend, relative or the Smokeline maybe?

Hi Jane, I was trying to help Caitlin by giving her advice about how to quit, but she didn't like any of my ideas. I know she can't go out for walks or some of the things I do because of her daughter, but she could always play with her daughter or something to take her mind off smoking. Remember to text 'help' if you need some support. xx

This week Megan has:

- Phoned a friend to relieve stress instead of smoking
- Tried to provide support for Caitlin to give up smoking

**Week 8**

**19 weeks**

**Week 19**

Your baby is the size of a mango!



Hair is starting to grow

Hi Jane, Woke up with horrible leg cramps in the night and Ryan was moaning because I woke him up, this pregnancy thing isn't easy! A cigarette would be great right now but I'm staying strong. I look at my scan picture a lot and it makes me feel better. Remember to text 'help' if you need some support. xx

Hi Jane, I have got used to taking my breaks at work with Mark now and he was telling me the things he does to help him quit – like drink a glass of water. I've been feeling a bit breathless recently and I'm sure my eyesight is a bit blurry. Phoned the midwife and she said its normal for this stage in the pregnancy. Have you had any strange pregnancy symptoms? xx

If yes: Its weird isn't it?! Every time something happens, it reminds me that I have this little person growing inside me! xx

If no: Lucky you to have a tiny person growing inside you without any strange things happening! My midwife said the baby might start moving any day now, so watch out for that! xx

Hi Jane, I felt the baby move! It was like a little flutter in my belly, such an amazing feeling. Shame I was on my own when it happened because Ryan was in the pub. Ryan is going out again tonight, I've told him he'll need to stop this when the baby comes. No way am I sitting in every night on my own. Needed a few deep breaths to calm down after he left. xx

This week Megan has:

- Looked at her scan picture to remind herself of why she quit.
- Got quit smoking tips from a friend
- Use deep breaths to calm down



**Week 9**

**20 weeks**



Hi Jane, Ryan didn't come home last night. Where is he?! I've phoned everyone who might now. Michelle said they saw him in the local but he seemed fine. I'm going mad! Had a cigarette but that is the least of my worries. xx

Hey Jane, So Ryan finally came home and says he passed out on a mate's couch on Saturday. Can't believe I was worried about him and he's made me start smoking again. I told myself it would just be the one to calm down yesterday but I can't stop now. Have you smoked a cigarette this week? xx

If yes: That's ok, lots of people find it difficult to quit. If you stop now, you will be over the worst in 3 days and you will be giving your baby the best start!  
xx

If no: That's great, good for you! Don't make the mistake I made by having just one. It never really is just one! xx

Hi Jane, Stayed at my mums last night. I think it scared Ryan because he has said he's really sorry and going to make more of an effort now. I've heard that before but can't stay at mums any longer because she's doing my head in. Remember to text 'help' if you need some support. xx

Hi Jane, Mum's giving me a guilt trip cos she knows I'm smoking again. She said that dad would have been disappointed in me. How dare she be so insensitive?!? I'm so upset with her and I've smoked more than ever today. Hope you are having a better time! xx

This week, Megan has:

- Had a cigarette because of a stressful situation.
- Smoked more because of the first cigarette.
- Been feeling guilty which has made it harder to stop again.

**Week 10**

**21 weeks pregnant**

**Week 21**

Your baby is the size of a pomegranate!



..and can now blink

Hi Jane, It's terrible but I've stopped answering the phone to my mum cos all she does is nag me about quitting. She thinks she's helping but it's just making me feel worse. Woman in the street was giving me dirty looks today. How dare she? It's not like I don't feel bad enough already without her judging me. I could be doing a lot worse! xx

Hi Jane, I keep thinking 'I'll just have one last one' but it never is. Only smoking half of what I used to, but when I spoke to the midwife she said that doesn't really help, the baby is still getting smoke. Do you have a good relationship with your midwife? xx

If yes: Midwives are great aren't they?  
Mine says I can talk to her about whatever I want but she doesn't push me because she knows that

If no: Remember there are lots of other health professionals who can help you – your GP or smoking cessation specialists for example (you can ask your midwife to be referred to them)

Hi Jane. Back at work the girls didn't say anything about me smoking again, they seemed quite pleased that I could spend my breaks with them and gossip again so that made me feel better. I feel a bit bad about not taking breaks with Mark anymore but he was really nice about it and said he understood how hard it was. Maybe I could just cut down instead of quitting totally – it can't be good for the baby me feeling so guilty. Remember to text 'help' if you need some support. xx

This week, Megan has:

- Been avoiding people who might be able to help her give up again.
- Started getting back into bad habits (smoking on her break at work)
- Cut down on cigarettes
- Tells herself that only smoking a few is ok (even though she knows it is not true)

**Week 11**

**22 weeks pregnant**



Second scan tomorrow! Can't wait to find out the sex of the baby! As long everything is ok, I don't mind too much what we are having but I'm secretly hoping for a girl. I don't want to tell my midwife I've started smoking again though ☺ xx

I burst into tears after the scan. It was so amazing to know everything is ok. We are having a boy! Was kind of hoping for a girl but Ryan was so happy that I didn't mind. He's even gone and phoned his mum to look out his old football from when he was wee. The midwife was great when I told her I started smoking again, totally understood and we had a good chat. She did say that cutting down was better than nothing but any amount of smoke is still not good for the baby. Hope everything went well with your scan. Did you find out the sex? xx

If yes:  
Ooh how exciting! I feel like I know my baby a little better now I know it's a he!

If no:  
Oh that's lovely, you will have a nice surprise to look forward to after the birth!

Decided to try and quit again. I always thought that nicotine gum and spray wasn't safe to use when I'm pregnant but the midwife says it's much better for baby than me smoking. I can even get it for free! Ryan has helped me throw out all the lighters and ashtrays in the house and promised to never smoke inside again. Remember to text 'help' if you need some support. xx

This week Megan has:

- Used Nicotine Replacement Therapy because it is safer for the baby than smoking.
- Seen her baby on the scan and become more determined to quit.
- Thrown out anything that might remind her of smoking
- Got some support from Ryan which makes it easier to quit.

**Week 12**

**23 weeks**

- Pregnancy information
  - Linea nigra



Hi Jane, Quit day take 2 today! I woke up and had some of the chewing gum. Will have some after each meal too. Started the quit jar again. Work is really busy at the moment so that took my mind off it too. Me, Michelle and Jenny work really well as a team - I miss spending time with them out of work. xx

Hi Jane, Every time I want a cigarette I look at my scan picture and remember who I am doing this for – the baby and for me! I've got Mark to do the same with his wife's scan. I've managed 2 days now. Wish I hadn't started again because I've got to go through the withdrawal again. Have you had a cigarette recently?

If yes: It's really hard to stop again Isn't it? I know you are strong and can do this! Text 'help' if you need extra support. xx

If no: That's fantastic! Well done. Be very proud of yourself! Why don't you post about how well you've done on facebook? xx

Hi Jane, I came home from work and Ryan had cleaned! A miracle! He ran me a bath and told me to relax. He knows me too well because I was in a foul mood before that. Also, I cried at something I watched on TV today. Never normally do that! Ryan was laughing at me. Remember to text 'help' if you need some support. xx

This week Megan has:

- Got some support from her boyfriend
- Used her scan photo to reminder why she quit
- Re-started the quit jar
- Used nicotine chewing gum
-

**Week 13**

**24 weeks**



Hi Jane, Mark's wife, Hannah, came into work today to drop something off for him. We ended up chatting for ages about babies. Her due date is only 2 days after mine! She told me that meat makes cigarettes taste better and food like cheese, fruit and veg make it taste worse! Not sure if it will work but I'm ordering a veggie pizza tonight!

We've been talking about names- I've told Ryan its really my decision cos I've done all the hard work. He wants to use his dad's name – Colin. I've said a big no to that! My belly button has popped out, it looks really odd! Have you decided on a name?

If yes: I think picking a name makes Ethan seem a bit more real! I can imagine him running around kicking a football now 😊 xx

If no: Plenty of time for that. Some people don't even decide til after the birth. Think about when you first meet your baby – maybe you'll just know! xx

Hi Jane, I was thinking about how quitting will be good for me and not just the baby - I'll smell better, won't get as many wrinkles, my teeth will be much healthier. Its given me loads more confidence already! My aunt has smoked all her life and her teeth look really yellow – she's even got yellow fingers. I don't want to end up like that! Remember to text 'help' if you need some support. xx

This week Megan has:

- Been thinking a lot about her baby.
- Thought about the positive effects of quitting on her looks.
- Found out that avoiding meat may help with cravings.

**Week 14**

**25 weeks**

Week 25  
Your baby is the size of  
an ear of corn!



...and is getting chubby!

Hi Jane, Finally we've decided on a name that we both like – Ethan. Not even telling mum I've decided on a name because I just know she'll hate it! I didn't tell Michelle and Jenny either although I was dying to at work! Mark and Hannah didn't find out the sex of their baby. Had some bad cravings after work – I have downloaded a new game on my phone and am playing that to keep my hands busy! xx

Hi Jane, I hope you are finding it easier to sleep than me! What position am I supposed to lie in?! Doesn't help that I stopped using the nicotine gum and have switched to normal chewing gum to keep my mouth busy. I've thought a lot about what the baby will look like. Have you?xx

If yes: I wonder if your baby will look like you! xx

If no: I find it so exciting to think about his tiny hands and feet – and who he will look like! (me hopefully!) xx

Hi Jane, I felt so sleepy at work today. Mark noticed and sent me home early so I could have a nap before antenatal class. Ryan has been singing this song to the baby for weeks now. It's so out of tune and terrible but the baby kicks like mad every time! It's crazy that he can hear us from in there.xx

This week Megan has:

- Avoided stress (by not talking to her mum about the baby's name!)
- Kept her hands busy when she had a craving
- Thought a lot about the baby
- Switched from nicotine gum to normal chewing gum

**Week 15**

**26 weeks**



Hi Jane, you won't believe it, I'm such a mug. Ryan's admitted to me that he stayed over at Jenny's house the night he disappeared! Says that he was really drunk, she persuaded him to come back for a drink and nothing happened. I told him to get out, don't know where he's gone and I don't care. Can't stop crying – everything was great yesterday. xx

Hi Jane, Jenny says that Ryan insisted on coming to her house and she didn't want to leave him alone in his drunken state but then he was all over her. She says he begged her not to tell me so she didn't. Not sure what to believe! I've told them both to never speak to me again. I'm a bit calmer today. I won't let that idiot make me start smoking again! I know what happens when I just have one. Taking deep breaths helps me calm down. Have you had a cigarette this week? xx

If yes: Don't worry. Lots of people slip up. Remember that one of the best things you can do for your baby over the next 13 weeks is give up. There is lots of support out there. xx

If no: Well done! That's fantastic! You have so many reasons to keep going. Just remind yourself of them if you are ever struggling.xx

I text Mark to tell him I needed a few days off. I went to see Caitlin today, she's as annoyed with her brother as I am but thinks I should give him a chance. Took my nicotine gum with me in case the smell of her smoking set me off again! Remember to text 'help' if you need some support. xx

- This week Megan has:
- Made a plan for a situation where she might smoke (took nicotine gum out with her)
  - Dealt with a stressful situation without smoking
  - Remembered that one cigarette leads to more

**Week 16**

**27 weeks**

Week 27  
Your baby is the size of  
a cauliflower



...and may now be dreaming!

Hey Jane, Spoke to Ryan on the phone – he says he only told me because things were going so well and he didn't want us to have any secrets. I almost believed him – almost! I'm gonna have to move back in with my mum cos it's Ryan's flat I'm living in now. xx

Hi Jane, I know I should be grateful that I have somewhere to live but living with mum is a nightmare. She watches what I eat, what I drink, how late I stay up. Today I had a bacon sandwich and she searched online to see if it was bad for the baby! Aargh! Is anyone annoying you like this?.xx

If yes: I know I should calmly talk to her but its hard isn't it? I promise next week I will sit down and tell her how I feel and ask her for a bit of help. xx

If no: That's good! Its so frustrating but I know I'm not helping things by snapping at her. xx

Hi Jane, Sounds silly but I've started drinking herbal tea. Green tea or chamomile is my favourite – I didn't realise how many kinds of tea there are!! heard that the baby might be able to dream now. I wonder what he's dreaming about – hopefully he's having a better sleep than me. I need to go back to work this week. Don't know how I'll cope seeing Jenny. xx

. This week, Megan has:

- Moved into a non-smoking home
- Kept herself busy
- Been drinking tea instead of smoking



**Week 17**

**28 weeks**

Week 28  
Your baby is the  
size of a turnip!



...his or her lungs  
nearly developed

Hi Jane, Things at work are horrible! Michelle is being ok with me but doesn't want to take sides. I'm ignoring Jenny so I don't see them much at work. I can see them outside chatting. Its not much better at home. Mum's just nagging at me all the time. Doesn't feel like I have anyone to talk to. I called the SmokeLine because I got really tempted – they told me to make myself busy for 5 minutes while the craving passes. xx

Hi Jane, Hannah (Marks wife) text me to ask how I was doing which was really sweet. She wants to meet up and go shopping together. I think Mark must have told her what happened. The lift is broken at my mums place – I'm so out of breath by the time I get up to her door..xx

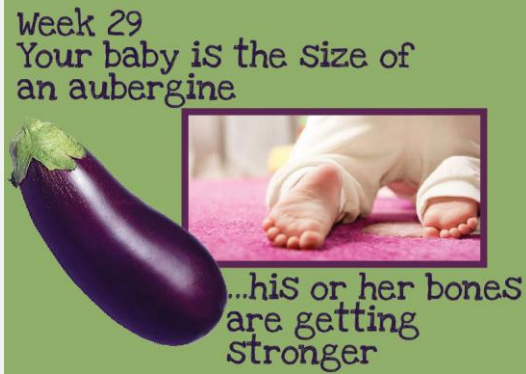
Michelle told me its not Jenny's fault and she was just looking out for Ryan. Even if that was true she still lied to me! The midwife said that I would feel the baby move any time from now. Thought I felt it earlier but probably just my dodgy stomach! The baby doesn't like it when I eat curry apparently! Remember to text 'help' if you need some support. xx

This week, Megan has:

- Waited 5 minutes for a craving to pass
- Phoned the Smokeline
- Made a new friend she can spend time with without smoking
-

**Week 18**

**29 weeks**



Hi Jane, Its now been 10 weeks since I stopped smoking. Can you believe it? I can't believe what I used to spend on cigarettes! I've now got a lot of money sitting in the quit jar. I never ever thought I would get that far. I went shopping for some baby clothes with Hannah today. When I got home, mum kept asking me how much everything cost and just made me stressed again. xx

Hi Jane, I sat down with mum today and told her that I've had a difficult time and really need her support – not to be told what to do all the time. I think the fact she's never smoked means she doesn't understand. Have you had a cigarette this week? xx

If yes: It will still do your baby lots of good if you give up now. You could contact your local stop smoking group. It might be scary but they know what you are going through and will be able to help. xx

If no: Wow! That's fantastic! Keep going xx.

Its really nice spending time with Hannah, but I don't feel like I know her well enough to have a good proper gossip with yet (especially because she's my boss' wife!). I miss being close to Michelle and Jenny. Things are a bit better with mum though, I think she really listened to me yesterday. xx

This week, Megan has:

- Added up her quit jar savings
- Thought about how far she has come
- Asked her mum for help
-

**Week 19**

**30 weeks**

Week 30  
Your baby is  
the size of a  
cucumber!



...his or her skin is getting  
Smoother

Hi Jane, just to let you know I was with Caitlin earlier and her waters broke early. It was so scary. Didn't know what to do so I phoned Ryan and he took us to hospital. Caitlin has had her baby, she's really tiny but the doctors say she's got a good chance. It was weird speaking to Ryan without fighting. He was really great with Caitlin and calmed her down. xx

Hi Jane, Caitlin's called her little girl Lily. Ryan phoned and said she's still hooked up to lots of tubes and a machine is helping her breathe but they think she will be ok. He asked if we could talk and I said I would think about it. I am still upset with Michelle but I called her anyway because she's one of the people that knows me best and we had a really good talk. Didn't mention Jenny at all though.. xx

Hi Jane, Mum came with me to a hospital appointment – she started telling me what I should wear and then stopped herself! She's actually been great. This is all wrong though, it should have been Ryan coming and getting excited with me. How can I trust him again? Remember to text 'help' if you need some support. xx

This week Megan has:

- Used her mother as support
- Told a friend how she was feeling

**Week 20**

**31 weeks**

**Week 31**  
**Your baby is the size of a**  
**pineapple!**



**...and can taste and**  
**smell things**



Hi Jane, I went to the hospital to see Caitlin and Lily. Looks like Lily will be in there for a few weeks at least. Poor Caitlin will struggle with childcare and getting to see Lily but I'll help as much as I can. It will be good practice! Mark said I can have as much time off as I need. xx

Hi Jane, hope you are doing well and the bump is growing like mine! I told Michelle about Caitlin and her baby at work because we were on shift together- she was really supportive and I thought maybe we were getting close again but then I saw her and Jenny leaving together after the shift. xx

Hi Jane, had a really long talk with Ryan last night and we've decided to give things another go. I'm still not sure I believe him but he's promised that he's changed and he realises that he wants to be with me and the baby. I told him all the things I would need from him to help me. xx

This week Megan has:

- Imagined what her baby will be like
- Kept herself busy by babysitting
- Told Ryan about the support she will need

**Week 21**

**32 weeks**

Week 32  
Your baby is the size of a  
bunch of leeks!



...and has developed eyebrows!

Hi Jane, I moved back in with Ryan today. He's got a lot of making up to do but I love him and we are having this baby together. He knows better than to do anything like that again. Mum told me she's glad we are giving it a try and she's right round the corner if I need to move out again.

Hi Jane, It's a long time since the last scan. I'm dying to see him again. I keep imagining what he might look like. I hope he looks like me and not too much like Ryan. I wonder if he'll have my eye colour. Have you had a cigarette this week? xx

If yes: Don't worry. Using the last weeks of your pregnancy to give up smoking will give your baby a great start! Make a plan and set a quit date. xx

If no: Great! We are doing pretty well now – It's a really good idea to start planning for after the birth to make sure you don't start again. xx

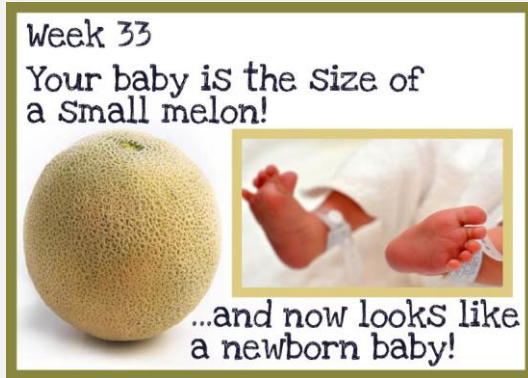
Hey Jane, I told Michelle that I'd moved back in with Ryan and she thinks I'm not being fair taking him back when I'm not speaking to Jenny still. I saw Caitlin today. Lily is so cute. Her lungs are really tiny and even a little bit of smoke could damage them. Remember to text 'help' if you need some support. xx

This week, Megan has:

- Thought about what her baby will look like
- Realised how delicate a newborn is
-

**Week 22**

**33 weeks**



Hi Jane, Michelle is really not being fair! She is stuck to Jenny like glue at work – I think they were laughing at me. I felt a bit stressed tonight so wrote a list of all the good things about quitting – tasting food better, breathing better, saving money, not having to stand out in the freezing cold in winter. Remember to text ‘help’ if you need some support. Xx

Hey Jane, Ryan bought me flowers – he’s still trying to make it up to me! Idiot! (but kind of sweet). They smell lovely – I wouldn’t have been able to smell them at all when I was smoking. I can’t eat much at the moment because I feel full. The baby must be taking up all the room in there!

Hey Jane, Midwife says that’s me full term now. The baby could arrive any minute – I just can’t wait to meet him! She also said that a lot of mums start smoking again after the birth and I should start preparing myself a bit. 2 more days of work before I’m off on maternity leave. Things still awful at work – thank goodness for Mark! I can’t wait to be out of there. Remember to text ‘help’ if you need some support. xx

This week, Megan has:

- Thought of the best things about quitting smoking
- Realised how much better things smell when she is not smoking
- Realised that lots of mums start smoking again after giving birth

**Week 23**

**34 weeks**



You'll never believe what's happened! Jenny started texts to Mark telling him she can't stop thinking about him. Hannah told me today – she's gone mad! I hadn't really spoken to Hannah about what happened with Jenny before but we now both hate her. xx

I sent Michelle a text telling her what Jenny's done but had no reply. So bored on maternity leave! Sitting around the house so much makes me want to smoke but every now and then I get a little kick that reminds me who I am doing this for! Of course I'm also saving money and looking after my own health but those are just a bonus! xx

Michelle sent me a text saying she's sorry and they all believe Ryan now and won't speak to Jenny again. No point in me staying angry with her so I said it was fine and we've agreed to meet up soon. The baby's moved position, I can breathe easier but am now waddling instead of walking! Remember to text 'help' if you need some support. xx

This week, Megan has:

- Made up with a good friend
- Thought about why she gave up smoking in the first place.

**Week 24**

**35 weeks**



Aw, had a lovely surprise today. Michelle and Mark had a wee surprise party for me in the staff room. A cake and loads of baby presents. So nice of them. I'm sleeping really badly at the moment. Still no Jenny at work today – too ashamed to show her face no doubt. Work was so much better without her there. xx

Hi Jane, Now I'm on maternity leave I don't know what to do with myself. I spent today packing my hospital bag. I need to remember so many things. Ryan bought me some new pyjamas and a dressing gown to wear in hospital. I can hardly fit into anything I've already got. Do you have your bag packed? xx

If yes: You are as organised as me! I heard that it's a good idea to take some earphones and something to play music on to relax! xx

If no: It's a good idea to be organised just in case! I heard that it's a good idea to take some earphones and something to play music on to relax! xx

Hey Jane, I'm trying to keep busy but I can't walk very far or bend over. I look like a whale. I got Ryan to get me some nicotine gum just in case I get tempted to smoke because there's nothing else to do! I know its not good for the baby to have nicotine but its better than giving him all the chemicals in cigarettes as well! I won't have any gum unless it's an emergency! Remember to text 'help' if you need some support. xx

- This week, Megan has:
- Realised she might be tempted to smoke because of boredom
- Got nicotine gum in case of an emergency



**Week 25**

**36 weeks**



Hi Jane, Mark and Hannah invited me and Ryan round to theirs tonight – a bit nervous cos I don't know how him and Ryan will get on because they are really different and I think Ryan might be a bit jealous that I talk about Mark a lot. xx

Hi Jane, Last night was a bit awkward at first but then Mark and Ryan found out they both like to talk about cars and then we couldn't get them to shut up! Me and Mark were saying how different everything was now – a few months ago and we'd both have been outside smoking every half hour! xx

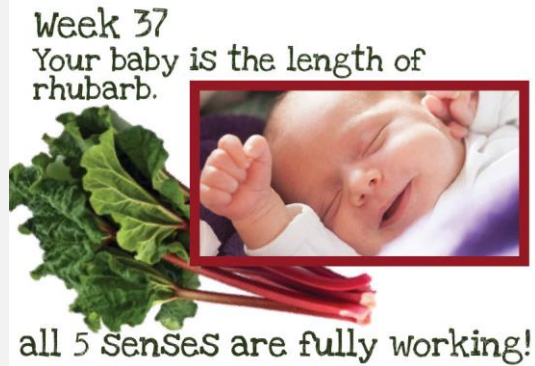
Hi Jane, Haven't seen Michelle since I went on maternity leave. I text her to find out what she had been up to and tell her I was bored! She invited me round to hers but I asked if she would come round here instead because I can't walk very far (and her house stinks of smoke but I didn't tell her that!) Forgot how much she makes me laugh! xx

This week, Megan has:

- Talked about life being easier without smoke breaks
- Spent time with non-smoking friends
- Avoided being in a smoking environment but still spent time with friends who smoke

**Week 26**

**37 weeks**



Hi Jane, turns out maternity leave is quite boring. I don't really have money to go out or go shopping. I'm finding it hard to sleep properly though so it's good to be able to take naps when I'm tired. Today I've baked a cake and done my nails and I'm still bored! Ryan will love the cake when he gets home! xx

Hi Jane, Hope you are doing well! Now I know I'm not physically addicted to cigarettes anymore I have to remind myself that the cravings are all in my head – I've got past the worst part and I don't NEED a cigarette anymore so starting again would just put me back to square one. Have you had a cigarette this week? xx

If yes: Why not use your baby's birth as a quit date? It is a whole new start for both of you. You could start cutting down now. xx

If no: Well done! Its really important to keep reminding yourself how well you have done and how difficult it was! xx

Hi Jane, I'm a bit worried about smoking again after the birth. I know as soon as I have a drink I'll want to smoke again but I don't want to, I've come too far to go back now. I wrote a list of all the things that might make me want a cigarette when the baby is here. Top 3 were – having a drink, being tired and stressed, and going round to friend's houses. Feel a bit more prepared now. Remember to text 'help' if you need some support. xx

This week Megan has:

- Kept herself busy at home
- Thought about things that might happen after the birth that will make her want to smoke.
- Realised that her physical addiction to smoking is gone.

**Week 28**

**38 weeks**



Hi Jane, Baby the size of a watermelon now. Are you kidding me! A watermelon?! No wonder I am so big! I know a lot of people go way past their due date but I hope I don't. I had a midwife appointment today – she was so proud and happy that I'd managed to give up smoking. Made it feel like a bit achievement! xx

Hi Jane, I don't want to be on my own at all at the moment! I'm scared I might go into labour. Michelle has been texting a lot - the gossip from work is that Jenny has left – she handed in her notice and then never turned up for her last shifts. I've been keeping myself busy sorting out things for the baby so don't really care anymore. xx

Hi Jane, Mark text to say that Hannah had her baby today. A little girl – no name yet. Its not fair!! Her due date was after mine. I'm happy for them, but so fed up of being a whale. I'm still bored but haven't even been tempted to smoke this week ☺ Remember to text 'help' if you need some support. xx

This week, Megan has:

- Realised what a big achievement quitting is
- Kept herself busy
- Realised that smoking is no longer a habit

**Week 29**

39 weeks



Hey Jane, I already wrote a list of the things I don't like about smoking, but now I think a list of all the things I love about not smoking will keep me going! Seems like all I do is write lists!! I've stuck them all on the fridge. It's a long list – some of the best things are that I feel so much happier and healthier and that Ethan will never ever see me smoke. xx

Hi Jane, Ryan is so excited about the baby! He phones me from work every half hour to check I'm not in labour – nightmare! Counted the quit jar today -there is loads of money! Ryan says we could keep going after the birth and save up for something big as well as keeping me motivated. Have you kept a quit jar? xx

If yes: great! Keep going with it and you'll be able to save up with money that you don't even notice is being saved. Think of something you really want or need and keep going until you can buy it.

If no: I bet you've noticed the extra money! If you smoked 10 cigarettes a day before you will save £?? a week – that's ?? in a month and even ?? if you keep going for a year!

Come on baby! I can't wait to meet him. I also can't wait to leave the house without waddling around! Michelle's birthday is in a month and I'll be invited to the party – I know that will be a good time to take some nicotine gum in case I get tempted to smoke! Remember to text 'help' if you need some support. xx

This week, Megan has:

- Counted her quit jar
- Planned for a situation that may tempt her to smoke
- Stuck all of her lists on the fridge

**Week 30**

**Birth**



Hi Jane, He's here! Ethan John was born one day after his due date! We're all doing fine. I'm totally in love with him and can't stop looking at him! Thank you for keeping me company!. You can text 'help' look back at all the text messages I've sent over the last few months if you ever find yourself struggling with smoking. xx