NICE Guidance title: Tobacco: harm-reduction approaches to smoking

Short title: Tobacco: harm reduction

Review 4: Barriers and facilitators to implementing tobacco harm reduction approaches; including user and provider perspectives

November 2021: NICE guidelines PH45 (June 2013) PH48 (November 2013) have been updated and replaced by NG209.
The recommendations labelled [2013] or [2013, amended 2021] in the updated guideline were based on these evidence reviews.
See www.nice.org.uk/guidance/NG209 for all the current recommendations and evidence reviews.

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APPENDICES

EXECUTIVE SUMMARY

1 INTRODUCTION

1.1 Aims of the review

To review smokers' (including their friends and family) and provider perspectives on the barriers and facilitators to implementing tobacco harm reduction (THR) approaches.

1.2 Research questions

- What factors might act as barriers or facilitators to tobacco harm-reduction approaches?
- What are smokers'/families' and healthcare professionals' views, experiences and perspectives on whether specific tobacco harm-reduction approaches (such as behavioural support, counselling, advice or self-help) are perceived to have a differential impact on particular groups (i.e. by age, gender, socio-economic status or ethnicity, level of contemplation, motivation and addiction)?
- What are smokers'/families' and healthcare professionals' views, experiences and perspectives on the potential or actual unintended consequences from adopting a harm-reduction approach?
- What are smokers'/families' and healthcare professionals' views, experiences and perspectives on how best to deliver messages about tobacco harm reduction without weakening the impact of advice about the benefits of stopping smoking?

1.3 Background

Although smoking rates have declined sharply in the last 30 years, this decline has slowed in recent years. In the past, public health strategies with respect to smoking have focused on discouraging people from starting to smoke and helping smokers to quit the habit completely. There remains a group of smokers who either want to quit but feel unable to stop abruptly or otherwise are not willing or able to quit but may be prepared to reduce the amount they smoke. The healthiest course of action for all smokers is to stop smoking but *harm reduction measures* attempt to limit the risks by reducing exposure to the toxic chemicals found in tobacco smoke (Royal College of Physicians, 2007). NICE has been asked by the Department of Health to develop guidance on 'Tobacco – harm reduction approaches to smoking'. Building on the review of safety, risk and pharmacokinetics of tobacco harm reduction (THR) technologies (Jones et al, 2011), The guidance will be underpinned by five evidence reviews. Review 1 considered the safety, risk and pharmacokinetics of tobacco harm reduction (THR) technologies (Jones et al, 2011). The second reviewed the effectiveness of interventions for 'cutting down to quit' (Morgan et al 2012a). The third considered interventions for long term smoking reduction without the intention of quitting (Morgan et al 2012b). This review is the fourth in the series and is a companion to reviews two and three; looking at barriers and

facilitators to harm-reduction approaches. The series will be completed with a health economic analysis of THR approaches.

2 METHODS

A systematic review of evidence to address the review questions has been undertaken. A wide range of databases and websites was searched systematically, supplemented by grey literature[1] searches. Searches were carried out in August 2011 to identify relevant studies in the English language published between 1990 and 2011. Follow-up database searches were conducted in November 2011 and January 2012. All populations of all ages were included other than pregnant women, with a particular focus on those who have been identified as being more likely to smoke, are at increased health risk from smoking and/or experiencing health inequalities.

Qualitative and quantitative evidence of views and opinions, and process evaluations of intervention studies were identified that addressed the following interventions for THR purposes:

- Pharmacotherapies that are licensed for cutting down, temporary abstinence or harm reduction (currently only nicotine replacement therapy is licensed for these indications);
- Other non-tobacco nicotine containing products (e-cigarettes and topical gels);
- Behavioural support, counselling, advice or self help.

THR purposes could refer to cut down to quit (CDTQ), long term smoking reduction (SR), enforced temporary abstinence in places where smoking was not allowed (TA) or preoperative smoking cessation for at least the day of surgery (PSC). Studies describing barriers and facilitators to smoke-free settings in order to protect of children or others from second hand smoke, were included if there was also a clear motivation or impact on the smokers tobacco consumption (i.e. reduction of tobacco consumption with or without eventual quitting). Furthermore, studies that described switching to use of nicotine products for smoking reduction or cutting down to quit or switching to long-term nicotine product use after abrupt smoking cessation were outside of the scope for this review. A separate report is available on quitting and switching to long-term use of nicotine products is available[2]

Quality assessment was undertaken by one reviewer and checked by a second, with 20% of papers being considered independently in duplicate, and tested for inter-rater reliability.

Data was extracted by one reviewer and checked by a second. A thematic synthesis of the views identified within the studies was completed.

3. RESULTS

A total of 46 papers were included in the review. See Table 2a and 2b (pp. 38-46) for a brief summary of the studies. Full details are provided in the Evidence Tables (Appendix A).

The quality of the included studies was generally moderate. Only three of the 17 qualitative studies (Q) were deemed to be of high quality (**Bottorff 2009 ++**, **Jones 2011++**, **Schultz 2011 ++**) and none of the 23 cross sectional surveys (CSS) or 3 mixed methods studies (MM) were rated as high quality. Most studies were deemed to be of moderate quality, with 1 qualitative, 6 cross-sectional surveys

[1] Technical or research reports, doctoral dissertations, conference papers and official publications.

[2] Morgan H, Morgan F, Weightman A, Whitehead S. Rapid review for NICE: long term use of non-tobacco nicotine containing products in individuals who have quit smoking abruptly. Cardiff: SURE, May 2012

and one mixed methods study being rated −. Two process evaluations (PE) were also identified which are not quality assessed.

Over one third of the studies were considered to have high applicability to the UK. This included five studies from the England-based Smoking Toolkit Study[3] (**Beard 2011a Q+**, **Beard 2011b CSS–**, **Beard 2012a CSS+** , **Beard 2012b CSS+** ,**Black 2012 CSS+**), a further nine UK-only studies(**Amos 1995 CSS–**, **Blackburn 2003 CSS–, Haddock 1997 PE**, **Jones 2011 Q++, McEwen 2001 CSS+**, **Phillips 2007 Q+**, **Ratschen 2009 CSS+**, **Ratschen 2010 Q+**, **Robinson 2010 Q+**), and two studies conducted in the UK plus other countries (**Cheong 2007 LS+**, **Etter 2011 CSS+**). Four studies were from countries judged to be have sufficiently similar smoking reduction and cessation programmes , including two based in Australia (**Ashton 2010 MM-**, **Hamilton 2000 CSS+**),one in Denmark (**Thomsen 2009 Q-**) and a further study conducted in several European countries including Spain (**Brotons 2005 CSS+**).

The majority of studies focused on THR approaches / outcomes or it was possible to disaggregate THR findings. However in the remaining studies, smoking cessation (SC) and THR were considered together and were not easily distinguishable.

There were seventeen studies examining smoking reduction (**Beard 2012a CSS+** , **Beard 2011b CSS–**, **Black 2012 CSS+**, **Bolliger 2000 CSS+**, **Cheong 2007 LS**, **Cunningham 2008 CSS+**, **Estabrooks 2010 MM+**, **Gaglio 2010 PE**, **Joseph 2004b CSS+**, **Joseph 2005 CSS+** , **Keizer 2009 CSS–** , **Nichter 2008 Q+**, **Nguyen 2009 CSS+**, **Okuyemi 2002 CSS+**, **Richter 2002 Q+**, **Schultz 2009 CSS+**, **Warner 2003 CSS+**).A further seven studies examined enforced temporary abstinence in settings such as hospitals, workplaces or homes/cars (**Abdullah 2011 Q+**, **Beard 2011a Q+**, **Beard 2012b CSS+**, **Herbert 2011 Q+**, **Kurko 2009 CSS+**, **Poland 2009 Q+**, **Schultz 2011 Q++**), one considered cut down to quit (**Cheong 2007 LS+**) and two were in smoking cessation prior to surgery (**Haddock 1997 PE**, **Thomsen 2009 Q–**). Three studies also covered more than one harm reduction approach, i.e. reduction and temporary abstinence (**Beard 2011a Q+, Ratschen 2010 Q+**) or cutting down to quit and sustained smoking reduction (**Shiffman 2007 CSS+**).

Evidence statements include information on the type of harm reduction examined in each study - denoting abbreviations either with 'THR', or with THR/Quit where harm reduction and smoking cessation cannot be disaggregated.

Only one study clearly identified that the participant views were those of smokers who had cut down to quit on their own (**Cheong 2007 LS+**). Six studies provided views from smokers who were being assisted by a study intervention (**Amos 1995 CSS–**, **Cunningham 2008 CSS+**, **Estabrooks 2010 MM+**, **Herbert 2011 Q+**, **Joseph 2004a Q+**, **Thomsen 2009 Q–**). In the remaining studies, the researchers did not record whether the views provided were those of smokers who had received professional assistance, though most were recruited from general smoking populations rather than health clinics/services. Where it was clear either that smokers were receiving support from professionals/via study interventions ('professionally supported'), or that their harm reduction activities were self-initiated, this is indicated in the evidence statements and narrative synthesis.

[3] http://www.smokinginengland.info/

4. EVIDENCE STATEMENTS

Q1. What factors might act as barriers or facilitators to tobacco harm-reduction approaches?

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Background environment factors described by smokers

Evidence Statements:

1.1 **Barrier: Social networks consisting of smokers.** Thirteen studies reported that social networks (including friends, family and colleagues) consisting of other smokers were perceived to hinder smokers' attempts to address their tobacco consumption (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Estabrooks 2010 USA MM+**, **Keizer 2009 CSS–**, **Nguyen 2009 USA CSS+**, **Nichter 2008 USA Q+**; THR-TA: **Abdullah 2011 CHN Q+**, **Herbert 2011 CAN Q+**, **Jones 2011 Q++, Phillips 2007 Q+, Schultz 2011 CAN Q++**; THR/Quit: **Green 2005 CAN MM–**, **Hamilton 2000 AUS CSS+**, **Stewart 2011 CAN Q+**). Smokers' in two studies were professionally supported to address their smoking behaviour (**Estabrooks 2010 USA MM+**, **Herbert 2011 CAN Q+**).

1.2 **Barrier: Travel is associated with smoking whilst driving.** Two studies reported that driving was a barrier to reducing smoking. This included one study of surgery outpatients in receipt of a telephone counseling intervention (THR-SR: **Estabrooks 2010 USA MM+**) and another of parents receiving professional support to implement smoke free homes and cars (THR-TA: **Herbert 2011 CAN Q+**). Parents described a range of reasons, including the habit of smoking, need for relaxation, and cravings to smoke while driving.

1.3 **Barriers to implementing smoke-free homes:** smokers described a desire or need to smoke in their home. Two studies reported that the home served as a place where they could smoke in comfort, privacy and in a safe environment (THR-TA: **Jones 2011 GBR Q++**, **Phillips 2007 GBR Q+**), three studies described how smoking outside conflicted with their need to care for their children (THR-TA: **Abdullah 2011 CHN Q+, Herbert 2011 CAN Q+, Jones 2011 GBR Q++**) and four studies identified a lack of knowledge of the harms of second-hand smoke on children (**THR-TA: Abdullah 2011 CHN Q+, Blackburn 2003 GBR CSS–, Jones 2011 GBR Q++, Nichter 2008 USA Q+**).

1.4 **Facilitator: Social pressure to change smoking behaviour.** Social pressure from friends, family or society in general to reduce, quit or implement smoke-free homes/cars was described in eight studies (THR-SR: **Bolliger 2000 CHE CSS+**, **Richter 2002 USA Q+**; THR/quit: **Bottorff 2009 CAN Q++**, **Green 2005 CAN MM–**, **Stewart 2011 CAN Q+**; THR-TA: **Abdullah 2011 CHN Q+**, **Herbert 2011 CAN Q+, Phillips 2007 GBR Q+**). Smokers in one study were professionally supported to address their smoking behaviour (**Herbert 2011 CAN Q+**).

1.5 **Facilitator: Social support from friends**, **family and professionals.** Social support from friends, family or professionals was perceived to be helpful in reducing smoking consumption in three studies. The studies involved surgery outpatients in receipt of a

smoking telephone counseling intervention to reduce smoking consumption (THR-SR: **Estabrooks 2010 USA MM+**), low income women describing attitudes to smoking reduction or quitting (THR/Quit: **Stewart 2011 CAN Q+**) and adolescents describing ways in which they control smoking levels (THR/Quit: **Johnson 2004 CAN Q+**).

1.6 **Facilitator: Expense of smoking.** Eight studies described participants' financial concerns about the cost of smoking and perceived financial gains from reducing or quitting smoking (THR-SR: **Bottorff 2009 CAN Q++**, **Richter 2002 USA Q+**; THR-PSC: **Abdullah 2011 CHN Q+**, **Haddock 1997 GBR PE**, **Thomsen 2009 DNK Q–**; THR/Quit: **Bolliger 2000 CHE CSS+**, **Hamilton 2000 AUS CSS+**, **Johnson 2004 CAN Q+**). In one study smokers were professionally supported to address their smoking beahviour (**Haddock 1997 GBR PE**)

1.7 **Facilitator: Smoking restrictions promote SR:** Eight studies included participants reporting that smoking restrictions helped them to reduce their smoking whether in: the home (**Abdullah 2011 CHN Q+**, **Blackburn 2003 GBR CSS –, Herbert 2011 CAN Q+, Jones 2003 Q++;** at work (**Amos 1995 GBR CSS–, Phillips 2007 GBR Q+, Robinson 2010 GBR Q+**) or hospital (**Keizer 2009 CHE CSS–**).

Just seven of the 21 studies were based in the UK (**Amos 1995 GBR CSS–**, **Beard 2011a GBR Q+**, **Blackburn 2003 GBR CSS–, Haddock 1997 GBR PE, Jones 2011 GBR Q++, Phillips 2007 GBR Q+, Robinson 2010 GBR Q+**) and two from countries judged to have similar applicability to the UK (**Hamilton 2000 AUS CSS+**, **Thomsen 2009 DNK Q–**).

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<u>Attitudes, beliefs and experiences regarding THR efforts</u>

Evidence Statements – Smokers' perspectives:

1.8 **Barrier: Smokers' boredom.** Seven studies identified boredom as a psychological barrier to reducing smoking consumption in a range of populations including adult smokers (THR-SR/TA: **Beard 2011a GBR Q+**; THR-TA**: Robinson 2010 GBR Q+**), low income women (THR-SR: **Nichter 2008 USA Q+**), psychiatric and general hospital inpatients where smoking bans are in place (THR-SR: **Keizer 2009 CHE CSS–**, THR-TA: **Schultz 2011 CAN Q+;** THR-TA/SR: **Ratschen 2010 Q+**) and surgery outpatients (THR-SR: **Estabrooks 2010 USA MM+**). Smokers' in one study were professionally supported to address their smoking behaviour (**Estabrooks 2010 USA MM+**)

1.9 **Barrier: Smokers' stress.** Smoking in response to stress was a recurring theme in eleven studies and across a range of populations including general adult smokers (THR-(SR/TA: **Beard 2011a GBR Q+**; THR-TA: **Robinson 2010 GBR Q+**), low income women (THR-SR: **Nichter 2008 USA Q+**; THR/Quit: **Stewart 2011 CAN Q+**; THR-TA: **Jones 2011 GBR Q++**), psychiatric and general-hospital inpatients where smoking bans are in place (THR-SR: **Keizer 2009 CHE CSS–**; THR-TA: **Schultz 2011 CAN Q+**), surgical patients (THR-SR: **Estabrooks 2010 USA MM+**, THR-PSC: **Haddock 1997 GBR PE**, **Thomsen 2009 DNK Q–**), and adolescents (THR/Quit: **Johnson 2004 CAN Q+**). Two studies included smokers that

were receiving professional support to address their smoking behaviour (**Estabrooks 2010 USA MM+**, **Haddock 1997 GBR PE**).

1.10 **Barrier: Smokers' perceived low ability in achieving smoking goals.** A common theme across three studies was participants' lack of confidence in their ability to achieve their smoking goals. These studies were conducted in potentially more vulnerable groups: pre-surgical patients (THR-PSC: **Haddock 1997 GBR PE**); low income women (THR/Quit: **Stewart 2011 CAN Q+**) and adolescents (THR/Quit: **Johnson 2004 CAN Q+**). One study included smokers that were receiving professional support to address their smoking behaviour (**Haddock 1997 GBR PE**).

1.11 **Barrier: Perceived high nicotine dependence/smoking addiction.** The addictive effect of smoking and the difficulty of resisting subsequent cravings were described as a barrier to reducing smoking or implementing smoke-free homes in three studies (THR-SR: **Keizer 2009 CHE CSS–**; THR-TA: **Herbert 2011 CAN Q+**; THR/Quit: **Bottorff 2009 CAN Q++**). However, in a further study perceived dependence on smoking was not associated with quitting success among smokers who first cut down without professional support (THR-CDTQ: **Cheong 2007 VAR CSS+**). The studies were conducted in general adult smokers (**Cheong 2007 VAR CSS+**), psychiatric inpatients (**Keizer 2009 CHE CSS–**) and parents / new fathers with children living at home (**Herbert 2011 CAN Q+**, **Bottorff 2009 CAN Q+**). One study included smokers that were professionally supported to address their smoking behaviour (**Herbert 2011 CAN Q+**).

1.12 **Facilitator: Smokers' perceived confidence in ability to achieve smoking goals.** High confidence in smokers' ability (self-efficacy) to achieve their smoking goals was described as a facilitator in three studies (THR-CDTQ: **Cheong 2007 VAR LS+**, THR-SR: **Richter 2002 USA Q+**; THR/Quit: **Johnson 2004 CAN Q+**). In two of the studies this appeared to be linked to the idea that reduction was more achievable than quitting (**Richter 2002 USA Q+**, **Johnson 2004 Q+**). In one study perceived confidence in ability to quit smoking was associated with quitting success among smokers who first cut down (**Cheong 2007 VAR LS+**).

1.13 **Facilitator: Smokers' perception that smoking reduction leads to cessation.** Six studies indicated that some smokers viewed reducing their smoking as a first step towards cessation. This belief was reported across a range of populations including general adult smokers (THR-CDTQ/SR: **Shiffman 2007 USA CSS+**; THR-SR: **Bolliger 2000 CHE CSS+**; THR-TA/SR: **Beard 2011a GBR Q+**), methadone users (THR-SR: **Richter 2002 USA Q+**), recent fathers (THR/Quit: **Bottorff 2009 CAN Q++**) and adolescents (THR/Quit: **Hamilton 2000 AUS CSS+**).

1.14 **Facilitator: Smokers' displeasure with smoking.** Five studies reported displeasure with aspects of smoking, that some participants did not enjoy smoking (THR/Quit: **Hamilton 2000 AUS CSS+),** perceived it to be smelly and messy (THR-SR: **Bolliger 2000 CHE CSS+**; THR-PSC: **Thomsen 2009 DNK Q–**; THR-TA: **Jones 2011 GBR Q++, Phillips 2007 GBR Q+**) and did not like 'being out of control' (**Bolliger 2000 CHE CSS+**).

1.15 **Facilitator: Smokers' own structuring and scheduling of smoking.** Seven studies identified that smokers use structuring or scheduling smoking techniques to limit or reduce their cigarette consumption or temporarily abstain. These included: half-butting

or smoking part of the cigarette (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Bottorff 2009 CAN Q++**, **Johnson 2004 CAN Q+**, **Okuyemi 2001 CSS+**); inhaling less or not at all (THR-SR/TA; **Beard 2011a GBR Q+**, THR-SR; **Okuyemi 2001 CSS+**); carrying only a set number of cigarettes (THR-SR: **Estabrooks 2010 USA MM+**); borrowing cigarettes instead of buying (THR/Quit: **Johnson 2004 CAN Q+**); cutting out unnecessary cigarettes e.g., not chain smoking (THR-SR/TA: **Beard 2011a GBR Q+**; THR/Quit: **Johnson 2004 CAN Q+**,); restricting the number of cigarettes smoked, where or when ? (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Okuyemi 2001 CSS+**; THR/Quit: **Johnson 2004 CAN Q+**, **Nguyen 2009 CSS+**) or delaying time between cigarettes (THR-SR/TA: **Beard 2011a GBR Q+**; THR-TA: **Poland 2009 CAN Q+, Robinson 2010 GBR Q+**; THR/Quit: **Bottorff 2009 CAN Q++**, **Johnson 2004 CAN Q+**). Three studies included smokers that were using NRT (**Beard 2011a GBR CSS+**, **Okuyemi 2001 CSS+**) or receiving behavioural interventions to achieve smoking goals (**Estabrooks 2010 USA MM+**).

1.16 **Facilitator: Smoking substitution techniques.** A common theme from three studies was smokers' use of techniques to distract or substitute smoking with other activities as an aid to reducing their cigarette consumption. These included: wanting to learn healthy eating habits to substitute for smoking (**Stewart 2011 USA Q+**); relaxation aids such as acupuncture, music or reading (**Beard 2011a GBR Q+**); using normal chewing gum, food or drinks (**Beard 2011a GBR Q+**) and exercising (**Estabrooks 2010 USA MM+**). Participants in one study were receiving professional support via a behavioural intervention to assist their smoking reduction (**Estabrooks 2010 MM+).**

1.17 **Facilitator: Smokers' wish to protect children from smoke.** Seven studies reported wishing to protect the health of their children as a facilitator to reducing their smoking (THR-SR: **Nichter 2008 USA Q+**) or in implementing smoke-free homes (THR-TA: **Abdullah 2011 CHN Q+**, **Bottorff 2009 CAN Q++**, **Herbert 2011 CAN Q+, Jones 2011 GBR Q++, Phillips 2007 GBR Q+, Poland 2009 CAN Q+**). Smokers in one study were receiving professional support to address their smoking behaviour (**Herbert 2011 CAN Q+**)**.**

1.18 **Facilitator: Smokers' worries of harm to own health from smoking.** Concern about the effect of tobacco on smokers' own health was a commonly reported facilitator across thirteen studies looking at reducing smoking or implementing smoke-free homes. Smokers described both worries of harm to their own health (THR-SR: **Bolliger 2000 CHE CSS+**, **Estabrooks 2010 USA MM+**; THR PSC: **Haddock 1997 GBR PE**; THR-TA: **Abdullah 2011 Q+**, **Poland 2009 CAN Q+**; THR/Quit: **Stewart 2011 CAN Q+**, **Hamilton 2000 AUS CSS+**) and perceived benefits to health from reduction of smoking (THR-SR/TA: **Beard 2011a GBR CSS+**, THR-SR: **Joseph 2005 USA CSS+**; THR-SR/CDTQ: **Shiffman 2007 USA CSS+**; THR-TA: **Thomsen 2009 DNK Q–**, THR/Quit: **Bottorff 2009 CAN Q++**). However one study found that worries about damage to health and quality of life from smoking or perceived benefits to health from quitting, were not associated with quitting success among smokers who first cut down (THR-SR: **Cheong 2007 VAR CR+**). Smokers' in two studies were receiving professional support to address their smoking behaviour (**Estabrooks 2010 USA MM+**, **Haddock 1997 GBR PE+**).

Of the 22 studies reporting smokers views regarding tobacco harm reduction, just six studies were solely conducted in the UK (**Beard 2011a GBR Q+**, **Haddock 1997 GBR PE+**, **+**, **Jones 2011**

GBR Q++, Phillips 2007 GBR Q+, Robinson 2010 GBR Q+, Thomsen 2009 DNK Q–), one study in multiple countries including the UK (**Cheong 2007 VAR CSS+**) and one study in a country deemed to have high applicability to the UK (**Hamilton AUS CSS+**).

Attitudes, beliefs and experiences regarding THR efforts

Evidence Statements – Providers' perspectives:

1.19 **Barrier: Provider perceptions that THR weakens cessation message.** Four studies reported concerns that THR or use of NRT products for THR would reduce smoking cessation (THR-SR: **Beard 2011b GBR CSS–**, **Joseph 2004a USA Q+**, **Martin 2004 USA Q+**, **Warner 2003 CSS+**).

1.20 **Barrier: Negative provider views towards encouraging smokers to attempt THR.** A single study suggests some tobacco control experts have concerns about whether THR should be promoted. Practitioners, policy makers and educationalists considered THR did not address nicotine addiction, which they believed to be the underlying factor in tobacco use. There were also concerns about how to accomplish reduced cigarette consumption, whether this leads to improved health and whether smokers change their smoking behaviour to compensate for reduced nicotine delivery (THR-SR: **Joseph 2004a USA Q+**).

1.21 **Facilitator: Positive provider views that encouraging smoking reduction will improve health.** Two studies reported that cutting down the number of cigarettes smoked was generally regarded to have positive effects to smokers' health amongst nurses (**Borrelli 2007 USA CSS–**) and tobacco control experts (**Joseph 2004a USA Q+**). Tobacco control experts viewed SR as a more realistic and understanding strategy and believed that smokers' self control and self esteem might be enhanced if those smokers believed they were taking steps toward improving their health (**Joseph 2004a USA Q+**).

1.22 **Facilitator: Positive provider views that encouraging smoking reduction will promote cessation.** Two studies reported large proportions of providers felt SR or use of NRT for SR may promote smoking cessation (THR-SR: **Beard 2011b CSS–**, **Joseph 2004a USA Q+**).

1.23 There is insufficient evidence to examine whether providers perceive their patients to be able to address their smoking behaviour. This was discussed in only one poor quality mixed methods study of mental health patients (THR/Quit: **Ashton 2010 AUS MM–**).

The evidence has limited applicability to UK THR. Two studies were conducted in applicable settings - the UK (**Beard 2011b CSS-**) and Australia (**Ashton 2010 MM–**). Additionally, four studies were USA based and used the Institute of Medicine (IOM) definition of THR which includes out-of scope products such as smokeless tobacco (**Borelli 2007 CSS–**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **Warner 2003 CSS+**).

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Attitudes, beliefs and experiences regarding NRT to assist THR

Evidence Statement – Smokers perspectives:

1.24 **Barrier: Some smokers perceive NRT does not help achieve THR goals.** Two studies found some smokers believed NRT was not helpful in enabling them to achieve their goals (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Richter 2002 USA Q+**). Two studies found that NRT was viewed as not addressing the craving for cigarettes (**Richter 2002 USA Q+**) or as only a partial substitute for cigarettes (**Beard 2011a GBR Q+**). It did not appear to live up to expectations in some users who commented variously that: the effects of NRT were too short lived; NRT was too weak; lozenge effect was too fast and NRT was only effective during enforced periods of temporary abstinence (**Beard 2011a GBR Q+**).

1.25 **Barrier: Smoker-perceived negative features of NRT products.** Action of nasal spray, dislike of using chewing gum, taste of gum, and lack of substitution for action of smoking were negatively-perceived features of various NRT products reported by smokers trying to reduce smoking or temporarily abstain (THR-SR/TA: **Beard 2011a GBR Q+**).

1.26 **Barrier: Smoker-perceived cost of NRT.** One study reported that adult smokers from the general population were deemed to be under-using NRT for THR purposes because of cost (THR-SR/TA: **Beard 2011a GBR Q+).** A second study of low-income women revealed that NRT for cessation or reduction was considered too expensive to use, unless it was provided free of charge (THR/Quit: **Stewart 2011 CAN Q+).**

1.27 **Barrier: Smoker-perceived side effects and safety concerns**. In three studies smokers were concerned about nicotine addiction and harm to health (THR-SR/TA: **Beard 2011a GBR Q+**; **THR-SR: Black 2012 GBR CSS+**) and about nicotine overdose, in particular from NRT patches (THR-SR/TA: **Beard 2011a GBR Q+**). Smokers also reported a range of perceived side effects including nightmares, sore skin, and mood swings patch), sore gums, acid reflux (gum) (**Beard 2011a GBR Q+**) and hyperactivity when using NRT and drinking coffee at the same time (THR/Quit: **Bottorff 2009 CAN Q++**). Black (**2012 GBR CSS+**) found concern that NRT is harmful was not a statistically significant deterrent for NRT use in smoking cessation or reduction, but concluded dose and duration of use may be affected. Beard (**2011a GBR Q+**) reported that participants were under-using NRT because of fears of nicotine overdose.

1.28 **Barrier: Smokers' misperceptions of how and when to use NRT for THR.** Two studies reported adult smokers from the general population had a range of misperceptions regarding NRT and THR use. These included the beliefs that NRT products could not be used at exactly the same time as smoking, or were used purely for smoking cessation purposes (THR-SR/TA: **Beard 2011a GBR Q+**, **Ratschen 2010 Q+**). Smokers were also unaware which NRT products were recommended and licensed for smoking reduction and/or temporary abstinence. Some participants were unaware of how to use the nicotine patch, leaving it on for too long or too short a period. (THR-SR/TA: **Beard 2011a GBR Q+**).

1.29 **Facilitator: Commonly reported beliefs that NRT helps achieve THR goals.** Eleven studies reported that NRT is perceived by smokers to be helpful in achieving their

smoking goals. This is indicated by high proportions of smokers using or willing to try NRT for reduction purposes (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Beard 2012b GBR CSS+**, **Black 2012 GBR CSS+**, **Cunningham 2008 CAN CSS+**, **Estabrooks 2010 USA Q+**, **Joseph 2005 USA CSS+**, **Joseph 2004b USA CSS+**, **Richter 2002 USA Q+**, **Shiffman 2007 USA CSS+**; THR/Quit: **Bottorff 2009 CAN Q++**, **Hamilton 2000 AUS CSS+**). Despite positive views towards NRT, one study found that there was no statistical association between attempts to quit smoking or reduce cigarette consumption and perceived helpfulness of NRT after adjusting for potential confounding variables (**Beard 2012b GBR CSS+**). Three studies were conducted in patients receiving professional support to address their smoking (**Cunningham 2008 CAN CSS+**, **Estabrooks 2010 USA Q+**, **Joseph 2004b USA CSS+**).

1.30 In the two studies highlighting preferences for different NRT products, the patch was used marginally more common than nicotine gum (**Beard 2012b CSS+**, **Shiffman 2007 CSS+**) both products were used more than lozenges, inhalator, or nasal spray (**Beard 2011b CSS+**).

1.31 **Facilitator: Smoker-perceived positive features of NRT products.** One study of smokers using NRT for smoking reduction or temporary abstinence reported that NRT patches were easy to carry, discrete and could be forgotten about. Nicotine gum was liked because it involved active participation, was felt to be similar to normal chewing gum, acted as a distraction, and was easy to carry. The NRT inhalator was liked for its similarity with the action of smoking. For some respondents the benefits of NRT patch was a prolonged nicotine dose, whilst others preferred the nicotine nasal spray because it gave them an instant hit (THR-SR/TA: **Beard 2011a GBR Q+**).

Only three of the eleven studies were conducted in the UK, all of which used data from the English Smoking Toolkit Study (THR-SR/TA: **Beard 2011a Q+**; THR-SR: **Beard 2012b CSS+**, **Black 2012 CSS+**).

<u>Attitudes, beliefs and experiences regarding NRT to assist THR</u>

Evidence Statements – Providers' perspectives:

1.32 **Barrier: Provider perceptions that NRT harms smokers' health.** Four studies reported that large proportions of the healthcare providers and tobacco control experts participating in the studies regarded NRT as harmful to health when used long term or concurrently with smoking. A range of serious harms and complications were perceived including heart disease, cancer, chronic lung disease, and the stimulant effects of NRT (THR-SR: **Beard 2011b GBR CSS–**, **Warner 2003 USA CSS+**; THR/Quit: **Borrelli 2007 USA CSS–**, **Ratschen 2009 GBR CSS+**).

1.33 **Barrier: Provider perceptions that NRT causes nicotine addiction**: Three studies reported significant proportions of nurses (THR/Quit: **Borrelli 2007 USA CSS–**), smoking cessation staff (THR-SR: **Beard 2011b GBR CSS–**) and tobacco control experts (THR-SR: **Joseph 2004 CSS+**) had concerns that NRT products could cause nicotine addiction.

1.34 **Barrier: Lack of understanding regarding use of NRT for THR:** Evidence from three non-UK studies (THR/Quit: **Borrelli 2007 USA CSS–**; THR-TA: **Kurko 2009 FIN CSS+**, **Schultz 2011 CAN Q++**) suggests there is no consistent understanding among healthcare

professionals of how to use NRT products for THR purposes.

1.35 There is insufficient evidence to determine whether providers view NRT to be a cost-effective intervention for THR purposes. Only one study of UK providers explored their views on the cost-effectiveness of NRT and it is unclear whether these related to THR (THR/Quit: **McEwen 2001 GBR CSS+**). A second study reported tobacco control experts' beliefs that NRT combined with behavioural interventions was too costly for smokers to access, yet this was based in USA and may not be applicable to UK NHS settings (THR-SR: **Joseph 2004 Q+**).

1.36 There was insufficient evidence that is applicable to THR in the UK, to determine providers' perceptions of whether NRT is helpful for helping smokers to achieve THR goals.

Evidence may have limited applicability to THR in UK settings. Only one study of providers' beliefs on the impact of NRT and THR was conducted in the UK (**Beard 2011b CSS–**). An additional UK study conveying provider views on NRT (**McEwen 2001 CSS+**) focused primarily on cessation and it is unclear whether these views also included THR. Three studies were conducted in the USA (**Borelli 2007 CSS–**, **Joseph 2004 CSS+**, **Warner 2003 CSS+**) and used the IOM definition of THR which includes out-of scope products such as smokeless tobacco. No UK evidence was identified for UK practitioners' knowledge of how NRT should be used for THR purposes. A further study was conducted in Finland (**Kurko 2009 CSS+**).

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Attitudes, beliefs and experiences regarding e-cigarette (e-cigs) to assist THR

Evidence Statements – Smokers' perspectives:

1.37 **Barrier: Belief e-cigs do not help with smoking craving.** There was some limited evidence that a small proportion of e-cig users (10%) believed that the product did not help with cravings in smokers aiming to cease or reduce smoking (THR-Quit: **Etter 2011 VAR CSS+**).

1.38 **Barrier: Some smokers are afraid of addiction and safety of e-cigarettes.** One study described smokers concerns over the safety of e-cigarettes. A small proportion of users (8%) were afraid of becoming addicted to e-cigarettes. A similar proportion (6%) felt e-cigarettes may be toxic, but the majority (83%) felt they were less toxic than tobacco. (THR/Quit: Etter 2011 CSS+).

1.39 **Barrier: Smoker-perceived negative features of e-cigs**. The design and functionality of e-cigs was criticised in one study. 37% of users felt that the battery discharged too quickly, 18% that the liquid often or sometimes leaked, and 8% that it was difficult to adjust nicotine dose with it. 20% felt that it should be easier to draw on e-cigarette and 20% that the vapour should be more concentrated (**Etter 2011 CSS+**).

1.40 **Facilitator: Significant proportion of smokers utilise e-cigarettes for THR and help with**

cravings. Two studies explored views of e-cig users in the general smoking population. One study found that 90% of users felt e-cigs helped relieve withdrawal symptoms (THR/Quit: **Etter 2011 VAR CSS+**). Although the majority of study participants were using an e-cig for smoking cessation, 20% used them for smoking reduction (**Etter 2011 VAR CSS+**, **Foulds 2011 USA CSS–**) and cutting down to quit (28%) (**Etter 2011 VAR CSS+**). Also, 64% of smokers in one study (**Foulds 2011 USA CSS–**) and 39% in another believed e-cigs could be used in places where they could not smoke (and 39%, **Etter 2011 VAR CSS+** respectively).

1.41 **Barrier: Smoker-perceived positive features of e-cigs**. The taste of e-cigarettes was viewed favourably in the large majority of users in two studies (**Etter 2011 CSS+**, **Foulds 2010 CSS–**). Users liked the sensation while inhaling (**Etter 2011 CSS+)** and that the e-cigarette can be used in places where smoking is banned (**Foulds 2010 CSS**

1.42 **Facilitator: E-cigs are perceived as less harmful than smoking.** E-cigs were perceived as less harmful to others or their own health than smoking by the majority of participants (THR/Quit: **Foulds 2011 USA CSS–**, **Etter 2011 VAR CSS+**) and perceived to help with withdrawal and craving symptoms of nicotine (**Etter 2011 VAR CSS+**).

1.43 **Facilitator: Smokers perceive using e-cigs to be cheaper than smoking.** One study found that over half (57%) of e-cig users who were using the product for cessation or reduction, said the product was cheaper than smoking (THR/Quit: **Etter 2011 VAR CSS+**)**.**

The evidence has limited applicability to the UK. **Etter 2011 VAR CSS+** included UK participants, although the majority were from USA and other countries. **Foulds 2011 USA CSS–** was conducted in a potentially biased sample of USA e-cig users attending an e-cigarette enthusiast meeting.

Attitudes, beliefs and experiences regarding e-cigarette (e-cigs) to assist THR

Evidence Statements – Providers' perspectives:

1.44 There was no evidence identified that evaluated providers' views regarding e-cigarettes for THR purposes.

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Attitudes, beliefs and experiences regarding behavioural interventions to assist THR

Evidence Statements – smokers' perspectives:

1.45 **Barrier: Smokers perceive they are not offered THR advice or assistance by healthcare providers.** Smokers in six studies did not consider they had been offered or received sufficient advice or assistance to help them reduce, cut down to quit or temporarily abstain from smoking. This was particularly apparent in studies of hospital patients who were required to temporarily abstain from smoking for surgery or whilst staying hospital (THR-TA: **Green 2005 CAN MM–**, **Schultz 2011 CAN**; THR-PSC: **Haddock 1997 GBR PE**;

THR-SR/TA **Ratschen 2010 Q+**). Similar views were expressed in two studies of community-based adult smokers (THR-SR/TA: **Beard 2011a Q+**, THR/Quit: **Bottorff 2009 CAN Q++**). One study included participants currently enrolled in a preoperative behavioural intervention who reported not being offered support in the past (**Haddock 1997 GBR PE**).

1.46 Facilitator: Positive views towards helpfulness of behavioural interventions for THR. Behavioural interventions were viewed positively by smokers who received them and by smokers who felt the addition of these strategies would be helpful for other smoking interventions. Face to face counselling (THR-PSC: **Haddock 1997 GBR PE, Thomsen 2009 DNK Q–**) was highly valued by those who received it. **Thomsen 2009 DNK Q–** provided counselling inspired by motivational interviewing. Smoking-related health screenings were also positively received (THR/Quit: **Amos 1995 GBR CSS–**; THR-PSC: **Haddock 1997 GBR PE+**). Support groups were perceived to be potentially useful by single mothers (THR/Quit: **Stewart 2011 CAN Q+**) and mental health acute inpatients (THR-SR/TA **Ratschen 2010 Q+**). There was a mixed picture of whether telephone interventions were helpful. Telephone counselling received some positive, but mostly negative comments in one study (**Estabrooks 2010 MM+**), but was perceived to be potentially helpful for implementing smoke-free homes in one study (**THR-TA: Abdullah 2011 CHN Q+)**. Telephone help-lines were positively received by workers (**THR/Quit: Amos 1995 CSS–**), but were not utilised by preoperative patients receiving a multicomponent smoking behavioural intervention (**Haddock 1997 GBR PE**).

1.47 Facilitator: Childcare and/or transport to attend support groups. One study in low income mothers identified practical assistance such as on-site child care and free transportation as a potential facilitator to attending support groups for smoking reduction or cessation (THR/Quit: **Stewart 2011 CAN Q+**).

The results may have limited applicability to a UK setting, as only four of the nine studies were conducted in the UK (**Amos 1995 GBR CSS–**, **Beard 2011a Q+**, **Haddock 1997 GBR PE, Ratschen 2010 Q+**).

Evidence Statements – providers' perspectives:

1.48 Barrier: Provider perceptions regarding smokers' barriers to achieving THR: In one study of mental health workers a range of barriers to quitting or reducing tobacco use for people with a mental illness were identified, including boredom and social isolation, mental illness, and addiction (THR/Quit: **Ashton 2010 AUS MM–**).

1.49 Barrier: Confidence in ability to provide THR interventions. Nurses who perceived ability barriers (i.e. confidence in their skills and knowledge related to tobacco reduction) were less likely to carry out tobacco reduction activities. Beliefs that addressing THR could cause a relationship strain with a patient also negatively influenced implementation of tobacco reduction interventions (THR-SR: **Schultz 2009 CAN CSS+**). However no studies described in any detail the degree to which healthcare professionals feel confident in their ability to deliver THR advice / interventions.

1.50 Facilitator: Workplace administrative barriers. One study found that perceived administrative barriers (adequacy of time and administrative support) negatively influenced implementation of tobacco reduction activities (THR-SR: **Schultz 2009 CAN**

CSS).

1.51 **Facilitator: Providers perceive THR advice to be part of their role.** Four studies suggest that many healthcare providers consider THR advice to be part of their role. The studies were conducted with UK GPs and nurses (**McEwen 2001 GBR CSS+,**) and mental health workers in the UK and Australia (**Ashton AUS CSS–**, **Ratschen 2009 GBR CSS+**). A further study reported that nurses with a positive THR role attitude were more likely to carry out tobacco reduction activities (THR-SR: **Schultz 2009 CAN CSS+**).

1.52 **Facilitator: THR supportive workplace environment.** One study found the perception that colleagues addressed tobacco reduction and that the clinical environment had rich tobacco reduction resources, were strong predictors of implementing tobacco reduction activities, including, but not limited to harm reduction strategies. (THR-SR: **Schultz 2009 CAN CSS+**).

1.53 No evidence was identified that assessed whether UK providers have appropriate knowledge and awareness of THR, or the full range of approaches that could be explored with patients.

The majority of studies are likely to have high applicability to a UK setting but did not clearly distinguish between THR and SC interventions (**Ashton 2010 AUS MM–**, **McEwen 2001 GBR CSS+, Ratschen 2009 GBR CSS+**). One study was conducted in Canada and examined SR (**Schultz 2009 CAN CSS+**).

Q2. What are smokers'/families' and healthcare professionals' views, experiences and perspectives on whether specific tobacco harm-reduction approaches (such as behavioural support, counselling, advice or self-help) are perceived to have a differential impact on particular groups (i.e. by age, gender, socio-economic status or ethnicity, level of contemplation, motivation and addiction)?

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Evidence Statement:

2.1 No studies were identified that explored participants' perspectives on whether THR interventions have a differential impact on particular population groups.

2.2 **Shiffman 2007 USA CSS+** found a range of in-study population group differences: women are more likely than men to prefer cutting down to quit. Those preferring long term reduction are more likely to be Caucasian. Participants who were more ready to change their smoking behaviour wanted a product that would help them quit rather than reduce long-term.

2.3 A study of young people aged 18-29 years old, found that men's smoking may be influenced more greatly by social situations such as parties and school/work breaks than

women (**Nguyen 2009 USA CSS+**).

2.4 A range of THR barriers and facilitators for low income populations were identified in four studies. Two studies explored the attitudes of low income women (THR-SR: **Nichter 2008 USA Q+**; THR/Quit: **Stewart 2011 CAN Q+**) and two explored those of low income men and women (THR-SR: **Okuyemi 2002 USA CSS+;** THR-TA: **Jones 2011 Q++**). Common factors reported across these studies were barriers faced from having smokers in their social networks and stress (**Jones 2011 Q++**, **Nichter 2008 Q+**, **Stewart 2011 Q+**) and lack of knowledge about harms of second hand smoke (**Jones 2011 Q++, Nichter 2008**). Common facilitators between studies were the wish to protect their own health and social pressure (**Nichter 2008 Q+**, **Stewart 2011 Q+**) and desire to protect children (**Jones 2011 Q++, Nichter 2008 Q+**).

2.5 One study explored the views of smokers receiving methadone treatment. Participants reported several facilitators to smoking reduction, including social pressure, the perception that smoking is expensive and harm to health from smoking. Facilitators were their ability to achieve reduction and the perception this leads to cessation. Participants had positive views on whether NRT helps achieve smoking reduction (THR-SR: **Richter 2002 USA Q+**).

2.6 Five studies examined barriers and facilitators encountered by mental health populations, from the perspective of patients and health workers. Common themes were boredom and a strong dependence on smoking (THR-SR: **Keizer 2009 CHE CSS–**; THR/Quit: **Green 2005 CAN MM–;** THR-SR/TA: **Ratschen 2010 Q+**). Many patients believed they were not offered adequate advice or assistance to address their smoking (**Green 2005 CAN MM–, Ratschen 2010 Q+**).This is supported in two studies by the relatively low proportion of mental health workers who considered smoking advice was an important part of their role (THR/Quit: **Ashton 2010 AUS MM–, Ratschen 2009 GBR CSS+**).

2.7 Two studies explored adolescents' reported barriers and facilitators for limiting their smoking. Aside from the perception that smoking is expensive. Themes differed between studies. (THR/Quit: **Hamilton 2000 AUS CSS+**; **Johnson 2004 CAN Q+**).

Three studies were based in the UK (**Jones 2011 Q++**, **Ratschen 2009 GBR CSS+, Ratschen 2010 Q+**) and two studies were identified from Australia that is likely to have UK applicable evidence regarding adolescents (**Hamilton 2000 AUS CSS+**) and psychiatric services (**Ashton 2010 AUS MM–**).

Q3. What are smokers'/families' and healthcare professionals' views, experiences and perspectives on the potential or actual unintended consequences from adopting a harm-reduction approach?

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Evidence Statement:

3.1 Six studies identified harm to health from long term NRT use or concurrent NRT and smoking was a concern both for smokers (THR-TA/SR: **Beard 2011a GBR Q+**; THR-SR: **Black 2012 GBR CSS+**; THR/Quit: **Bottorff 2009 CAN Q++**) and providers (THR-SR: **Beard 2011b GBR CSS–**; THR-SR: **Warner 2003 USA CSS+**; THR/Quit: **Borelli 2007 USA CSS–**).

3.2 Three studies reported that significant proportions of nurses (THR/Quit: **Borrelli 2007 USA CSS–**), stop smoking service staff (THR-SR/TA: **Beard 2011b GBR CSS–**) and tobacco control experts (THR/Quit: **Joseph 2004a USA CSS+**) had concerns that NRT products cause nicotine addiction. Experts from the USA also considered THR products could be misused by adolescents or lead to relapse in former smokers (THR-SR: **Martin 2004 USA Q+**, **Warner 2003 USA CSS+**).

3.3 In six studies a number of smokers viewed reducing as a first step to cessation (THR-SR/TA: **Beard 2011a GBR Q+**, THR-SR: **Bolliger 2000 CHE CSS+**, **Richter 2002 USA Q+**; THR-CDTQ/SR: **Shiffman 2007 USA CSS+**; THR/Quit: **Bottorff Q++**, **Hamilton 2000 AUS CSS+**)**.** In contrast, four studies reported provider concerns that THR or using products to assist THR would hinder smoking cessation (THR-SR/TA: **Beard 2011b GBR CSS–**; THR-SR: **Martin 2004 USA Q+**, **Joseph 2004a USA CSS+**, **Warner 2003 USA CSS+**).

Only four of the eleven studies were clearly applicable to the UK (**Beard 2011a GBR Q+**, **Beard 2011b GBR CSS–**, **Black 2012 GBR CSS+**, **Hamilton 2000 AUS CSS+**)**.** Furthermore, three of the studies specifically stated they used the USA IOM definition of THR which includes out-of scope products such as smokeless tobacco (**Joseph 2004a USA CSS+**, **Martin 2004 USA Q+**, **Warner 2003 USA CSS+**).

Q4. What are smokers'/families' and healthcare professionals' views, experiences and perspectives on how best to deliver messages about tobacco harm reduction without weakening the impact of advice about the benefits of stopping smoking?

4.1 No evidence was identified on how best to deliver messages about tobacco harm reduction without weakening the impact of advice about the benefits of stopping smoking.

5. DISCUSSION

This review contains a large body of evidence of relevance to the barriers and facilitators of tobacco harm reduction, identified by smokers and healthcare providers.

The quality of the included studies was generally moderate. Only three of the 17 qualitative studies (Q) were deemed to be of high quality (**Bottorff 2009 ++**, **Jones 2011++**, **Schultz 2011 ++**) and none of the 23 cross sectional surveys (CSS) or 3 mixed methods studies (MM) were rated as high quality. Most studies were deemed to be of moderate quality, with 1 qualitative, 6 cross-sectional surveys and one mixed methods study being rated −. Two process evaluations (PE) were also identified which are not quality assessed.

Over one third of the studies were considered to have high applicability to the UK. This included five studies from the England-based Smoking Toolkit Study[4] (**Beard 2011a Q+**, **Beard 2011b CSS–**, **Beard 2012a CSS+** , **Beard 2012b CSS+** ,**Black 2012 CSS+**), a further nine UK-only studies(**Amos 1995 CSS–**, **Blackburn 2003 CSS–, Haddock 1997 PE**, **Jones 2011 Q++, McEwen 2001 CSS+**, **Phillips 2007 Q+**, **Ratschen 2009 CSS+**, **Ratschen 2010 Q+**, **Robinson 2010 Q+**), and two studies conducted in the UK plus other countries (**Cheong 2007 LS+**, **Etter 2011 CSS+**). Four studies were from countries judged to be have sufficiently similar smoking reduction and cessation programmes , including two based in Australia (**Ashton 2010 MM-**, **Hamilton 2000 CSS+**),one in Denmark (**Thomsen 2009 Q-**) and a further study conducted in several European countries including Spain (**Brotons 2005 CSS+**).The majority of the remaining studies were USA or Canada based, with a further two studies performed in Switzerland and one in Finland and one in China.

The majority of studies solely regarded THR approaches or it was possible to extract findings relating to smoking reduction, temporary abstinence where smoking was not allowed, smoking cessation prior to surgery or cut down to quit. However almost a third of studies considered both smoking cessation (without mention of a gradual reduction phase) and THR together, and it was not always possible to separate results for THR (**Amos 1995 CSS–**, **Ashton 2010 MM–**, **Bottorff 2009 Q++**, **Brotons 2005 CSS+**, **Etter 2011 CSS+**, **Foulds 2011 CSS–**, **Green 2005 MM–**, **Hamilton 2000 CSS+**, **Johnson 2004 Q+**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **McEwen 2001 CSS**+, **Stewart 2011 Q+).**

Results suggest there are a number of trigger points in smokers' daily lives that may benefit from interventions to enhance or minimise the effects of existing facilitators and barriers of THR. These were mapped onto a conceptual model of implementation (see section 5). The themes were also compared with the hypotheses and programme content (programme theory and logic) underpinning design of the higher quality intervention trials identified from review 2 (cut down to quit) and review 3 (long-term harm reduction) (see section 6).

The review findings are summarised below, highlighting evidence of effectiveness from intervention trials in reviews 2 and 3, where relevant.

Overall, the evidence within the review suggests that:

- A range of underlying background environment and intrapersonal factors affect smokers attitudes and attempts at THR. These barriers appear to be faced even when smokers are utilising interventions to assist THR (e.g. NRT or behavioural interventions).

[4] http://www.smokinginengland.info/

- Environmental barriers included smokers in social networks, association of travel with smoking whereas environmental facilitators included social pressure, social support, high cost of smoking, and smoking restrictions.
- Psychological barriers included stress, boredom and perceived low ability to achieve THR. A number of studies in Reviews 2 and 3 evaluated motivational interviewing and counselling interventions that could address these barriers. However evidence of the effectiveness of these techniques alone (without NRT) is weaker than evidence of such approaches combined with NRT, or NRT with minimal support (see reviews 2 and 3).
- Psychological facilitators included displeasure with aspects of smoking and the perception that smoking reduction can lead to cessation.
- Smokers trying to reduce or control their smoking consumption employ a range of informal self-management techniques – such as structuring or scheduling their smoking activities and substituting smoking with other hobbies or distractions, to replace their smoking behaviours. They appear to employ these methods with or without the use of formal interventions to assist THR (e.g. NRT or behavioural interventions). There is limited evidence from intervention trials as yet for scheduled reduction approaches in cutting down to quit, but stronger evidence advocating its use in reduction of cigarette consumption (see reviews 2 and 3).
- Many smokers perceived NRT to be helpful for THR purposes although beliefs that the products were expensive to buy was also reported. Whilst Healthcare providers viewed NRT as helpful in stopping smoking, some providers expressed concerns about affordability balanced against effectiveness. It was not clear in these studies whether the views were provided in relation to abrupt quitting or whether they represented the views of professionals' perceptions on the effectiveness of NRT for smoking reduction, cutting down to quit or temporary abstinence. Review 3 identified significant benefits from NRT when smoking reduction is the intended outcome.
- Nicotine patches appear to be the most commonly used form of NRT for THR purposes, though a range of positive and negative features were described for each NRT product. Smokers' preferences for NRT appear to be a matter of personal choice depending on characteristics of the product valued (e.g. discreetness, dose of nicotine, or replication of smoking action). There is some modest evidence that offering smokers a choice of medication may enhance efficacy for long term reduction (see Review 3).
- Whilst the majority of surveyed smokers used e-cigarettes for smoking cessation, a significant proportion were using them for smoking reduction purposes. They perceived less health risk than smoking and help with cravings. As yet there is little evidence on the health and other effects of e-cigarette usage (see Review 1)
- Behavioural interventions were viewed favourably in both qualitative/process evaluations linked to intervention studies and by smokers providing general opinions on their desired interventions. Evidence from intervention trials suggest limited benefit of motivational interviewing and other behavioural interventions for long term reduction, although both brief and intensive (multiple-sessions) pre-operative smoking interventions, combining counselling with NRT, increased smoking cessation at the time of surgery. Only intensive interventions were effective long term. (Review 3).
- There was inconsistent understanding amongst healthcare professionals (HCPs) and smokers regarding knowledge of how and when to use NRT, and a number of HCPs lacked confidence in

their ability to provide THR advice. Healthcare providers also demonstrated misconceptions about the harms to health associated with long-term use of NRT and anticipated that its use would reduce the likelihood of cessation in smokers. It is unclear if these views are based on practice experience and observations. However, available evidence in intervention trials tends to counter these health concerns (see Reviews 1, 2 and 3)

- No studies explored smoker/family or provider perspectives on whether THR interventions have a differential impact on particular population groups.
- Several unintended consequences were perceived by smokers and providers, relating to the safety and harm to health from use of NRT long term or concurrently with smoking; concerns nicotine products may lead to nicotine addiction and product misuse in non-smokers ; and whether THR messages and THR interventions deter smokers from cessation.
- None of the included studies gathered views on how to deliver messages without weakening the impact of advice about the benefits of stopping smoking.

ABBREVIATIONS

AUS	Australia
BMRB	British Market Research Bureau
C	Control group
CAN	Canada
CDTQ	Cut down to quit
CHE	Switzerland
CHN	China
CM	Contingency management
CO	Carbon monoxide
CPD	Cigarettes per day
CPW	Cigarettes per week
CSS	Cross sectional survey
DH	Department of Health
DNK	Denmark
E-cig	E-Cigarette
ES	Evidence Statements
ETS	Environmental tobacco smoke
FIN	Finland
FTQ	Fagerstrom Tolerance Questionnaire
GBR	Great Britain
GP	General Practitioner
HCP	Healthcare professionals
HMO	Health management organisation
I	Intervention group
IOM	Institute of Medicine
LS	Longitudinal study
MHRA	Medicines and Healthcare products Regulatory Agency
MI	Motivational interviewing
MM	Mixed methods study
NCP	Nicotine containing product
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence
NIDA	National Institute of Drug Abuse
NRT	Nicotine replacement therapy
NTIS	National Technical Information Service
PE	Process evaluation
PPM	Parts per million
PSC	Pre-operative Smoking Cessation
Q	Qualitative study
RCT	Randomised controlled trial
SC	Smoking Cessation

SES	Socio-economic status
SF	Smoke free
SR	Smoking Reduction
SSS	Smoking Services Staff
ST	Standard treatment
TA	Temporary abstinence
THR	Tobacco harm reduction
THR/Quit	Study examines views tobacco harm reduction and smoking cessation ('without mention of cutting down phase') together
THR-CDTQ	Study examines views on cutting down to quit
THR-PSC	Study examines views on preoperative smoking cessation
THR-SR	Study examines views on smoking reduction
THR-TA	Study examines views on temporary abstinence
UBA	Uncontrolled before and after study
UK	United Kingdom
USA	United States
VAR	Various countries included in study
WHO	World Health Organisation

1 INTRODUCTION

1.1 Aims of the review

To review the barriers and facilitators to implementing smoking cessation and tobacco harm reduction (THR) approaches, including user and provider perspectives.

1.2 Research questions

- What factors might act as barriers or facilitators to tobacco harm-reduction approaches?
- What are smokers'/families' and healthcare professionals' views, experiences and perspectives on whether specific tobacco harm-reduction approaches (such as behavioural support, counselling, advice or self-help) are perceived to have a differential impact on particular groups (i.e. by age, gender, socio-economic status or ethnicity, level of contemplation, motivation and addiction)?
- What are smokers'/families' and healthcare professionals' views, experiences and perspectives on the potential or actual unintended consequences from adopting a harm-reduction approach?
- What are smokers'/families' and healthcare professionals' views, experiences and perspectives on how best to deliver messages about tobacco harm reduction without weakening the impact of advice about the benefits of stopping smoking?

1.3 Background

Although smoking rates have declined sharply in the last 30 years, this decline has slowed in recent years with prevalence rates levelling off at 21% in England in 2008 (Robinson and Bugler, 2010) and 24% in Wales in 2009 (Welsh Assembly Government, 2010). Fourteen percent of adults in managerial and professional households in England reported that they currently smoked, compared with 29% in routine and manual households; the corresponding figures for Wales were 15% versus 31%.

People from routine and manual occupational groups take in more nicotine from cigarettes than more affluent people (Jarvis 2010). This increases their exposure to the other toxins in tobacco smoke and, thus, increases their risk of smoking-related disease. Higher nicotine exposure can also make it harder for them to quit and they are more likely to cut down first rather than quit smoking 'abruptly' (Siahpush et al. 2010). Exposure to increased levels of nicotine, carbon monoxide and other toxins can also result from 'roll-your-own' as compared to manufactured cigarettes (UK Department of Health Tobacco Policy Team 2003).

In the past, public health strategies with respect to smoking have focused on discouraging people from starting to smoke and helping smokers to quit the habit completely. There remains a group of smokers who either want to quit but feel unable to stop abruptly or otherwise are not willing or able to quit but may be prepared to reduce the amount they smoke. The healthiest course of action for all smokers is to stop smoking but *harm reduction measures* attempt to limit the risks by reducing exposure to the toxic chemicals found in tobacco smoke (Royal College of Physicians, 2007).

Harm reduction is defined as 'policies, programmes, services and actions which aim to reduce the harm to individuals, communities and society that are associated with the use of drugs'. Such measures are pragmatic, recognising that the reduction of harms may be more feasible than complete elimination of drug use (UK Harm Reduction Alliance).

In relation to tobacco use specifically a product is considered harm reducing 'if it lowers total tobacco-related mortality and morbidity, even though use of that product may involve continued exposure to tobacco related toxicants' (Stratton et al, 2001). Harm reduction can refer both to those who want to quit but feel unable to do so abruptly, and those who smoke and do not feel willing or able to quit but who want to reduce the harm that smoking is doing to their health, or to the health of those around them (Royal College of Physicians, 2007).

Smokers continue to smoke predominantly due to nicotine addiction, but in so doing expose themselves to a large number of chemicals, many of which are established carcinogens. Tobacco smoke contains over 4,000 chemicals, including carbon monoxide, nitrosamines, polycyclic aromatic hydrocarbons, nitrogen oxides, hydrogen cyanide and heavy metals. Furthermore, exposure to second-hand smoke in the home causes an estimated 11,000 deaths a year in the UK from lung cancer, stroke and ischaemic heart disease (Jamrozik 2005).

The Royal College of Physicians estimate that if only 0.4% of the population of smokers in the UK switch from smoking to less harmful nicotine sources each year, this would save approximately 25,000 lives in 10 years. In addition, the Department of Health's (DH) publication *'Drug Misuse and dependence: UK guidelines on clinical management'* states that: 'Given the high rates of smoking and the low quit rates in drug misusers, it may be reasonable to consider harm reduction approaches to smoking such as replacing cigarettes with clean nicotine in the form of patches for some of the day. This may be particularly useful in alleviating the symptoms of tobacco withdrawal while a patient is within a residential or inpatient drug treatment facility' (DOH, 2007).

A systematic review of the evidence (Pisinger 2007) found that the limited data available suggest that a substantial reduction in smoking (defined in many studies as ≥50% reduction in baseline smoking) improves several cardiovascular risk factors and respiratory symptoms. In addition, smoking reduction is associated with a 25% decline in biomarkers and incidence of lung cancer and a small, non significant, increase in birth weight.

Although harm reduction strategies have been successful in other areas, when applied to tobacco they are controversial. For example there may be unintended consequences of adopting harm reduction measures such as ex-smokers relapsing to the harm reduction option and young people starting off with the harm reduction option in the belief that it is safer. In such cases it is possible the benefits may be overwhelmed by more widespread uptake of harm reduction measures. Another criticism levelled against harm reduction measures is that they represent an admission of defeat and still leave the smoker exposed to harm (Bates, 2002).

The National Institute for Health and Clinical Excellence (NICE) has been asked by the Department of Health to develop guidance on 'Tobacco – harm reduction approaches to smoking'. This guidance will provide recommendations for good practice based on the best available evidence of effectiveness, including cost effectiveness. It is aimed at professionals, commissioners and managers with public health as part of their remit. It is especially aimed at

those involved in smoking cessation services within the NHS, local authorities and the wider public, private, voluntary and community sectors. It will also be of interest to members of the public, especially people who want to stop or cut down the amount they smoke.

The guidance will make recommendations on approaches to help smokers of all ages who:

- want to quit smoking but feel unable to do so ‘abruptly’ (that is, they want to cut down before quitting)
- are not willing or able to quit, but want to reduce the harm that smoking is doing to their health (or to the health of those around them)
- want to quit smoking but are not willing or able to stop using nicotine
- want to stop smoking temporarily, for example, while at work.

2. METHODS

2.1 Literature search

A comprehensive literature search was undertaken to identify evidence in the English language that is:

- of the highest quality available, considering the hierarchy of evidence ;
- applicable to the UK, from world-wide studies;
- of high methodological quality, as assessed by critical appraisal;
- publicly available, including trials in press ("academic in confidence").

The following study designs were included:

- Qualitative and quantitative evidence of views and opinions - questionnaire surveys, process evaluations and qualitative studies; both primary studies and systematic reviews of studies which were unpicked for relevant primary studies.

2.1.1 Electronic sources (databases and websites)

The following sources were searched in August 2011 to identify relevant intervention studies in the English language published between 1990 and 2011. In November 2011 and January 2012 update searches were conducted in the databases marked * and GlobaLink and ASH Scotland newsletters were checked on a weekly basis for additional research.

The search strategy was developed for Ovid Medline [Appendix C] and translated for use in all other sources detailed below. A full set of search strategies are available from the authors.

Databases:

- AMED (Allied and Complementary Medicine)*
- ASSIA (Applied Social Science Index and Abstracts)
- British Nursing Index
- CINAHL (Cumulative Index of Nursing and Allied Health Literature)
- Cochrane Central Register of Controlled Trials*
- Cochrane Database of Systematic Reviews*
- Cochrane Public Health Group Specialized Register [based at SURE]
- Database of Abstracts of Reviews of Effectiveness (DARE)*
- Database of promoting health effectiveness reviews (DoPHER), EPPI-Centre
- Current Contents
- EMBASE*
- HMIC (or King's Fund catalogue and DH data)*
- Medline and Medline in Process*
- NHS EED*
- UK Clinical Research Network Portfolio Database
- PsycINFO*
- Sociological Abstracts
- Social Policy and Practice
- Web of Knowledge (Science and Social Science Citation Indexes)*

- WHO Tobacco Control Database

Web sites:

- Smoke free http://smokefree.nhs.uk
- NHS Centre for Smoking Cessation and Training http://www.ncsct.co.uk/
- Action on Smoking and Health (ASH) http://www.ash.org.uk
- Treat tobacco.net http://www.treatobacco.net/en/index.php
- Society for Research on Nicotine and Tobacco http://www.srnt.org
- International Union against Cancer http://www.uicc.org
- WHO Tobacco Free Initiative (TIF) http://www.who.int/tobacco/en
- International Tobacco Control Policy Evaluation Project http://www.itcproject.org
- Tobacco Harm Reduction http://www.tobaccoharmreduction.org/index.htm
- Current controlled trials www.controlled-trials.com
- Association for the treatment of tobacco use and dependence (ATTUD) www.attud.org
- National Institute on drug abuse- the science of drug abuse and addiction http://www.nida.nih.gov/nidahome.html
- NICE http://www.nice.org.uk/
- OpenGrey http://www.opengrey.eu/
- Public health observatories http://www.apho.org.uk/
- Scottish Government http://home.scotland.gov.uk/home
- Welsh Government http://wales.gov.uk/?lang=en
- NHS Evidence http://www.evidence.nhs.uk/
- Joseph Rowntree Foundation http://www.jrf.org.uk/
- The Centre for Tobacco Control Research (University of Stirling) http://www.management.stir.ac.uk/research
- UK Centre for Tobacco Control Studies http://www.ukctcs.org/ukctcs/index.aspx
- Tobacco Control Research Group (University of Bath) http://www.bath.ac.uk/health/tobacco/
- Health Evidence Canada http://health-evidence.ca/articles/search
- ASH Scotland news digest http://www.ashscotland.org.uk/ash/4782
- American Association of Public Health Physicians http://www.aaphp.org/tobacco
- Health NZ News http://www.healthnz.co.nz/News2010.htm
- Globallink http://www.globalink.org
- Cancer Research UK http://www.cancerresearchuk.org

2.1.2 Additional searches

Following database and web site searching, the contents pages of the 'top' journals (i.e. the journals with the greatest number of papers meeting inclusion criteria) were hand searched - *Nicotine and Tobacco Research*, *Tobacco Control*, *Qualitative Health Research*, *Addiction* and *Addictive Behaviors* for the previous twelve months. Citation searches via Web of Science were also carried out for included papers.

NICE issued a call for evidence from registered stakeholders in August 2011.

In addition, first authors of all the studies that met the inclusion criteria and other topic specialists identified by the Expert Advisory Group and NICE (Appendix A) were contacted to request information on additional published studies, unpublished work or research in progress.

Information on studies in progress, unpublished research or research reported in the grey literature was sought through searching a range of relevant databases including OpenGrey, Conference Proceedings Citation Index: Science (Thompson Reuters), Inside Conferences, National Technical Information Service (NTIS) and Clinical Trials.gov

Results of the literature searches were imported into Reference Manager and de-duplicated. Please note that whilst studies exploring general perspectives of THR (irrespective of an intervention) were captured by bibliographic database searches, these strategies were primarily designed to identify studies regarding the barriers and facilitators of THR interventions. Searches for general THR views were supplemented by the extensive website and additional search techniques described above.

2.2 Inclusion and exclusion criteria:

	Inclusion	**Exclusion**
Population	1. Smokers (and their families) of all ages who meet at least one of the following: • want to either 'cut down to quit'(CDTQ) smoking or simply reduce the amount they smoke (SR) • need/want to stop smoking temporarily e.g. whilst at work (TA) or pre-operatively to ensure abstinence on day of operation (PSC) • want to quit smoking but are not willing or able to stop using nicotine , and who take part in a study examining a tobacco harm reduction (THR, i.e. CDTQ, TA, PSC, SR) approach (*see THR criteria below*) • others who participate in THR including interventions designed to reduce the number of cigarettes smoked per day; or pre-op interventions designed to ensure abstinence on day of operation • Provide opinions / beliefs / experiences regarding THR approaches 2. Service providers, healthcare personnel and policy makers who may deliver/ commission/refer smokers to THR interventions.	Pregnant women [the post partum population was included]
Tobacco Harm Reduction (THR) approaches	Interventions aimed at helping participants attempt one or more: CDTQ, SR, TA, PSC Methods of interventions offered: • Pharmacotherapies that are licensed for THR: o All nicotine replacement therapy (NRT) products (gum, transdermal patches, inhalers, microtabs, mouth/nasal sprays and lozenges) • Other non-tobacco 'nicotine-containing products', such as 'electronic nicotine delivery systems' (sometimes known as 'electronic cigarettes' or 'e-cigarettes') and topical gels.	• Studies designed as smoking cessation (SC) interventions (i.e. designed to help smokers quit without a 'cutting down' phase) • Interventions to reduce the effects of second hand smoke on children where it is not possible to determine that parents were reducing their overall cigarette consumption. • Pharmacotherapies that are not licensed for THR; including nicotine

	• Behavioural support, counselling or advice for individuals/groups. • Self help.	agonists (e.g. varenicline) and antidepressants (eg bupropion). • Any products containing tobacco. This includes products that claim to deliver reduced levels of toxicity (such as 'low tar' cigarettes), or that reduce exposure to tobacco smoke, for example, by warming instead of burning it. • Products that are smoked that do not contain tobacco, such as herbal cigarettes. • Smokeless tobacco products such as gutka, or paan. • 'Snus' or similar oral snuff products as defined in the European Union's Tobacco Product Directive (European Parliament and the Council of the European Union 2001). • Alternative or complementary therapies, such as hypnotherapy or acupuncture
Outcomes	Smokers/families and healthcare professionals' views, experiences and perspectives on one of the following issues: • Barriers or facilitators to THR approaches • Potential or actual unintended consequences from adopting a harm-reduction approach • Whether specific tobacco harm-reduction approaches (see list above) are perceived to have a differential impact on particular groups (i.e. by age, gender, socio-economic status or ethnicity, level of contemplation, motivation and addiction)? • How best to deliver messages about tobacco harm reduction without weakening the impact of advice about the benefits of stopping smoking	
Study Designs	Qualitative studies, process evaluations and quantitative attitudinal surveys (including correlation studies examining the association of attitudinal variables with SR/CDTQ/TA/PSC. Mixed methods studies were included at least one of the study types above (e.g. qualitative process evaluation of an intervention study addressing THR)	Stand-alone Intervention studies evaluating the effectiveness of interventions on THR outcomes Correlation studies that do not include attitudinal variables (Please note relevant studies identified during the search will be excluded from the main findings of the review, but will be summarised as an appendix).

Table 1: Inclusion/exclusion criteria

To be included, studies had to demonstrate that the purpose of the intervention or the motivation of the participants was THR i.e. long-term reduction of cigarette consumption (SR – smoking reduction), gradual tobacco cessation/cut down to quit (CDTQ), temporary abstinence where smoking is not allowed (TA) or preoperative smoking cessation (PSC) for SC on the day of surgery.

THR purposes could refer to cut down to quit (CDTQ), long term smoking reduction (SR), enforced temporary abstinence in places where smoking was not allowed (TA) or preoperative smoking cessation for at least the day of surgery (PSC). Studies describing barriers and

facilitators to smoke-free settings in order to protect of children or others from second hand smoke, were included if there was also a clear motivation or impact on the smokers' tobacco consumption (i.e. reduction of tobacco consumption with or without eventual quitting). Furthermore, studies that described switching to use of nicotine products for smoking reduction or cutting down to quit or switching to long-term nicotine product use after abrupt smoking cessation were outside of the scope for this review. A separate report is available on quitting and switching to long-term use of nicotine products is available[5]

Studies often described attitudes towards THR and smoking cessation (without mention of CDTQ or TA phase) together. To ensure potentially relevant themes were captured, these perspectives were extracted, omitting key findings if they clearly related to abrupt cessation. For example studies of healthcare providers often discussed barriers and facilitators towards smoking cessation, yet it was clear that some of the same sample (minimum 20%) were providing THR advice within their role, or attitudes were gathered from users of pharmacotherapy aids for the purposes of THR or smoking cessation. Such studies were included if it could be identified that a significant proportion of the sample (20% or more) were providing THR advice, or using aids for the purposes of THR. Studies were also included if participants were questioned about their attitudes towards quitting or smoking reduction together. Where necessary, citations to referenced studies are described in the key findings with a preceding indication of whether they are specific to THR outcomes such, i.e. smoking reduction outcomes (THR-SR), cut down to quit (THR-CDTQ), temporary abstinence where smoking is not allowed, such as public places and smoke-free homes or cars (THR-TA), preoperatively for SC on the day of surgery (THR-PSC) or if the studies refer to a combination of THR and smoking cessation without mention of a cut down to quit phase (THR/Quit).

This information is marked in table 2a and 2b for each study, and included in the study citation each time it is first mentioned in an evidence statement (ES).

2.3 Study selection

Titles and abstracts were screened independently by two reviewers using the inclusion/ exclusion parameters. Any disagreement was resolved by discussion with a third reviewer and, if in doubt, included. Full paper screening was also undertaken independently by two reviewers, with recourse to a third to resolve any disagreements.

Excluded papers were retained with reasons for exclusion. Papers of potential relevance to review teams undertaking associated reviews were identified and forwarded to those teams.

2.4 Quality assessment

Quality assessment was conducted using the GATE checklist for correlation studies and/or the checklist for qualitative studies [NICE 2009]. Ten percent of the checklists were checked by a second reviewer. The review team assessed each study's internal validity and, where required, external validity (external validity measured how far the findings of the study might be generalised beyond the participants to a wider population from which the participants were

[5] Morgan H, Morgan F, Weightman A, Whitehead S. Rapid review for NICE: long term use of non-tobacco nicotine containing products in individuals who have quit smoking abruptly. Cardiff: SURE, May 2012

drawn but not to other populations). Given the inherent problems with bias and confounding associated with design of cross sectional surveys, these studies were rated only as + or – and summary scores only are presented. No checklist was available for process evaluation studies and these have not been assessed for validity.

Summary ratings for all studies are included in the evidence tables (Appendix A) and a quality rating for each element assessed is provided in Appendix B and Appendix C for qualitative and correlation studies respectively. In addition, Appendix B provides a summary of the quality ratings for each element of the included studies that was assessed. Inter-rater reliability scores were explored and resulted in an overall kappa score of 0**.7**8.

2.5 Applicability to the UK

Based on advice from members of the Expert Advisory Group, it was agreed that research from settings where the smoking reduction and cessation programmes are sufficiently similar to those in the UK (including Spain, Norway, Denmark, Australia and New Zealand) would be assessed as having high applicability to the UK.

2.6 Data extraction

Data were extracted as specified in Appendix K of the NICE Public Health Methods Manual and are presented in the Evidence Tables with study characteristics, quality scores and key findings reported by the authors.

2.7 Data synthesis

2.7.1 Thematic synthesis of views, experiences and perspectives

A thematic synthesis of the views regarding barriers and facilitators to tobacco harm reduction (THR) was directed by the team's qualitative synthesis expert and guided by the methods manual (Section 5**.4**) and Dixon Woods (2004).

An index ladder of codes was developed *a priori* to organise the key findings from the included studies at the same time as they were extracted, in accordance with Richie and Spencer (2010). The index of codes was designed to address the review questions. It was formulated following initial reading of a sample of papers by the review team, and collaborative discussion with the team's qualitative synthesis expert. Two separate indices of codes were designed, one for views of healthcare professionals and the tobacco control community, and another for the views of smokers and their families.

Each index of codes was designed to organise the key findings into three main themes of barriers and facilitators:

i. The background environment (e.g. social, physical, financial)
ii. Knowledge, attitudes, beliefs and behaviours towards smoking reduction/ cutting down to quit/temporary abstinence
iii. Knowledge, attitudes, beliefs and behaviours towards specific THR interventions to assist smoking reduction/cutting down to quit/temporary abstinence

Population differences highlighted within the study and any miscellaneous issues of importance not coded elsewhere in the index ladder of codes were also extracted. If studies included themes/findings outside of the review scope, these were noted but not extracted.

The coding system was also designed to determine the intervention being discussed (where applicable), whether smokers were professionally supported in the intervention they adopted and whose voice the key findings represented. Where studies included smokers' and/or their friends' and families' views, a range of population characteristics were coded for gender, age, ethnicity, socioeconomic, sexual orientation, health characteristics (e.g. mental health patient, hospital inpatient or awaiting surgery), whether successful SR/CDTQ/quitter, smoking status (e.g. regular smoker/strong nicotine dependency), motivation to SR/CDTQ/quit; and parenting status. Where studies included views of professionals, their occupations were coded together with the characteristics of the smoking population where provided.

Key findings were extracted from the qualitative interviews, cross-sectional surveys, mixed methods studies and process evaluations identified. Findings from quantitative surveys were thematically described, and numerical values reported where necessary.

Extracted data were organised within the index of codes, under thematic headings. The findings were then read and re-read by two reviewers. Categories were collapsed, and subdivided to derive main themes emerging from the papers. Individual studies included a range of findings, some of which were not reported in other studies. Where the data were from studies of poor quality, limited applicability to UK or were judged not to be relevant to the review question – the findings were not included in the analysis of main themes and barriers.

2.7.2 PAHRIS Framework

The identified barriers and facilitators were also mapped against a conceptual model of implementation (Promoting Action on Research Implementation in Health Services (PARIHS) framework to better understand the critical factors for successful implementation and tobacco harm reduction in smokers. The PARIHS framework has been theoretically and empirically developed to represent the interplay and interdependence of the many factors influencing implementation of evidence (interventions) into practice. The hypothesis offered is that for interventions to be successful there needs to be clarity about the nature of the interventions being used, the quality of context, and, the type of facilitation needed to ensure a successful process.

2.7.3 Mapping whether effectiveness studies from Reviews 2 and 3, address the identified facilitators and barriers to THR approaches

In order to determine whether intervention studies were consistent with the beliefs of smokers and providers, the theories, intent and processes underpinning interventions used in the effectiveness reviews 2 and 3 were examined and judged whether they addressed the barriers and facilitators identified by smokers and providers.

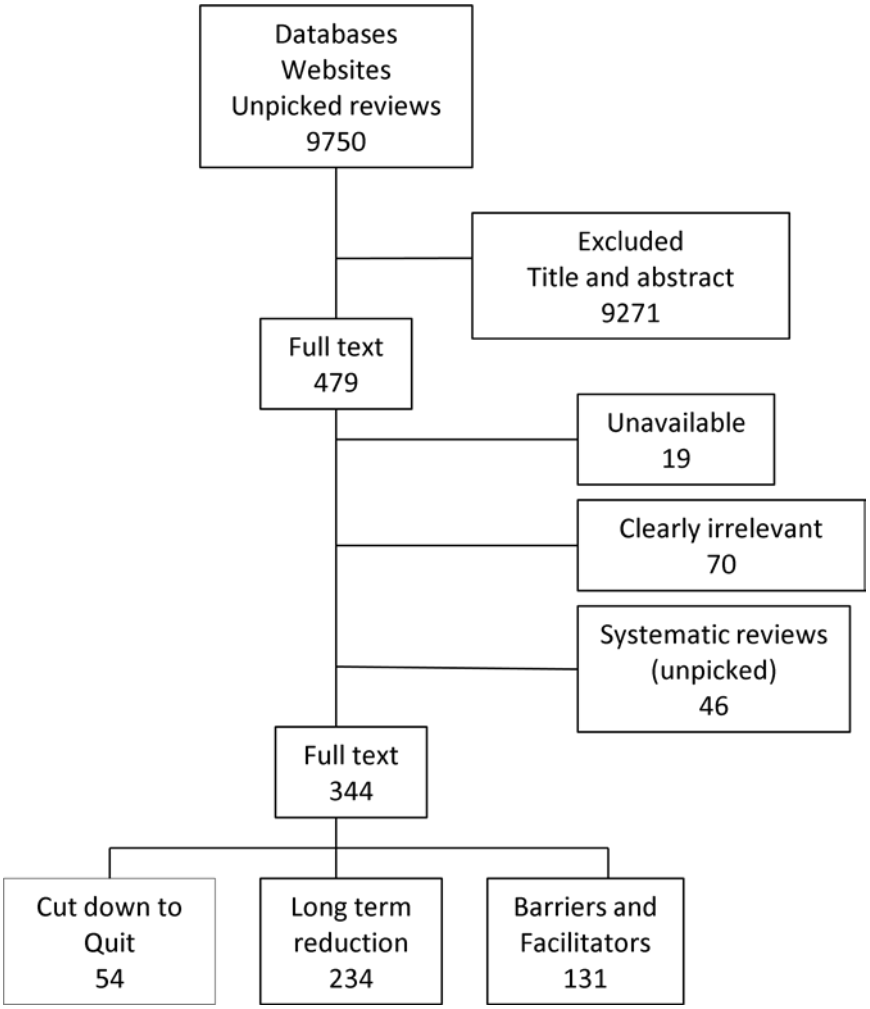
3. RESULTS

3.1 Search Results

The search strategy was conducted in two stages. An original search was run across reviews 2, 3 and 4. This identified 9750 citations of which 9271 were excluded at title and abstract. Of the remaining papers to be considered in full text, 19 were unavailable, 70 were found to be clearly irrelevant and 46 were systematic reviews. The remaining 344 papers were considered for inclusion in one or more of the three reviews. 131 were identified from the original searches for consideration in this review.

Update searches, reference list checking and contacts with experts were then completed, with a total of 624 references considered for inclusion. 182 were reviewed in full text. Of these, 46 are included in the review. A full list of excluded papers for the review is provided in Appendix H.

Literature search – stage 1



Literature search – stage 2

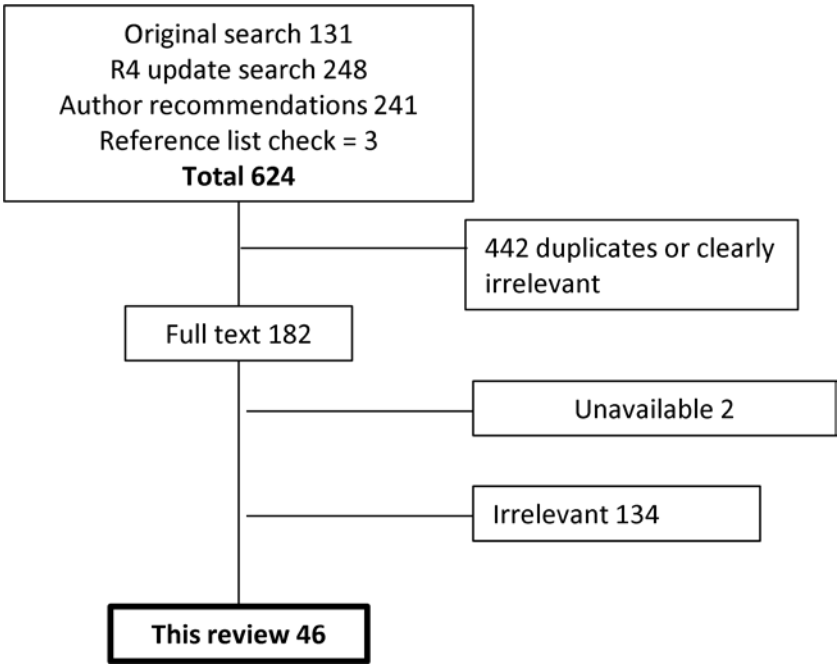


Figure 1: Flow diagram of studies

3.2 Quality and applicability of studies

The quality of the included studies was generally moderate. Only three of the 17 qualitative studies (Q) were deemed to be of high quality (**Bottorff 2009 ++**, **Jones 2011++**, **Schultz 2011 ++**) and none of the 23 cross sectional surveys (CSS) or 3 mixed methods studies (MM) rated as high quality. Most studies were deemed to be of moderate quality, with 1 qualitative, 6 cross-sectional surveys and one mixed methods study being rated −.

Over one third of the studies were considered to have high applicability to the UK. This included five studies from the England-based Smoking Toolkit Study[6] (**Beard 2011a Q+**, **Beard 2011b CSS–**, **Beard 2012a CSS+** , **Beard 2012b CSS+** ,**Black 2012 CSS+**), a further nine UK-only studies(**Amos 1995 CSS–**, **Blackburn 2003 CSS–, Haddock 1997 PE**, **Jones 2011 Q++, McEwen 2001 CSS+**, **Phillips 2007 Q+**, **Ratschen 2009 CSS+**, **Ratschen 2010 Q+**, **Robinson 2010 Q+**), and two studies conducted in the UK plus other countries (**Cheong 2007 LS+**, **Etter 2011 CSS+**). Four studies were from countries judged to be have sufficiently similar smoking reduction and cessation programmes , including two based in Australia (**Ashton 2010 MM-**, **Hamilton 2000 CSS+**),one in Denmark (**Thomsen 2009 Q-**) and a further study conducted in several European countries including Spain (**Brotons 2005 CSS+**).

Four studies (**Borelli 2007 CSS–**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **Warner 2003 CSS+**) were USA-based, and specifically stated that they adopted the Institute of Medicine (IOM) definition of THR whereby: "a product is harm reducing if it lowers total tobacco-related mortality and morbidity even though use of that product may involve continued exposure to tobacco-related toxins (including nicotine). All tobacco containing products are outside the scope of this

[6] http://www.smokinginengland.info/

review. A further ten studies were also conducted in the USA (**Estabrooks 2010 MM+** , **Foulds 2011 CSS–** , **Gaglio 2010 PE**, **Joseph 2004b CSS+** , **Joseph 2005 CSS+**, **Nichter 2008 Q+**, **Nguyen 2009 CSS+**, **Okuyemi 2002 CSS+**, **Richter 2002 Q+**, **Shiffman 2007 CSS+**), nine in Canada (**Abdullah 2011 Q+**, **Bottorff 2009 Q++**, **Cunningham 2008 CSS+**, **Green 2005 MM–**, **Herbert 2011 Q+**, **Johnson 2004 Q+**, **Poland 2009 Q+**, **Schultz 2009 CSS+**, **Schultz 2011 Q++**, **Stewart 2011 Q+**), two in Switzerland (**Bolliger 2000 CSS+**, **Keizer 2009 CSS–**) and one in Finland (**Kurko 2009 CSS+**) and China (**Abdullah 2011 Q+**)**.**

3.3 Nature of THR information provided

As discussed, the barriers and facilitators to smoking cessation and tobacco harm reduction were not always clearly separated within studies. The majority of studies solely regarded THR approaches or it was possible to extract findings relating only to THR. There were seventeen examining smoking reduction (**Beard 2012a CSS+** , **Black 2012 CSS+**, **Cunningham 2008 CSS+**, **Estabrooks 2010 MM+**, **Gaglio 2010 PE**, **Joseph 2004b CSS+**, **Joseph 2005 CSS+** , **Keizer 2009 CSS–** , **Nichter 2008 Q+**, **Nguyen 2009 CSS+**, **Okuyemi 2002 CSS+**, **Richter 2002 Q+**, **Beard 2011b CSS–**, **Bolliger 2000 CSS+**, **Schultz 2009CSS+**, **Warner 2003 CSS+**, **Cheong 2007 LS+**); eleven examining temporary abstinence at public places, hospitals, workplaces or homes/cars (**Abdullah 2011 Q+**, **Blackburn 2003 CSS–**, **Herbert 2011 Q+**, **Jones 2011 Q++** , **Phillips 2007 Q+** , **Poland 2009 Q+**, **Robinson 2010 Q+**, **Schultz 2011 Q++**, **Beard 2011a Q+**, **Beard 2012b CSS+**, **Kurko 2009 CSS+**), one regarded cut down to quit (**Cheong 2007 LS+**) and two covered smoking cessation prior to surgery (**Haddock 1997 PE**, **Thomsen 2009 Q–**). Two studies also covered more than one THR approach, i.e. smoking reduction and temporary abstinence(**Beard 2011a Q+, Ratschen 2010 Q+**) plus cut down to quit and smoking reduction(**Shiffman 2007 CSS+**)**.**

The remaining studies considered both smoking cessation and THR together, and it was not always possible to separate results for THR (**Amos 1995 CSS–**, **Ashton 2010 MM–**, **Bottorff 2009 Q++**, **Borrelli 2007 CSS**, **Brotons 2005 CSS+**, **Etter 2011 CSS+**, **Foulds 2011 CSS–**, **Green 2005 MM–**, **Hamilton 2000 CSS+**, **Johnson 2004 Q+**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **McEwen 2001 CSS+**, **Ratschen 2009 CSS+**, **Stewart 2011 Q+**).

3.4 Whether smokers' THR efforts were supported by professionals /study interventions

Only one study clearly identified that the participants views were smokers who had cut down to quit on their own (**Cheong 2007 LS+**). Six studies provided views from smokers who were being assisted by a study intervention (**Amos 1995 CSS–**, **Cunningham 2008 CSS+**, **Estabrooks 2010 MM+**, **Herbert 2011 Q+**, **Joseph 2004a Q+**, **Thomsen 2009 Q–**).

In the remaining studies, whilst most were recruited from general populations, the researchers did not record whether the views provided were from smokers who had received professional assistance.

The evidence statements and narrative synthesis only highlight studies that are known to have received / not received support from professionals and study interventions. Table 2a provides further information, recording whether participants did /did not receive support or where it is not clearly reported.

Table 2a: Brief summary of included studies (Smokers' Perspectives)

* Studies are complex and this table can only give a flavour of each intervention. See Appendix A for more detailed summaries.

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
Abdullah 2011 [Q+]	Why/how much carers of children aged 5 or under smoke around children, understand the hazards, think about adopting a no smoking policy at home, and how they can reduce children's exposure to SHS and cut down or quit smoking	• 31 primary caregivers of young children (15 smokers, 16 non-smokers) in Urban Shanghai, China • Four focus groups and 10 in-depth semi-structured interviews • THR focus: Temporary abstinence (smoking restrictions at home) • Support: Unclear if receiving support to implement smoking restrictions	• Barriers: Smokers in social network • Facilitators: Social pressure, expense of smoking, wish to protect children, worries of harm to own health
Amos 1995 [CSS–] *Linked to effectiveness study*	To explore the value of providing a telephone helpline service to workplace smokers to provide information and advice to staff about the no-smoking policy, and to offer additional services to those who wanted help to give up smoking. These services included a literature pack containing leaflets and information about smoking and ways of quitting, an individual 'Smoke Screen' (health check) with occupational health service and a presentation at their workplace about cessation	• 696 British Telecom employees who completed a follow-up survey after calling the smoking helpline. UK (nationwide) • Self-completed questionnaires • THR focus: Mixed purpose. Callers were reducers or quit attempters. Workplace was also subject to a smoking ban. • Support: Yes. Callers sought advice from helpline.	• Intervention beliefs: helpfulness of behavioural interventions • Facilitator: smoke-free setting
Beard 2011a [Q+]	Part of Smoking Toolkit study. To identify factors that may account for the lack of reliable reductions in cigarette consumption among those spontaneously using NRT for smoking reduction/temporary abstinence and possible reasons for smokers' preference for the nicotine patch	• 36 users of NRT, UK • Interviews • THR focus: NRT for reduction (n=9), temporary abstinence (5) or both (n=22). • Support: Unclear. Recruited from general smoking population. Not reported how users acquired NRT. Some quotes show that they have discussed smoking with health care providers.	• Barriers: smokers in social network, boredom, stress, • Facilitators: perception that smoking reduction leads to cessation, self-management - structuring and scheduling of smoking, worries of harm to own health from smoking • Intervention beliefs: whether NRT helps achieve THR goals, perceived negative and positive features of NRT for THR, perceived cost of NRT , perceived side effects and safety concerns, misconceptions of how and when to use NRT for THR, perceptions NRT harms smokers health • Not offered THR advice or assistance by healthcare providers
Beard 2012a *in press* [CSS+]	Part of Smoking Toolkit study. To assess the association of self reports of smoking reduction and use of NRT for smoking reduction with standard ratings of happiness and life satisfaction	• 1,532 current smokers (848 were attempting to cut down, including 235 NRT users), UK, England • Four months cross sectional data • THR focus: Reduction using NRT • Support: Unclear. Recruited from general population. Not reported how users acquired NRT or decided to	• Smokers use of NRT for smoking reduction • Use of NRT for smoking reduction is not associated with benefits to life satisfaction or happiness

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
		cut down	
Beard 2012b *In press* [CSS+]	Part of Smoking Toolkit study. To assess the prevalence of NRT use in various situations requiring periods of temporary abstinence, the helpfulness of NRT and associates with cigarette consumption and attempts to quit smoking	• 3775 adult smokers, 13% were regular users of NRT for temporary abstinence • National household survey • THR focus: NRT for use in the office, at home in a pub/bar, restaurant and/or while travelling • Support: Unclear. Recruited from general population. Not reported how users acquired NRT or decided to cut down	• Intervention beliefs: NRT helps achieve THR goals
Black 2012 [CSS+]	Part of Smoking Toolkit study. To measure concerns among smokers about the harmfulness of NRT, association with NRT use as an aid to cessation and its use for smoking reduction	• 1,657 current and recent ex-smokers. 14% were using NRT for reduction. England, UK • Four months cross sectional data from the smoking toolkit study • THR focus: Mixed purpose – views regarding long-term use of NRT for cessation or reduction • Support: Unclear. Recruited from general population. Not reported how users acquired NRT or decided to cut down	• Intervention beliefs: smokers beliefs on whether NRT helps achieve THR goals, smokers-perceived side effects and safety concerns
Blackburn 2003 [CSS-]	To examine parents' reported knowledge and use of harm reduction strategies to protect their infants from exposure to tobacco smoke in the home.	• 314 smoking households with infants, Coventry and Birmingham, UK • Cross sectional survey • THR focus: Temporary abstinence (smoking restrictions at home) • Support: Unclear if receiving support to implement smoking restrictions	• Barrier: lack of knowledge of the harms of second-hand smoke on children • Facilitator: smoke-free setting
Bolliger 2000 **[CSS+]**	To explore the reasons and motivators for wanting to reduce smoking and how do those wanting to reduce differ from those wanting to quit immediately	• 400 smokers enrolled in an intervention study to encourage reduction (paper also reports smokers enrolled for a cessation trial (n=100), which are not discussed in this review). Switzerland • Baseline questionnaire of smokers enrolled in a smoking reduction trial. • THR focus: Reduction • Support: Yes. Sample are those volunteering to enter intervention study, though views are collected at baseline	• Barriers: social pressure • Facilitators: smokers perception that smoking is expensive, smokers perception that smoking reduction leads to cessation, smokers displeasure with smoking, smokers worries of harm to own health
Bottorff 2009 [Q++]	To learn how new fathers narrate their experiences of tobacco reduction and cessation during their partners' pregnancy and postpartum	• 29 new fathers who had smoked prior to or during their partner's/wife's pregnancy and lived in the same household, Canada	• Facilitators: social pressure, perception that smoking is expensive perception that smoking reduction leads to cessation, structuring and scheduling of smoking, wish to

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
	period. To identify ways interventions might be tailored to address the tobacco reduction needs of fathers	• Semi-structured interviews • THR focus: Mixed purpose - views on reduction and cessation • Support: Unclear. Recruited from general population, where participants discuss use of NRT or reduction it is not reported if they sought / received assistance to do so.	protect children, worries of harm to own health • Barriers: smokers perceived dependence and nicotine addiction, • NRT Intervention beliefs: whether NRT helps achieve THR goals, smokers-perceived side effects and safety concerns • Smokers perceptions they are not offered THR advice or assistance by healthcare providers
Cheong 2007 [**LS+**]	To examine characteristics of smokers who quit on their own and who reported using each of two quitting methods (abrupt cessation vs. gradual reduction)	• 856 adult smokers who had quit after cutting down. UK, USA, Canada and Australia • Structured telephone interviews with 301 recent smokers who had made a quit attempt between the follow up and previous wave. • THR focus: 'Cut down to quit' results are extracted, results for those who used abrupt cessation are not extracted in this review • Support: No. Authors state participants were those who had made a cut down to quit attempt on their own (with or without stop smoking medication)	• Facilitators: Smokers perceived confidence in ability to achieve smoking goal, worries of harm to own health • Barriers: smokers perceived dependence and nicotine addiction
Cunningham 2008 [CSS+]	To find out if participants would be interested in NRT if offered free of charge, for what purpose would they use the NRT, for how long would they be willing to stay off cigarettes and how soon would they use it if sent to their home	• 825 adult smokers, Canada • Telephone survey • THR focus: Only extracted views regarding use of NRT for reduction • Support: Unclear. General smoking population,; Views regarding use of NRT if free and how soon they would use it if sent to their homes	• Smokers beliefs on whether NRT helps achieve THR goals
Estabrooks 2010 [MM+] *Linked to effectiveness study*	To determine if there are personal contextual differences that may explain why some participants were able to successfully reduce tobacco use while others were not, following receipt of a behavioural intervention (telephone counselling and newsletter intervention) to promote smoking reduction	• 164 adult smokers in Colorado, USA • Quantitative and qualitative data collected during counselling calls and during sample collections • THR focus: Reduction • Support: Yes .Behavioural intervention provided by nurse	• Barriers: smokers in social network, association of smoking and driving to THR, boredom, stress • Facilitators: social support, smokers structuring and scheduling of smoking, worries of harm to own health • Intervention beliefs: Smokers beliefs on whether NRT helps achieve THR goals
Etter 2011 [CSS+]	To assess how and why e-cigarette users used the product, their satisfaction with it and its perceived effects	• 3587 adults. 62% from USA, 6% UK and remainder from other countries including France, Switzerland and Canada (Visitors to the Swiss *StopTabac* web site). 84.5% were current users of e-cigs, 15% never users and 1% past users. • Internet survey in English and French • THR focus: Mixed purpose. 29% of sample was current	• Intervention beliefs: utilising e-cigarettes to help with THR, beliefs that e-cigarettes do not help with smoking craving, smokers perceptions e-cigarettes are cheaper than smoking, fear of addiction and safety of e-cigarettes

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
		smokers, of which 84% were attempting reduction, and 60% cessation. Some questions ask specifically about use of e-cigs for temporary abstinence • Support: Unclear. Not reported how users acquired e-cigs or decided to address smoking	
Foulds 2011 [**CSS–**]	To identify the e-cigarette products used by experienced users, their pattern of use and the impact on tobacco use	• 104 e-cigarette users , attending a meeting of e-cigarette enthusiasts, USA • Questionnaire • THR focus: Mixed purpose sample, 20% of sample were using e-cigs for reduction and 77% for cessation or avoid relapsing. Some questions are asked about e-cig use for temporary abstinence • Support: Unclear. Not reported how users acquired e-cigs or decided to address smoking	• Significant proportion of e-cigarette users utilising e-cigarettes for THR • Smokers beliefs that e-cigarettes do not help with smoking craving
Gaglio 2010 [PE] *Linked to effectiveness study* and Estabrooks 2010.	Process evaluation of a smoking reduction telephone counselling and newsletter intervention.	• Describes lessons learned in designing a behavioural intervention to reduce smoking that was tested on 320 adult smokers scheduled for outpatient surgery or diagnostic procedure. Colorado, USA • Author discussion of lessons learned in designing intervention • THR focus: Reduction	• The paper reported difficulties faced in the design of a THR behavioural intervention described in Estabrooks 2010. This paper is discussed in the section relating to smokers views of behavioural interventions along with Estabrooks 2010.
Green 2005 [MM–]	To explore attitudes about smoking or not smoking when hospitalised	• 32 adults with mental illness and subsequent focus groups with 21 of the respondents. Participants were current smokers or had already quit smoking for 1 year. Winnepeg, Canada • Cross sectional questionnaire and qualitative study • THR focus: Mixed purpose – describes people's attitudes towards cut down to quit or cessation • Support: Not reported whether smoking addressed within medical intervention, though experiences of being offered assistance discussed	• Barriers: smokers in social network, social pressure to THR • Smokers perceptions they are not offered THR advice or assistance by healthcare providers
Haddock 1997 [PE] *Linked to effectiveness study*	To explore satisfaction with a behavioural intervention to support those individuals with the intention of stopping or reducing smoking, to do so prior to hospital admission for surgery	• 60 smokers enrolled in a pre-surgical smoking cessation trial (receiving intervention or control) in an NHS hospital, Derbyshire, UK. • Interview and questionnaire • THR focus: Quitting or reducing prior to surgery • Support: Yes. Intervention assisted	• Facilitators: perception that smoking is expensive, worries of harm to own health from smoking • Barriers: stress , perceived low ability in achieving smoking goal • Intervention beliefs: behavioural interventions help achieve THR • Smokers perceptions they are not offered THR advice or assistance

Study & Rating	**Aim**	**Population and location, Method, type of THR and whether smokers were professionally supported**	**Overview of (review) themes – Smokers' perspectives**
Hamilton 2000 [CSS+]	To explore the determinants of regular versus occasional smoking by students' attitudes, experiences and behavioural practices	• 1,662 school students aged 12-15 years old answered quantitative questions and a sub-sample of 256 students answered qualitative questions. Current, former and non- smokers. Western Australia • Survey with structured and open questions • THR focus: Mixed purpose. Discusses attitudes regarding smoking and methods students use to limit smoking; Authors discuss in the context of harm reduction. Of the regular smokers 46% had attempted to quit and 24% to reduce smoking. Some questions are specific to smoking reduction • Support: Unclear. No mention of receiving assistance or information	• Barriers: smokers in social network, • Facilitators: perception that smoking is expensive, smoking reduction leads to cessation, displeasure with smoking, worries of harm to own health from smoking • Intervention beliefs: whether NRT helps achieve THR goals
Herbert 2011 [Q+] *Linked to an effectiveness study testing an intervention to empower parents to make their homes and vehicles smoke-free*	To explore the barriers and facilitators to smoke-free homes and vehicles	• 36 parents of where at least one adult smoked in the home daily with a child five years old or younger residing in the home. Prince Edward Island, Canada • Interviews • THR focus: Temporary abstinence (smoke-free homes and vehicles) • Support: Yes, however, sample was enrolled in RCT, whereby intervention group received intervention to empower parents to make homes smoke-free. No intervention effect was detected, so intervention and control participants were treated as a single sample.	• Barriers: smokers in social network, association of smoking and driving, stress, perceived dependence and nicotine addiction • Facilitators: social pressure, smokers wish to protect children
Johnson 2004 [Q+]	To examine youth accounts of smoking and their engagement in purposeful strategies to restrict their smoking	• 35 adolescents were current (regular or occasional), former and non- smokers. Canada • Qualitative Interviews • THR focus: Mixed purpose, controlling smoking is discussed in context of reduction or cessation (authors state that these strategies overlap) • Support: Unclear. It is not reported whether the adolescents received advice or assistance to control their smoking. Authors refer to "natural processes of youth tobacco control".	• Facilitators: social support, perception smoking is expensive, perceived confidence in ability to achieve smoking goal, self-management - structuring and scheduling of smoking • Barriers: stress, perceived low ability in achieving smoking goal
Jones 2011 [Q++]	To explore home smoking behaviours and the motivators and barriers to smoke-free homes among a group of disadvantaged caregivers for young children and to identify the positive levers	• 22 disadvantaged caregivers accessing Children's Centre Services, Nottingham, UK • Qualitative interviews • THR focus: Temporary abstinence (smoking	• Barriers: Social networks consisting of smokers, barriers to implementing smoke-free homes, stress • Facilitators: smoking restrictions, dislike of homes smelling of smoke, wish to protect children

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
	that healthcare professionals can utilize when supporting smoking behaviour change.	restrictions at home) • Support: Unclear if receiving support to implement smoking restrictions	
Joseph 2004b [CSS+]	To describe smokers' interest in harm reduction strategies, specifically concurrent smoking and NRT	• 301 smokers having made a recent quit attempt at a medical centre, USA • Telephone survey • THR focus: Only extracted information regarding reduction • Support: Yes. Smokers recruited from a medical centre who had received pharmacological aid for smoking cessation. Interest in further treatment among this population for reduction measured.	• Intervention beliefs: whether NRT helps achieve THR goals • Perceptions that THR weakens cessation message
Joseph 2005 [CSS+] *Linked to The Reduction of Smoking in Cardiac Patients (ROSCAP) trial*	To assess self initiated reduction prior to enrolment (in a smoking reduction trial providing behavioural counselling and NRT) and determine predictors of that behaviour	• 152 adult smokers with heart disease enrolled in a trial to reduce smoking, Minneapolis, USA • Survey administered as part of baseline data collection • THR focus: Reduction • Support: Unclear. The study measured 'self-initiated' reduction prior to starting the trial. Not reported whether participants received help to achieve this.	• Intervention beliefs: tobacco-reduction assisted by NRT improves health
Keizer 2009 [CSS–] *Linked to a trial evaluating the impact of a partial smoking ban on psychiatric patients and staff*	To study the effect of a partial smoking ban (smoking allowed in a single room only) on psychiatric patients and staff members. For the purposes of this review, only the results regarding motivations to increase or decrease smoking on psychiatric inpatients were extracted	• 134 inpatients and 85 staff members (post partial ban) in a psychiatric hospital. Geneva, Switzerland • Cross-sectional questionnaires (administered face-to-face with patients) • THR focus: Reduction (only data on patients reported influences on decreases or increases of smoking in hospital were extracted) • Support: N/A. Background influences on smoking in hospital described, not efforts to control tobacco consumption	• Barriers: boredom, stress, smokers perceived dependence and nicotine addiction
Nguyen 2009 [CSS+]	Analysing situations in which intermittent smokers (former daily smokers and those who had never smoked daily) were likely to smoke	• 1,581 current smokers (18-29 years old).California, USA • Questionnaire (California Tobacco Survey) • THR focus: Reduction. For the purposes of this review, results for intermittent smokers who formerly smoked daily (former-daily intermittent) and compare to daily smokers • Support: Unclear. Recruited from general population. Not reported whether participants received assistance	• Barriers: smokers in social network • Facilitators: self-management - smokers structuring and scheduling of smoking

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
		to reduce smoking	
Nichter 2008 [Q+]	To explore contextual factors contributing to smoking abstinence, relapse and harm-reduction practices post-partum.	• 44 low-income post partum smokers, Large city, Southwestern USA • Qualitative Interviews • THR focus: Reduction in the post-partum period • Support: Unclear. Recruited from general population. Not reported whether participants received assistance to reduce smoking.	• Barriers: smokers in social network, boredom, stress • Facilitators: smokers wish to protect children
Okuyemi 2002 [CSS+]	To explore whether a significantly greater proportion of occasional and light smokers engage in smoking reduction strategies than moderate and heavy smokers	• 484 low-income African Americans, USA • Survey • THR focus: Reduction • Support: Unclear. Participants were recruited from an inner-city health centre. Not reported whether they had received assistance to adopt the behavioural smoking reduction strategies described	• Facilitators: self-management -smokers structuring and scheduling of smoking
Phillips 2007 [Q+]	To explore the accounts of smokers and non-smokers (who live with smokers) of smoking in their homes and cars after the Scottish smoke-free legislation and to examine the reported impact on smoking in the home	• 50 adults (aged 18-75) who were smokers and lived with smokers or non-smokers, and non-smokers living with smokers. • Qualitative interviews • THR focus: temporary abstinence (smoke-free homes) • Support: n/a – participants describe their own views to smoke-free homes not interventions to facilitate making restrictions	• Barriers: social networks • Facilitators: social pressure, smoking restrictions, dislike home smelling of smoke, wish to protect children
Poland 2009 [Q+]	To understand the nature and genesis of measures taken by household members to manage environmental tobacco smoke in the home and how social arrangements are made	• 15 households with at least one adult smoker (and one child under 18 years of age) taking at least some measures to limit tobacco smoke exposure in the home. Ontario, Canada • Qualitative Interviews • THR focus: Temporary abstinence (smoke-free homes). Of the four households with a high degree of smoking restrictions in the home, found it had helped them cut down on smoking. • Support: Unclear. Recruited from general population. Not reported whether participants received assistance	• Facilitators: smokers structuring and scheduling of smoking, smokers wish to protect children, worries of harm to own health from smoking
Ratschen 2010 [Q+]	To explore inpatients' experience with a smoke-free policy, their smoking behaviour, dependence, withdrawal and related issues.	• 15 mental health acute inpatients, England UK • Semi-structured interviews • THR focus: Discusses issues related to temporary	• Barriers: boredom, smokers perceptions they are not offered THR advice or assistance • Facilitators: desire to reduce smoking

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
		abstinence, smoking reduction and cessation. Views clearly related to cessation have not been extracted for this review. • Support: Inpatients discuss support offered by healthcare professionals, but not all are receiving support	• Intervention beliefs: helpfulness of behavioural interventions, lack of knowledge NRT can be used for THR
Richter 2002 [Q+]	To identify ways to tailor nicotine dependence treatment to patients; to assess whether smoking reduction and nicotine-maintenance are attractive and potentially harm-reducing options for people who do not consider quitting an option	• 78 adults from five methadone maintenance treatment sites. Kansas, USA • Focus groups and interviews • THR focus: Reduction and long-term nicotine maintenance (as an alternative to cessation or controlled smoking). Cessation was also discussed but this has not been extracted for this review • Support: For those who describe experience of attempting reduction, it is not reported whether they did so with assistance or not.	• Facilitators: social pressure, perception that smoking is expensive, • perceived confidence in ability to achieve smoking goal, perception that smoking reduction leads to cessation • Intervention beliefs: smokers beliefs on whether NRT helps achieve THR goals
Robinson 2010 [Q+] secondary analysis of two studies, inc. sub-sample of Phillips 2007	To explore who, when and why people still expose other adults and children to second-hand smoke in home environments, and how this intersects with changing public health policy	• 30 adult smokers, living with non-smokers, who smoke in their own home. Scotland, UK • Secondary analysis of two qualitative studies, included a subsample of Phillips 2007 • THR focus: temporary abstinence (smoke-free homes) • Support: n/a – participants describe their own views to smoke-free homes not interventions to facilitate making restrictions	• Barriers: boredom, stress • Facilitators: scheduling of smoking (delay) and smoking restrictions
Schultz 2011 [Q++]	To explore perspectives on and experiences with tobacco dependence and managing the use of tobacco. Impressions of the smoke-free policy	• 186 participants: 82 inpatients and 104 providers (support or ward staff, healthcare providers and policy makers) at two tertiary acute-care hospitals with smoke free policies, Canada • Interviews, focus groups, observations and document review • THR focus: Temporary abstinence (Smoke-free hospital setting) • Support: Varied. Patients report different experiences of tobacco-related advice with hospital staff	• Barriers: smokers in social network, boredom, stress • Intervention beliefs: understanding of NRT for THR use • Smokers perceptions they are not offered THR advice or assistance by healthcare providers
Shiffman 2007 [CSS+]	To explore the interest smokers have in using an NRT product for reducing their smoking, either as a vehicle for moving toward cessation or as a means of reducing harm	• 1,000 adult daily smokers, USA • Telephone interview • THR focus: Reduction and cut down to quit • Support: Unclear. Interest in using NRT to achieve goal	• Facilitators: smoking reduction leads to cessation, worries of harm to own health from smoking • Intervention beliefs: whether NRT helps achieve THR goals

Study & Rating	Aim	Population and location, Method, type of THR and whether smokers were professionally supported	Overview of (review) themes – Smokers' perspectives
		measured, but does not report whether with medical assistance or not	
Stewart 2011 [Q+]	To explore the support needs and intervention preferences of low income women who smoke	• 64 female smokers, Canada • Qualitative interviews • THR focus: Mixed purpose – Reduction or cessation. • Support: Unclear. In those who discuss previous quit attempts, not reported whether with medical assistance or not	• Barriers: smokers in social network, stress, perceived low ability in achieving smoking goal • Facilitators: social pressure, social support, worries of harm to own health from smoking • Intervention beliefs: perceived cost of NRT, helpfulness of behavioural interventions, assistance to attend support groups
Thomsen 2009 [Q–] *Linked to effectiveness study providing preoperative smoking cessation counselling*	To examine how women smokers with newly diagnosed breast cancer experience a brief preoperative smoking cessation intervention in relation to breast cancer surgery	• 11 women smokers with breast cancer, Denmark • Interviews • THR focus: Pre surgery cessation (though patients were encouraged to remain permanently abstinent) • Support: Yes. Smoking Cessation Counselling including offer of NRT	• Barriers: stress • Facilitators: perception smoking is expensive, displeasure with smoking, worries of harm to own health

Table 2b: Brief summary of included studies (Providers' Perspectives)

Study & Rating	Aim	Location, Population and Method	Overview of (review) themes – Providers' perspectives
Ashton 2010 [MM–]	To assess mental health workers' attitudes to addressing patients ' tobacco use	• 324 mental health service employees, Adelaide, Australia • Self-completed questionnaires • THR focus: Mixed purpose – views on supporting their patients to quit or reduce smoking	• Barrier: Professional perceptions of smokers barriers to THR • Facilitator: THR advice to be part of their role
Beard 2011b [CSS–]	Part of Smoking Toolkit study. To explore current beliefs of stop smoking practitioners and managers about using NRT for smoking reduction and what factors are related to these beliefs	• 484 stop smoking practitioners and 58 managers working for the NHS, England, UK • Online survey • THR focus: Practitioners views about using NRT for reduction	• Intervention beliefs: providers beliefs on whether NRT helps achieve THR goals, provider-perceptions that NRT causes nicotine addiction, provider perceptions that THR weakens cessation message
Borrelli 2007 [CSS–]	Assess nurse perceptions of the safety of harm reduction products and behaviours	• 78 nurses at a hospital or home health care agency, USA • Self-report questionnaires • THR focus: Views on reduction and beliefs about NRT were extracted (not views specifically regarding other products outside of the scope of this review)	• Intervention beliefs: provider-perceptions that NRT harms smokers health, provider-perceptions NRT causes nicotine addiction, providers understanding of NRT for THR use, positive provider views of encouraging THR
Brotons 2005 [CSS+]	To explore knowledge and attitudes of European GPs in implementing evidence-based health promotion and disease prevention recommendations in primary care	• 2082 GPs, 11 European countries (not including UK) • Self-report questionnaire • THR focus: Only extracted view s regarding reduction	• Smoker GPs felt less effective in helping patients to reduce tobacco consumption than non-smoker GPs
Joseph 2004a [Q+]	To investigate community tobacco control leaders' attitudes toward harm reduction approaches to tobacco use, to assess benefits and risks associated with these strategies	• 47 community tobacco control leaders (public policy experts, clinicians treating nicotine dependence and youth education specialists). Minnesota, USA • Focus groups • THR focus: Harm reduction via reduction or 'reduced harm products'. USA IOM definition* is used, which includes out-of scope products such as smokeless tobacco. Results are not extracted where clearly only regarding ineligible products	• Positive and negative provider views about encouraging THR • Intervention beliefs: whether NRT helps achieve THR goals, provider-perceptions that NRT causes nicotine addiction
Kurko 2009 [CSS+]	To examine perceptions of NRT products' role and usage patterns approx one year after deregulation from pharmacy-only to general sales	• 1,190 pharmacy owners and staff , Finland • Survey • THR focus: Only data related to knowledge of using NRT for temporary abstinence was extracted for this review	• Providers understanding of NRT for THR use
Martin 2004 [Q+]	To assess tobacco control experts' opinions about the future of, and potential to improve	• 29 tobacco control professionals, mostly from the USA (n=36/40)	• Provider perceptions that THR weakens cessation message

* product is harm reducing if it lowers total tobacco-related mortality and morbidity even though use of that product may involve continued exposure to tobacco-related toxins.

Study & Rating	Aim	Location, Population and Method	Overview of (review) themes – Providers' perspectives
	individual and public health through tobacco harm reduction	• Semi-structured telephone interviews • THR focus: Harm reduction via reduction or 'reduced harm products'. USA IOM definition* is used, which includes out-of scope products such as smokeless tobacco. Results are not extracted where clearly only regarding ineligible products	
McEwen 2001 [CSS+]	To explore GPs and practice nurses attitudes and behaviours towards addressing smoking with their patients and interventions to assist smokers (such as NRT and counselling)	• 303 GPs and 459 practice nurses, UK • Postal surveys • THR focus: Mixed purpose. Study measures attitudes towards cessation activities, yet a high proportion (76%) of the sample were providing reduction advice if smokers were unable to quit.	• Providers perceive THR advice to be part of their role
Ratschen 2009 [CSS+]	To investigate staff knowledge and attitudes relating to smoking prevalence, dependence, treatment and the relationship between smoking and mental illness.	• 459 mental health professionals, UK NHS mental health trust • Cross-sectional postal surveys • THR focus: smoke free hospital policies and smoking cessation or reduction	• Barriers: Workplace administrative barriers (lack of time) and provider perceptions that NRT harms smokers' health • Facilitator: Providers perceive THR advice to be part of their role
Schultz 2009[CSS+]	To conceptualize and test a theoretical model that depicts relationships among factors believed to influence nurses' engagement in tobacco reduction activities to address patients' tobacco use, which includes, but are not limited to, harm reduction studies	• 214 registered nurses at two hospitals. British Columbia, Canada • Survey • THR focus: Reduction	• Facilitators: providers perceive THR advice to be part of their role, confidence in ability to provide THR interventions, providers perceive workplace environment to be supportive of THR
Schultz 2011 [Q++]	To explore perspectives on and experiences with tobacco dependence and managing the use of tobacco. Impressions of the smoke-free policy	• 186 participants: 82 inpatients and 104 providers (support or ward staff, healthcare providers and policy makers) at two tertiary acute-care hospitals with smoke free policies. Canada • Interviews, focus groups, observations and document review • THR focus: Temporary abstinence (smoke-free hospital setting)	• Barriers: smokers in social network, boredom, stress • Intervention beliefs: understanding of NRT for THR use • Smokers perceptions they are not offered THR advice or assistance by healthcare providers
Warner 2003 [CSS+]	To evaluate the grassroots tobacco control community's knowledge, opinions and beliefs about THR	• 1,473 US based registrants at 2001 National Conference on Tobacco or Health (activists, educators, researchers, medical professionals, policy makers), USA	• Provider-perceptions that NRT harms smokers health

Study & Rating	Aim	Location, Population and Method	Overview of (review) themes – Providers' perspectives
		• Internet survey • THR focus: Harm reduction via reduction or 'reduced harm products'. USA IOM definition* is used, which includes out-of scope products such as smokeless tobacco. Results are not extracted where clearly only regarding ineligible products	

*product is harm reducing if it lowers total tobacco-related mortality and morbidity even though use of that product may involve continued exposure to tobacco-related toxins.

4. FINDINGS

Q1. What factors might act as barriers or facilitators to tobacco harm-reduction approaches?

Barriers and facilitators reported by smokers (and their family / friends) and providers are narratively described within three main categories:

- Background environment factors affecting smokers/professional THR efforts
- Attitudes, beliefs and experiences regarding THR efforts
- Attitudes, beliefs and experiences regarding specific interventions to assist THR

Within each broad topic, barriers and facilitators are grouped into sub-categories, as shown in Figure 2 below:

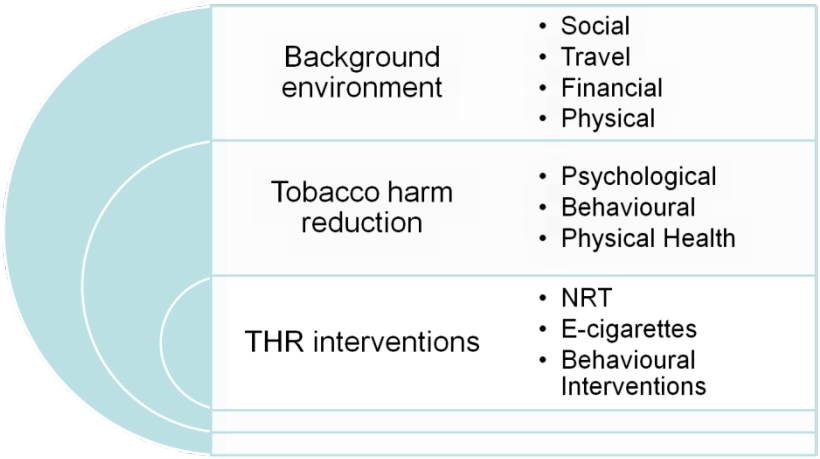


Figure 2: Structure of barriers and facilitators described in the report

Background Environment factors described by Smokers

Background environment factors describe a range of influences underpinning smokers' everyday lives. These factors may exist upstream of specific interventions to change behaviour. Environmental factors that may help or hinder tobacco harm reduction efforts, identified from the included studies, are described below. Just seven of the 21 studies were based in the UK (**Amos 1995 CSS–**, **Beard 2011a Q+**, **Blackburn 2003 CSS–, Haddock 1997 PE, Jones 2011 Q++, Phillips 2007 Q+, Robinson 2010 Q+**) and two from countries judged to have similar applicability to the UK (**Hamilton 2000 CSS+**, **Thomsen 2009 Q–**).

Social Factors: Social networks consisting of other smokers

Thirteen studies reported that social networks (including friends, family and colleagues) consisting of other smokers, were perceived to be a barrier to reducing smoking (**Abdullah 2011 Q+**, **Beard 2011a Q+**, **Estabrooks 2010 MM+**, **Green 2005 MM–**, **Hamilton 2000 CSS+**, **Herbert 2011 Q+**, **Jones 2011 Q++, Keizer 2009 CSS–**, **Phillips 2007 Q+, Nichter 2008 Q+**, **Nguyen 2009 CSS+**, **Schultz 2011 Q++**, **Stewart 2011 Q+**)

Studies described participants living in social worlds where smoking was normative (THR-SR: **Nichter 2008 Q+**; **Stewart 2011 Q+**; **Hamilton 2000 CSS+**):

"Everyone that I know in my life still smokes. They've been smoking for a long time and it makes it hard for me to quit. Because, you know as a child, you watch everything around you, you see women, everybody else smoking around you. And what you see is what you do." (**Stewart 2011 Q+**)

Social networks were also viewed as a source of socialisation (**Green 2005 MM–**, **Keizer 2009 CSS–**, **Nichter 2008 Q+**, **Nguyen 2009 CSS+**, **Schultz 2011 Q++**, **Stewart 2011 Q+**), or family members were described as working against their smoking efforts (**Estabrooks 2010 MM+**). One study reported avoiding smokers and smoking paraphernalia as a way of reducing smoking (**Beard** 2011a Q+).

These barriers were described in studies where participants were using NRT (**Beard 2011a Q+**) or were professionally supported by behavioural interventions (**Estabrooks 2010 MM+**, **Herbert 2011 Q+**). The influence of social networks was consistently reported across studies specifically interested in either smoking reduction (**Estabrooks 2010 MM+**, **Keizer 2009 CSS–**, **Nguyen 2009 CSS+**, **Nichter 2008 Q+**), temporary abstinence where smoking was not allowed (**Abdullah 2011 CHN Q+**, **Herbert 2011 CAN Q+**, **Schultz 2011 CAN Q++**), both (**Beard 2011a GBR Q+**) or those studies that considered THR and smoking cessation together (**Green 2005 MM–**, **Hamilton 2000 CSS+**, **Stewart 2011 Q+**).

Social networks were seen to influence smoking across a range of populations including adolescents (**Hamilton 2000 CSS+**), low income women (**Nichter 2008 Q+**, **Stewart 2011 Q+**), hospital patients (**Estabrooks 2010 MM+**, **Schultz 2011 Q++**) and mental health outpatients (**Green 2005 MM–**).

Social Factors: Social Pressure to change smoking behaviour

Social pressure to quit or reduce smoking, or implement smoke-free homes/cars was described in eight studies across studies specifically interested in either smoking reduction (**Bolliger 2000 CSS+**, **Richter 2002 Q+**), temporary abstinence where smoking was not allowed (**Abdullah 2011 Q+**, **Herbert 2011 Q+, Phillips 2007 Q+**) or those studies that considered THR and smoking cessation together (**Bottorff 2009 Q+**, **Green 2005 MM–**, **Stewart 2011 Q+**). Pressure was perceived from friends/family (**Abdullah 2011 Q+**, **Bolliger 2000 CSS+**, **Herbert 2011 Q+**, **Phillips 2007 Q+, Richter 2002 Q+**, **Stewart 2011 Q+**) and society in general (**Bolliger 2000 CSS+**, **Bottorff 2009 Q++** , **Green 2005 MM–**). For example, almost half of smokers (46%) who enrolled in a tobacco reduction trial stated it was because 'others want me to stop/reduce smoking' and 20% because 'smoking is socially unacceptable' (**Bolliger 2000 CSS+**).

Social pressure was seen to influence smoking across a range of populations including general adult smoker populations (**Bolliger 2000 CSS+**, **Herbert 2011 Q+**), Chinese parents (**Abdullah 2011 Q+**), methadone users (**Richter 2002 Q+**), psychiatric outpatients (**Green 2005 MM–**), low income women (**Stewart 2011 Q+**), and recent fathers (**Bottorff 2009 Q++**).

Social Factors: Social Support

Having friends and family who support smokers' smoking reduction / cessation efforts was perceived to be helpful in three studies (**Estabrooks 2010 MM+**, **Stewart 2011 Q+ and Johnson 2004 Q+**). The studies involved surgery outpatients in receipt of a smoking telephone counseling intervention to reduce smoking consumption (**Estabrooks 2010 MM+**), low income women describing attitudes to smoking reduction or quitting (**Steward 2011 Q+**) and adolescents describing ways in which they control smoking levels (**Johnson 2004 Q+**). Support was described from non-smokers, or mutual support between smokers. For example:

"I'll make a pact with my friend, "Whenever we smoke we can only smoke together. So if we're gonna smoke we have to find each other and have a cigarette together and share a cigarette." (17-yr old occasional smoker) (**Johnson 2004 Q+**)

Participants in one study (**Stewart 2011 Q+**) also described how they felt they could benefit from the experience of peer facilitators who were former smokers within a social support intervention:

"When you have a facilitator that has been a single Mom, has been on welfare, has dealt with a crack addict boyfriend … well they can encourage you and say, "Okay, I can't tell you what to do because I know it's hard to have somebody dictate to you what you need to do to stop, but these are the things that helped me … these are the steps that I took to get away from that situation."

The women also suggested help of a "buddy" or combining one-to-one support with a support group. They preferred to receive support from a variety of people including professionals, family and peers who were low-income women and had quit or reduced smoking, or would go through the reduction / quitting with them.

Travel Factors: Association of smoking and driving

Two studies reported that driving was a barrier to reducing smoking. This was reported in surgery outpatients in receipt of a telephone counseling intervention (**Estabrooks 2010 MM+**) **and** parents receiving professional support to implement smoke free homes and cars (**Herbert 2011 Q+**). A range of reasons were described, including the habit of smoking, need for relaxation, and cravings to smoke while driving. For example:

"He's made the connection in his head…when he drives, he smokes. On trips it keeps him awake, he has nothing to do" (**Herbert 2011 Q+**)

Financial Factors: Expense of smoking

Eight studies identified the high expense of smoking as a reason for addressing smoking behaviour. Four studies described financial concerns as a reason for wanting to reduce smoking (THR-SR: **Bolliger 2000 CSS+**, **Bottorff 2009 Q++**), quit smoking preoperatively (**Thomsen 2009 Q–**) and quit or reduce smoking amongst people who were professionally supported in doing so (**Hamilton 2000 CSS+**). Four further studies focused on the financial gains from quitting smoking pre-operatively (**Haddock 1997 PE**), reducing smoking (**Richter 2002 Q+**), restricting smoking at home (**Abdullah 2011 Q+**) and reducing or quitting smoking (**Johnson 2004 Q+**). For example, one study of introducing smoke free homes described the benefit of adopting a complete or partial ban on home smoking as the financial saving from not smoking or reduced smoking (7/31 participants) (**Abdullah 2011 Q+**).

The high cost of smoking was an influence across a range of populations including general adult smokers (**Bolliger 2000 CSS+**), adolescents (**Hamilton 2000 CSS+**), Chinese parents (**Abdullah 2011 Q+**), methadone users (**Richter 2002 Q+**) and recent fathers (**Bottorff Q++**).

Physical Factors: Smoking restrictions

Smoking restrictions in public settings or at home were described as helping smokers reduce or quit their smoking in eight studies.

Smoking restrictions at work (**Amos 1995 GBR CSS–, Phillips 2007 Q+, Robinson 2010+**) or hospital (**Keizer 2009 CHE CSS–**) were commonly reported as helping smokers to reduce their smoking. Smokers described reducing their smoking in order to minimise their children's exposure to second hand smoke at home (**Abdullah 2011Q+, Blackburn 2003 CSS –**) or that implementing smoke free homes facilitated smoking reduction or cutting down to quit (**Herbert 2011 Q+, Jones 2011 Q++**).

However some respondents described their home as a place where they could smoke in comfort, privacy and in a safe environment (**Jones 2011 Q++**, **Phillips 2007 Q+**). Other barriers to introducing smoke-free homes included conflicts with the caregiving role (**Abdullah 2011 Q+, Herbert 2011 Q+, Jones 2011 Q++**) and lack of knowledge of the harms of second-hand smoke (**Abdullah 2011 Q+, Blackburn 2003 CSS–, Nichter 2008 Q+**) as demonstrated by the quotes below:

"We just, just decided to but we wouldn't dare smoke in front of her, I don't know why. But that when she started crawling around and we're both outside, we didn't really want to leave her in, leave her by herself so . . . then we would smoke in the kitchen and then we just started smoking around her as well." [major theme] (single mother, 16–24 yrs) ***(Jones 2011 Q++)***

"Even though I realised I was a smoker I didn't realise the damage it was doing to my eldest son. Erm he was asthmatic cos he lived in a home where there was always somebody smoking which was me erm but the time I realised that and stopped smoking out of the house, erm his asthma went but you know, he was about . . . eight. So for a fair number of years I'd actually caused him damage as well as myself. I never connected his asthma with my smoking" (single mother, 25–34 yrs) ***(Jones 2011 Q++)***

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Background environment factors described by smokers

Evidence Statements:

1.1 **Barrier: Social networks consisting of smokers.** Thirteen studies reported that social networks (including friends, family and colleagues) consisting of other smokers were perceived to hinder smokers' attempts to address their tobacco consumption (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Estabrooks 2010 USA MM+**, **Keizer 2009 CSS–**, **Nguyen 2009 USA CSS+**, **Nichter 2008 USA Q+**; THR-TA: **Abdullah 2011 CHN Q+**, **Herbert 2011 CAN Q+**, **Jones 2011 Q++, Phillips 2007 Q+, Schultz 2011 CAN Q++**; THR/Quit: **Green 2005 CAN MM–**, **Hamilton 2000 AUS CSS+**, **Stewart 2011 CAN Q+**). Smokers' in two studies were professionally supported to address their smoking behaviour (**Estabrooks 2010 USA MM+**, **Herbert 2011 CAN Q+**).

1.2 **Barrier: Travel is associated with smoking whilst driving.** Two studies reported that driving was a barrier to reducing smoking. This included one study of surgery outpatients in receipt of a telephone counseling intervention (THR-SR: **Estabrooks 2010 USA MM+**) and another of parents receiving professional support to implement smoke free homes and cars (THR-TA: **Herbert 2011 CAN Q+**). Parents described a range of

reasons, including the habit of smoking, need for relaxation, and cravings to smoke while driving.

1.3 **Barriers to implementing smoke-free homes:** smokers described a desire or need to smoke in their home. Two studies reported that the home served as a place where they could smoke in comfort, privacy and in a safe environment (THR-TA: **Jones 2011 GBR Q++**, **Phillips 2007 GBR Q+**), three studies described how smoking outside conflicted with their need to care for their children (THR-TA: **Abdullah 2011 CHN Q+, Herbert 2011 CAN Q+, Jones 2011 GBR Q++**) and four studies identified a lack of knowledge of the harms of second-hand smoke on children (**THR-TA: Abdullah 2011 CHN Q+, Blackburn 2003 GBR CSS–**, **Jones 2011 GBR Q++, Nichter 2008 USA Q+**).

1.4 **Facilitator: Social pressure to change smoking behaviour.** Social pressure from friends, family or society in general to reduce, quit or implement smoke-free homes/cars was described in eight studies (THR-SR: **Bolliger 2000 CHE CSS+**, **Richter 2002 USA Q+**; THR/quit: **Bottorff 2009 CAN Q++**, **Green 2005 CAN MM–**, **Stewart 2011 CAN Q+**; THR-TA: **Abdullah 2011 CHN Q+**, **Herbert 2011 CAN Q+, Phillips 2007 GBR Q+**). Smokers in one study were professionally supported to address their smoking behaviour (**Herbert 2011 CAN Q+**).

1.5 **Facilitator: Social support from friends**, **family and professionals.** Social support from friends, family or professionals was perceived to be helpful in reducing smoking consumption in three studies. The studies involved surgery outpatients in receipt of a smoking telephone counseling intervention to reduce smoking consumption (THR-SR: **Estabrooks 2010 USA MM+**), low income women describing attitudes to smoking reduction or quitting (THR/Quit: **Stewart 2011 CAN Q+**) and adolescents describing ways in which they control smoking levels (THR/Quit: **Johnson 2004 CAN Q+**).

1.6 **Facilitator: Expense of smoking.** Eight studies described participants' financial concerns about the cost of smoking and perceived financial gains from reducing or quitting smoking (THR-SR: **Bottorff 2009 CAN Q++**, **Richter 2002 USA Q+**; THR-PSC: **Abdullah 2011 CHN Q+**, **Haddock 1997 GBR PE**, **Thomsen 2009 DNK Q–**; THR/Quit: **Bolliger 2000 CHE CSS+**, **Hamilton 2000 AUS CSS+**, **Johnson 2004 CAN Q+**). In one study smokers were professionally supported to address their smoking beahviour (**Haddock 1997 GBR PE**)

1.7 **Facilitator: Smoking restrictions promote SR:** Eight studies included participants reporting that smoking restrictions helped them to reduce their smoking whether in: the home (**Abdullah 2011 CHN Q+**, **Blackburn 2003 GBR CSS –, Herbert 2011 CAN Q+, Jones 2003 Q++;** at work (**Amos 1995 GBR CSS–, Phillips 2007 GBR Q+, Robinson 2010 GBR Q+**) or hospital (**Keizer 2009 CHE CSS–**).

Just seven of the 21 studies were based in the UK (**Amos 1995 GBR CSS–**, **Beard 2011a GBR Q+**, **Blackburn 2003 GBR CSS–, Haddock 1997 GBR PE, Jones 2011 GBR Q++, Phillips 2007 GBR Q+, Robinson 2010 GBR Q+**) and two from countries judged to have similar applicability to the UK (**Hamilton 2000 AUS CSS+**, **Thomsen 2009 DNK Q–**).

Attitudes, beliefs and experiences regarding THR efforts – Smokers' views

Of the 22 studies reporting smokers' views and experiences of reducing smoking, cutting down to quit, temporary abstinence or preoperative smoking cessation, just six studies were solely conducted in the UK (**Beard 2011a Q+**, **Haddock 1997 PE+**, **Jones 2011 Q++, Phillips 2007 Q+, Robinson 2010 Q+, Thomsen 2009 Q–**). One further study was conducted in multiple countries including the UK (**Cheong 2007 CSS+**) and one study in a country deemed to have high applicability to the UK (**Hamilton CSS+**). The smoker identified factors are described below.

Psychological Factors: Boredom

Six studies reported boredom as a psychological barrier to reducing smoking consumption (**Beard 2011a Q+**, **Estabrooks 2010 MM+**, **Keizer 2009 CSS–**, **Nichter 2008 Q+**, **Ratschen 2010 Q+**) or temporarily abstaining from smoking at hospitals (**Schultz 2011 Q++**) or home (**Robinson 2010 Q+).** Boredom was identified across a range of populations including general adult smokers (**Beard 2011a Q+**), low income women (**Nichter 2008 Q+**), psychiatric and general-hospital inpatients where smoking bans are in place (**Keizer 2009 CSS–**, **Schultz 2011 Q+**) and surgery outpatients (**Estabrooks 2010 MM+**). This barrier was also described in studies where participants were using NRT (**Beard 2011a Q+**) or receiving professional support via telephone counselling and newsletter (**Estabrooks 2010 MM+**).

Psychological Factors: Stress

Smoking in response to stress was a recurring theme in eleven studies, which examined smoking reduction (Beard **2011a Q+**, **Estabrooks 2010 MM+**, **Keizer 2009 CSS–**, **Nichter 2008 Q+**), preoperative smoking cessation (**Haddock 1997 PE**, **Thomsen 2009 Q–**), temporary abstinence at hospitals or homes (**Herbert 2011 Q+**, **Jones 2011 Q++, Robinson 2010 Q+, Schultz2011 Q++**) and reducing or quitting (**Johnson 2004 Q+**). Some studies specified the causes of stress participants were facing, including work / job security (**Estabrooks 2010 MM+**, **Johnson 2004 Q+**), school (**Johnson 2004 Q+**), family crises (**Johnson 2004 Q+**), health issues (**Estabrooks 2010 MM+**), poverty and unemployment (**Stewart 2011 Q+**).

Psychological Factors: Perceived ability in achieving smoking goal

A common barrier reported across three studies was participants' lack of confidence in their ability to achieve their smoking goals (**Haddock 1997 PE, Johnson 2004 Q+, Stewart 2011 Q+).** These studies were conducted in potentially more vulnerable groups than general adult smokers: pre-surgical patients receiving a behavioural intervention to assist temporary abstinence (**Haddock 1997 PE**), low income women (**Stewart 2011 Q+**) and adolescents (**Johnson 2004 Q+**). In one study participants were concerned about their ability to cope with stress and nicotine withdrawal for reducing or quitting smoking (**Stewart 2011 Q+**). A second described low levels of self-esteem and self-efficacy as a barrier to reducing or temporary abstinence in preparation for surgery (**Haddock 1997 PE**). In the third study teenagers who failed to limit their smoking started smoking again without restriction (**Johnson 2004 Q+**).

Conversely, three studies found smokers reporting strong confidence in their ability to achieve their smoking goals. This was perceived as a facilitator for cutting down to quit (**Cheong 2007 LS+**), reducing smoking (**Richter 2002 Q+**), and reducing or quitting smoking (**Johnson 2004 Q**).

Two studies described how reducing or limiting smoking was achievable (**Richter 2002 Q+**, **Johnson 2004 Q+**). A methadone user positively described the concept of reducing smoking:

> *"Being able to take some sort of positive action by removing the fear and panic inherent in committing to quit completely"* (**Richter 2001 Q+**)

In one study, perceived confidence in ability to quit smoking was associated with quitting success among smokers who first cut down without professional support (**Cheong 2007 LS+**). Studies were conducted in smokers who were also methadone users (**Richter 2002 Q+**), adolescents (**Johnson 2004 Q+**) and a general adult smoking population (**Cheong 2007 LS+**).

Psychological Factors: Smokers perception smoking reduction leads to cessation

Six studies indicated that some smokers viewed reducing their smoking as a first step towards cessation (**Beard 2011a Q+**, **Bottorff 2009 Q++**, **Bolliger 2000 CSS+**, **Hamilton 2000 CSS+**, **Richter 2002 Q+**, **Shiffman 2007 CSS+**).

Hamilton 2000 CSS+ found that 19% of young students thought that reducing their smoking lessened the likelihood of becoming addicted to smoking and would make quitting easier. This idea was supported by perspectives provided in qualitative studies:

> *"Well, I've managed to cut it down to 50% and hopefully I'm going to cut it out completely by the end of the year (40 year old Male)"* (**Beard 2011a Q+**)

> *"If you say to yourself, I'm going to stop smoking in one year, okay, now we're in January, in January I'm smoking let's say, for example, 15 cigarettes; February I'm going to smoke 10 cigarettes, you know; March, I'll smoke eight, you know…it's going to work eventually because your body is going to get used to it, you know."* (**Bottorff 2009 Q++**)

One study found that overall the majority of adolescents viewed public health messages advocating 'it's best if you don't smoke, but if you do, smoke less' more positively than a 'don't smoke' message. A high proportion of students across all regular, occasional and experimental smoking groups felt that this message would lead to young people considering quitting or reducing smoking(**Hamilton 2000 CSS+**).

The belief that smoking reduction can lead to cessation was reported across a range of populations including general adult smokers (**Beard 2011a Q+**, **Bolliger 2000 CSS+**, **Shiffman 2006 CSS+**), methadone users (**Richter 2002 Q+**), recent fathers (**Bottorff Q++**), and adolescents (**Hamilton 2000 CSS+**).

Psychological Factors: Smokers dislike their smoking habit

Five studies described some participants not enjoying aspects of smoking. 'I feel that smoking is dirty and messy', 'I don't really enjoy smoking' and 'don't like being out of control' were rated as important reasons for wanting to stop/reduce smoking in 31%, 41% and 79% of smokers respectively who enrolled in a smoking reduction trial (**Bolliger 2000 CSS+**). Women awaiting breast cancer surgery regarded smoking as 'smelly and messy' (**Thomsen 2009 Q–**). A strong theme in two studies of smoke-free homes found that concern for décor and disliking the smell of cigarette smoke as a reason for not smoking in the home (**Jones 2011 Q++, Phillips 2007 Q+**). A further study found that,

although not statistically significant, indicating smoking was not enjoyable appeared to increase in importance as a reason for quitting or reducing smoking in adolescents (**Hamilton 2000 CSS+**).

Behavioural Factors: Structuring and scheduling of smoking

Eight studies identified that smokers use structuring or scheduling smoking techniques to limit or reduce their cigarette consumption (**Beard 2011a Q+**, **Bottorff 2009 Q++**, **Estabrooks 2010 MM+**, **Nguyen 2009 CSS+**, **Okuyemi 2001 CSS+**), reduce or quit smoking (**Johnson 2004 Q+**), or temporarily abstain where smoking is not allowed (**Beard 2011a Q+**, **Poland 2009 Q+**).

Techniques included half-butting or smoking part of the cigarette (**Beard 2011a Q+ Bottorff 2009 Q++**, **Johnson 2004 Q+**, **Okuyemi 2001 CSS+**).

> *"You just kinda resist the craving, just spread it out over the day, and try not to really think about it too much. Sometimes, I'd take like a couple of drags of a cigarette and put it out and then later take a couple of drags . . . and y'know, make that cigarette kind of last". (17-year-old male participant, self-described occasional smoker)* (**Johnson 2004 Q+**)

Other methods included inhaling less or not at all (**Beard 2011a Q+**, **Okuyemi 2001 CSS+**), carrying only a set number of cigarettes (**Estabrooks 2010 MM+**), borrowing cigarettes instead of buying (**Johnson 2004 Q+**), cutting out unnecessary cigarettes such as chain smoking (**Johnson 2004 Q+**, **Beard 2011a Q+**,),restricting the number of cigarettes smoked, where or when (**Beard 2011a Q+**, , **Johnson 2004 Q+**, **Nguyen 2009 CSS+**, **Okuyemi 2001 CSS+**), or delaying time between cigarettes (**Beard 2011a Q+**, **Bottorff 2009 Q++**, **Johnson 2004 Q+**, **Poland 2009 Q+, Robinson 2010 Q+**).

> *"I try not to go any higher. Once I can start smelling it pretty bad on myself I've had enough." (18-year-old regular smoker) "I'm not going to smoke more than five cigarettes a day because then I'll get too addicted."(16-year-old regular smoker)* (**Johnson 2004 Q+**)

> *"It used to be one cigarette per hour or less, now it's one cigarette every three hours."* (**Bottorff 2009 Q++**)

Such methods were described in studies where patients were using NRT (**Beard 2011a CSS+**, **Okuyemi 2001 CSS+**) or receiving professional support via behavioural interventions (**Estabrooks 2010 MM+**). They were also reported by a range of populations including general adult smokers (**Beard 2011a Q+**), adolescents (**Johnson 2004 Q+**), new fathers (**Bottorff 2009 Q++**) and African Americans (**Okuyemi 2001 CSS+**).

Johnson (**2004 Q+**) concluded that it might be useful to devise harm reduction strategies that replicate the natural processes of youth tobacco control. Thus, harm reduction education could involve facilitating a more rapid progression through this process, potentially through tailored interventions that focus on self-identified goals and behaviour.

Behavioural Factors: Smoking substitution techniques

A common theme in three studies was smokers' use of techniques to distract or substitute smoking with other activities as an aid to reducing their cigarette consumption. These included wanting to

learn health eating habits to substitute for smoking (**Stewart 2011 Q+**), relaxation aids such as acupuncture, music, reading (**Beard 2011a Q+**), using normal chewing gum, food or drinks (**Beard 2011a Q+**) and exercising (**Estabrooks 2010 MM+**).

Physical Health Factors: Perceived high nicotine dependence / smoking addiction

The addictive effect of smoking and the difficulty of resisting subsequent cravings were described as a barrier to reducing smoking (**Keizer 2009 CSS–**), implementing smoke free homes (**Herbert 2011 Q+**) and smoking or reducing (**Bottorff 2009 Q++**). However, in a further study perceived dependence on smoking was not associated with quitting success among smokers who first cut down without professional support (**Cheong 2007 CSS+**). The studies were conducted in general adult smokers (**Cheong 2007 CSS+**), psychiatric inpatients (**Keizer 2009 CSS–**), and parents / new fathers with children living at home (**Herbert 2011 Q+**, **Bottorff 2009 Q+**). One study included smokers that were professionally supported (**Herbert 2011 Q+**).

Physical Health Factors: Wish to protect children

Seven studies reported wishing to protect the health of their children as a facilitator to reducing their smoking (**Nichter 2008 Q+**) and implementing smoke-free homes (**Abdullah 2011 Q+**, **Bottorff 2009 Q++**, **Herbert 2011 Q+, Jones 2011 Q++, Phillips 2007 Q+, Poland 2009 Q+**). Smokers in one study were receiving professional support to address their smoking (**Herbert 2011 Q+**).

Physical Health Factors: Worries of harm to own health

Concern about the effects of tobacco on smokers' own health was a commonly reported facilitator. Smokers described worries of harm to own health from smoking, in studies exploring views towards smoking reduction (**Bolliger 2000 CSS+**, **Estabrooks 2010 MM+**, **Richter 2002 Q+**), temporary abstinence at home (**Abdullah 2011 Q+**, **Poland 2009 Q+**), preoperative smoking cessation (**Haddock 1997 PE**) and reducing or quitting smoking (**Hamilton 2000 CSS+**, **Stewart 2011 Q+**). Smokers also perceived benefits to health from reducing smoking (**Beard 2011a CSS+**, **Joseph 2005 CSS+**, **Shiffman 2007 CSS+**) reducing or quitting (**Bottorff 2009 Q++**) and preoperative smoking cessation (**Thomsen 2009 Q–**). However one study found that worries about damage to health and quality of life from smoking or perceived benefits to health from quitting, were not associated with quitting success among smokers who first cut down without professional support (**Cheong 2007 CSS+**).

Studies were conducted in a range of populations, including general adult smokers (**Beard 2011a Q+**, **Bolliger 2000 CSS+**, **Poland 2009 Q+**, **Shiffman 2007**), methadone users (**Richter 2002 Q+**), adolescents (**Johnson 2004 Q+**, **Hamilton CSS+**), low income women (**Stewart 2011 Q+**), surgical patients (**Haddock 1997 PE+**, **Thomsen 2009 Q–**) and new fathers (**Bottorff 2009 Q++**).

Knowledge attitudes and beliefs and behaviours affecting THR efforts - Provider views

Six studies reported providers (including healthcare professionals, stop smoking staff and tobacco control experts) views regarding the promotion of tobacco harm reduction. The evidence has limited applicability to UK THR. Two studies were conducted in applicable settings - the UK (**Beard 2011b CSS-**) and Australia (**Ashton 2010 MM–**). However four studies were USA based, and adopted the Institute of Medicine (IOM) definition of THR, whereby "a product is harm reducing if it lowers total tobacco-related mortality and morbidity even though use of that product may involve continued exposure to tobacco-related toxins (including nicotine) (**Borelli 2007 CSS–**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **Warner 2003 CSS+**). Therefore 'reduced harm' tobacco products could include products outside of this reviews scope – such as smokeless tobacco.

The identified themes are described below.

Provider perceptions on whether THR weakens cessation message

Four studies reported concerns that THR or using products to assist THR would reduce smoking cessation (**Beard 2011b CSS–**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **Warner 2003 CSS+**). One UK-based study revealed a significant proportion of stop smoking staff believed that use of NRT for smoking reduction may undermine cessation (17% believed it would hinder cessation and 17% that it would have no effect), yet the majority (57%) felt that it would encourage cessation (**Beard 2011b CSS–**). Whilst some positive perceptions of THR on cessation were observed in a further USA study, they were outweighed by negative beliefs that THR interventions would weaken cessation (**Joseph 2004a Q+**).

Provider views regarding encouraging smokers to attempt THR

Two studies reported that tobacco control experts generally viewed cutting down the number of cigarettes smoked would have positive effects to a smokers 'health (THR-SR: **Borrelli 2007 CSS–**, **Joseph 2004a Q+**). The studies were both USA based where THR includes the use of 'reduced harm' tobacco products that are outside the scope of this review. The studies were conducted with nurses (**Borrelli 2007 CSS–**) and tobacco control experts (**Joseph 2004a Q+**).

Some participants in one study viewed THR to be a more realistic and understanding strategy to addressing smoking. They also believed that self control and self esteem might be enhanced in smokers if they believed they are taking steps towards improving their health (**Joseph 2004a Q+**). However, in the same study other tobacco control experts had concerns regarding whether tobacco harm reduction should be promoted, raising the issue that harm reduction does not address nicotine addiction, which they believed to be the underlying factor in tobacco use *(***Joseph 2004a Q+**):

> *''…it truly is the addiction that we have to address, and I would be afraid that we would lose sight or track of that.''* (**Joseph 2004a Q+**)

There were also doubts about whether reduced smoking improves health, how to accomplish the goal of reduced smoking, and concerns that smokers change their behaviour to compensate for reduced nicotine delivery (**Joseph 2004a Q+**).

Provider perceptions of smokers' willingness or ability to address smoking

There is insufficient evidence to examine whether providers perceive their patients to be able to address their smoking behaviour. One low quality mixed methods study (**Ashton 2010 MM–**) in a mental health setting found that 33% of providers interviewed felt that more than half of their patients wanted smoking cessation support and 10% felt that none of their patients wanted support to address tobacco use. Furthermore, a significant proportion of mental health service staff (19%) felt that addressing tobacco use (quitting or reducing smoking) was a matter of patient choice, and only important if the client wished to make changes. Similarly, when surveyed about current practice, 36% of staff stated that they only discussed tobacco use when they were concerned about their patient's tobacco use or if the patient raises the issue (**Ashton 2010 MM–**).

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Attitudes, beliefs and experiences regarding THR efforts

Evidence Statements – Smokers' perspectives:

1.8 **Barrier: Smokers' boredom.** Seven studies identified boredom as a psychological barrier to reducing smoking consumption in a range of populations including adult smokers (THR-SR/TA: **Beard 2011a GBR Q+**; THR-TA**: Robinson 2010 GBR Q+**), low income women (THR-SR: **Nichter 2008 USA Q+**), psychiatric and general hospital inpatients where smoking bans are in place (THR-SR: **Keizer 2009 CHE CSS–**, THR-TA: **Schultz 2011 CAN Q+;** THR-TA/SR: **Ratschen 2010 Q+**) and surgery outpatients (THR-SR: **Estabrooks 2010 USA MM+**). Smokers' in one study were professionally supported to address their smoking behaviour (**Estabrooks 2010 USA MM+**)

1.9 **Barrier: Smokers' stress.** Smoking in response to stress was a recurring theme in eleven studies and across a range of populations including general adult smokers (THR-(SR/TA: **Beard 2011a GBR Q+**; THR-TA: **Robinson 2010 GBR Q+**), low income women (THR-SR: **Nichter 2008 USA Q+**; THR/Quit: **Stewart 2011 CAN Q+**; THR-TA: **Jones 2011 GBR Q++**), psychiatric and general-hospital inpatients where smoking bans are in place (THR-SR: **Keizer 2009 CHE CSS–**; THR-TA: **Schultz 2011 CAN Q+**), surgical patients (THR-SR: **Estabrooks 2010 USA MM+**, THR-PSC: **Haddock 1997 GBR PE**, **Thomsen 2009 DNK Q–**), and adolescents (THR/Quit: **Johnson 2004 CAN Q+**). Two studies included smokers that were receiving professional support to address their smoking behaviour (**Estabrooks 2010 USA MM+**, **Haddock 1997 GBR PE**).

1.10 **Barrier: Smokers' perceived low ability in achieving smoking goals.** A common theme across three studies was participants' lack of confidence in their ability to achieve their smoking goals. These studies were conducted in potentially more vulnerable groups: pre-surgical patients (THR-PSC: **Haddock 1997 GBR PE**); low income women (THR/Quit: **Stewart 2011 CAN Q+**) and adolescents (THR/Quit: **Johnson 2004 CAN Q+**). One study included smokers that were receiving professional support to address their smoking behaviour (**Haddock 1997 GBR PE**).

1.11 **Barrier: Perceived high nicotine dependence/smoking addiction.** The addictive effect of smoking and the difficulty of resisting subsequent cravings were described as a barrier to reducing smoking or implementing smoke-free homes in three studies (THR-SR: **Keizer 2009 CHE CSS–**; THR-TA: **Herbert 2011 CAN Q+**; THR/Quit: **Bottorff 2009 CAN Q++**). However, in a further study perceived dependence on smoking was not associated with quitting success among smokers who first cut down without professional support (THR-CDTQ: **Cheong 2007 VAR CSS+**). The studies were conducted in general adult smokers (**Cheong 2007 VAR CSS+**), psychiatric inpatients (**Keizer 2009 CHE CSS–**) and parents / new fathers with children living at home (**Herbert 2011 CAN Q+**, **Bottorff 2009 CAN Q+**). One study included smokers that were professionally supported to address their smoking behaviour (**Herbert 2011 CAN Q+**).

1.12 **Facilitator: Smokers' perceived confidence in ability to achieve smoking goals.** High confidence in smokers' ability (self-efficacy) to achieve their smoking goals was described as a facilitator in three studies (THR-CDTQ: **Cheong 2007 VAR LS+**, THR-SR: **Richter 2002 USA Q+**; THR/Quit: **Johnson 2004 CAN Q+**). In two of the studies this appeared to be linked to the idea that reduction was more achievable than quitting (**Richter 2002 USA Q+**, **Johnson 2004 Q+**). In one study perceived confidence in ability to quit smoking was associated with quitting success among smokers who first cut down (**Cheong 2007 VAR LS+**).

1.13 **Facilitator: Smokers' perception that smoking reduction leads to cessation.** Six studies indicated that some smokers viewed reducing their smoking as a first step towards cessation. This belief was reported across a range of populations including general adult smokers (THR-CDTQ/SR: **Shiffman 2007 USA CSS+**; THR-SR: **Bolliger 2000 CHE CSS+**; THR-TA/SR: **Beard 2011a GBR Q+**), methadone users (THR-SR: **Richter 2002 USA Q+**), recent fathers (THR/Quit: **Bottorff 2009 CAN Q++**) and adolescents (THR/Quit: **Hamilton 2000 AUS CSS+**).

1.14 **Facilitator: Smokers' displeasure with smoking.** Five studies reported displeasure with aspects of smoking, that some participants did not enjoy smoking (THR/Quit: **Hamilton 2000 AUS CSS+),** perceived it to be smelly and messy (THR-SR: **Bolliger 2000 CHE CSS+**; THR-PSC: **Thomsen 2009 DNK Q–**; THR-TA: **Jones 2011 GBR Q++, Phillips 2007 GBR Q+**) and did not like 'being out of control' (**Bolliger 2000 CHE CSS+**).

1.15 **Facilitator: Smokers' own structuring and scheduling of smoking.** Seven studies identified that smokers use structuring or scheduling smoking techniques to limit or reduce their cigarette consumption or temporarily abstain. These included: half-butting or smoking part of the cigarette (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Bottorff 2009 CAN Q++**, **Johnson 2004 CAN Q+**, **Okuyemi 2001 CSS+**); inhaling less or not at all (THR-SR/TA; **Beard 2011a GBR Q+**, THR-SR; **Okuyemi 2001 CSS+**); carrying only a set number of cigarettes (THR-SR: **Estabrooks 2010 USA MM+**); borrowing cigarettes instead of buying (THR/Quit: **Johnson 2004 CAN Q+**); cutting out unnecessary cigarettes e.g., not chain smoking (THR-SR/TA: **Beard 2011a GBR Q+**; THR/Quit: **Johnson 2004 CAN Q+**,); restricting the number of cigarettes smoked, where or when ? (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Okuyemi 2001 CSS+**; THR/Quit: **Johnson 2004 CAN Q+**, **Nguyen 2009 CSS+**) or delaying time between cigarettes (THR-SR/TA: **Beard 2011a GBR Q+**; THR-TA: **Poland 2009 CAN Q+, Robinson 2010 GBR Q+**; THR/Quit: **Bottorff 2009 CAN Q++**,

Johnson 2004 CAN Q+). Three studies included smokers that were using NRT (**Beard 2011a GBR CSS+**, **Okuyemi 2001 CSS+**) or receiving behavioural interventions to achieve smoking goals (**Estabrooks 2010 USA MM+**).

1.16 **Facilitator: Smoking substitution techniques.** A common theme from three studies was smokers' use of techniques to distract or substitute smoking with other activities as an aid to reducing their cigarette consumption. These included: wanting to learn healthy eating habits to substitute for smoking (**Stewart 2011 USA Q+**); relaxation aids such as acupuncture, music or reading (**Beard 2011a GBR Q+**); using normal chewing gum, food or drinks (**Beard 2011a GBR Q+**) and exercising (**Estabrooks 2010 USA MM+**). Participants in one study were receiving professional support via a behavioural intervention to assist their smoking reduction (**Estabrooks 2010 MM+).**

1.17 **Facilitator: Smokers' wish to protect children from smoke.** Seven studies reported wishing to protect the health of their children as a facilitator to reducing their smoking (THR-SR: **Nichter 2008 USA Q+**) or in implementing smoke-free homes (THR-TA: **Abdullah 2011 CHN Q+**, **Bottorff 2009 CAN Q++**, **Herbert 2011 CAN Q+, Jones 2011 GBR Q++, Phillips 2007 GBR Q+, Poland 2009 CAN Q+**). Smokers in one study were receiving professional support to address their smoking behaviour (**Herbert 2011 CAN Q+**).

1.18 **Facilitator: Smokers' worries of harm to own health from smoking.** Concern about the effect of tobacco on smokers' own health was a commonly reported facilitator across thirteen studies looking at reducing smoking or implementing smoke-free homes. Smokers described both worries of harm to their own health (THR-SR: **Bolliger 2000 CHE CSS+**, **Estabrooks 2010 USA MM+**; THR PSC: **Haddock 1997 GBR PE**; THR-TA: **Abdullah 2011 Q+**, **Poland 2009 CAN Q+**; THR/Quit: **Stewart 2011 CAN Q+**, **Hamilton 2000 AUS CSS+**) and perceived benefits to health from reduction of smoking (THR-SR/TA: **Beard 2011a GBR CSS+**, THR-SR: **Joseph 2005 USA CSS+**; THR-SR/CDTQ: **Shiffman 2007 USA CSS+**; THR-TA: **Thomsen 2009 DNK Q–**, THR/Quit: **Bottorff 2009 CAN Q++**). However one study found that worries about damage to health and quality of life from smoking or perceived benefits to health from quitting, were not associated with quitting success among smokers who first cut down (THR-SR: **Cheong 2007 VAR CR+**). Smokers' in two studies were receiving professional support to address their smoking behaviour (**Estabrooks 2010 USA MM+**, **Haddock 1997 GBR PE+**).

Of the 22 studies reporting smokers views regarding tobacco harm reduction, just six studies were solely conducted in the UK (**Beard 2011a GBR Q+**, **Haddock 1997 GBR PE+**, **+**, **Jones 2011 GBR Q++, Phillips 2007 GBR Q+, Robinson 2010 GBR Q+, Thomsen 2009 DNK Q–**), one study in multiple countries including the UK (**Cheong 2007 VAR CSS+**) and one study in a country deemed to have high applicability to the UK (**Hamilton AUS CSS+**).

<u>Attitudes, beliefs and experiences regarding THR efforts</u>

Evidence Statements – Providers' perspectives:

1.19 **Barrier: Provider perceptions that THR weakens cessation message.** Four studies reported concerns that THR or use of NRT products for THR would reduce smoking cessation (THR-SR: **Beard 2011b GBR CSS–**, **Joseph 2004a USA Q+**, **Martin 2004 USA Q+**,

Warner 2003 CSS+).

1.20 **Barrier: Negative provider views towards encouraging smokers to attempt THR.** A single study suggests some tobacco control experts have concerns about whether THR should be promoted. Practitioners, policy makers and educationalists considered THR did not address nicotine addiction, which they believed to be the underlying factor in tobacco use. There were also concerns about how to accomplish reduced cigarette consumption, whether this leads to improved health and whether smokers change their smoking behaviour to compensate for reduced nicotine delivery (THR-SR: **Joseph 2004a USA Q+**).

1.21 **Facilitator: Positive provider views that encouraging smoking reduction will improve health.** Two studies reported that cutting down the number of cigarettes smoked was generally regarded to have positive effects to smokers' health amongst nurses (**Borrelli 2007 USA CSS–**) and tobacco control experts (**Joseph 2004a USA Q+**). Tobacco control experts viewed SR as a more realistic and understanding strategy and believed that smokers' self control and self esteem might be enhanced if those smokers believed they were taking steps toward improving their health (**Joseph 2004a USA Q+**).

1.22 **Facilitator: Positive provider views that encouraging smoking reduction will promote cessation.** Two studies reported large proportions of providers felt SR or use of NRT for SR may promote smoking cessation (THR-SR: **Beard 2011b CSS–**, **Joseph 2004a USA Q+**).

1.23 There is insufficient evidence to examine whether providers perceive their patients to be able to address their smoking behaviour. This was discussed in only one poor quality mixed methods study of mental health patients (THR/Quit: **Ashton 2010 AUS MM–**).

The evidence has limited applicability to UK THR. Two studies were conducted in applicable settings - the UK (**Beard 2011b CSS-**) and Australia (**Ashton 2010 MM–**). Additionally, four studies were USA based and used the Institute of Medicine (IOM) definition of THR which includes out-of scope products such as smokeless tobacco (**Borelli 2007 CSS–**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **Warner 2003 CSS+**).

Attitudes, beliefs and experiences regarding interventions to assist THR

Three groups of interventions are described: NRT, e-cigarettes (e-cigs) and behavioural interventions.

Attitudes, beliefs and experiences regarding NRT to assist THR – smokers' views

Only four of the twelve studies regarding smokers views of NRT for THR purposes were conducted in the UK, three of which used England data from the smoking toolkit study (**Beard 2011a Q+**; **Beard 2012b CSS+**, **Black 2012 CSS+**) and one study was conducted in Mental Health inpatients (**Ratschen 2010 Q+**). The remaining studies had limited applicability to the UK. Smoker beliefs regarding NRT are described below.

Beliefs regarding whether NRT helps achieve smoking goals

Eleven studies indicate that NRT is perceived by smokers to be helpful in achieving their goals. In one study 85% of smokers felt that NRT was helpful to use during periods where they were unable to smoke, such as at work, home or in bars (**Beard 2012b CSS+**). In four further studies, large

proportions of smoking participants were willing to use or were using NRT to help smoking reduction (**Beard 2012a CSS+**, **Black 2012 CSS+**, **Joseph 2004b CSS+**, **Shiffman 2007 CSS+**,). The same attitudes were expressed by some participants in qualitative studies (**Beard 2011a Q+**, **Bottorff 2009 Q++**).

In three studies, participants believed use of NRT might help reduce harm by decreasing exposure to smoking (**Hamilton 2000 CSS+**, **Joseph 2005 CSS+**, **Richter 2002 Q+**). Participants who had previously failed to reduce believed they would have been more successful had they tried nicotine products and that NRT prevented withdrawal cravings (**Beard 2011a Q+**). Participants who had received a telephone counselling intervention and successfully reduced smoking , believed that adding NRT was a way to improve the intervention (**Estabrooks 2010 MM+**).

Despite positive views towards NRT, one study found that there was no statistical association between attempts to quit smoking or reduce cigarette consumption and reports of the helpfulness of NRT, after adjusting for potential confounding variables (**Beard 2012b CSS+**).

In contrast to the positive views described, two studies indicated some smokers believed that NRT was not helpful in smokers from the general population (**Beard 2011a Q+)** and methadone users **(Richter 2002 Q+**). **Richter 2002 Q+** reported that long-term NRT was viewed by some as not addressing the craving for cigarettes, quoting a smoker of 35 cigarettes per day.

> *"I wouldn't be over the craving. It would still be there–not for the nicotine, but just the actual act of smoking."* (**Richter 2002 Q+**)

In a UK study of smokers from the general population, NRT was seen by some smokers as only a partial substitute for cigarettes (**Beard 2011a Q+**). Some NRT users felt that the product did not live up to their expectations, stating the effects of NRT were too short lived, NRT was too weak, and lozenges were perceived to take too fast an effect (**Beard 2011a Q+**).

Studies were conducted in a general adult smoking population (**Beard 2011a Q+**, **Beard 2012b CSS+**, **Black 2012 CSS+**, **Joseph 2004b CSS+**, **Shiffman 2007 CSS+**), as well as surgical outpatients (**Estabrooks 2010 Q+**), smokers with heart disease (**Joseph 2005 CSS+**), adolescents (**Hamilton 2000 CSS+**), new fathers (**Bottorff 2009 Q++**) and methadone users (**Richter 2009 Q+**).

Use of different NRT products

Whilst the use of the nicotine patch was marginally more common than nicotine gum, both products were used more than lozenges, inhalator, or nasal spray (**Beard 2011a Q+**, **Beard 2011b CSS+**)**.** The studies were both part of the Smoking Toolkit study involving smokers from the general population in England (**Beard 2011a Q+**, **Beard 2012b CSS+**, **Shiffman 2007 CSS+**). In a further study conducted in a general population in the USA, 50% of smokers were interested in using the nicotine patch and 39% in using nicotine gum to aid smoking reduction (**Shiffman 2007 CSS+**).

Views regarding preference, design and mode of action of NRT

One study described smoker-perceived positive features of NRT products for smoking reduction or temporary abstinence (**Beard 2011a Q+**). Nicotine patches were considered easy to carry, discrete and could be forgotten about. Gum was liked because it involved active participation, was felt to be similar to normal chewing gum, acted as a distraction, and was easy to carry. The inhalator was liked for its similarity with the action of smoking. Some respondents also mentioned a prolonged nicotine

dose as a benefit of the patch, whereas other smokers preferred the nasal spray because it gave them an instant hit (**Beard 2011a Q+**).

Smoker-perceived negative views and mode of action were also reported. Some older smokers saw NRT gum as an unacceptable product to be using at their age, taste was also not liked by some smokers, and the nasal spray was disliked due to having to place it in the nose. The lack of substitution for the act of smoking when using a patch was also disliked by some smokers (**Beard 2011a Q+**).

The authors suggested that choice of product could be related to whether smokers viewed nicotine dependence as a result of depleted brain nicotine or in response to smoking cues (**Beard 2011a Q+**).

Perceptions about the cost of NRT

Adult smokers from the general population were deemed to be under-using NRT because of cost, in one study (**Beard 2011a Q+**). In addition, a study of low-income women conveyed views that NRT for cessation or reduction was too expensive, thought they would use 'something like the patch' if it was freely provided (**Stewart 2011 Q+**).

Perceptions about unintended consequences from NRT

Three studies described smokers' concerns over the safety of NRT. Regarding NRT use for smoking reduction or temporary abstinence smokers, were concerned about nicotine overdose particularly from patches (**Beard 2011a Q+**), and nicotine addiction and harm to health (**Beard 2011a Q+**, **Black 2012 CSS+**).

> *"Well I have heard that the gum, from my neighbour who was chewing the gum, that he got addicted to the gum and he went to a smoking clinic and they told him they were not recommending the gum anymore because you get addicted to it (62 year old female)".* (**Beard 2011a Q+**),

Smokers also reported a number of what they believed were side effects including nightmares, sore skin and mood swings (from the nicotine patch) and sore gums and acid reflux (from nicotine gum) (**Beard 2011a Q+**).

> *"Um, I don't really like the idea of patches to be honest. My little sister used to use them and she used to go off on tangents. I think the nicotine did affect her. She'd get the hump a lot (HM, 23 year old female)".* (**Beard 2011a Q+**)

One respondent described problems of hyperactivity when using NRT and drinking coffee at the same time (**Bottorff 2009 Q++**). Black (**2012 GBR CSS+**) found concern that NRT is harmful was not a statistically significant deterrent for NRT use in smoking cessation or reduction, but concluded dose and duration of use may be affected. Beard (**2011a GBR Q+**) reported that participants were under-using NRT because of fears of nicotine overdose.

Smokers knowledge and awareness of how and when to use NRT for THR

Two studies reported UK adult smokers had a range of misconceptions regarding NRT and THR use. This included the belief that NRT products could not be used at exactly the same time as smoking, or were used purely for smoking cessation purposes (**Beard 2011a Q+**, **Ratschen 2010 Q+**). Some participants were unaware of how to use the nicotine patch, leaving it on for too long or too short a period.

"I put them on in the morning and then I probably leave them on for a couple of days and then I change them, yeh (60 year old male)". (**Beard 2011a Q+**).

Furthermore, smokers did not know which NRT products were recommended and licensed for smoking reduction and/or temporary abstinence, although some were aware that they could use NRT without having to stop smoking completely:

"I remember being told by the pharmacist that um, gum was good as it would replace some of the actions involved in smoking, but I couldn't tell you which one's specifically for cutting down" (24-year-old female) (**Beard 2011a CSS+**).

Smokers generally opted for those products that were more extensively promoted and had a longer history. They were largely unaware of some of the newer products (**Beard 2011a CSS+**).

Attitudes, beliefs and experiences regarding NRT to THR – provider views

Evidence regarding provider views on NRT for THR purposes may have limited applicability to THR in UK settings. Only one study of providers' beliefs on the impact of NRT and THR was conducted in the UK (**Beard 2011b CSS–**). Two additional UK studies conveyed provider views on NRT (**McEwen 2001 CSS+, Ratschen 2009 CSS+**) but it is unclear whether these views were focused on smoking cessation or also included THR. Three studies were conducted in the USA (**Borelli 2007 CSS–**, **Joseph 2004 CSS+**, **Warner 2003 CSS+**) and used the IOM definition of THR which includes out-of scope products such as smokeless tobacco. No UK evidence was identified for UK practitioners' knowledge of how NRT should be used for THR purposes. A further study was conducted in Finland (**Kurko 2009 CSS+**).

Provider beliefs regarding whether NRT helps achieve smoking goals

No studies clearly explored the views of professionals' perceptions of the effectiveness of approaches to reduced cigarette consumption, cutting down to quit or temporary abstinence. One study gathered opinions of UK GP and nurses who were questioned about their provision of smoking cessation advice, and identified that a high proportion of the sample provided advice to reduce smoking, in patients that were not able or willing to quit. Participants described how NRT improves chances of stopping smoking, and just under half of the sample (47%) thought NRT was sufficiently effective to justify its cost. However it is unclear whether these comments relate only to abrupt cessation or include views on NRT for THR purposes (**McEwen 2005 CSS+**). One US study described considerable debate over the efficacy and adequacy of nicotine content in nicotine patches, gum and lozenges (**Martin 2004 Q+**).

Provider perceptions about the cost of NRT

Two studies identified concerns amongst healthcare professionals and tobacco control experts over the cost of THR interventions. One UK study found that less than half of GPs (47%) and nurses (42%) thought NRT was sufficiently effective to justify its cost. A minority of GPs (32%) and 53% of nurses thought NRT should be made available on NHS prescriptions. Less than half of GPs (44%) and nurses (44%) thought NRT should be made available on general sale (**McEwen 2005 CSS+**). One US study with a tobacco control community population identified that harm reduction strategies combining behavioural and pharmacological treatment to reduce smoking or sustain abstinence may be too cost prohibitive to most consumers (**Joseph 2004a CSS+**).

Provider perceptions of unintended consequences resulting from NRT for THR purposes

Review 1 concluded "evidence from nine randomised controlled trials strongly suggests that adverse events are common when NRT is used for smoking harm reduction, but these tend to be mild or moderate and are rarely severe."

In this review (Review 4), three studies reported concerns that using products to assist THR would reduce smoking cessation (**Beard 2011b CSS–**, **Martin 2004 Q+**, **Joseph 2004a CSS+**). One UK-based study revealed a significant proportion of Stop Smoking Services (SSS) staff believed use of NRT for smoking reduction may undermine cessation. Seventeen percent reported they believed it would hinder cessation and 17% that it would have no effect (**Beard 2011b CSS–**). Whilst some positive perceptions of THR on cessation were observed in one study, they were outweighed by negative beliefs that THR interventions would weaken cessation (**Joseph 2004a CSS+**). It is not reported whether these views also meant that providers perceive messages to reduce, cut down to quit or temporarily abstain, weaken the cessation message or if these views were specific to the use of NRT and potential unintended consequences.

Concerns regarding harm to health from NRT use were reported from three populations: nurses (**Borelli 2007 CSS–**), mental health professionals (**Ratchsen 2009 CSS+**) smoking cessation service staff (**Beard 2011b CSS–**) and tobacco control experts (**Warner 2003 CSS+**). A range of harms were perceived from long-term NRT usage or concurrent use of NRT and cigarettes (heart attack and other heart diseases, cancer, high blood pressure). A number of other complications were also perceived from long-term nicotine use including emphysema, chronic lung disease or COPD, oral / dental problems, increased psychological dependence, mental health issues, increases salt intake from lozenges, stimulant effects of NRT, and problems during pregnancy (**Beard 2011b CSS–**). A large proportion of nurses believed nicotine is a cause of cancer in one study (**Borrelli 2007 CSS–**) and in a study of tobacco control community, participants THR products were perceived to produce negative effects on health (**Warner 2003 CSS+**). These provider perceptions of harm to health from NRT are at variance with the findings from Review 1 which concluded that "evidence from nine randomised controlled trials strongly suggests that adverse events are common when NRT is used for smoking harm reduction, but these tend to be mild or moderate and are rarely severe."

Three studies reported that significant proportions of nurses (**Borrelli 2007 CSS–**), smoking cessation staff (**Beard 2011b CSS–**) and tobacco control community members (**Joseph 2004 CSS+**) had concerns that NRT products could cause nicotine addiction.

Two studies of tobacco control community reported concerns of nicotine containing products being used by youth, non-smokers or leading to relapse by former smokers (**Warner 2003 CSS+**, **Martin 2004 Q+**).

Knowledge and awareness of how and when to use NRT for THR

Evidence from three non-UK studies suggests there is not a consistent understanding amongst healthcare professionals of how to use NRT for THR purposes. One Finnish study found that only 72% correctly agreed with the statement that NRT products can be used to replace cigarettes when smoking is not allowed (**Kurko 2009 CSS+**). A USA study found that over 40% of nurses incorrectly believed that a prescription was needed for the nicotine patch and 15% that a prescription was

needed for nicotine gum (**Borrelli 2007 CSS–**). In Canada, many interviewed hospital-based health care providers admitted having limited knowledge about how NRT alleviated cravings (**Schultz 2011 Q++**).

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Attitudes, beliefs and experiences regarding NRT to assist THR

Evidence Statement – Smokers perspectives:

1.24 **Barrier: Some smokers perceive NRT does not help achieve THR goals.** Two studies found some smokers believed NRT was not helpful in enabling them to achieve their goals (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Richter 2002 USA Q+**). Two studies found that NRT was viewed as not addressing the craving for cigarettes (**Richter 2002 USA Q+**) or as only a partial substitute for cigarettes (**Beard 2011a GBR Q+**). It did not appear to live up to expectations in some users who commented variously that: the effects of NRT were too short lived; NRT was too weak; lozenge effect was too fast and NRT was only effective during enforced periods of temporary abstinence (**Beard 2011a GBR Q+**).

1.25 **Barrier: Smoker-perceived negative features of NRT products.** Action of nasal spray, dislike of using chewing gum, taste of gum, and lack of substitution for action of smoking were negatively-perceived features of various NRT products reported by smokers trying to reduce smoking or temporarily abstain (THR-SR/TA: **Beard 2011a GBR Q+**).

1.26 **Barrier: Smoker-perceived cost of NRT.** One study reported that adult smokers from the general population were deemed to be under-using NRT for THR purposes because of cost (THR-SR/TA: **Beard 2011a GBR Q+**)**.** A second study of low-income women revealed that NRT for cessation or reduction was considered too expensive to use, unless it was provided free of charge (THR/Quit: **Stewart 2011 CAN Q+**)**.**

1.27 **Barrier: Smoker-perceived side effects and safety concerns**. In three studies smokers were concerned about nicotine addiction and harm to health (THR-SR/TA: **Beard 2011a GBR Q+**; **THR-SR: Black 2012 GBR CSS+**) and about nicotine overdose, in particular from NRT patches (THR-SR/TA: **Beard 2011a GBR Q+**). Smokers also reported a range of perceived side effects including nightmares, sore skin, and mood swings patch), sore gums, acid reflux (gum) (**Beard 2011a GBR Q+**) and hyperactivity when using NRT and drinking coffee at the same time (THR/Quit: **Bottorff 2009 CAN Q++**). Black (**2012 GBR CSS+**) found concern that NRT is harmful was not a statistically significant deterrent for NRT use in smoking cessation or reduction, but concluded dose and duration of use may be affected. Beard (**2011a GBR Q+**) reported that participants were under-using NRT because of fears of nicotine overdose.

1.28 **Barrier: Smokers' misperceptions of how and when to use NRT for THR.** Two studies reported adult smokers from the general population had a range of misperceptions regarding NRT and THR use. These included the beliefs that NRT products could not be used at exactly the same time as smoking, or were used purely for smoking cessation

purposes (THR-SR/TA: **Beard 2011a GBR Q+**, **Ratschen 2010 Q+**). Smokers were also unaware which NRT products were recommended and licensed for smoking reduction and/or temporary abstinence. Some participants were unaware of how to use the nicotine patch, leaving it on for too long or too short a period. (THR-SR/TA: **Beard 2011a GBR Q+**).

1.29 **Facilitator: Commonly reported beliefs that NRT helps achieve THR goals.** Eleven studies reported that NRT is perceived by smokers to be helpful in achieving their smoking goals. This is indicated by high proportions of smokers using or willing to try NRT for reduction purposes (THR-SR/TA: **Beard 2011a GBR Q+**; THR-SR: **Beard 2012b GBR CSS+**, **Black 2012 GBR CSS+**, **Cunningham 2008 CAN CSS+**, **Estabrooks 2010 USA Q+**, **Joseph 2005 USA CSS+**, **Joseph 2004b USA CSS+**, **Richter 2002 USA Q+**, **Shiffman 2007 USA CSS+**; THR/Quit: **Bottorff 2009 CAN Q++**, **Hamilton 2000 AUS CSS+**). Despite positive views towards NRT, one study found that there was no statistical association between attempts to quit smoking or reduce cigarette consumption and perceived helpfulness of NRT after adjusting for potential confounding variables (**Beard 2012b GBR CSS+**). Three studies were conducted in patients receiving professional support to address their smoking (**Cunningham 2008 CAN CSS+**, **Estabrooks 2010 USA Q+**, **Joseph 2004b USA CSS+**).

1.30 In the two studies highlighting preferences for different NRT products, the patch was used marginally more common than nicotine gum (**Beard 2012b CSS+**, **Shiffman 2007 CSS+**) both products were used more than lozenges, inhalator, or nasal spray (**Beard 2011b CSS+**).

1.31 **Facilitator: Smoker-perceived positive features of NRT products.** One study of smokers using NRT for smoking reduction or temporary abstinence reported that NRT patches were easy to carry, discrete and could be forgotten about. Nicotine gum was liked because it involved active participation, was felt to be similar to normal chewing gum, acted as a distraction, and was easy to carry. The NRT inhalator was liked for its similarity with the action of smoking. For some respondents the benefits of NRT patch was a prolonged nicotine dose, whilst others preferred the nicotine nasal spray because it gave them an instant hit (THR-SR/TA: **Beard 2011a GBR Q+**).

Only three of the eleven studies were conducted in the UK, all of which used data from the English Smoking Toolkit Study (THR-SR/TA: **Beard 2011a Q+**; THR-SR: **Beard 2012b CSS+**, **Black 2012 CSS+**).

<u>Attitudes, beliefs and experiences regarding NRT to assist THR</u>

Evidence Statements – Providers' perspectives:

1.32 **Barrier: Provider perceptions that NRT harms smokers' health.** Four studies reported that large proportions of the healthcare providers and tobacco control experts participating in the studies regarded NRT as harmful to health when used long term or concurrently with smoking. A range of serious harms and complications were perceived including heart disease, cancer, chronic lung disease, and the stimulant effects of NRT (THR-SR: **Beard 2011b GBR CSS–**, **Warner 2003 USA CSS+**; THR/Quit: **Borrelli 2007 USA CSS–**, **Ratschen 2009 GBR CSS+**).

1.33 **Barrier: Provider perceptions that NRT causes nicotine addiction**: Three studies reported significant proportions of nurses (THR/Quit: **Borrelli 2007 USA CSS–**), smoking cessation staff (THR-SR: **Beard 2011b GBR CSS–**) and tobacco control experts (THR-SR: **Joseph 2004 CSS+**) had concerns that NRT products could cause nicotine addiction.

1.34 **Barrier: Lack of understanding regarding use of NRT for THR:** Evidence from three non-UK studies (THR/Quit: **Borrelli 2007 USA CSS–**; THR-TA: **Kurko 2009 FIN CSS+**, **Schultz 2011 CAN Q++**) suggests there is no consistent understanding among healthcare professionals of how to use NRT products for THR purposes.

1.35 There is insufficient evidence to determine whether providers view NRT to be a cost-effective intervention for THR purposes. Only one study of UK providers explored their views on the cost-effectiveness of NRT and it is unclear whether these related to THR (THR/Quit: **McEwen 2001 GBR CSS+**). A second study reported tobacco control experts' beliefs that NRT combined with behavioural interventions was too costly for smokers to access, yet this was based in USA and may not be applicable to UK NHS settings (THR-SR: **Joseph 2004 Q+**).

1.36 There was insufficient evidence that is applicable to THR in the UK, to determine providers' perceptions of whether NRT is helpful for helping smokers to achieve THR goals.

Evidence may have limited applicability to THR in UK settings. Only one study of providers' beliefs on the impact of NRT and THR was conducted in the UK (**Beard 2011b CSS–**). An additional UK study conveying provider views on NRT (**McEwen 2001 CSS+**) focused primarily on cessation and it is unclear whether these views also included THR. Three studies were conducted in the USA (**Borelli 2007 CSS–**, **Joseph 2004 CSS+**, **Warner 2003 CSS+**) and used the IOM definition of THR which includes out-of scope products such as smokeless tobacco. No UK evidence was identified for UK practitioners' knowledge of how NRT should be used for THR purposes. A further study was conducted in Finland (**Kurko 2009 CSS+**).

Attitudes, beliefs and experiences regarding e-cigarettes to assist THR – Smokers' Views

The evidence regarding smokers' views towards e-cigs has limited applicability to the UK. Whilst Etter (**2011 CSS+**) included participants from the UK, the majority were from USA and other countries, whereas Foulds (**2011 CSS–**) was conducted in the USA in a potentially biased sample of e-cig users attending a US e-cigarette enthusiast meeting.

Smokers beliefs regarding whether e-cigarettes help achieve smoking goals

Two studies explored views of e-cigarette users in the general smoking population who were using the product for smoking cessation or THR purposes. One study found that the vast majority of users (90%) felt e-cigarettes helped relieve withdrawal symptoms (**Etter 2011 CSS+**). Whilst the majority of study participants were using e-cigarettes for smoking cessation, significant proportions (20%) stated purposes of smoking reduction (**Etter 2011 CSS+**, **Foulds 2011 CSS–**) and cutting down to quit (28%)

(**Etter 2011 CSS+**). Smokers also believed e-cigarettes could be used for places where they could not smoke (64% and 39%, **Foulds 2011 CSS–**, **Etter 2011 CSS+** respectively).

Views regarding the design and mode of action of e-cigarettes

The taste of e-cigarettes was viewed favourably in the large majority of users in two studies (**Etter 2011 CSS+**, **Foulds 2010 CSS–**). Users liked the sensation while inhaling (**Etter 2011 CSS+)** and that the e-cigarette can be used in places where smoking is banned (**Foulds 2010 CSS–**). The design and functionality of e-cigarettes was criticised in one e-cigarette study. 37% of users felt that the battery discharged too quickly, 18% that the liquid often or sometimes leaked, and 8% that it was difficult to adjust nicotine dose with it. 20% felt that it should be easier to draw on e-cigarette and 20% that the vapour should be more concentrated (**Etter 2011 CSS+**).

Smoker perceptions about the cost of e-cigarettes

One study found that 57% of e-cigarette users, who were using the product for cessation or reduction, said the product was cheaper than smoking (**Etter 2011 CSS+**).

Smokers' perceptions about the unintended consequences of e-cigarettes

One study described smokers concerns over the safety of e-cigarettes. A small proportion of users (8%) were afraid of becoming addicted to e-cigarettes. Furthermore 6% of users felt that e-cigarettes may be toxic, but the majority (83%) felt they were less toxic than tobacco (**Etter 2011 CSS+**).

Attitudes, beliefs and experiences regarding e-cigarettes to assist THR – Provider Views

No studies were identified that evaluated providers' views regarding e-cigarettes for THR purposes.

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Attitudes, beliefs and experiences regarding e-cigarette (e-cigs) to assist THR

Evidence Statements – Smokers' perspectives:

1.37 **Barrier: Belief e-cigs do not help with smoking craving.** There was some limited evidence that a small proportion of e-cig users (10%) believed that the product did not help with cravings in smokers aiming to cease or reduce smoking (THR-Quit: **Etter 2011 VAR CSS+**).

1.38 **Barrier: Some smokers are afraid of addiction and safety of e-cigarettes.** One study described smokers concerns over the safety of e-cigarettes. A small proportion of users (8%) were afraid of becoming addicted to e-cigarettes. A similar proportion (6%) felt e-cigarettes may be toxic, but the majority (83%) felt they were less toxic than tobacco. (THR/Quit: Etter 2011 CSS+).

1.39 **Barrier: Smoker-perceived negative features of e-cigs**. The design and functionality of e-cigs was criticised in one study. 37% of users felt that the battery discharged too quickly, 18% that the liquid often or sometimes leaked, and 8% that it was difficult to adjust nicotine dose with it. 20% felt that it should be easier to draw on e-cigarette and

20% that the vapour should be more concentrated (**Etter 2011 CSS+**).

1.40 **Facilitator: Significant proportion of smokers utilise e-cigarettes for THR and help with cravings.** Two studies explored views of e-cig users in the general smoking population. One study found that 90% of users felt e-cigs helped relieve withdrawal symptoms (THR/Quit: **Etter 2011 VAR CSS+**). Although the majority of study participants were using an e-cig for smoking cessation, 20% used them for smoking reduction (**Etter 2011 VAR CSS+**, **Foulds 2011 USA CSS–**) and cutting down to quit (28%) (**Etter 2011 VAR CSS+**). Also, 64% of smokers in one study (**Foulds 2011 USA CSS–**) and 39% in another believed e-cigs could be used in places where they could not smoke (and 39%, **Etter 2011 VAR CSS+** respectively).

1.41 **Barrier: Smoker-perceived positive features of e-cigs**. The taste of e-cigarettes was viewed favourably in the large majority of users in two studies (**Etter 2011 CSS+**, **Foulds 2010 CSS–**). Users liked the sensation while inhaling (**Etter 2011 CSS+)** and that the e-cigarette can be used in places where smoking is banned (**Foulds 2010 CSS**

1.42 **Facilitator: E-cigs are perceived as less harmful than smoking.** E-cigs were perceived as less harmful to others or their own health than smoking by the majority of participants (THR/Quit: **Foulds 2011 USA CSS–**, **Etter 2011 VAR CSS+**) and perceived to help with withdrawal and craving symptoms of nicotine (**Etter 2011 VAR CSS+**).

1.43 **Facilitator: Smokers perceive using e-cigs to be cheaper than smoking.** One study found that over half (57%) of e-cig users who were using the product for cessation or reduction, said the product was cheaper than smoking (THR/Quit: **Etter 2011 VAR CSS+**)**.**

The evidence has limited applicability to the UK. **Etter 2011 VAR CSS+** included UK participants, although the majority were from USA and other countries. **Foulds 2011 USA CSS–** was conducted in a potentially biased sample of USA e-cig users attending an e-cigarette enthusiast meeting.

Attitudes, beliefs and experiences regarding e-cigarette (e-cigs) to assist THR

Evidence Statements – Providers' perspectives:

1.44 There was no evidence identified that evaluated providers' views regarding e-cigarettes for THR purposes.

Attitudes, beliefs and experiences regarding behavioural interventions to assist THR

Attitudes, beliefs and experiences regarding behavioural interventions to assist THR – Smoker Views

The evidence regarding smokers' views towards behavioural interventions may have limited applicability to the UK, as only four of the nine studies were conducted in the UK (**Amos 1995 CSS-, Beard 2011a Q+, Haddock 1997 PE, Ratschen 2010 Q+**).

Four of the seven studies exploring smokers views of behavioural interventions, were linked to effectiveness trials. Two studies evaluated various approaches to help prepare patients for reducing / ceasing smoking prior to surgery (**Haddock 1997 PE**, **Thomsen 2009 Q–**). **Thomsen 2009 Q–** assessed

views regarding a pre-operative smoking cessation counseling intervention involving motivational interviewing for breast cancer patients. **Haddock 1997 PE** measured participants satisfaction with a package of interventions consisting of individual face-to-face counseling by a nurse, advice regarding cessation aids, an information leaflet, a smoking diary, and referral to a GP/community pharmacist where appropriate. **Amos 1995 CSS–** examined workers satisfaction with a workplace smoking telephone helpline to help workers refrain from smoking during work following a worksite ban. **Estabrooks 2010 MM+** explored the perceived the barriers and facilitators that participants, who received a telephone counseling sessions and newsletter intervention, encountered when trying to reduce their smoking. Three further studies examined perceptions of potential interventions to help achieve smoking reduction or cessation (**Ratschen 2010 Q+**, **Stewart 2011 Q+**) or smoke free homes (**Abdullah 2011 Q+**).

Helpfulness of behavioural interventions

The face-to-face counseling intervention was considered the most helpful part of a multicomponent behavioural programme, and participating smokers particularly valued the counselors' sensitive approach and speaking to someone who listens and understands what they said without being made to feel "like a leper, guilty or a failure" (**Haddock 1997 PE**). Many women undergoing breast cancer surgery stated that had they not been offered the intervention (pre-operative smoking cessation counseling including offer of free NRT), they would probably not have contemplated smoking cessation (**Thomsen 2009 Q–**). Participants attempting to make their homes smoke-free settings also perceived that a counseling intervention would help them achieve their goals (**Abdullah 2011 Q+**).

One study revealed that female low income smokers believed a support group would help them in reducing or ceasing smoking. They described preferences for ideally small group support to facilitate conversation, whereby they could share personal, problems, successes and challenges. Peer facilitators or "buddys" who had/were trying to address their smoking were also anticipated to be helpful:

> *"When you have a facilitator that has been a single Mom, has been on welfare, has dealt with a crack addict boyfriend … well they can encourage you and say, "Okay, I can't tell you what to do because I know it's hard to have somebody dictate to you what you need to do to stop, but these are the things that helped me … these are the steps that I took to get away from that situation."*(**Stewart 2011 Q+**)

Nearly all of the women indicated that they would benefit from a combination of one-to-one support and peer support within a group. They preferred to receive support from a variety of people, including professionals, friends, family and peers who were low-income women who had quit smoking (**Stewart 2011 Q+**). The women also stated that they required on-site child care and free transportation in order to attend support groups for smoking reduction or cessation (**Stewart 2011 Q+**).

A further study of mental health inpatients found that whilst only a few respondents were interested in quitting smoking the majority would take up offers related to smoking cessation and reduction on wards, or at least attend some information sessions.

> "Yes, I think I would go along [if a group on smoking cessation was offered]. It's on your mind anyway, but if it was there then it would probably make you thinkg "Well I can't smoker, so…(female, acute ward)" (**Ratschen 2010 Q+**)

Some however felt that the ward was not a suitable environment to address smoking and that they would only be able to deal with the issue when discharged (**Ratschen 2010 Q+**).

Two studies examined views regarding 'smoking-related health screenings' as part of a counseling intervention (**Haddock 1997 PE**, **Amos 1995 CSS–**). In both studies the majority of participants felt this was helpful. One smoker described 'it made me acknowledge to myself that I was actually a smoker' (**Haddock 1997 PE**).

There was a mixed picture of whether telephone interventions were helpful for achieving goals. More negative than positive comments were made regarding the telephone and newsletter intervention delivered to help support reduction (**Estabrooks 2010 MM+**), and the telephone quit line was not used at all by the smokers receiving a multicomponent intervention pre-admission to hospital (**Haddock 1997 PE**). However there were generally high levels of satisfaction with the workplace smoking cessation telephone helpline (**Amos 1995 CSS–** *NB* within this sample over 30% of workers reduced their cigarette consumption), and one of the potential methods smokers perceived would help with implementing smoke-free homes was telephone-based counseling (**Abdullah 2011 Q+**)**.**

One process evaluation (**Gaglio 2010 PE)** reported on the lessons learned during the design of the telephone and newsletter intervention described in **Estabrooks 2010 MM+**. The authors reported that the complexity of the intervention design provoked unanticipated time and cost resources in terms of time and cost needed to train intervention deliverers, expenses for materials, and expenses for unplanned changes. They recommended that a sufficient length pilot phase and proper anticipation of obstacles during the pilot phase were felt to be the two factors that could contribute to the successful development of the intervention.

Only one study examined the use of a smoking diary as part of a multicomponent intervention for smoking reduction/quitting prior to surgery. This was found to be the least helpful, with only 20% opting to complete one. However amongst those who did all subjects positively changed their behaviour before admission (**Haddock 1997 PE**).

No studies were identified that reported further information about smokers' views regarding the cost of behavioural interventions or unintended consequences.

Whether smokers perceive they are offered THR advice and assistance

A common theme across a number of studies was participants reporting they had not received support from healthcare providers to help them reduce, cut down to quit or temporarily abstain from smoking. This was particularly apparent in studies of different hospital patients who were required to temporarily abstain from smoking for surgery or whilst staying hospital (**Green 2005 MM–**, **Haddock 1997 PE**, **Ratschen 2010 Q+**, **Schultz 2011 Q++**). In a UK study, mental health acute inpatients generally stated that they had been informed of the smoke-free policy and related arrangements and were offered nicotine patches on admission. However, none reported having received detailed information or offers of comprehensive support (**Ratschen 2010 Q+**). In a Canadian study of psychiatric outpatients, over half of all subjects had never received information, advice or

support in the past by hospital staff to quit smoking whilst staying in hospital (**Green 2005 MM–**). Similarly, a study of hospital patients in Canada, described that discussions regarding smoking were not helpful and NRT was not routinely offered and some patients faced barriers to obtaining it.

> *"I know there are some people who are trying to quit, but if all the nurses ask if is you smoke, they don't ask you if you are trying to quit or that kind of question. So if they could ask that, then they would know that you want that and you could get help."* (**Schultz 2011 Q++**)

> *"Researcher: So they offered you the patch? Respondent: I kind of asked for it. Researcher: As far as you remember, nobody at the hospital offered you a patch or any other kind of NRT. Respondent: No. I got my mom to get me nicorette gum, but when they found out…they told me no. I had to get it approved"* (**Schultz 2011 Q++**)

Furthermore, whilst some patients abstained from smoking during their stay in hospital, few described receiving assistance to support abstinence or to develop a strategy for cessation as part of planning for their discharge from hospital (**Schultz 2011 Q++**)

A process evaluation of a pre-operative smoking behavioural intervention found that only 33% of participants in the control and 56% in the treatment group had previously received help, information or support regarding smoking cessation, prior to entering the intervention trial. Of these few cited the hospital setting as a source of help (**Haddock 1997 PE**)

In studies with adult smokers from the general population, issues regarding the lack of THR advice and assistance were also noted. In one UK study, smokers using NRT to reduce or temporarily abstain from smoking reported that health care professionals had largely advised against smoking reduction, instead emphasising cessation. Those who did recommend smoking reduction often encouraged smokers to cut down by as much as possible and informed them that it was a difficult process:

> *"Um, I mean I think she said it's a bad thing to do and I shouldn't do it, and if I do I should try and cut down as much as possible if I can" (61-year-old male).* (**Beard 2011a Q+**)

> *"But about three years ago I went to a smokers clinic and they told us not to try and cut down before a quit attempt as it would make it worse and just to smoke normally until the quit date" (29-year-old female).* (**Beard 2011a Q+**)

It was also noted that in a Canadian study of new fathers, few men made smoking reduction or cessation plans in consultation with health-care providers, or consulted them when they ran into problems (**Bottorff 2009 Q++**).

<u>Attitudes, beliefs and experiences regarding behavioural interventions to assist THR - Provider perspectives</u>

Three of the five studies examining provider perspectives of THR are likely to have high applicability to a UK setting. Two of these considered both THR and smoking cessation together (**Ashton 2010 AUS MM–**, **McEwen 2001 GBR CSS+**) and one considered smoke-free policies, and smoking cessation or reduction (**Ratschen 2009 CSS+**). One study was conducted in Canada and examined smoking reduction (**Schultz 2009 CAN CSS+**).

Perceptions regarding whether providing THR advice is part of healthcare providers role

One study reported that the majority of GPs (96%) and practice nurses (99%) believed it was part of their job to advise and assist smokers to stop. 98% of GPs and 95% of nurses advised smokers to stop at least every now and then, and 76% of GPs and 85% of nurses said they advised smokers to cut down if they could not stop (**McEwen 2001 CSS+**).

One UK study found that 71% of mental health professionals surveyed agreed that protecting patients and staff from second-hand smoke through the smoke-free policy is an important aim. However only 43% felt it was their responsibility to address smoking and However only 50% of respondents also agreed that within their working routine, 'they could make the time to deal with patient's nicotine dependence by helping them to quit or reduce smoking if they so wish' (Ratschen 2009 CSS+). One study of mental health service staff found the majority rated addressing tobacco addiction with their patients as important, citing concerns over patient's poor health and financial problems (52%). A minority (28%) believed that other medical issues and time constraints made addressing tobacco addiction a lower priority (**Ashton 2010 CSS–**).

One study found that nurses with a positive role attitude were more likely to report carry out tobacco reduction activities within their role. They were also less likely to report perceived health issue barriers (health outcomes in general or in relation to treatments with continued tobacco use), concerns of a relationship strain with patients caused by addressing tobacco reduction), and ability barriers (i.e. confidence in their skills and knowledge related to tobacco reduction) (**Schultz 2009 CSS+**).

Confidence in ability to provide THR interventions

Nurses who perceived ability barriers (i.e. confidence in their skills and knowledge related to tobacco reduction) were less likely to carry out tobacco reduction activities (**Schultz 2009 CSS+**). However no studies described in any detail the degree to which healthcare professionals do feel confident in their ability to deliver THR advice / interventions.

Influence of healthcare professionals' workplace environment as a context for delivering THR

One study found the perception that colleagues addressed tobacco reduction and that the clinical environment had rich tobacco reduction resources (such as availability of tobacco-related policies, in-service education opportunities, community resources, ward resource material, formulary medications and physician involvement), were strong predictors of implementing tobacco reduction activities. General workplace climate variables (supervisor support, managerial control, co-worker cohesion and innovation) were not strong predictors of implementing tobacco reduction activities. Only supervisor support demonstrated limited influence (**Schultz 2009 CSS+**).

Perceived administrative barriers such as adequacy of time and administrative support, patient concern barriers (i.e. perceptions of a relationship strain with a patient caused by addressing THR), health issue barriers and ability barriers (confidence in their skills and knowledge related to tobacco reduction) negatively influenced implementation of tobacco reduction interventions (**Schultz 2009 CSS+**).

Knowledge and awareness of the THR interventions and how to deliver them

No studies explored whether UK professionals have appropriate knowledge and awareness of THR, and the full range of THR approaches that should be explored.

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Attitudes, beliefs and experiences regarding behavioural interventions to assist THR

Evidence Statements – smokers' perspectives:

1.45 **Barrier: Smokers perceive they are not offered THR advice or assistance by healthcare providers.** Smokers in six studies did not consider they had been offered or received sufficient advice or assistance to help them reduce, cut down to quit or temporarily abstain from smoking. This was particularly apparent in studies of hospital patients who were required to temporarily abstain from smoking for surgery or whilst staying hospital (THR-TA: **Green 2005 CAN MM–**, **Schultz 2011 CAN**; THR-PSC: **Haddock 1997 GBR PE**; THR-SR/TA **Ratschen 2010 Q+**). Similar views were expressed in two studies of community-based adult smokers (THR-SR/TA: **Beard 2011a Q+**, THR/Quit: **Bottorff 2009 CAN Q++**). One study included participants currently enrolled in a preoperative behavioural intervention who reported not being offered support in the past (**Haddock 1997 GBR PE**).

1.46 **Facilitator: Positive views towards helpfulness of behavioural interventions for THR.** Behavioural interventions were viewed positively by smokers who received them and by smokers who felt the addition of these strategies would be helpful for other smoking interventions. Face to face counselling (THR-PSC: **Haddock 1997 GBR PE, Thomsen 2009 DNK Q–**) was highly valued by those who received it. **Thomsen 2009 DNK Q–** provided counselling inspired by motivational interviewing. Smoking-related health screenings were also positively received (THR/Quit: **Amos 1995 GBR CSS–**; THR-PSC: **Haddock 1997 GBR PE+**). Support groups were perceived to be potentially useful by single mothers (THR/Quit: **Stewart 2011 CAN Q+**) and mental health acute inpatients (THR-SR/TA **Ratschen 2010 Q+**). There was a mixed picture of whether telephone interventions were helpful. Telephone counselling received some positive, but mostly negative comments in one study (**Estabrooks 2010 MM+**), but was perceived to be potentially helpful for implementing smoke-free homes in one study (**THR-TA: Abdullah 2011 CHN Q+)**. Telephone help-lines were positively received by workers (**THR/Quit: Amos 1995 CSS–**), but were not utilised by preoperative patients receiving a multicomponent smoking behavioural intervention (**Haddock 1997 GBR PE**).

1.47 **Facilitator: Childcare and/or transport to attend support groups.** One study in low income mothers identified practical assistance such as on-site child care and free transportation as a potential facilitator to attending support groups for smoking reduction or cessation (THR/Quit: **Stewart 2011 CAN Q+**).

The results may have limited applicability to a UK setting, as only four of the nine studies were conducted in the UK (**Amos 1995 GBR CSS–**, **Beard 2011a Q+**, **Haddock 1997 GBR PE, Ratschen 2010 Q+**).

Evidence Statements – providers' perspectives:

1.48 **Barrier: Provider perceptions regarding smokers' barriers to achieving THR:** In one

study of mental health workers a range of barriers to quitting or reducing tobacco use for people with a mental illness were identified, including boredom and social isolation, mental illness, and addiction (THR/Quit: **Ashton 2010 AUS MM–**).

1.49 **Barrier: Confidence in ability to provide THR interventions.** Nurses who perceived ability barriers (i.e. confidence in their skills and knowledge related to tobacco reduction) were less likely to carry out tobacco reduction activities. Beliefs that addressing THR could cause a relationship strain with a patient also negatively influenced implementation of tobacco reduction interventions (THR-SR: **Schultz 2009 CAN CSS+**). However no studies described in any detail the degree to which healthcare professionals feel confident in their ability to deliver THR advice / interventions.

1.50 **Facilitator: Workplace administrative barriers.** One study found that perceived administrative barriers (adequacy of time and administrative support) negatively influenced implementation of tobacco reduction activities (THR-SR: **Schultz 2009 CAN CSS**).

1.51 **Facilitator: Providers perceive THR advice to be part of their role.** Four studies suggest that many healthcare providers consider THR advice to be part of their role. The studies were conducted with UK GPs and nurses (**McEwen 2001 GBR CSS+,**) and mental health workers in the UK and Australia (**Ashton AUS CSS–**, **Ratschen 2009 GBR CSS+**). A further study reported that nurses with a positive THR role attitude were more likely to carry out tobacco reduction activities (THR-SR: **Schultz 2009 CAN CSS+**).

1.52 **Facilitator: THR supportive workplace environment.** One study found the perception that colleagues addressed tobacco reduction and that the clinical environment had rich tobacco reduction resources, were strong predictors of implementing tobacco reduction activities, including, but not limited to harm reduction strategies. (THR-SR: **Schultz 2009 CAN CSS+**).

1.53 No evidence was identified that assessed whether UK providers have appropriate knowledge and awareness of THR, or the full range of approaches that could be explored with patients.

The majority of studies are likely to have high applicability to a UK setting but did not clearly distinguish between THR and SC interventions (**Ashton 2010 AUS MM–**, **McEwen 2001 GBR CSS+, Ratschen 2009 GBR CSS+**). One study was conducted in Canada and examined SR (**Schultz 2009 CAN CSS+**).

Q2. What are smokers/families and providers' views, experiences and perspectives on whether specific tobacco harm-reduction approaches (such as behavioural support, counselling, advice or self-help) are perceived to have a differential impact on particular groups?

No studies explored smokers/families or providers' perspectives on whether THR interventions have a differential impact on particular population groups.

This section describes information identified in the studies on within-study population group differences, and shared barriers and facilitators reported in studies of similar population groups. Three studies were based in the UK (**Jones 2011 Q++**, **Ratschen 2009 GBR CSS+, Ratschen 2010 Q+**) and two studies were identified from Australia that is likely to have UK applicable evidence regarding adolescents (**Hamilton 2000 AUS CSS+**) and psychiatric services (**Ashton 2010 AUS MM–**)

Within-study population differences

Differences within study populations were described in only two studies (**Shiffman 2007 CSS+** and **Nguyen CSS+**) and provided limited information on potential differences in smoking populations.

One study suggested that women are more likely than men to prefer to quit using gradual reduction (CdtQ) and those who preferred long term reduction rather than quitting were more likely to be white. Furthermore smokers who were closer to quitting on the contemplation ladder were more likely to prefer a product that would help them quit completely than one that would help them reduce and maintain (**Shiffman 2007 CSS+**).

One study suggested that unlike males, female former-daily intermittent smokers (i.e. those that had reduced their smoking) did not differ between never-daily intermittent smokers in the situations where they were likely to smoke. Male smokers who had reduced from daily smoking however, were more likely than male never- daily smokers to smoke at parties or when taking a break at work or school (**Nguyen CSS+**).

Low income

Four studies explored the attitudes of low income women (**Nichter 2008 Q+, Stewart 2010 Q+)** and low income men and women (**Jones 2011 Q++, Okuyemi 2002 Q+**). Common factors reported across these studies were barriers faced from having smokers in their social networks and stress (**Jones 2011 Q++**, **Nichter 2008 Q+**, **Stewart 2011 Q+**) and lack of knowledge about harms of second hand smoke (**Jones 2011 Q++, Nichter 2008**). **Nichter 2008 Q+** reported additional barriers of boredom, and, whereas Stewart (2011 Q+) reported perceived low ability in achieving smoking goals). Common Facilitators were the wish to protect their own health and social pressure (**Nichter 2008 Q+**, **Stewart 2011 Q+**) and wish to protect children (**Jones 2011 Q++, Nichter 2008 Q+**). Additional facilitators were social support (**Stewart 2011 Q+**) not wanting own children to start smoking or homes smelling of cigarette smoking (**Jones 2011 Q++**).

In one further study of Low-income African Americans, participants were reported to use a range of structured scheduling or structuring methods to limit their smoking consumption (**Okuyemi 2002 Q+**).

Methadone users

One study explored the barriers and facilitators reported by smokers undergoing methadone treatment. Participants reported several facilitators to smoking reduction, including social pressure, perception that smoking is expensive and perceived harm to health from smoking. Confidence in ability to achieve smoking goal and the perception that smoking reduction leads to cessation were also reported. Participants also had positive views regarding whether NRT helps achieve smoking reduction (**Richter 2002 Q+**).

People with mental health problems

Psychiatric patients' views of smoking when hospitalised included boredom, stress, perceived dependence and nicotine addiction (**Keizer 2009 CSS–, Ratschen 2010 Q+**) and smokers in social networks (**Green 2005 MM–**). Mental health workers perceptions of their patients' barriers were consistent with these studies – they perceived boredom, social isolation, their mental illness and addiction to nicotine (**Ashton 2010 MM–**).

Green 2005 (**MM–**) and **Ratschen 2010** (**Q+**) found that patients believed they were not offered adequate advice or assistance to address their smoking. It is therefore relevant to note that in two studies of mental health workers only approximately half of the sample perceived it was important part of their role to address smoking with their patients (**Ashton 2010 MM–, Ratschen 2009 CSS+**) although protectin patients and staff from second hand smoking was valued by the majority of staff (71%) as an important aim (**Ratschen 2009 CSS+**).

Adolescents

Two studies explored adolescents reported barriers and facilitators for limiting their smoking. Aside from the perception that smoking is expensive, themes differed between studies. One study reported barriers of smokers in social network, facilitators of beliefs that smoking reduction leads to cessation, displeasure with smoking and worries of harm to own health. They also believed that NRT was helpful for achieving THR goals (**Hamilton CSS+**).

A further study found facilitators of social support, perceived confidence in ability to achieve smoking goal, and the use of a range of self-management techniques to structure and schedule their smoking. Stress and perceived low ability in achieving smoking goals (**Johnson 2004 Q+**).

Information from other studies (Appendix I)

A number of studies were identified during searching and screening for review 4, that concerned whether population characteristics associated with smoking reduction. The studies were longitudinal or cross-sectional surveys. These are not included in the review as they do not report smokers/providers views and attitudes. As these studies are not part of the review, they have not been formally quality assessed, but data have been extracted (please see Appendix I for further information). A brief narrative summary of the results are provided below.

Findings in relation to demographic factors generally showed a lack of relationship between these variables and smoking reduction. Six studies examined age and gender **(Falba 2004, Farkas 2011, Hyland 2005, Meyer 2003, Knoke 2006, MacPherson 2007)** and four of these also examined level of education **(Falba 2004, Farkas 2011, Hyland 2005, Knoke 2006s)**. Only one study found a relationship between these three factors and reductions in cigarette consumption **(Knoke 2006).**

Among the remaining studies no significant associations were found. Only one study examined the relationship between income and smoking reduction and found this was not statistically signficant **(Hyland 2005)**.

Of four studies examining the relationship between ethnicity and smoking reduction, one found no association **(Hyland 2005)**, a second found being white to be associated with a decreased likelihood of reducing **(Levy 2009)**, and a third found there to be a greater number of black people in the group who had increased smoking levels as opposed to those who had not changed **(Falba 2004)**. The final study found that Hispanic smokers were more likely than non-Hispanic whites to reduce, whilst differences for other ethnicities were not statistically significant **(Farkas 2011)**.

Several smoking related variables were found to be associated with smoking reduction. These included having had previous quit attempts **(Knoke 2006, Beard 2011b, Farkas 2011, Hyland 2005, Levy 2009, West 2001)** and previous number of cigarettes per day **(Knoke 2006, Hyland 2005)**, although **MacPherson 2007** found this relationship to not be significant among the three groups of quit attempters, reducers or maintainers in their study. Factors associated with a decreased likelihood of reducing smoking included smoking daily **(Levy 2009)** and smoking the first cigarette of the day within 30 minutes of waking **(Levy 2009)**, although again **MacPherson 2007** found no association between nicotine dependence and level of smoking. These differences in findings may be attributable to the specific population (hospitalised mental health population) in **MacPherson 2007**, where levels of nicotine dependence may be higher and smoking reduction and cessation may be a more difficult target. Desire to quit **(Hyland 2005)** and the age at which the participant started smoking **(Hyland 2005, Meyer 2003)** were not associated with smoking reduction.

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

2.1 No studies were identified that explored participants' perspectives on whether THR interventions have a differential impact on particular population groups.

2.2 **Shiffman 2007 USA CSS+** found a range of in-study population group differences: women are more likely than men to prefer cutting down to quit. Those preferring long term reduction are more likely to be Caucasian. Participants who were more ready to change their smoking behaviour wanted a product that would help them quit rather than reduce long-term.

2.3 A study of young people aged 18-29 years old, found that men's smoking may be influenced more greatly by social situations such as parties and school/work breaks than women (**Nguyen 2009 USA CSS+**).

2.4 A range of THR barriers and facilitators for low income populations were identified in four studies. Two studies explored the attitudes of low income women (THR-SR: **Nichter 2008 USA Q+**; THR/Quit: **Stewart 2011 CAN Q+**) and two explored those of low income men and women (THR-SR: **Okuyemi 2002 USA CSS+;** THR-TA: **Jones 2011 Q++**). Common factors reported across these studies were barriers faced from having smokers in their

social networks and stress (**Jones 2011 Q++**, **Nichter 2008 Q+**, **Stewart 2011 Q+**) and lack of knowledge about harms of second hand smoke (**Jones 2011 Q++, Nichter 2008**). Common facilitators between studies were the wish to protect their own health and social pressure (**Nichter 2008 Q+**, **Stewart 2011 Q+**) and desire to protect children (**Jones 2011 Q++, Nichter 2008 Q+**).

2.5 One study explored the views of smokers receiving methadone treatment. Participants reported several facilitators to smoking reduction, including social pressure, the perception that smoking is expensive and harm to health from smoking. Facilitators were their ability to achieve reduction and the perception this leads to cessation. Participants had positive views on whether NRT helps achieve smoking reduction (THR-SR: **Richter 2002 USA Q+**).

2.6 Five studies examined barriers and facilitators encountered by mental health populations, from the perspective of patients and health workers. Common themes were boredom and a strong dependence on smoking (THR-SR: **Keizer 2009 CHE CSS–**; THR/Quit: **Green 2005 CAN MM–;** THR-SR/TA: **Ratschen 2010 Q+**). Many patients believed they were not offered adequate advice or assistance to address their smoking (**Green 2005 CAN MM–, Ratschen 2010 Q+**).This is supported in two studies by the relatively low proportion of mental health workers who considered smoking advice was an important part of their role (THR/Quit: **Ashton 2010 AUS MM–, Ratschen 2009 GBR CSS+**).

2.7 Two studies explored adolescents' reported barriers and facilitators for limiting their smoking. Aside from the perception that smoking is expensive. Themes differed between studies. (THR/Quit: **Hamilton 2000 AUS CSS+**; **Johnson 2004 CAN Q+**).

Three studies were based in the UK (**Jones 2011 Q++**, **Ratschen 2009 GBR CSS+, Ratschen 2010 Q+**) and two studies were identified from Australia that is likely to have UK applicable evidence regarding adolescents (**Hamilton 2000 AUS CSS+**) and psychiatric services (**Ashton 2010 AUS MM–**).

Q3. What are smokers/families and healthcare professionals' views, experiences and perspectives on the potential or actual unintended consequences from adopting a harm-reduction approach?

Safety and harm to health of NRT

Three studies described smokers' concerns over the safety of NRT. Regarding NRT use for smoking reduction or temporary abstinence smokers were concerned about nicotine overdose, in particular from patches (**Beard 2011a Q+**), nicotine addiction and harm to health (**Beard 2011a Q+**, **Black 2012 CSS+**). Smokers also reported a number of what they believed were side effects including nightmares, sore skin and mood swings (from the nicotine patch) and sore gums and acid reflux (from nicotine gum)(**Beard 2011a Q+**). One respondent described problems of hyperactivity when using NRT and drinking coffee at the same time (**Bottorff 2009 Q++**).

Concerns regarding harm to health from NRT use were reported from three populations: nurses (**Borelli 2007 CSS–**); smoking cessation service staff (**Beard 2011b CSS–**) and tobacco control experts (**Warner 2003 CSS+**). A range of harms were perceived from long-term NRT usage or concurrent use

of NRT and cigarettes (heart attack and other heart diseases, cancer, high blood pressure). A number of other complications were also perceived from long-term nicotine use including emphysema, chronic lung disease or COPD, oral / dental problems, increased psychological dependence, mental health issues, increases salt intake from lozenges, stimulant effects of NRT, and problems during pregnancy (**Beard 2011b CSS–**). A large proportion of nurses believed nicotine is a cause of cancer in one study (**Borrelli 2007 CSS–**) and in a study of tobacco control community, participants THR products were perceived to produce negative effects on health (**Warner 2003 CSS+**).

These provider perceptions of harm to health from NRT are at variance with the findings from Review 1 which concluded that "evidence from nine randomised controlled trials strongly suggests that adverse events are common when NRT is used for smoking harm reduction, but these tend to be mild or moderate and are rarely severe."

Nicotine addiction and product misuse

Three studies reported that significant proportions of nurses (**Borrelli 2007 CSS–**), smoking cessation staff (**Beard 2011b CSS–** and tobacco control community members (**Joseph 2004 CSS+**) had concerns that NRT products could cause nicotine addiction.

Two studies of tobacco control community reported concerns of nicotine containing products being used by youth, non-smokers or leading to relapse by former smokers (**Warner 2003 CSS+**, **Martin 2004 Q+**).

Whether THR reduces smoking cessation

Six studies demonstrated that some smokers viewed reducing their smoking as a first step towards cessation (**Beard 2011a Q+**, **Bolliger 2000 CSS+**, **Bottorff Q++**, **Hamilton 2000 CSS+**, **Richter 2002 Q+**, **Shiffman 2006 CSS+**)**.** In contrast, three studies reported provider concerns that using products to assist THR would reduce smoking cessation (**Beard 2011b CSS–**, **Martin 2004 Q+**, **Joseph 2004a CSS+**). One UK-based study revealed a significant proportion of Stop Smoking Services (SSS) staff believed use of NRT for smoking reduction may undermine cessation. Seventeen percent reported they believed it would hinder cessation and 17% that it would have no effect (**Beard 2011b CSS–**). Whilst some positive perceptions of THR on cessation were observed in one study, they were outweighed by negative beliefs that THR interventions would weaken cessation (**Joseph 2004a CSS+**). It is not reported whether these views also meant that providers perceive messages to reduce, cut down to quit or temporarily abstain, weaken the cessation message or if these views were specific to the use of NRT and potential unintended consequences.

Information from other studies (Appendix I)

A number of studies were identified during searching and screening for review 4, that concerned whether smoking reducers go on to quit smoking. These are not included in the review as they do not report smokers/providers views and attitudes. As these studies are not part of the review, they have not been formally quality assessed, but data have been extracted. However they have been summarised and provided in Appendix I for further information. A brief narrative summary of the results are provided below.

Three studies examined the relationship between smoking reduction and later cessation in adults. Two studies found smoking reduction in adults to be associated with a greater likelihood of cessation **(Falba 2004, Hyland 2005)**, and a third found that although overall rates of cessation did not differ

between those who reduce and those who did not, reduction did increase cessation among moderate to heavy smokers who went on to become light smokers **(Farkas 2011)**.

Four studies demonstrated mixed results for the relationship between smoking reduction and quit attempts. One study found that the probability of quit attempts was equal between those attempting to reduce and those not attempting to reduce or quit **(Meyer 2003)**, a second found that those with a goal of reducing were more likely to make a quit attempt than those with a goal of not changing, although this difference was not statistically significant **(Peters 2009,)**. In a third study attempts to cut down as a prelude to quitting did predict future quit attempts but cutting down for its own sake did not **(West 2001)**. Amongst the psychiatrically hospitalised adolescent smokers, reducers had a greater percentage of quit attempts at follow-up than did maintainers, although there were no significant differences across groups in terms of abstinence rates **(MacPherson 2007)**.

Three studies examined the relationship between use of NRT and subsequent reduction or cessation. None of these studies were associated with an intervention, and it was not reported whether participants had received professional support to obtain NRT. Two studies from the Smoking Toolkit Study found that use of NRT for reduction or temporary abstinence and was a positive predictor of later quit attempts and abstinence **(Beard 2011c, Beard 2011d)**. However, **Levy 2007** found no significant association between past non-standard NRT use (for reasons other than to aid with abstinence) and 50% reduction in cigarettes per day, quit attempts or cessation at follow-up.

Key: AUS= Australia; CAN = Canada; CHE = Switzerland; CHN = China; CSS = cross sectional survey; DNK = Denmark; FIN = Finland; GBR = Great Britain; Q=qualitative; MM = mixed methods; PE = process evaluation; THR =Tobacco harm reduction; THR/Quit=THR and smoking cessation examined together; THR-CDTQ= examines views on cutting down to quit; THR-PSC= examines views on preoperative smoking cessation; THR-SR = examines views on smoking reduction; THR-TA= examines views on temporary abstinence; USA = United States; VAR= various countries .

Evidence Statement:

3.1 Six studies identified harm to health from long term NRT use or concurrent NRT and smoking was a concern both for smokers (THR-TA/SR: **Beard 2011a GBR Q+**; THR-SR: **Black 2012 GBR CSS+**; THR/Quit: **Bottorff 2009 CAN Q++**) and providers (THR-SR: **Beard 2011b GBR CSS–**; THR-SR: **Warner 2003 USA CSS+**; THR/Quit: **Borelli 2007 USA CSS–**).

3.2 Three studies reported that significant proportions of nurses (THR/Quit: **Borrelli 2007 USA CSS–**), stop smoking service staff (THR-SR/TA: **Beard 2011b GBR CSS–**) and tobacco control experts (THR/Quit: **Joseph 2004a USA CSS+**) had concerns that NRT products cause nicotine addiction. Experts from the USA also considered THR products could be misused by adolescents or lead to relapse in former smokers (THR-SR: **Martin 2004 USA Q+**, **Warner 2003 USA CSS+**).

3.3 In six studies a number of smokers viewed reducing as a first step to cessation (THR-SR/TA: **Beard 2011a GBR Q+**, THR-SR: **Bolliger 2000 CHE CSS+**, **Richter 2002 USA Q+**; THR-CDTQ/SR: **Shiffman 2007 USA CSS+**; THR/Quit: **Bottorff Q++**, **Hamilton 2000 AUS CSS+**)**.** In contrast, four studies reported provider concerns that THR or using products to assist THR would hinder smoking cessation (THR-SR/TA: **Beard 2011b GBR CSS–**; THR-SR: **Martin 2004 USA Q+**, **Joseph 2004a USA CSS+**, **Warner 2003 USA CSS+**).

Only four of the eleven studies were clearly applicable to the UK (**Beard 2011a GBR Q+**, **Beard**

2011b GBR CSS–, **Black 2012 GBR CSS+**, **Hamilton 2000 AUS CSS+).** Furthermore, three of the studies specifically stated they used the USA IOM definition of THR which includes out-of scope products such as smokeless tobacco (**Joseph 2004a USA CSS+**, **Martin 2004 USA Q+**, **Warner 2003 USA CSS+**).

Q4. What are smokers/families and healthcare professionals' views, experiences and perspectives on how best to deliver messages about tobacco harm reduction without weakening the impact of advice about the benefits of stopping smoking?

None of the included studies gathered views on how to deliver messages without weakening the impact of advice about the benefits of stopping smoking.

4.1 No evidence was identified on how best to deliver messages about tobacco harm reduction without weakening the impact of advice about the benefits of stopping smoking.

5. PARIHS FRAMEWORK

There is a wider evidence base on the critical success factors to successful implementation of interventions in practice. These critical success factors have been incorporated in conceptual implementation frameworks such as the Promoting Action on Research Implementation in Health Services PARiHS Framework (Kitson et al 2008). Within the PARiHS framework, successful implementation is associated with the quality and value of the intervention, the qualities of the context in which the intervention is being introduced, and the way the intervention is facilitated and supported to achieve successful outcomes. The barriers and facilitators are mapped against these core concepts on a high to low continuum.

Please see Table 3 overleaf.

The value of such a framework can be to summarise a range of factors that should be considered, in both the intervention design and the context in which it is delivered, to maximise the chance of the success of any individual intervention. Entries in the last column (opportunities for additional interventions) are for illustration only.

PARiHS framework concepts/domains	**Critical success factors for translation and implementation of THR interventions**		**Potential additional interventions to optimise implementation** (review author suggestions)
	LOW implementation (**Barriers**)	**HIGH implementation** (**Facilitators**)	
CONTEXT **Health service/ provider context** service, quality assurance, evaluation, beliefs and values of the service/ professionals, culture and leadership	**Lack of confidence:** providers' lack of confidence in ability to provide THR interventions **Lack of provider administrative support:** such as adequacy of time and administrative support.	**Role priority:** providers' positive belief that smoking cessation advice and tobacco harm reduction is part of the health practitioners' role **Supportive resources in the clinical environment**: availability of high quality tobacco reduction resources (such as availability of related policies, in-service education opportunities, community resources, ward resource material, formulary medications and physician involvement)	Training to increase provider confidence
Home/ work/ social context of smoker	***Social/psychological issues:*** *smokers associate in a social network of smokers* ***Association of smoking and driving****: the habit is hard to break* ***Boredom and stress:*** *smokers found it difficult not to smoke* ***Smoking at home****: smokers view home as comfortable, private environment to smoke, and smoking outside conflicted with ability to provide care for children*	***Social support and social pressure:*** *help smokers to reduce/stop smoking* ***Harm of smoking:*** *smokers wished to protect children and worried about harm of smoking to own health* ***Value of smoking restrictions:*** *restrictions at home, work or hospital helped smokers reduce smoking consumption*	Teach smokers psychological techniques to manage negative situations Teach families psychological techniques to support smoker
FACILITATION and SUPPORT Types of referral, patient choices, holistic enabling support, guidance, and purposeful knowledge exchange to support implementation/ concordance, family and other support	***Lack of information and support****: smokers not offered information or assistance to support THR* ***Negative beliefs:*** providers' concern of patients low willingness or ability of patients to address smoking, *and smokers' negative beliefs regarding their dependence and nicotine addiction and perceived low ability in achieving smoking goal. Providers concern that encouraging THR reduces smoking cessation.*	**Goal attainment and positive encouragement***: smokers' perceived confidence in ability to achieve smoking goal.* **High value** placed by providers towards encouraging THR ***Self-management:*** *smokers taking control by structuring and scheduling of smoking, and using substitution techniques.* Provider beliefs that self control and self esteem might be enhanced in smokers if they believed they are taking steps towards improving their health. **Realistic and understanding strategy***:* THR seen by providers as a more realistic and understanding strategy to addressing smoking ***Behavioural interventions:*** *viewed positively* ***Facilitate attendance:*** *transport and childcare facilities To enable low income mothers to attend support groups*	Access to information and facilitation of and individually-tailored and targeted support Additional psychological techniques such as motivational goal attainment to underpin intervention

TABLE 3: PARIHS Framework for THR barriers and facilitators. Key to Barriers and Facilitators: Black text = Providers' views; Italics = Smokers' views. Themes are emphasised in bold.

PARiHS framework concepts/domains	**Critical success factors for translation and implementation of THR interventions**		**Potential additional interventions to optimise implementation** (review author suggestions)
	LOW implementation (Barriers)	**HIGH implementation (Enablers)**	
Value placed on intervention – e.g. knowledge, attitudes and beliefs from various stakeholder perspectives	***Low value:*** *smoker belief that NRT or e-cigs does not help achieve smoking goals or help with smoking craving* ***Negative features for different NRT products****: action of nasal spray, dislike chewing gum, taste, lacks action of smoking. Negative perceptions of battery life and quality of e-cigarettes* **Patient affordability:** *smokers perceived NRT as expensive to buy.* Provider concerns about affordability balanced against effectiveness of THR interventions. Differing opinions of providers as to whether NRT should be prescribed, with nurses more supportive than doctors (half versus one third) **Provider belief:** that encouraging smokers to reduce consumption/ cut-down to quit or temporarily abstain does **not address nicotine addiction**. **Perceived harm to health:** *smoker concerns regarding safety of NRT and health side effects.* Provider concerns regarding harm to health from NRT use: e.g. heart diseases, cancer, high blood pressure, and various complications from long-term use **Beliefs NRT and e-cigs cause nicotine addiction:** provider concerns that NRT could cause nicotine addiction. *Smokers concern that NRT and e-cigs may lead to nicotine addiction* **NRT perceived to lead to product misuse or smoking relapse**: provider concerns of nicotine containing products being used by youth, non-smokers or leading to relapse by former smokers **Inconsistent understanding:** amongst healthcare professionals of how NRT should be used for THR. *Smokers lacked knowledge on how and when to use NRT for THR purposes and harms of second hand smoke*	**High value place on positive beliefs and harm reduction:** *commonly reported smoker's belief that NRT helps reduce or cease smoking, reduce harm from smoking and help with craving.* Providers place high value on smoking reduction and associated positive effects to a smokers health ***High value placed on behavioural interventions:*** *namely face-to-face counselling, with some positive views of telephone counselling and support groups* ***Perceived value of e-cigarettes:*** *significant proportion of e-cig users utilising product for reducing, cutting down to quit or temporary abstinence, perceiving e-cigs reduce harm from smoking and help with cravings* ***Belief in smoking reduction:*** *as leading to cessation* ***Positive views on NRT:*** *smokers favourably perceived features of different NRT products: taste, ease of use, discreteness, distraction and similarity with the action of smoking.* ***Affordability:*** *smokers considered the* ***cost of smoking high****, e-cigs considered cheaper than smoking* ***Displeasure with smoking:*** *smokers' dislike of their own smoking*	Assess readiness of smoker to accept intervention Additional psychological Interventions to support smoking intervention Address inaccurate perceptions of smokers and providers Additional educational interventions for smokers

TABLE 3 continued: PARIHS Framework for THR barriers and facilitators. Key to Barriers and Facilitators: Black text = Providers' views; Italics = Smokers views. Themes are emphasised in bold

6. COMPARISON OF IDENTIFIED BARRIERS AND FACILITATORS AGAINST INTERVENTION STUDIES

Table 4 links the barriers and facilitators identified in this review to the hypotheses and programme content (programme theory and logic) underpinning the intervention design in the higher quality intervention trials identified from review 2 (cut down to quit) and review 3 (long-term harm reduction). Where an evidence statement (ES) from review 2 or review 3 is directly relevant to an identified theme it is referenced in the foot notes. Some suggestions for measures to address the themes that are not linked to intervention studies have been added by the review team as illustrations only and are given in italics.

The Table is designed to provide an overview of the intervention evidence in relation to the themes identified. It may aid the identification of gaps in good quality interventions and inform research recommendations.

Table 4: Comparison of identified barriers and facilitators against intervention studies

Themes – Identified barriers & facilitators	**Potential measures to address them** (*review authors' Illustrative ideas in italics)*	**Coverage in theory of intervention trials from reviews 2 (R2) & 3 (R3) graded +/++**
1. Environmental: Smokers		
1.1 Social barriers • Smokers in social networks		
1.2 Social facilitators • Social pressure – Society not accepting of smoking • Social support (friends/family) to address smoking	Support smokers and their families with techniques to manage situations when smoking is unacceptable – e.g. local smoking bans[9]	R3: Borland 1999
1.3 Travel barriers • Association of travel (driving) with smoking		
1.4 Physical facilitators • Cost of smoking • Smoking restrictions (home, work, hospitals)	Support smokers and their families with techniques to manage situations when smoking is not allowed[6]	R3: Borland 1999
2. Intrapersonal: Smokers		
2.1 Psychological barriers • Stress • Boredom • Low perceived ability (self-efficacy) to achieve THR goal(s)	Address psychological barriers with motivational interviewing[10] Address psychological barriers with counselling/support[11]	R3: Audrain-McGovern 2011, Davis 2011, Gulliver 2008, Horn 2007, Kelly 2006, McCambridge 2005 R3: Glasgow 2009, Hovell 2000, Irvine 1999, Wakefield 2002
2.2 Psychological facilitators • Perception that smoking reduction can lead to cessation • Displeasure with aspects of smoking	Offer the choice of gradual reduction vs. abrupt cessation[12]	R2: Etter 2009, Hughes 2010

[9] No evidence as yet to suggest that self help to cope with smoking bans is effective (R3 ES 4.12)

[10] No evidence of effectiveness of motivational interviewing components alone, compared to other behavioural methods or no support (R3 ES 4.1, 4.2)

[11] No evidence of effectiveness for counselling alone (R3 ES 4.4, 4.6)

[12] Moderate evidence of effectiveness (R2 ES 1.1)

Themes – Identified barriers & facilitators	**Potential measures to address them** (*review authors' Illustrative ideas in italics)*	**Coverage in theory of intervention trials from reviews 2 (R2) & 3 (R3) graded +/++**
2.3 Behavioural barriers	Address behavioural barriers with cognitive behavioural therapy[13]	R2: Cinciripini 1994, Marks 2002 R3: Schleicher 2010
2.4 Behavioural facilitators • Structuring or scheduling smoking activities • Substitution techniques	Provide support /guidance for scheduled reduction[14] *Provide support /guidance re substitution techniques*	R2: Cinciripini 1995 R3: Riley 2002
2.5 Personal health facilitators • Worries about harm to health from smoking • Wish to protect children	*Address with patients at key times (e.g. preparation for surgery) to stress health benefits* Behavioural support for adults to reduce the impact of environmental tobacco smoke on children[15]	R3: Hovell 2000, Irvine 1999, Wakefield 2002
3. Attitudes to THR approaches: Smokers		
3.1 Belief barriers • Some perceive that NRT does not help achieve smoking goals • Small proportion believe that product does not help cravings (e-cigarette users)	*Increase awareness of evidence for the effectiveness of NRT*	
3.2 Belief facilitators • Commonly reported belief that NRT helps reduce or cease smoking, reduce harm from smoking and help with cravings • Behavioural interventions viewed positively (face-to-face counselling/support groups) • Significant proportion of e-cigarette users use product for THR perceiving less health risk and help with cravings[16]	Offer NRT treatment (with no or minimal support)[17] Offer NRT with a motivational component[18] Offer NRT with counselling[19]	R2: Etter 2009, Hughes 2010, Martin 1997, Shiffman 2009 R3: Batra 2005, Bolliger2000, Etter 2007, Foulds 1992, Rennard 2006, Wennike 2003 R3: Carpenter 2004, Chan 2011 R3: Hanson 2008, Joseph 2008,Thomsen 2010
3.3 Intervention feature barriers • Negative views of some NRT products (action of nasal spray, dislike of chewing gum, taste and lack of substitution for action of smoking) • Negative perceptions of battery life and quality of e-cigarettes	Offer choice of NRT treatment	R3: Chan 2011, Etter 2007, Fagerstrom 1997, Hanson 2008, Kralikova 2009, Pisinger2005
3.4 Intervention feature facilitators • Positively perceived features of different NRT products (taste, ease of use, discreteness, distraction and – • Positively perceived features of e-cigarettes (taste and sensation, use where smoking is banned, similarity with the action of smoking)	Offer choice of NRT treatment *Provide more evidence based advice on e-cigarettes/pros and cons*	As above

[13] Moderate evidence of effectiveness for cut down to quit (R2 ES 4.1) but not for reduction (R3 4.10)
[14] Weak evidence supports scheduled reduction (R2 ES 6.1; R3 ES 6.1)
[15] Evidence available to date does not support behavioural interventions in this context (R3 ES 4.4)
[16] As yet there is very little evidence on the health and other effects of e-cigarette usage (see Review 1)
[17] Moderate (R2 ES 1.1,1.2) or strong/moderate (R3 ES1.1, 1.3) evidence of effectiveness
[18] Moderate evidence of effect for NRT with *or without* a motivational interviewing component (R3 ES 1.2)
[19] Some evidence of effect for pre-operative approaches (R3 4.8) but not for adolescents (R3 4.5)

Themes – Identified barriers & facilitators	**Potential measures to address them** (*review authors' Illustrative ideas in italics)*	**Coverage in theory of intervention trials from reviews 2 (R2) & 3 (R3) graded +/++**
3.5 Cost barriers • Perception that NRT products are expensive	*Offer NRT at no or low cost; Highlight prescription availability as appropriate*	
3.6 Cost facilitators • Perception that NRT is cheaper than smoking	*Provide cost information on the relative costs of NRT versus smoking*	
3.7 Access to intervention barriers • Not being offered assistance to cut down or quit	*Offer additional training and support to health professionals to encourage offers of help to patients*	
3.8 Access to intervention facilitators • Request from low income mothers for practical assistance to attend support groups	*Offer practical assistance to facilitate attendance for smoking reduction/cessation treatment*	
3.9 Knowledge barriers • Lack of knowledge on how and when to use NRT for THR purposes (e.g. belief that not possible to combine NRT with smoking) • Lack of knowledge regarding harms of second hand smoke	*Address inaccurate perceptions of HCPs (e.g. confirm that NRT can be combined with smoking)* Objective feedback on child's level of ETS exposure Behavioural support for adults to reduce the impact of ETS on children[20]	R3: Wakefield 2002 R3: Hovell 2000, Irvine 1999, Wakefield 2002
4. Attitudes to THR approaches: Providers		
4.1 Implementation barriers • Perception of unintended consequences from NRT use (reduces likelihood of cessation/harm to health) [21] • Concerns about high cost of THR interventions • Lack of confidence in own ability to provide THR interventions • Lack of confidence in patients' willingness or ability to address smoking • Does not address nicotine addiction	*Address inaccurate perceptions of HCPs - e.g. provide summaries of best evidence for health professionals and patients re risks of NRT* *Offer additional training and support to health professionals to increase confidence*	
4.2 Implementation enablers • Positive belief that part of health professional role to provide harm reduction and smoking cessation advice • Perception that THR improves health • Healthcare environment an appropriate context for delivering interventions		

Format adapted from: Harden A, Brunton G, Fletcher A, Oakley A. Teenage pregnancy and social disadvantage: systematic review integrating controlled trials and qualitative studies. BMJ 2009; 339: b4254

[20] No evidence of effectiveness (R3 ES 4.4)

[21] The available evidence from studies of long term use tends to counter these concerns (R3 ES 8.1, See also Review 1)

7. DISCUSSION

This review contains a large body of evidence of relevance to the barriers and facilitators of tobacco harm reduction, identified by smokers and healthcare providers.

The quality of the included studies was generally moderate. Only three of the 17 qualitative studies (Q) were deemed to be of high quality (**Bottorff 2009 ++**, **Jones 2011++**, **Schultz 2011 ++**) and none of the 23 cross sectional surveys (CSS) or 3 mixed methods studies (MM) were rated as high quality. Most studies were deemed to be of moderate quality, with 1 qualitative, 6 cross-sectional surveys and one mixed methods study being rated −. Two process evaluations (PE) were also identified which are not quality assessed.

Over one third of the studies were considered to have high applicability to the UK. This included five studies from the England-based Smoking Toolkit Study[22] (**Beard 2011a Q+**, **Beard 2011b CSS–**, **Beard 2012a CSS+** , **Beard 2012b CSS+** ,**Black 2012 CSS+**), a further nine UK-only studies(**Amos 1995 CSS–**, **Blackburn 2003 CSS–, Haddock 1997 PE**, **Jones 2011 Q++, McEwen 2001 CSS+**, **Phillips 2007 Q+**, **Ratschen 2009 CSS+**, **Ratschen 2010 Q+**, **Robinson 2010 Q+**), and two studies conducted in the UK plus other countries (**Cheong 2007 LS+**, **Etter 2011 CSS+**). Four studies were from countries judged to be have sufficiently similar smoking reduction and cessation programmes , including two based in Australia (**Ashton 2010 MM-**, **Hamilton 2000 CSS+**),one in Denmark (**Thomsen 2009 Q-**) and a further study conducted in several European countries including Spain (**Brotons 2005 CSS+**).The majority of the remaining studies were USA or Canada based, with a further two studies performed in Switzerland and one in Finland and one in China.

The majority of studies solely regarded THR approaches or it was possible to extract findings relating to smoking reduction, temporary abstinence where smoking was not allowed, smoking cessation prior to surgery or cut down to quit. However almost a third of studies considered both smoking cessation (without mention of a gradual reduction phase) and THR together, and it was not always possible to separate results for THR (**Amos 1995 CSS–**, **Ashton 2010 MM–**, **Bottorff 2009 Q++**, **Brotons 2005 CSS+**, **Etter 2011 CSS+**, **Foulds 2011 CSS–**, **Green 2005 MM–**, **Hamilton 2000 CSS+**, **Johnson 2004 Q+**, **Joseph 2004a Q+**, **Martin 2004 Q+**, **McEwen 2001 CSS+**, **Stewart 2011 Q+).**

Results suggest there are a number of trigger points in smokers' daily lives that may benefit from interventions to enhance or minimise the effects of existing facilitators and barriers of THR. These were mapped onto a conceptual model of implementation (see section 5). The themes were also compared with the hypotheses and programme content (programme theory and logic) underpinning design of the higher quality intervention trials identified from review 2 (cut down to quit) and review 3 (long-term harm reduction) (see section 6).

The review findings are summarised below, highlighting evidence of effectiveness from intervention trials in reviews 2 and 3, where relevant.

Overall, the evidence within the review suggests that:

- A range of underlying background environment and intrapersonal factors affect smokers attitudes and attempts at THR. These barriers appear to be faced even when smokers are utilising interventions to assist THR (e.g. NRT or behavioural interventions).

[22] http://www.smokinginengland.info/

- Environmental barriers included smokers in social networks, association of travel with smoking whereas environmental facilitators included social pressure, social support, high cost of smoking, and smoking restrictions.
- Psychological barriers included stress, boredom and perceived low ability to achieve THR. A number of studies in Reviews 2 and 3 evaluated motivational interviewing and counselling interventions that could address these barriers. However evidence of the effectiveness of these techniques alone (without NRT) is weaker than evidence of such approaches combined with NRT, or NRT with minimal support (see reviews 2 and 3).
- Psychological facilitators included displeasure with aspects of smoking and the perception that smoking reduction can lead to cessation.
- Smokers trying to reduce or control their smoking consumption employ a range of informal self-management techniques – such as structuring or scheduling their smoking activities and substituting smoking with other hobbies or distractions, to replace their smoking behaviours. They appear to employ these methods with or without the use of formal interventions to assist THR (e.g. NRT or behavioural interventions). There is limited evidence from intervention trials as yet for scheduled reduction approaches in cutting down to quit, but stronger evidence advocating its use in reduction of cigarette consumption (see reviews 2 and 3).
- Many smokers perceived NRT to be helpful for THR purposes although beliefs that the products were expensive to buy was also reported. Whilst Healthcare providers viewed NRT as helpful in stopping smoking, some providers expressed concerns about affordability balanced against effectiveness. It was not clear in these studies whether the views were provided in relation to abrupt quitting or whether they represented the views of professionals' perceptions on the effectiveness of NRT for smoking reduction, cutting down to quit or temporary abstinence. Review 3 identified significant benefits from NRT when smoking reduction is the intended outcome.
- Nicotine patches appear to be the most commonly used form of NRT for THR purposes, though a range of positive and negative features were described for each NRT product. Smokers' preferences for NRT appear to be a matter of personal choice depending on characteristics of the product valued (e.g. discreetness, dose of nicotine, or replication of smoking action). There is some modest evidence that offering smokers a choice of medication may enhance efficacy for long term reduction (see Review 3).
- Whilst the majority of surveyed smokers used e-cigarettes for smoking cessation, a significant proportion were using them for smoking reduction purposes. They perceived less health risk than smoking and help with cravings. As yet there is little evidence on the health and other effects of e-cigarette usage (see Review 1)
- Behavioural interventions were viewed favourably in both qualitative/process evaluations linked to intervention studies and by smokers providing general opinions on their desired interventions. Evidence from intervention trials suggest limited benefit of motivational interviewing and other behavioural interventions for long term reduction, although both brief and intensive (multiple-sessions) pre-operative smoking interventions, combining counselling with NRT, increased smoking cessation at the time of surgery. Only intensive interventions were effective long term. (Review 3).
- There was inconsistent understanding amongst healthcare professionals (HCPs) and smokers regarding knowledge of how and when to use NRT, and a number of HCPs lacked confidence in

their ability to provide THR advice. Healthcare providers also demonstrated misconceptions about the harms to health associated with long-term use of NRT and anticipated that its use would reduce the likelihood of cessation in smokers. It is unclear if these views are based on practice experience and observations. However, available evidence in intervention trials tends to counter these health concerns (see Reviews 1, 2 and 3)

- No studies explored smoker/family or provider perspectives on whether THR interventions have a differential impact on particular population groups.
- Several unintended consequences were perceived by smokers and providers, relating to the safety and harm to health from use of NRT long term or concurrently with smoking; concerns nicotine products may lead to nicotine addiction and product misuse in non-smokers ; and whether THR messages and THR interventions deter smokers from cessation.
- None of the included studies gathered views on how to deliver messages without weakening the impact of advice about the benefits of stopping smoking.

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