

# Young people's access to tobacco

## A mixed-method systematic review

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## Executive summary

### Background

This report describes the findings and methods of a systematic review of research exploring how young people aged 11-18 years access tobacco in the UK. The review was commissioned to support the development of policies to reduce rates of smoking among young people; it sought to understand the relative importance of both retail and social sources of tobacco for young people.

To address this issue, we asked:

- i. What are the retail and non-retail sources of tobacco used most by young people aged 11 to 18 and do patterns vary according to contextual factors such as age and sex?
- ii. How do young people describe accessing tobacco and what do they indicate are the barriers to and facilitators of tobacco access?
- iii. What kinds of interventions that aim to limit the non-retail supply of tobacco to young people have been evaluated and how do they address the barriers and facilitators identified as significant by young people in the UK?

To answer these questions, this report draws together findings from three interconnected pieces of work:

- a synthesis and statistical meta-analysis of survey data from young people in the UK;
- a synthesis of qualitative research from young people in the UK; and
- a descriptive map of international research activity examining the impact of interventions on non-retail access.

### Findings

*Which sources are most used by young people in the UK?*

- Friends, closely followed by shops, are the most frequently reported sources across all young people surveyed.
- Boys, older young people and regular smokers are more likely to use retail sources.
- Girls, younger young people and occasional smokers are more likely to use social sources.
- Meta-analysis confirms that regular smokers are 2.6 times more likely to use retail sources than social sources compared to occasional smokers.

*What do young people in the UK say about tobacco access?*

- Young people feel ‘it’s easy’ to access cigarettes, given the right strategy.
- They state that friends, shops and proxy purchasing are the most significant sources for them.
- Young age or age-appearance, risk and cost are described as barriers to obtaining cigarettes.
- The sociability and visibility of access and the apparent complicity of adults are described as facilitating tobacco access.

*What evidence is available about ways to curtail non-retail access?*

- Four broad types of intervention targeting non-retail access have been evaluated: possession laws; retail interventions measuring non-retail access; school policies; and home access restrictions.
- These interventions address some, but not all, of the barriers and facilitators identified by young people, and none tackle proxy purchasing specifically.
- Quality and relevance is low: little methodologically strong research has been conducted in this area, and no UK studies were identified.

## **Implications for policy, practice and research**

### *Social sources*

- Intervening to prevent tobacco access from social sources will be necessary to prevent young people from starting smoking, as both younger and occasional smokers predominantly depend upon social sources.
- Intervention evidence suggests that more effort has gone into developing retail interventions - possibly due to difficulty of knowing how to tackle social sources - making social sources a priority area for intervention development and evaluation.
- The sociability and visibility of accessing tobacco through friends and peers in schools clearly facilitates this source; targeting the organised exchange of tobacco between young people in schools may be key to reducing this type of access.

### *Retail sources*

- Though raising the purchase age to 18 in the UK appears to have reduced access via shops, it remains one of the most popular routes for young people.
- Patterns of retail access shown in surveys and qualitative data suggest that retail regulation implementation is variable, but where implemented consistently will deter access attempts.
- It is important to explore reasons for, and to identify ways to combat, lax implementation of regulations in smaller stores.

- Sensitive approaches are needed, as young people's attitudes towards regulation are complex, and increased regulation may serve to heighten the kudos of smoking.

*Proxy purchasing*

- Qualitative research suggests that proxy purchasing is a significant access route for young people, though the very limited amount of survey evidence available at the time of the review does not support this view.
- Survey data published since the review was conducted validate the qualitative findings.

*Other sources*

- Low levels of access using sources that do not require face-to-face contact with a retailer (vending machines, stealing, internet and black market) are reported in comparison to shops and friends.
- Ease of access using other routes may mean that it is unnecessary to use these, but they may become more popular if interventions to tackle access from shops and friends prove successful.
- There is a continuing need for both qualitative and survey research to keep abreast of shifting patterns of access and 'new' sources of tobacco.

## 1 Background

### 1.1 Young people, health and smoking

In recent decades, rates of smoking have been steadily declining, from 45 percent in 1974 to 21 percent in 2009 (Office for National Statistics 2011). However, smoking-related disease is still the leading cause of preventable death in the UK, taking the lives of over 80,000 people each year in England alone, most commonly through lung cancer, chronic obstructive pulmonary disease (COPD) and cardiovascular disease (Department of Health 2010).

Smoking rates among young people are also declining, but current data show that it still occurs at significant levels. Almost half of 15-year-olds in England have tried smoking and 12 percent smoke regularly (Fuller 2011). Although smoking rates increase with age, over a quarter of all 11- to 15-year-olds in England have tried it at least once (Fuller 2011). Patterns of use also reveal gender to be an important factor. Young women aged 11 to 15 are more likely to smoke than their male counterparts (28 percent and 25 percent respectively) and are more likely to be regular smokers (6 percent and 4 percent respectively) (Fuller 2011).

Evidence suggests that young smokers may be disproportionately affected by the health risks for several reasons:

- Those who begin smoking in their teens are very likely to continue smoking as adults and are more likely than others to become heavy smokers; two-thirds of adult smokers in the UK started before the age of 16 (Office for National Statistics 2011).
- Young smokers are those most susceptible to the harms of tobacco. A study of male students at Glasgow University found that those who became smokers during adolescence or early adult life were significantly more likely to die from smoking-related illnesses compared to those who started smoking later in life (McCarron et al. 2001). Although some of the additional risk for young smokers may be due to a greater number of 'smoking years', research has shown that young smokers are more likely to get lung cancer than those who start to smoke as adults even after controlling for amount and length of tobacco exposure (Hegmann et al. 1993, Wiencke et al. 1999).
- There is a trend in the UK for women to take up smoking at an increasingly younger age; the proportion of women taking up smoking before the age of 16 rose from 28 percent in 1992 to 37 percent in 2009 (Office for National Statistics 2011).

There is a clear need, then, to find effective ways of reducing rates of smoking among young people. Current approaches to combat smoking which highlight its health risks may be ineffective for this age group, as health messages are known to have little salience for children and young people (Thomas et al. 2004). Approaches that inhibit young people's ability to obtain tobacco may therefore be more appropriate for preventing smoking in this age group.

## 1.2 Smoking: the policy context

Tobacco use is estimated to cost the NHS around £2.7 billion every year (Department of Health 2010). The NHS calculates that in England in 2007/08 there were about 440,000 hospital admissions of adults aged 35 and over with a diagnosis of a disease that was caused by smoking. Recent research estimates that the decline in the number of smokers over the past decade has led to annual savings to the NHS of around £380 million (Callum 2008).

Since 1998 and until 2009, tobacco control and smoking policy was guided by the 1998 White Paper *Smoking Kills* (Department of Health 1998) and the Public Health White Paper, *Choosing Health* (Department of Health 2004). In February 2010, the Department of Health strategy document *A Smokefree Future* set out a ten-year strategy to achieve a reduction of smoking to 10 percent or less among adults and to 1 percent or less among 11-15 year olds (Department of Health 2010). Most recently, the Tobacco Control Plan (TCP) for England (Department of Health 2011) sets out targets to be achieved by 2015. In particular, it sets out a target to reduce smoking among 15-year-olds in England to 12 percent or less by the end of 2015.

Since the 1998 White Paper, the government has used legislation to reduce rates of smoking, including measures to ban the advertising and promotion of tobacco, the introduction of health messages on cigarette packets and the banning of smoking in enclosed public places and workplaces.

Further legislative measures have addressed specifically the issue of *access* to tobacco. In 2007, the legal age for purchasing tobacco was raised from 16 to 18 in England, Wales and Scotland (Northern Ireland followed in 2008). Measures in the Health Act (2009) also address the issue of access by prohibiting the sale of tobacco from vending machines in England from 1 October 2011 (Wales, Scotland and Northern Ireland have also committed to a ban), and by prohibiting the display of tobacco products in large shops from 6 April 2012 and in small shops from 6 April 2015. In addition, from 1 October 2013, only specialist tobacconists will be able to advertise and display tobacco products.

The Tobacco and Primary Medical Services (Scotland) Act 2010 is similar to the Health Act 2009 but contains additional measures aimed specifically at reducing the availability of tobacco to under 18s, namely: making it an offence for under 18s to purchase tobacco; making it an offence for adults to buy tobacco for under 18s (proxy purchase); and giving courts the power to ban retailers from selling tobacco where they have continually broken the law.

The measures in the Scottish legislation regarding proxy sales are the first to address the issue of 'non-retail' access, and this review was commissioned to inform the exploration of further policy development in this area.

## 1.3 Young people and access to tobacco

Although it is illegal to sell tobacco to a person under the age of 18 in the UK, research has found that young people here access tobacco through both retail and non-retail sources (Croghan et al. 2003, Robinson and Amos 2010). Tougher retail

legislation, such as raising the legal age for purchasing cigarettes, may therefore easily be bypassed by young people through switching to non-retail sources. It is clear, therefore, that there is scope for policy initiatives that go beyond addressing retail sources. A robust and comprehensive evidence base on the sources of tobacco used by young people in the UK, the different contextual factors that interact with this and the potential for curbing non-retail sources will therefore be of great value in the development of future policy.

#### **1.4 Research on young people's access to tobacco**

A number of systematic reviews have collected evidence on the effectiveness of interventions to reduce illegal retail or over-the-counter sales of tobacco to underage young people (known as 'access restriction interventions'). A Cochrane review by Stead and Lancaster (2005) concluded that actively enforcing laws or using multi-component retailer and community educational strategies were most effective for reducing sales to minors. However, they also found that whilst restriction interventions appeared to have a significant effect on the sales of tobacco to young people, this did not translate into a significant impact on smoking prevalence. Other reviews have reached a similar conclusion: Richardson et al. (2009) and Fichtenberg (2002) found that access restriction interventions may produce significant reductions in the rate of illegal tobacco sales to young people, but that one of the chief obstacles to reducing smoking rates (as opposed to tobacco sales) is young people's ability to acquire cigarettes from social sources.

Access to tobacco was one of three key themes to emerge in a broad-ranging systematic review of qualitative research on all aspects of adolescent tobacco use published in 2007 (Walsh and Tzelepis 2007). The authors concluded that the studies 'point to the variety and flexibility of strategies adolescents adopt to obtain cigarettes in different periods of adolescence and in different situations' (p1310). However, the authors acknowledge the limited generalisability of their findings as only 3 of the 19 studies included with data on access were published outside the US; two were from the UK (Oakley et al. 1992, Barnard and Forsyth 1996).

A 2009 non-systematic review on young people and smoking in England drew together survey data on many aspects of youth smoking, including access behaviour (Amos and Hastings 2009). However, included studies were not quality assessed and in relation to patterns of access behaviour, the review drew findings from one survey only (Fuller 2007) and therefore did not pool or compare findings from multiple studies.

Thus, whilst recent qualitative research has explored the range and significance of sources of tobacco available to young people in the UK (Croghan et al. 2003, Robinson and Amos 2010), review-level evidence from the UK is limited. In addition, we are not aware of any reviews that have examined interventions to address non-retail access to tobacco.

This review attempts to address these gaps in knowledge by locating, appraising and synthesising evidence about: the different retail and non-retail sources of

tobacco used by young people in the UK; young people's views and experiences of tobacco access; and interventions which attempt to limit the non-retail supply of tobacco to young people.

## 2 Aims and methods

### 2.1 Aims

This systematic review examines how young people aged 11-18 years access tobacco in the UK. It uses data from a range of study types in order to assess the range and prevalence of sources used, to gain a deeper insight into young people's experiences and views about tobacco access, and to explore potential avenues for intervention.

To address this issue, we asked:

- i. What are the retail and non-retail sources of tobacco used most by young people aged 11 to 18 and do patterns vary according to contextual factors such as age and sex?
- ii. How do young people describe accessing tobacco and what do they indicate are the barriers to, and facilitators of, tobacco access?
- iii. What kinds of interventions that aim to limit the non-retail supply of tobacco to young people have been evaluated and how do they address the barriers and facilitators identified as significant by young people in the UK?

To answer these questions, this report draws together findings from several interconnected pieces of work:

- a synthesis and statistical meta-analysis of survey data from young people in the UK;
- a synthesis of qualitative data from UK young people;
- a descriptive map of international research activity examining the impact of interventions on non-retail access.

### 2.2 Methods

Because this is a systematic review, using explicit and rigorous methods to synthesise evidence, its methods are necessarily described in some detail. In order to give due prominence to the findings of the review however, we provide a brief overview of its methods here, with more detail being given later in the report (Chapter 7).

The review was conducted in two stages: a mapping exercise which described the characteristics of all relevant research; and an in-depth review focusing on a particular subset of research identified by the Department of Health as most relevant for its needs. This report contains the findings of the second stage of the review.

#### *Identifying and describing studies*

We searched over 100 sources of information, including websites with a tobacco and/or a young people focus and electronic databases from the fields of health and social sciences. We also carried out 'citation chasing'; contacted experts to find further studies; and contacted the authors of all included qualitative studies for

further information on the included studies, and for related or similar studies. The nature of the review question and developments in ‘text mining’ technology meant that we searched more widely and sensitively than we would usually and we were able to automate some of the usually manual process of sifting through titles and abstracts.

To be included in the first stage of the review, studies had to be:

- a) about sources of or access to tobacco;
- b) about young people aged 11-18 years;
- c) published in or after 1998 (1990 for intervention studies);<sup>1</sup>
- d) published in English: and
- e) be one of the following types of primary research:
  - i. qualitative studies from the UK;
  - ii. international surveys;
  - iii. international studies examining the impact of an intervention on non-retail access.

Further details about the inclusion criteria, in particular with reference to intervention studies, are provided in Chapter 7.

After removing duplicate references, those not in English and those not meeting our inclusion criterion for publication date, just under 36,000 titles and abstracts remained in our database. Text mining was used to identify the most relevant studies of them for manual screening.

We identified 98 international surveys, 10 qualitative studies and 24 intervention studies that met our inclusion criteria. These studies were used to produce a descriptive map of research about young people and tobacco access. Following consultations with the Department of Health, it was decided to focus the review on evidence with contextual relevance for the UK. Thus we appraised and synthesised UK-based surveys (n=9) and qualitative studies (n=10). As we found no intervention studies from the UK, it was decided to examine and describe the content of evaluated interventions addressing non-retail access in order to reveal potential intervention routes and their contextual relevance for the UK. However, we decided to stop short of appraising the studies and synthesising the findings on the impact of these interventions because of particular difficulties of transferring effectiveness findings from one context to another (n=16).<sup>2</sup>

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<sup>1</sup> 1998 was chosen because it was the year in which the tobacco control White Paper *Smoking Kills* was published; however, we extended the time period of our search for interventions as we wanted to improve the likelihood of including a greater number of studies.

<sup>2</sup> Working on the survey and qualitative syntheses gave us a deeper understanding of the nature of social and retail sources, and their contextual relevance in the UK. A number of studies were excluded based on this knowledge, including those focusing exclusively on vending machine access (n=7) and sales of single cigarettes (n=1).

### *Appraisal and in-depth review*

Qualitative and survey studies were appraised using detailed standardised frameworks which explored the reliability of each study and its relevance for answering the review questions. An overall judgement was then made regarding each study's overall 'usefulness'. Assessment and rating was done for each study by two reviewers, who first worked independently and then compared their work to reach a consensus. Studies rated as 'low' were excluded from the syntheses (survey studies n=2, qualitative studies n=4). The resulting review thus consisted of:

- A statistical synthesis of data from seven UK surveys;
- A thematic synthesis of data from six UK qualitative studies; and
- A detailed descriptive map of 16 international intervention studies.

Survey data were pooled across the studies to analyse the prevalence and range of sources used by young people, and a statistical meta-analysis was performed to determine whether associations exist between sources used and the smoking status of young people. Thematic analysis of the qualitative studies enabled us to identify the significant features of a range of different access methods, and also revealed barriers and facilitators of tobacco access across sources. These syntheses were conducted independently by two separate teams of researchers.

Though not appraised for their methodological rigour, we also assessed intervention studies to determine the nature and extent of the evidence base. We then examined the studies in the light of the findings of the above syntheses in order to explore the mechanisms through which interventions might work and to identify potential avenues for UK-relevant policy development.

### 3 Survey synthesis: which sources of tobacco are used most by young people in the UK?

This chapter draws on the findings of seven surveys. Data from these studies were synthesised in order to answer the following questions:

- Which sources of tobacco are used most commonly by young people in the UK?
- Do patterns of access differ in relation to age, gender or smoking status?
- Have patterns of access changed since the purchase age was raised from 16 to 18?
- Are regular smokers more likely to use retail sources than non-retail sources compared with occasional smokers?

The characteristics of included studies and their participants are described in Section 3.1. The synthesis of study findings includes the following analyses: patterns in tobacco access for all young people (Section 3.2); sources used according to age, gender and smoking status (Section 3.3); access before and after the 2007 purchase laws (Section 3.4); and meta-analysis to determine whether there are significant differences between the sources used by regular and occasional smoking young people (Section 3.5).

#### 3.1 Surveys included in the synthesis (n=7)

- Seven studies from the UK were high in quality and/or relevance.
- National and regional samples from across the UK.
- Data from over 9,000 young smokers.

Our searches revealed nine UK-based surveys containing data from young people on access to tobacco. Quality and relevance assessments (as described in Section 7.8) revealed seven studies to be of high methodological quality and/or high usefulness for the synthesis, and the two low rated studies were excluded from the synthesis. An overview of the characteristics of included studies can be found in Appendix 1 and details of excluded studies in Appendix 2.

##### *The young people surveyed*

The seven surveys (Croghan et al. 2003, Turner and Gordon 2004, Balding 2008, Milton et al. 2008, Auton and Hoang 2009, Black et al. 2009, Fuller 2009) collected data from a total of 51,609 young people from across the UK. The smallest sample consisted of 76 participants (Milton et al. 2008). The largest sample of 32,162 young people was found in the study conducted by Balding (2008), and was the only UK-wide sample. The data used in the analyses below come from the 9,041 participants in these studies that were regular smokers (typically defined as those smoking one or more cigarettes per week) or occasional smokers (those who smoked less than one cigarette per week).

Each study included roughly equal numbers of males and females. The ages of participants ranged from those younger than 11 (Milton et al. 2008) to 17-year-olds (Auton and Hoang 2009), but were predominantly 13 to 15 years old. No studies conducted prior to the 2007 change in tobacco legislation sampled young people 16 years or older (i.e. young people who could legitimately purchase cigarettes). Three studies explicitly sampled young people from a range of socio-economic backgrounds (Croghan et al. 2003, Black et al. 2009, Fuller 2009) and another focused specifically on those from relatively disadvantaged areas (Turner and Gordon 2004). The findings thus broadly cover the range of young people in the UK in terms of smoking status, age, sex and socio-economic status.

#### *Tobacco sources measured in the studies*

The sources measured in each of the studies largely fall into four categories: retail sources, social sources, social purchases and other sources. The sources captured within each of these categories are illustrated in Table 3.1. (Details of the specific measures used in each of the studies and how they were categorised for the review are provided in Appendix 3.) The majority of studies asked participants to indicate where they ‘usually’ obtained tobacco and enabled them to indicate more than one source. Two studies asked participants to specify one source only; their first cigarette (Milton et al. 2008) or their most recent cigarette (Balding 2008). The approach taken in the study by Turner and Gordon (2004) was unclear.

**Table 3.1** Source categories and definitions

Category	Sources
Retail	Purchased from: <ul style="list-style-type: none"> <li>• Shops               <ul style="list-style-type: none"> <li>○ Supermarket</li> <li>○ Garage shop</li> <li>○ Newsagent, tobacconist or sweetshop</li> <li>○ Off-licence</li> </ul> </li> <li>• Vending machine</li> <li>• Internet</li> <li>• Informal retail (e.g. street sellers, private houses)</li> </ul>
Social sources	Given by <ul style="list-style-type: none"> <li>• Friends</li> <li>• Parents/relatives</li> <li>• Siblings</li> <li>• Other</li> </ul> Steal/take
Social purchases	Purchased from: <ul style="list-style-type: none"> <li>• Friends/relatives</li> <li>• Other</li> </ul> Proxy purchases
Other sources	Acquired from: <ul style="list-style-type: none"> <li>• Unspecified sources, e.g. ‘get them some other way’</li> </ul>

### 3.2 Which sources of tobacco are used most by young people in the UK?

- Friends and shops are the most common sources of tobacco for young people in the UK.
- Compared to friends and shops very few young people steal, or use black market sources, vending machines or the internet.
- None of the young people in the single study surveying the extent of proxy purchasing report using that source.

Table 3.2 provides details of the proportion of all smokers in each study accessing tobacco from each source, and a weighted mean percentage representing the combined figure for all studies. The list of sources is presented in order from the most frequently used to the least frequently used sources. A '0' denotes that a study measured a particular source but that none, or less than one percent of young people in that study reported using it. Studies not measuring a particular source are denoted by '-'.

**Table 3.2** Percentage of all young people using a source by study with overall weighted mean percent

Source	Weighted Mean %	Auton	Balding	Black	Croghan et al.	Fuller	Milton	Turner
Social: Friend	39	31	37	51	21	58	61	49
Retail: Shop	38	-	32	44	27	44	-	83
Social Purchase: friend/family	24	-	-	23	5	33	-	-
Social Purchase: other	19	-	-	18	3	28	-	-
Retail: Informal retail	13	16	17	3	-	6	-	-
Social: Sibling	10	-	-	9	-	10	-	17
Social: Parent/relative	7	12	4	5	-	6	8	4
Retail: Vending machine	7	12	0	8	0	10	-	-
Social: Stolen/taken	3	-	0	8	1	7	21	4
Other source	2	2	0	2	-	11	9	-
Social: other social source	2	-	0	-	17	-	-	13
Retail: Internet	1	-	-	1	-	1	-	-
Social: Proxy purchase	0	-	0	-	-	-	-	-
Base n	(Total n) 9041	3296	3121	1373	276	755	76	144

### 3.2.1 Social access via friends

Young people in the UK most commonly access tobacco through their friends, as can be seen in Table 3.2. The weighted mean percent for this source (39 percent) is just above that for shops (38 percent). However, the figure for friends is likely to be a conservative estimate for a number of reasons.

First, this category primarily reflects access from friends on a reciprocal basis, as most studies distinguished between being given cigarettes by friends for free and purchasing cigarettes from friends (see the Section 3.2.3). Were we able to calculate the overall proportion of young people either purchasing or being given tobacco by friends, the figure would be even greater.

Second, three of the studies (Auton and Hoang 2009, Croghan et al. 2003 and Turner and Gordon 2004) had multiple categories for friends that were not mutually exclusive; therefore only one category could be used for each study in the analysis to avoid double counting. For example, the study by Turner and Gordon 2004 distinguished between accessing tobacco from pupils in school (used in the analysis) and accessing from friends outside of school, with 46 percent of participants reporting that they accessed via friends outside of school.

Third, it should be noted that although in the Auton and Hoang study (2009), data for access from friends were combined with data on access from siblings, it is unlikely that these combined data inflate the figures. Indications from other studies are that access via siblings is minimal: the overall weighted mean for access from siblings is just 10 percent. Moreover, it is likely that only a small portion of those who do receive tobacco from their siblings do so exclusively. Additionally, if the data for Auton and Hoang (2009) are excluded from calculations, the overall weighted mean percent for friends rises from 39 to 43.

For all these reasons, it is clear that friends are the most common source of tobacco for young people in the UK, though precise quantification is not straightforward.

### 3.2.2 Shops

Though used slightly less often than friends as a direct source of tobacco, shops are a significant route of tobacco access for young people in the UK, with over a third of young people reportedly using this source. (Indirectly, of course, shops are likely to be the largest source, as the tobacco sourced through friends will often have been purchased legally or illegally from shops.) Some studies provide detail about the types of shops most commonly used by young people, as described in Table 3.3.

**Table 3.3** Details of studies measuring specific shop sources with overall weighted mean percentage

Type of shop	Studies measuring source (%)	Total N	Weighted mean %
News agents, tobacconists, sweetshops	Auton (52) Black (35) Fuller (36)	5,424	45
Off-licenses	Auton (55) Balding (0)	6,417	28
Supermarkets	Auton (26) Black (9) Fuller (12)	5,424	20
Garage shops	Black (10) Fuller (11)	2,128	10

It is clear that newsagents, tobacconists and sweetshops, which are likely to be independent small businesses, are the preferred type of retail outlet for young people. Almost half of all young people in studies collecting detailed data about shops reportedly used smaller retail outlets. Larger outlets such as supermarkets and garage shops are much less frequently used.

### 3.2.3 Social purchase

The next most common sources of tobacco, after friends and shops, were social purchases from friends or relatives (24 percent) or from others (19 percent). While social purchases from friends or family and from others were each used by less than a quarter of young people, this figure may again be a conservative estimate for several reasons. First, one study by Croghan et al. (2003) measured social purchases from friends only, whereas the other studies used a single category for both friends and relatives. Second, as the studies distinguished between social purchasing from friends/family and social purchasing from others, it is likely that if all social purchasing were measured together, the overall percentage for this source would be higher.

### 3.2.4 Lesser used sources

Each of the other sources measured were used by less than 15 percent of young people. Of these lesser used sources, 'informal retail', such as from markets and street sellers, appears to be the most significant (13 percent).

While it is clear that social sources of tobacco are significant for young people, it appears that family members (siblings 10 percent, family/relatives 7 percent) are a far less important social source of tobacco than friends (39 percent).

The figures in Table 3.2 illustrate that although vending machines were reportedly used far less than the most popular sources, enough young people were still using them to justify the recent ban in the UK. However, the relative lack of interest in vending machines, stealing and the internet, is perhaps surprising given that these sources avoid face-to-face contact with a retailer.

### 3.2.5 Proxy purchasing

The fact that only one of the studies attempted to measure proxy purchasing (Balding 2008) is perhaps another surprising feature of the survey data; even more surprising is that none of the young people in this study reported using this source. However, the ambiguous wording used in this study for this category ('someone else buys them for me') means that proxy purchases may have been recorded under other categories, such as 'from friends' or 'parents'. Moreover, since the review was conducted, Fuller and colleagues have published their most recent data set (Fuller 2011), in which they collected data on proxy purchasing for the first time. The 2011 survey found that 53 percent of occasional smokers and 89 percent of regular smokers had asked someone else to buy them cigarettes from a shop in the year preceding the survey (Fuller 2011 p29). However, this recent data was not collected in a form that allows us to compare the prevalence of proxy purchasing as a 'usual source' of tobacco with other sources.

### 3.3 Who accesses, in what ways?

- Girls, younger young people and occasional smokers are more likely to use social sources.
- Boys, older young people and regular smokers are more likely to use retail sources.

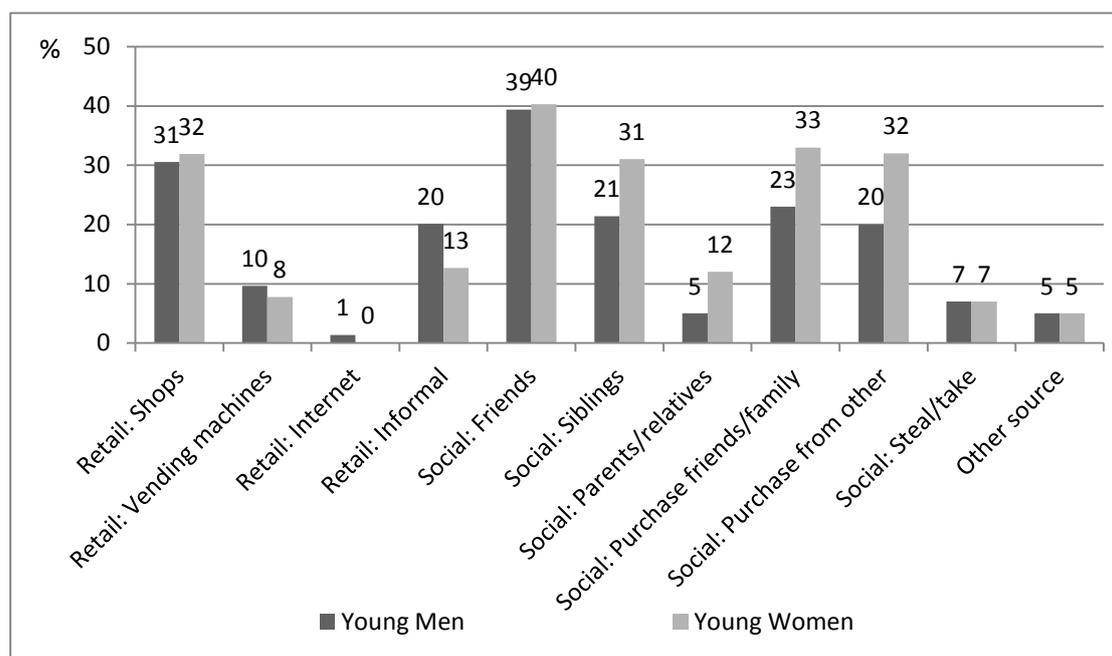
Across the seven studies included for analysis, four examined the distribution of cigarette sources by gender, age or smoking status in young people, and contained synthesisable data. The studies providing data for these different groups are listed in Table 3.4.

**Table 3.4** Studies providing data on sources according to gender, age and smoking status

Gender	Age	Smoking status
Auton	Balding	Auton
Balding	Black	Black
Black	Fuller	Croghan
Fuller	Turner	Fuller

#### 3.3.1 Gender

Four studies reported on sources of cigarettes by gender: Auton and Hoang (2009), Balding (2008), Black et al. (2009) and Fuller (2009). Figure 3.1 illustrates the weighted mean percentage across studies for each source comparing the figures for males and females.

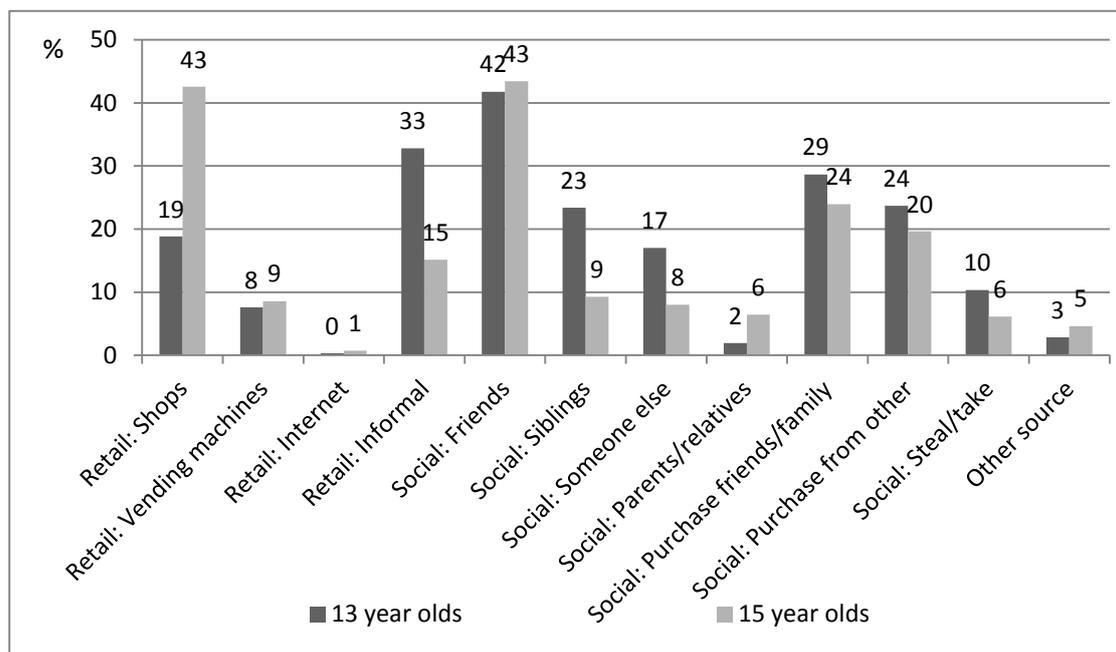
**Figure 3.1** Source of tobacco by gender - weighted mean %

Overall, both young men and young women access a range of sources in order to obtain cigarettes. The most frequently reported sources for both young men and young women were the same: friends (39 percent and 40 percent respectively), followed by shops (31 percent and 32 percent). Young men and young women were also equally likely to report stealing or using ‘other’ sources of cigarettes. However, in comparison to young men, young women consistently reported proportionately more access to cigarettes through other social sources: siblings (31 percent vs 21 percent respectively); social purchases from friends or family (33 percent young women vs 23 percent young men), or from others (32 percent vs 20 percent). Conversely, more young men than young women reported accessing cigarettes through other retail sources: informal retail sources (20 percent vs 13 percent) and although the difference for vending machines is minimal (10 percent vs 8 percent) the direction is the same.

### 3.3.2 Age

Age was represented in differing ways across five of the seven studies. It was important to use the largest number of studies possible in our analysis, but also to use age data that were most relevant for the review question and the UK context. Four studies measured and reported data separately for 13-year-olds and 15-year-olds. Figure 3.3 shows the distribution of sources used by 13- and 15-year-olds.

**Figure 3.2** Source of tobacco by age: 13- and 15-year-olds: weighted mean percentage

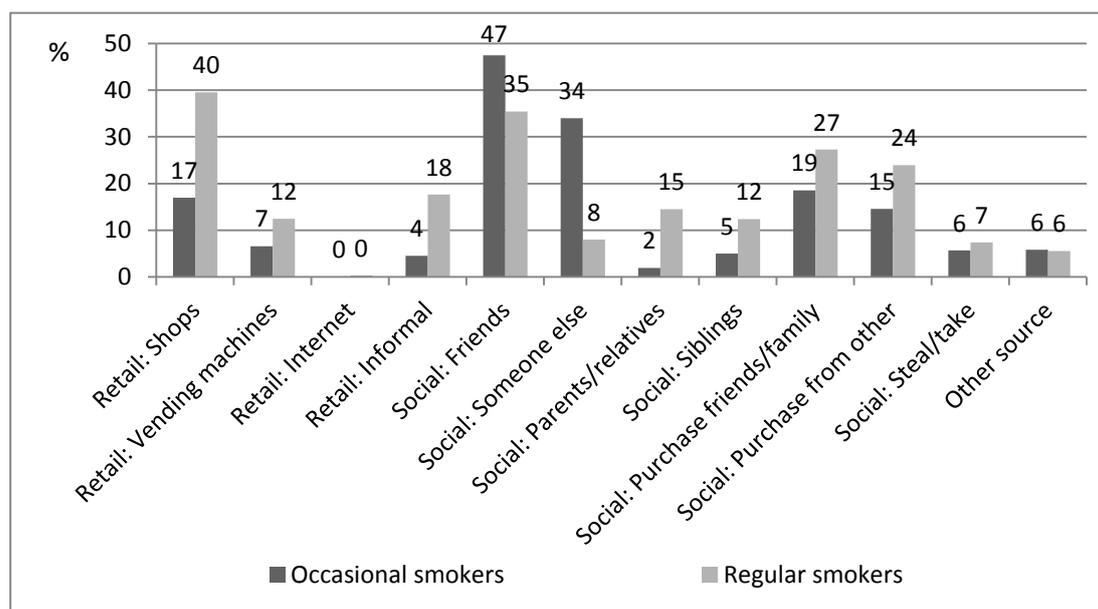


Whilst a similar proportion of both 13- and 15-year-old smokers got or were given cigarettes by their friends (42 percent and 43 percent respectively), a marked difference is apparent for the second most commonly used category: shops (19 percent and 43 percent respectively). Differences are also apparent for other categories, with 13-year-olds reporting more than twice the level of access of 15-year-olds for the following sources: informal retail (33 percent vs 15 percent); siblings (23 percent vs 9 percent); and someone else (17 percent vs 8 percent). The younger age group was also more likely to report social purchasing from friends and family, or from others, and stealing. The only other source, besides shops, that 15-year-olds were more than twice as likely as 13-year-olds to report using was parents/relatives. Patterns in use of vending machines were similar for both age groups (8 percent and 9 percent).

### 3.3.3 Smoking status

Four studies provided data on sources according to whether participants were occasional or regular smokers. Weighted mean percentages were calculated for occasional and regular smokers for each source across the studies. They are shown in Figure 3.3.

**Figure 3.3** Source of tobacco by smoking status: occasional vs regular smokers - weighted mean percentage



Both occasional and regular smokers across the studies report accessing cigarettes from a wide range of sources, but marked differences appear in each group's patterns of use. Both regular and occasional smokers frequently report acquiring cigarettes from friends, though a higher proportion of occasional smokers report using this source (47 vs 35 percent). Moreover, more than twice the proportion of regular smokers than occasional smokers report purchasing tobacco from shops (40 vs 17 percent). Regular smokers also report much higher rates of access than occasional smokers via the following sources: vending machines (12 vs 7 percent); informal retail (18 vs 4 percent); parents/relatives (15 vs 2 percent); and siblings (12 vs 5 percent). Regular smokers also report higher rates of social purchases than occasional smokers, both from friends and family and from others. Similarly, low rates of access via the Internet, stealing/taking, or other unspecified sources were reported by both groups of smokers.

### 3.4 Access before and after the 2007 purchase laws

As can be seen from Table 3.2, it appears that raising the legal age of purchase from 16 to 18 in 2007 in the UK may have had an impact on the types of sources being accessed. Of the two studies collecting data before 2007 (Croghan et al. 2003, Turner and Gordon 2004) both reported rates of sourcing from shops to be higher than rates of sourcing via friends (27 percent vs 21 percent and 83 percent vs 49 percent respectively). Conversely, the three studies collecting data after 2007 for both friends and shops (Balding 2008, Black et al. 2009, Fuller 2009) all reported higher rates of access from friends as compared to access from shops (37 vs 32 percent, 51 vs 44 percent, and 58 vs 44 percent respectively).

Three studies reported the prevalence of tobacco sources both before and after 2007 (Auton and Hoang 2009, Black et al. 2009, Fuller 2009). The reported use of shops to obtain cigarettes in this time span decreased dramatically: in two of the

three studies, reported use decreased between 2006 and 2008 by 18 percent (Black et al. 2009) and 21 percent (Fuller 2009). The third study (Auton and Hoang 2009) reported a reduction between 2007 and 2009 of between 17 and 20 percent, depending on the type of shop (off-license and newsagent). The rate of obtaining cigarettes through friends, however, increased only slightly across all three studies: Black et al. (2009) reported a 6 percent increase between 2006 and 2008; Fuller (2009) showed a 1 percent increase over the same time period. Auton and Hoang (2009) noted an 'increase' in sourcing by friends between 2007 and 2009 but did not provide a numeric value. Additionally, Black et al. (2009) and Fuller (2009) both noted a modest increase in social purchases (9 and 10 percent respectively) from 2006 to 2008. These data were not reported in the Auton and Hoang (2009) study.

### **3.5 Are regular smokers more likely to use retail sources than occasional smokers?**

- **Regular smokers are 2.6 times more likely to use retail sources than social sources compared with occasional smokers.**

In order to examine whether apparent differences between groups of smokers were significant, we conducted a statistical meta-analysis of four studies (Croghan et al. 2003, Auton 2009, Black et al. 2009, Fuller 2009). The overall mean effect size (odds ratio) was 2.65 (95% confidence interval = 1.46 - 4.81), though the strength of this relationship varies from study to study. This can be interpreted to mean that regular smokers are 2.65 times more likely to use retail sources (compared to social sources) than occasional smokers. While there is some uncertainty over the magnitude of the association - as regular smokers may be anything between 1.46 and 4.81 times more likely than occasional smokers to use retail sources - since this relationship is statistically significant and all four studies are agreed that regular smokers are more likely to use retail sources, we can be fairly confident that this relationship does indeed exist.

Unfortunately, due to a lack of data, we are unable to test possible reasons for this association (such as age differences in the participants across studies). However, the findings from the analysis of sources by weighted mean percentages comparing age, gender and smoking status, suggest that all three factors play a role in influencing where young people access cigarettes. It is also possible that at least some of the statistical variation is due to the small number of studies in our analysis: estimates tend to be less precise when they are based on little information and the accuracy of the estimates is likely to increase with an increased number of studies (Raudenbush 1994). For further detail about this analysis, please see Appendix 6.

## 4 Qualitative synthesis: what do young people say about tobacco access?

This chapter reports the findings of the synthesis of six qualitative studies to answer the following questions:

- How do young people describe accessing tobacco?
- What do different groups of young people tell us about the sources they use?
- What do young people indicate are the barriers to and facilitators of tobacco access?

Section 4.1 provides a brief overview of the studies and their participants. Section 4.2 reports the relative ease with which young people access tobacco and their accounts of the different sources they use. Section 4.3 explores how young people's accounts of access suggest relationships with age, gender and smoking status. Finally, Section 4.4 examines the barriers to and facilitators of tobacco access for young people.

### 4.1 Qualitative studies included in the synthesis (n=6)

- Six UK qualitative studies were rated as high in terms of quality and relevance.
- Data are provided by approximately 500 male and female smokers and non-smokers aged 9-17.

Our searches identified 10 UK-based studies about young people's access to tobacco, of which six were rated as of 'high' usefulness using the tool described in Chapter 7. Details of the characteristics of included studies are in Appendix 1, and of excluded studies in Appendix 2.

The six studies included in this synthesis (Croghan et al. 2003, Turner and Gordon 2004, Amos and Bostock 2007, Milton et al. 2008, Borland and Amos 2009, Robinson and Amos 2010) involved a total of approximately 500 young people from Scotland and England in focus groups and individual interviews; one study did not give specific figures. Three studies sampled young people from a range of socio-economic backgrounds; the others accessed young people from disadvantaged or deprived areas only. Each of the studies involved both young men and women aged predominantly between 13 and 16 years, and three included both smokers and non-smokers. The earliest study was conducted in 2003 and the most recent in 2010; two of the studies collected data from young people after the legal age of purchase was raised to 18 in the UK in 2007.

The studies thus represent good quality and highly relevant research with a range of young people in terms of their:

- geographical location;
- socio-economic background;
- age;

- sex;
- smoking status;
- experiences before and after the 2007 purchase legislation.

## 4.2 How do young people describe accessing tobacco?

- Young people in five of the six studies stated that they found accessing tobacco easy.
- Social sources, retail purchases and proxy purchases are reported to be the main sources used.
- Elaborate tactics and conventions for accessing tobacco are described.

The primary question we aimed to answer was: ‘How do young people access tobacco?’ Three key themes emerged. First, it became clear that young people found it easy to access tobacco (Section 4.2.1). Second, young people described using some sources but not others (Section 4.2.2). Third, young people described specific customs and practices associated with each method of sourcing they used. Sections 4.2.3 to 4.2.6 provide a rich description of the practices involved in accessing tobacco through each source.

### 4.2.1 Young people’s tobacco access: ‘easy’ and ‘common’

One of the most consistent and striking findings was the perceived ease with which underage young people accessed tobacco. In all but one study, authors make statements about the extent of young people’s access and the ease with which tobacco is sourced.

#### **Box 4.1** Ease of access

You just get somebody to get them or you get them yourself (Participant description: Turner and Gordon 2004, p432)  
 None of the children who had tried smoking repeatedly suggested that they found it difficult to access cigarettes (Author description: Milton et al. 2008, p303)  
 Most participants described how they and others could easily purchase cigarettes from local shops (Author description: Turner and Gordon 2004, p432)

Two studies described how increasing the age of sale in the UK in 2007 had not made access harder for young people (Borland and Amos 2009, Robinson and Amos 2010). Those who found it harder to purchase following the law simply found alternative routes through which to source their tobacco.

#### **Box 4.2** Purchase age laws: lack of impact

It’s not gonna make a difference to you ... cause you’re gonna find one way of getting your fags or another (Participant description: Borland and Amos 2009, p677)  
 Despite the increase in the age of sale, many 13-15-year-olds could access cigarettes from shops easily (Author description: Robinson and Amos 2010, p1839)

However, young people seem to favour some sources over others, and have to employ particular tactics to access cigarettes, suggesting that a certain amount of experience, knowledge or skill is required. As Turner and Gordon note:

*Although participants stated it was ‘easy’ to buy cigarettes, they only did so when describing how those purchasing used various tactics. (Author description: Turner and Gordon 2004, p432)*

#### 4.2.2 Three key sources: social, retail and proxy purchases

The three predominant sources through which young people stated that they access tobacco are:

- social sources: including purchases, exchanges and sharing between young people and their close friends, school peers or family members;
- retail purchases: tobacco purchased by young people over the counter; and
- proxy purchases: over-the-counter purchases made by others on behalf of young people.

Other sources were discussed, but the data indicate they were less widely used. This is consistent with the findings from the survey data. Table 4.1 provides details of the studies with data on each source, and the following sections explore each in more detail.

**Table 4.1** Studies in which each source is described

Social sources	Retail purchases	Proxy purchases	Lesser used sources
Amos Borland Croghan Milton Turner	Amos Borland Milton Robinson Turner	Borland Croghan Robinson Turner	<i>Stealing cigarettes</i> Amos Borland Croghan <i>Cheap/foreign cigarettes</i> Borland Robinson <i>Unattended cigarettes</i> Milton

#### 4.2.3 Social sources: buying, exchanging and sharing

- Young people in two studies described buying from friends or from school peers; in some schools it appears to be a highly organised trade.
- Four studies described the reciprocal exchange of cigarettes between friends.
- Five studies reported the sharing of individual cigarettes or packs with friends.
- The sociability of this type of access is emphasised in young people’s descriptions.

### *Purchasing from friends and peers*

Participants in two studies described purchasing cigarettes from other young people in school (Croghan et al. 2003, Turner and Gordon 2004). Young people in these studies described ‘social’ or ‘peer’ vendors as friends or ‘peers’ (individuals in school who were known to sell packs or individual cigarettes for profit).

Young people from a range of schools in the two studies were clear that ‘social vending’ was a common and very visible practice and known to both smokers and non-smokers, although its prevalence varies between schools.

#### **Box 4.3** Social vendors

Numerous accounts were given of pupils buying and selling singles from/to one another. (Author description: Turner and Gordon 2004, p433)

The interviews and focus groups revealed a wide knowledge among all students of the peer market, its existence, purposes, and methods of working. (Author description: Croghan et al. 2003, p71)

Young people who wanted to smoke knew whom to ask for cigarettes, or what place to be in to be offered cigarettes to buy. (Author description: Croghan et al. 2003, p71)

Sales were generally of single cigarettes, and amongst unknown peers tended to be substantially above the normal retail price (Turner and Gordon 2004, Croghan et al. 2003). Some young people reportedly made substantial profits selling tobacco to their peers, and buyers were keenly aware of the financial penalties involved.

Participants from a school with higher rates of smoking reported that peer vendors sold on the school grounds, taking up a highly visible position beside the school gate (Turner and Gordon 2004, p433). Likewise in the Croghan et al. study, peer vendors were known and approached by other students seeking to buy cigarettes. In contrast, pupils in a school with lower rates of smoking (Turner and Gordon 2004) reported peer selling as being rare and less organised. Turner and Gordon (2004) suggest that the reduced size, organisation and visibility of the peer market at this school may have been influenced by the lower smoking rates and the fact that the school’s smoking regulations meant that smoking largely occurred off school grounds and was therefore more out of sight and less confined to specific areas.

#### *Exchange: ‘He gives me fags, I give them back’*

The practice of exchanging cigarettes is described in four studies (Croghan et al. 2003, Turner and Gordon 2004, Amos and Bostock 2007, Borland and Amos 2009). Young people report being willing to provide friends with cigarettes, with an expectation that the favour would be returned. These types of exchanges were referred to as ‘crashing’ (Amos and Bostock 2007) or ‘tapping’ (Turner and Gordon 2004). These data emphasise the intricate link between tobacco access and socialising for young people.

**Box 4.4** Exchanging cigarettes

Say, 'tap us a fag', and they give you one and then when you get yours you just give them it back. (HS3, girls, non-smokers) (Participant description: Turner and Gordon 2004, p433)

M2: Me and M3, we share them all the time ... he gives me fags, I give them back.

(Participant description: Borland and Amos 2009, p676)

*Sharing: going 'halvers' and 'leaving the beef'*

Sharing packs and individual cigarettes was discussed in four studies (Croghan et al. 2003, Turner and Gordon 2004, Amos and Bostock 2007, Borland and Amos 2009,) and briefly mentioned in a fifth (Robinson and Amos 2010). As with exchanges, the two parties involved in sharing were friends rather than peers.

Young people talked about pooling their resources in order to be able to afford a pack of cigarettes to share (Croghan et al. 2003, Turner and Gordon 2004, Amos and Bostock 2007). Sharing individual cigarettes was also described (Borland and Amos 2009, p675, Amos and Bostock 2007). These activities suggest both the sociability of smoking for young people and the significance of cost for them.

**Box 4.5** Sharing

You [i.e. two friends] put in a pound each and then there's ten fags between you, and you can either go twos (smoke half each) on them all or have five each. (girls, smokers) (Participant description: Turner and Gordon 2004, p433)

Someone would ask for a 'left-on' or be left the 'beef' (end of the cigarette). This was different from passing a cigarette around. It was about handing over the cigarette when most of it had been smoked (Participant description: Amos and Bostock 2007, p774)

*4.2.4 Retail purchases: 'Do it sneakily basically'*

- **Young people in five studies described using various strategies to purchase tobacco in shops.**
- **Specific shops were targeted where young people use tactics either to dupe retailers or facilitate purchases from complicit retailers.**

All studies, except Croghan et al. (2003), explored young people's experiences of retail access. Young people described being highly aware of which shops would serve them and how to get served. They described a high rate of success in small independent shops, where they would either employ strategies in an attempt to dupe the retailer, or follow protocols to facilitate sales from complicit retailers. However, as Turner and Gordon (2004) noted, some young people stated that certain shops 'just sell you them', implying that such measures were not always necessary.

*Knowledge of which shops will serve you: 'Never the big ones'*

Three studies reported that young people saw local shops and vans to be an easy source of cigarettes; supermarkets and garages were avoided because they had a reputation for strict enforcement of regulations (Turner and Gordon 2004, Borland and Amos 2007, Robinson and Amos 2010). (Survey studies showed that young people were far more likely to purchase cigarettes from newsagents, tobacconists and sweetshops, than they were from supermarkets or garages - see Chapter 3). All three studies referred to common knowledge among 'most participants' of the relative ease of access from small independent shops, and it appears that even non-smoking young people were aware of the distinction (see quote 3 in Box 4.6).

**Box 4.6** Local independent shops are easier to buy from

M OK, do they tend to be the big shops that serve you cigarettes?  
 P1 No, never the big ones.  
 P2 This is the corner shops  
 P1 The ones that are a bit dopey and don't care.  
 (Participant description: Robinson and Amos 2010, p1838)  
 Supermarkets were avoided as they were perceived to be stricter in enforcing the law. (Author description: Borland and Amos 2009, p676)  
 P: Wee (small) newsagents just sell you them...  
 P: The (general store) an' (and) that don't.  
 P: No, an' the garages, they're...  
 P: The garage's dead strict. (girls, non-smokers)  
 (Participant description: Turner and Gordon 2004, p432)

*Strategies for deceiving retailers - go to the shop 'without your schoolbag'*

Participants reported various different strategies for convincing retailers that they were 18, such as removing items of school wear, making themselves appear taller or older, using fake ID or saying they had forgotten it, or saying they were buying cigarettes for their parents.

**Box 4.7** Strategies for deceiving retailers

I: So where do pupils buy cigarettes?  
 P: Shops  
 I: Quite easy to get them?  
 P: Aye, you just get somebody to get them or you get them yourself, without your schoolbag. (Girls, non-smokers). (Participant description: Turner and Gordon 2004, p432)  
 P: I walked in with sunglasses on and stuff and tip toed and I got served.  
 M: Because they assumed you were 18?  
 P: It was just a little man and he was like you 'are old enough?', and I was like 'yes', and he was like 'OK'. (Participant description: Robinson and Amos 2010, p1838)

*Tactics for sourcing from complicit retailers - 'In a shop with no one else there you're 99% guaranteed to get them'*

Young people also described shopkeepers who were willing to sell to young people if certain protocols were followed. In such cases young people reported entering shops when there were no other customers present (Borland and Amos 2009; Robinson and Amos 2010), or being asked by the shopkeepers to wait until other customers had left (Robinson and Amos 2010). Some shopkeepers reportedly sold singles to young people at above the retail price (Turner and Gordon 2004, Milton et al. 2008).

**Box 4.8** Shopkeepers' complicity

If you want fags you have to go like behind the counter, and he will pass them and then you have to like go out. So do it sneakily basically. (Participant description: Robinson and Amos 2010, p1838)

They turned all the cameras off you and you go in there, and you ask them for fags, but you have to pay £1 extra. (Participant description: Robinson and Amos 2010, p1838)

As long as there's nobody else in the shop. If you can get in a shop with no one else there, you're 99.9% guaranteed to get them. (Participant description: Borland and Amos 2009, p676)

Another reported tactic was to attempt to build a relationship with the shopkeeper (Borland and Amos 2009, Robinson and Amos 2010). In addition to the discomfort that a shopkeeper might feel in challenging a 'friendly customer', Robinson and Amos (2010) surmise that the shopkeeper would be more likely to serve an underage person that they knew, since it was less likely that the young person would inform against them.

It is evident then, that some young people feel it is easy to buy tobacco from shops and that they are willing to use sophisticated tactics to secure such purchases. However, it is also clear that others choose to use alternative sources, suggesting that over-the-counter purchases are not easy or attractive for all.

*4.2.5 Proxy purchasing: 'you ask people to buy fags and they do it'*

- **Four studies investigate proxy purchasing.**
- **Many young people - smokers and non-smokers - were aware of this practice.**
- **Proxy purchases were made via friends, family, peers or 'unknowns'.**

The four studies exploring proxy purchasing indicated that this is another important tobacco source for young people (Croghan et al. 2003, Turner and Gordon 2004, Borland and Amos 2009, Robinson and Amos 2010). Young people describe asking others to purchase cigarettes on their behalf; either complete strangers outside a shop (Borland and Amos 2009, Robinson and Amos 2010) or friends or 'peers' (Croghan et al. 2003, Turner and Gordon 2004, Borland and Amos 2009). A few participants also described proxy purchasing by family members, including parents (Borland and Amos 2009). Although only one included survey study collected data

on proxy purchasing and no respondents apparently accessed tobacco through this source, survey data published since the review was undertaken corroborates the qualitative data on the significance of proxy purchasing (Fuller 2011).

**Box 4.9** Prevalence of proxy purchasing

The most commonly reported methods were buying cigarettes themselves from shops and asking others to buy for them from shops, i.e. proxy purchases.

(Author description: Robinson and Amos 2010, p1837)

The apparent increased importance of such 'proxy' purchases raises the question of whether legislation should be considered that would ban the purchase of cigarettes on behalf of under-18s. (Author analysis: Borland and Amos 2009, p678)

*Proxy purchases from 'strangers'*

Proxy purchasing from strangers was reported as a particularly visible practice in two studies (Borland and Amos 2009, Robinson and Amos 2010). Study participants identified buyers as being more likely to be young and male (Borland and Amos 2009, Robinson and Amos 2010). Young people reported that buyers often kept the change or some cigarettes for themselves (Croghan et al. 2003, Robinson and Amos 2010) and some reported looking forward to proxy purchasing for others for this reason (Turner and Gordon 2004, Borland and Amos 2009, Robinson and Amos 2010). Although this is a time intensive method to acquire cigarettes, one study suggested that young people, including non-smokers, saw it as 'game', and that they incorporated the practice into their socialising activities (Robinson and Amos 2010).

**Box 4.10** Proxy purchasing: 'strangers'

You have to stand in the road like for about half an hour waiting asking certain people to go to the shop for you, sometimes they say no you are too young.

(Participant description: Robinson and Amos 2010, p1840)

Non-smoking participants who did not wait outside shops described how the sight of young people waiting outside was very familiar, and they were well aware of which shops had customers who would buy cigarettes for underage smokers.

(Author description: Robinson and Amos 2010, p1839)

Old people donnae bother ... old women and that ... they say no. You have to get someone who's young. (Participant description: Borland and Amos 2009, p676)

*Proxy purchases from peers, friends and family*

Alternatively, some young people asked their older or older-looking friends to buy cigarettes for them (Turner and Gordon 2004, Robinson and Amos 2010). In the study in which parents and other family members were cited as proxy purchasers, the authors indicated that this practice occurred because of the change in purchase age in 2007 (Borland and Amos 2009).

**Box 4.11** Proxy purchasing friends and family

Int: So you got them from?

F3: From my friends and stuff. Because you ask people to buy fags and they do it.  
(Participant description: Borland and Amos 2009, p675)

Like some older people will make money off younger students who want cigarettes and then they go and buy them from the shop and they will then want more money off them for going to the shop. (Participant description: Croghan et al. 2003, p72)

I just asked my sister and my dad and they were willing to buy for me.  
(Participant description: Borland and Amos 2009, p676)

As reported in Chapter 3, no respondents reported using proxy purchasing in the single study with a category for proxy purchase ‘someone bought them for me’ (Balding 2008). However, as many proxy purchases appear to involve friends or family members, the data may have been captured under other categories in that study, such as ‘from friends’ or ‘parents’. Though little evidence is available from survey data available at the time of the review, young people’s accounts and more recent survey data suggest that proxy purchasing may be of similar significance as social sources and retail purchases. The qualitative findings suggest that proxy purchasing is not a recent phenomenon, as two of the studies describing it were published some time ago (Croghan et al. 2003, Turner and Gordon 2004).

#### 4.2.6 Lesser used sources

- **Three studies mentioned the stealing of cigarettes by young people; two studies explored ‘black-market’ cigarettes; and one study described opportunistic access.**
- **No data on vending machines and internet purchases are available.**

A number of studies touched briefly on other sources, all indicating their lesser appeal to young people. Purchases from vending machines and the internet were not discussed in any of the studies.

#### *Stealing*

Stealing was briefly mentioned in three studies. As it was mentioned only tangentially and not further discussed by the authors, it did not appear to be a significant source for young people (Croghan et al. 2003, Amos and Bostock 2007, Borland and Amos 2009). It may have been that young people felt inhibited in disclosing stealing cigarettes to researchers. In two studies, young people described stealing cigarettes from family members (Croghan et al. 2003, Borland and Amos 2009); the victim of stealing in the third study was unclear (Amos and Bostock 2007).

#### *Black-market cigarettes: ‘they’re no really as good’*

Two studies (Borland and Amos 2009; Robinson and Amos 2010) explored young people’s awareness of unregulated sales of cigarettes, referred to in the studies as ‘cheap’, ‘foreign’ or ‘black-market’ cigarettes. Some young people were aware of

this type of illicit trade, for example a ‘woman down the street sold cheap fags’ (Borland and Amos 2009, p677). However, both studies noted that such sources were not commonly used by young people.

#### *Unattended or discarded cigarettes: ‘It was on the floor’*

Smoking cigarettes left by others was also identified as a source, but by a very small number of very young people experimenting with smoking in the study by Milton et al. (2008). The opportunistic nature of this practice suggests that it is not likely to be a source used by regular or even occasional smokers, but by young people curious to try it for the first time.

These lesser used sources all have in common the fact that they avoid the need for direct interaction with others in their acquisition, and as such their lack of use is perhaps surprising. However, as young people report little difficulty in accessing tobacco, it appears that the use of these alternative sources is simply unnecessary.

### 4.3 What do different groups of young people tell us about the sources they use?

- Young people’s accounts suggest that source selection is related to sex, smoking status, age and appearance.
- Qualitative data support and help to explain findings from surveys.

The data from the qualitative studies corroborate the findings from the surveys about the patterns of access among different groups of young people; however, they also help us to understand the reasons for associations between tobacco sources and sex, smoking status, and age.

**Table 4.2** The characteristics of social sources vs retail sources

Social sources more likely to be used by ...	Retail sources more likely to be used by ...
Girls	Boys
Experimental smokers	Regular smokers
Younger looking young people	Older looking young people

#### 4.3.1 Gender and access

In Chapter 3, we report that, although roughly equal proportions of boys and girls accessed tobacco from shops and friends, girls consistently reported higher rates of access via other social sources (parents/relatives and social purchasing), and boys reported greater rates of access from other retail sources (informal retail and vending machines).

This appears in part to be explained by the importance placed on sharing for female friendships, and boys’ preference for more ‘rebellious’ means to access tobacco. Amos and Bostock (2007), who aimed explicitly to assess the gendered nature of smoking among young people, argued that whilst boys found sharing cigarettes distasteful, reciprocity was an important part of female friendship:

*smoking was woven into female relationships - the way they interacted with one another, did favours for one another and helped each other out. (Author description: Amos and Bostock 2007, p774).*

Girls' preference for social sourcing may also reflect a reluctance to use retail sources. Borland and Amos (2009) reported that girls preferred social sources because they did not want to 'break the law' by attempting to buy in a shop. In contrast, boys used 'elaborate' and 'extreme' strategies to buy from a shop (Amos and Bostock 2007, Borland and Amos 2009). While not elaborating on sex differences, the findings of Croghan et al. (2003) underline the association of retail sources with a more risk-taking attitude. They reported social sourcing as being more common among 'quiet' groups who do well at school, while 'truants' and 'rebels' preferred retail sources (Croghan et al. 2003). However, as noted by Amos and Bostock (2007), some young women might take on behaviours typically associated with men in order 'to symbolize an alternative fun-loving, rebellious female lifestyle and identity' (Amos and Bostock 2007, p778).

#### **Box 4.12** Gender and access

Male: I leave someone a draw if they don't have their own ... I won't take one. I would leave someone one.

Int: Why is that?

Male: 'Cos it's been on their lips. It's like the scraps.

(Participant description: Amos and Bostock 2007, p774)

After the age of purchase changed to 18 years, they [girls] reported that they had not attempted to purchase cigarettes from shops because they did not want to 'break the law' and/or they had remained reliant upon previous sources of cigarettes, such as friends, parents or boyfriends. (Author description: Borland and Amos 2009, p676)

#### 4.3.2 Age and access

Consistent with the findings from the survey studies (see Figure 3.2), younger people reported primarily using social sources as they were unable to get served in shops (Turner and Gordon 2004, Borland and Amos 2009, Robinson and Amos 2010). However, young people's statements revealed that appearance, rather than age, was the principal factor in their ability to purchase from shops (Turner and Gordon 2004, Amos and Bostock 2007, Robinson and Amos 2010). As reported in section 4.2.3, young people attempted to circumvent this by employing various tactics to appear older (see Box 4.7). Other young people describe asking their older looking friends to proxy purchase for them (see Box 4.11).

#### **Box 4.13** Age, appearance and access

F4: Nah, because it's still 18, so I like get my boyfriend to go up.

Int: And he doesn't have ID but he looks older?

F4: Yup. (Participant description: Borland and Amos 2009, p676)

So obviously at the end of the day it don't matter because if you look old enough they are going to serve you ain't they. (Participant description: Robinson and Amos 2010, p1841)

### 4.3.3 Smoking status and access

As reported in Chapter 3, meta-analysis of the survey data found that regular smokers are over two and half times more likely than occasional smokers to access cigarettes through retail sources. Qualitative data from five studies suggest several reasons for this (Croghan et al. 2003, Amos and Bostock 2007, Milton et al. 2008, Borland and Amos 2009, Robinson and Amos 2010). First, occasional smokers required fewer cigarettes than regular smokers, and so sporadic acquisition through peers was less problematic (see Box 4.14). Second, experimental smokers tended to be younger and would therefore find it more difficult to buy cigarettes from a retail source (see Section 4.3.2 above). Third, experimental smokers were more likely to hide their smoking from their parents, and therefore found it convenient to access ‘singles’ rather than to bring home a packet which could be discovered (see Box 4.14).

However, though reported not to be their usual source of cigarettes, social sources were used by regular smokers in ‘emergency’ situations, such as when feeling stressed in school (Croghan et al. 2003) or when unable to afford to buy from a shop (Amos and Bostock 2007). This perhaps explains why friends ranked as the most used source overall (see Table 3.2); where occasional smokers might predominantly report accessing via friends only, regular smokers were likely to report both friends and shops as sources.

#### **Box 4.14** Smoking status and access

I buy one, 'cos if I buy 10 then, um, I can't take them back home 'cos I might probably get caught. Occasional smoking male, 14 (Participant description: Croghan et al. 2003, p71)

Participants talked about how social sources of cigarettes, i.e. from family and friends, had been important when they started smoking, as they had taken cigarettes from smoking relatives, been given them, or offered a ‘drag’ on someone’s cigarette.

(Author description: Robinson and Amos 2010, p1837)

Most smokers said that they now paid for their cigarettes, as they needed more cigarettes, and more regularly, than informal sources could supply. (Author description: Robinson and Amos 2010, p1837)

The following section assesses the factors influencing access that appeared to cut across sources and across the characteristics of young people.

## 4.4 What are the barriers to and facilitators of tobacco access for young people?

- Young age or age appearance, risk and cost are described as barriers to obtaining cigarettes.
- The sociability and visibility of access and the apparent complicity of adults are described as facilitating tobacco access.

This section brings together evidence to highlight the factors that young people indicate either hinder or help them to access tobacco. Understanding the significance of the practices used to circumvent barriers and the mechanisms involved in facilitators, may provide insights for future interventions.

**Table 4.3** Barriers to and facilitators of tobacco access

Barriers	Facilitators
1. Young age/appearance	1. Sociability
2. Cost	2. Visibility
3. Risk	3. Complicity of adults

#### 4.4.1 Barriers to access for young people

*Barrier 1 - Age and appearance: 'If you look old enough they are going to serve you'*

The studies indicated that 'looking young' is the single most important barrier to accessing tobacco from shops. The low level of retail access by 13-year-olds compared to 15-year-olds in the surveys substantiates this finding (see Section 3.3.2). As retail purchase is one of the sources used most by young people, the significance of age and appearance as a barrier is important to understand.

Young people in three studies (Turner and Gordon 2004, Amos and Bostock 2007, Robinson and Amos 2010) stated that younger-looking young people found it more difficult to buy in shops than those who looked older, even if both groups were underage.

Whether young people deceived retailers, or retailers knowingly sold to underage young people, it is clear that some underage young people were able to purchase tobacco, which could then be distributed to 'younger looking' young people through proxy purchases or social sources. The findings thus suggest that stricter enforcement of ID checks may reduce underage sales and proxy purchases, and limit the social sourcing of tobacco by young people.

*Barrier 2 - The high price of smoking for young people: 'you get skanked'*

Young people in five studies described how they paid above the retail price of tobacco to retailers, peers and through proxy purchases (Croghan et al. 2003, Turner and Gordon 2004, Amos and Bostock 2007, Borland and Amos 2009, Robinson and Amos 2010).

Young people did not expressly report that price was a barrier; they appeared to be willing to pay a higher price and a few young people appeared to suggest that it was appropriate to do so. Two studies noted admiration for those profiting from selling to young people (Croghan et al. 2003, Robinson and Amos 2010). However, the prevalence of comments about the additional 'levy' they paid suggests that price was a significant factor for young people. Many described feeling 'skanked' or

‘ripped off’ and others described having to ‘go halvers’ or buy singles because they could not afford to buy packs.

Croghan et al. (2003) suggest that where regulation in schools is stricter, the price of social purchases in school rises even higher, suggesting that risk may be one factor inflating the price for young people. However, Turner and Gordon (2004) suggest that the reasons for increased prices are multi-faceted, depending not just on the risks to the vendor but the vulnerabilities of the purchaser.

These findings indicate that, in addition to interventions which raise the cost of tobacco to young people, either directly or through making it riskier, one potential avenue for deterring access among young people would be to highlight the financial exploitation commonly experienced.

### *Barrier 3 - Risk: ‘Worth a try’?*

Though a mixed picture on tobacco sourcing and risk emerges from the studies, young people’s perception of risk does seem to affect the way they source tobacco. In Borland and Amos’s study (2009), some young women avoided attempting to buy in a shop or proxy purchasing as they thought it was illegal. Others described social sourcing as a means to avoid being caught with cigarettes (Croghan et al. 2003). As discussed in section 4.3.1, social sourcing is more common amongst girls and associated with ‘quiet’ groups who do well at school (Croghan et al. 2003). It appears then that social sourcing amongst peers is considered the least risky for young people - the risk being taken on by the vendor or proxy purchaser.

However, young people in two studies suggested that buying cigarettes in shops was not only easy, but entailed little risk since there were no negative consequences for trying (Turner and Gordon 2004, Robinson and Amos 2010). This insouciant discourse may have been encouraged by the group discussion format, since it is clear that other young people feel apprehensive about trying to buy in a shop.

Moreover, we hypothesise that one reason for the low level of reporting of stealing and buying black market cigarettes was that these practices are the most ‘risky’, since they are actually illegal activities.

Possession laws or laws which illegalise young people’s cigarette purchases may increase the perceived risk for young people. But these interventions are controversial; in particular, it has been argued that such measures punish young people who are victims of tobacco marketing (Etter 2006). Overly punitive measures may also have the unintended consequence of encouraging smoking by helping to characterise it as an act of rebellion (see Facilitator 3 below).

#### *4.4.2 Factors facilitating young people’s access*

##### *Facilitator 1 - Sociability: A way to make new friends*

It has been widely reported that, for young people, smoking may be important in relation to self-image, self-empowerment and self-affirmation (Denscombe 2001). The findings of these six studies provide evidence that it is not simply the act of

smoking that is important, but that access activities also have an important social element.

*SOCIAL SOURCES – INITIATING AND SOLIDIFYING FRIENDSHIPS*

In two studies (Turner and Gordon 2004, Borland and Amos 2009), authors found a link between sourcing and initiation of friendships. In one of these studies, young people explicitly described starting smoking because of the opportunities for engaging with peers that accessing cigarettes provided (Turner and Gordon 2004). In a third study (Milton et al. 2008), young people aged 9-11 described how they began smoking in order to fit into the group, although this appeared to be a negative experience of peer pressure. Older young people's descriptions of the social market in three studies exemplified how social networks can develop from the opportunities for social exchange (Croghan et al. 2003, Turner and Gordon 2004, Borland and Amos 2009).

Further evidence from three studies (Amos and Bostock 2007, Robinson and Amos 2010, Turner and Gordon 2004) suggested that social sourcing also played an important part in the social cohesion of groups of young people. As discussed in Section 4.3.1, sharing is particularly important in female friendship groups. Proxy purchasing was also reported as a shared activity for smokers and sometimes even non-smokers (Amos and Bostock 2007, Robinson and Amos 2010); and smoking and drinking represented a 'fun activity' for young people who associated with a more rebellious group identity (Amos and Bostock 2007).

*ACCESS AND IDENTITY*

There emerges a picture of underage retail access as the preferred source of older, more committed smokers, and young men willing to try their luck in a shop. This suggests that the means of access for young people may not just be motivated by pragmatic considerations, but also with how it fits with their social identity. Young people 'advance' from social sources when they begin smoking, to retail access as they learn how to manoeuvre the underage ban or reach the required age limit. If this is the case, it would seem that there is kudos in being able to access cigarettes independently and therefore in being a supplier of tobacco to others, whether through proxy purchasing, sharing with friends or acting as a peer vendor. As Croghan et al. (2003) remark: 'Purchasing, like smoking itself, is part of a repertoire of behaviours that define group and through that individual identity' (p73). Such attitudes towards access are likely to perpetuate the cycle of social sources of tobacco.

The intricate relationship between access and sociability is perhaps the most difficult area in which to intervene to reduce smoking rates; nevertheless, Croghan et al. (2003) saw fit to conclude that 'We need to establish methods for preventing smoking and the purchasing of cigarettes being a symbol of groups' and individuals' identities' (p73).

*Facilitator 2 - Visibility of sources and smoking behaviour: 'I saw them smoking on the field and buying off mates and stuff'*

Young people's accounts and author descriptions made it clear that young people's tobacco access was a very visible activity. This finding led two authors to speculate that the visibility or awareness of smoking sources may have been a critical factor in encouraging or enabling curious young people to experiment with smoking and in increasing the extent and prevalence of smoking overall (Turner and Gordon 2004, Milton et al. 2008). Young people themselves also indicated that visibility affected their smoking behaviour.

The authors of the Turner and Gordon (2004) paper speculated that the lower rates of smoking in one school may in part have been due to the more diffused geography of peer smoking in that school, compared to a much more visible smoking culture in the school with higher rates of smoking. Lower visibility may be another reason, in addition to the level of risk (see Barrier 3 above), accounting for the lack of young people's interest in black market cigarettes. Both studies which explored black market cigarettes noted that only a small minority of participants had direct experience buying from illicit traders, and descriptions indicate that these occurred through opportunistic encounters.

Avenues for reducing the visibility of tobacco sources are perhaps one of the most plausible options for tackling access among young people. In particular, school regulations present an opportunity for breaking up established networks of social vending. Other potential avenues are in relation to tackling the practice of proxy purchases from 'unknowns', which involves hanging around outside shops. The viability of these options, coupled with the potential for reducing the level of sociability at the same time, make this an attractive option for policy development.

*Facilitator 3 - Complicity of adults: 'They don't care if it's harming us or if it's the law'*

In several studies, young people described how adults such as retailers, parents and unknown proxy purchasers willingly aided young people's access to tobacco.

According to young people's accounts, the higher rate of purchasing in smaller stores was due to retailers' complicity (see section 4.2.4). Young people's statements about supermarkets suggest that it is possible to enforce regulation to a degree where young people will not attempt to purchase (see Box 4.6). In-depth investigation into the experiences and views of small independent retailers may be key to understanding how to curb this access route.

However, young people's accounts suggest that adult complicity is a complex issue. Although young people reported going to some length to access tobacco, some also indicated that they felt resentful towards adults who were willing to supply them with tobacco. In two studies, young people described shop vendors who sold cigarettes to them as exploitative (Borland and Amos 2009; Robinson and Amos 2010). Moreover, two young people in the study by Borland and Amos (2009) expressed regret that their parents provided them with tobacco.

But while some young people felt that adults should be concerned with protecting young people from the harms of smoking, young people in one study saw the rise in the purchase age to be 'unfair and shocking' (Borland and Amos 2009, p677). In this study, it was noted that there was 'general discontent and anger, even among those who said that they wanted to quit' with regard to the increase in age of purchase in 2007 (Borland and Amos 2009, p677). In this study, some young people expressed concern that raising the age limit meant that young people would have to rely on proxy purchasers, whom they felt would then be vulnerable to being criminalised.

In addition, authors noted that overly punitive or restricting measures on young people's access to tobacco might serve to *encourage* young people's access:

*There is a sense in which young people are 'banding together' to obtain cigarettes as a direct challenge to adult opposition. (Author analysis: Croghan et al. 2003, p73)*

Thus, whilst adult complicity may be seen as a facilitator of tobacco access, and therefore an opportunity for intervention, the impact of reducing adult involvement in young people's tobacco access may simply serve to emphasise smoking as an opportunity for rebellion against adult authority.

Therefore, a second potential avenue for policy development with regard to adult complicity may be to tap into young people's feelings of disappointment and exploitation with regard to the adults who supply them. The success of the Florida anti-tobacco 'Truth' campaign, which highlighted the exploitative approaches used by tobacco companies to young people, suggests the validity of such an approach (Sly et al. 2001).

## 5 Interventions map: What evidence is available about ways to curtail non-retail access?

- Four broad types of intervention were identified:
  - possession law interventions;
  - retail interventions measuring impact on non-retail access;
  - school policies on smoking;
  - home restrictions on smoking/access.
- No UK studies and few studies with robust designs were found.

This chapter provides a description of non-retail access intervention studies to give a broad indication of the existing evidence base, the gaps in the literature and possible future intervention routes. Four different intervention types were identified within the 16 included studies; the studies examined their impact on either smoking rates or access behaviours.

To explore the mechanisms through which these interventions might reduce young people's access to tobacco, we consider the ways in which each of the four intervention types addressed the barriers and facilitators identified by young people in the qualitative studies. These barriers and facilitators were not necessarily identified by the authors of the intervention studies, but emerge from our understanding of the factors important to young people when accessing tobacco. The range of barriers and facilitators addressed by each intervention type are displayed in Table 5.1. We have not assessed the methodological quality of these studies, or conducted a synthesis of their results.

The purpose of this chapter is to describe what may be useful avenues to explore in the future here in the UK. Since none of the intervention studies are based in the UK and because of the difficulties of transferring effectiveness findings from one context to another, it was decided that an examination of the effectiveness of these interventions would be of little value.

**Table 5.1** The barriers and facilitators addressed by the four intervention types

Intervention type	Possession laws	Retail interventions	School policies	Home restrictions
<b>Barriers/facilitators addressed</b>	Risk Price Visibility	Risk Price Age appearance Adult complicity (shops)	Risk Price Visibility	Risk Visibility Adult complicity (Home)

## 5.1 Possession law interventions

- Possession law interventions address the following barriers and facilitators to tobacco access: Risk, price, and visibility.
- Two randomised controlled studies and one observational study measured the impact of possession laws.

Young people stated that a barrier to access is their perception of the *risk* that the use of a given source entails. One way of increasing perceived risk is by increasing the possibility, or level, of punishment. Interventions targeted this barrier to access by:

- legislating state-wide possession laws (Florida) including non-criminal penalties (progressive for multiple violations) such as fines and withdrawal of driving licenses for underage young people who purchase, possess or use tobacco (Livingood et al. 2001).
- issuing warnings and civic fines (approximately \$75) to underage young people violating possession laws (Jason et al. 2008).
- implementing an unspecified purchaser penalty (Forster et al. 1998).

Two of the above strategies also target another barrier to access: *price*. Imposing fines on those caught in possession of tobacco would increase the costs of tobacco use significantly. While young people are aware that they pay above the retail price for tobacco, and appear to be willing to do so, they also describe difficulties in being able to afford tobacco, pooling resources being one strategy to address this barrier. Substantial fines like those examined in the intervention studies not only increase the cost of tobacco, but as young people are unlikely to pool their resources to pay a fine, they also focus that cost on a single individual. Thus the impact of the increased cost is likely to be particularly hard felt by young people who incur fines.

*Visibility* is the final barrier to access targeted by possession law interventions. The qualitative studies suggested that smoking rates are lower when the use of tobacco is hidden, and social sources of supply are less obvious. By making the possession of tobacco more costly - both in terms of punishment and fines - possession law interventions may also reduce visibility, since young people will be keen to hide their tobacco to avoid being caught.

Three US-based studies examined the impact of fines or other penalties for possession on underage young people's smoking behaviour (Forster et al. 1998, Jason et al. 2008, Livingood et al. 2001) and access behaviour (Forster et al. 1998). Livingood et al. (2001) compared tobacco use in Florida counties with differing levels of possession law enforcement. Jason et al. (2008) and Forster et al. (1998) compared randomly allocated districts receiving a possession law intervention with control districts. Forster et al. (1998) did not specify the purchaser penalty implemented in their intervention groups. This intervention also included a retail access intervention (vending machine and self-services bans), and a community social awareness campaign, making their results more difficult to attribute solely to possession law implementation.

## 5.2 Retail interventions

- Retail interventions potentially address the following barriers: risk, price and age appearance; and the following facilitator: adult complicity.
- Six studies of varying design measure the impact of retail interventions on social access.

The qualitative findings indicated that a perception of *risk* may be heightened if young people experience more refusals from retailers. Thus, although none of the six retail interventions directly addressed risk by, for example, penalising the young people who attempted to buy tobacco, interventions which successfully reduce sales to underage young people may increase the perception of the risk involved and may therefore deter purchase attempts.

Increased *price* as a deterrent to young people's tobacco access was addressed in one retail intervention study (Katzman 2002). This study explored whether differences in prices resulting from state tax policies impacted on levels of consumption and on access behaviour.

*Age appearance* is the principal factor in determining their ability to buy tobacco according to some young people in the qualitative studies. Retail interventions targeted this barrier by imposing a minimum age for sales (Rimpela and Rainio 2004, Sundh and Hagquist 2005), or by tightening underage sales controls through:

- banning vending machines (Forster et al. 1998);
- placing age locks on vending machines<sup>3</sup> (Schneider et al. 2009); and
- rigorous enforcement of underage sales laws (Levinson and Mickiewicz 2007).

Penalties for retailers caught selling to underage young people in the study examining rigorous enforcement of sales laws (Levinson and Mickiewicz 2007) mean that this intervention also targets a key facilitator: *adult complicity*.

Six studies examined a variety of retail interventions, all of which aimed to impede retail access but which measured the impact of this on social sources of tobacco. Studies reported outcomes in terms of smoking rates (Forster et al. 1998, Katzman et al. 2002), and retail and social access (Rimpela and Rainio 2004, Sundh and Hagquist 2005, Schneider et al. 2009).

Two studies examined the impact of vending machine restrictions: Forster et al. (1998) the impact of banning vending machines and Schneider et al. (2009) the impact of placing age locks on vending machines. Sundh and Hagquist (2005) and Rimpela and Rainio (2004) measured the impact of a national underage sales ban in Finland. Katzman et al. (2002) measured the impact of differences in tobacco prices (state tax policies), and Levinson and Mickiewicz (2007) the rigorous enforcement of laws against selling cigarettes to minors, using staged cigarette

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<sup>3</sup> Consumers are required to insert some form of electronic identification, an electronic cash card or a European driving licence, to purchase cigarettes from vending machines.

purchase attempts with escalating fines for clerks and stores that repeatedly sold. Only one study used an RCT design (Forster et al. 1998), three used a pre-post intervention design (Rimpela and Rainio 2004, Sundh and Hagquist 2005, Schneider et al. 2009) and two used a correlational/observational design (Katzman et al. 2002, Levinson and Mickiewicz 2007).

### 5.3 School policies

- **School policy interventions address the following barriers and facilitators: risk, visibility and, potentially, price.**
- **Six observational studies examined the impact of school policies.**

As with possession laws, penalties or restrictions on smoking or possessing tobacco in school increase the *risk* to young people. As discussed in Section 4.4, this increased risk for social vendors in school may also result in an increased *price* within the peer tobacco market.

Visibility is also addressed by school policies, since young people are less likely to smoke, or certainly to smoke openly on campus, if there is a smoking ban. However the qualitative studies suggest that school policies which confine smoking to a particular area in school may enhance the visibility of access by facilitating a high concentration of trading and exchanges in one area, and by making clear to young people where they can go to access cigarettes (See section 4.2.3).

Six correlational/observational studies examined the impact of school smoking policies on young people's access to tobacco or smoking behaviour. Types and levels of school restrictions varied, but all restricted smoking either partly or completely on school grounds.

Three studies examined the impact of state- or county-level school smoking policies in the US: Chaloupka and Grossman (1996) compared counties based on the fraction of the population subject to state or local restrictions on smoking in schools; Tauras et al. (2001) compared states which had laws restricting smoking in public schools and those which didn't; and Katzman et al. (2002) compared states with three kinds of smoking bans - Ban 1 restricted smoking but did not entail a separate ventilated area; Ban 2 required an enclosed ventilated area or banned smoking; and Ban 3 totally prohibited smoking in school. The other three studies examined the impact of school-level policies. Nonnemaker (2002) examined the impact of both school smoking bans and penalties for school smoking, such as exclusions. Darling et al. (2006) examined the impact of school policies with different emphases (punishment, cessation and prevention) and policies with differing levels of comprehensiveness. Lewit et al. (1997) examined the impact of variation in the stringency of school policies (allowed to smoke anywhere in school, allowed to smoke in smoking area, allowed to smoke outside, no smoking allowed).

## 5.4 Home access/restrictions

- Home access/restriction interventions appear to address the facilitators of visibility and adult complicity and the barrier risk
- Three observational studies examined the impact of home restrictions on smoking or access.

Home access interventions appear to address the facilitators of visibility and adult complicity. When young people are restricted in their ability to smoke at home around family and friends, the *visibility* of smoking is inhibited. Opportunities to see or engage in exchanges and/or sharing at home are targeted by this type of intervention.

It is clear that all young people's tobacco access must originate either with the deception of adults or with *adult complicity*. As well as retailers and proxy purchasers, young people suggested that parents and other adult family members were complicit in young people's tobacco access. Parents who refuse to supply tobacco to young people therefore impede this key access facilitator.

Young people in the qualitative studies also talked about the *risk* of being caught by their parents with cigarettes; therefore, clear home policies on tobacco possession should increase this perceived risk.

Three studies measured the impact of young people's reported home restrictions on smoking, or their ability to access tobacco at home. All three studies used a correlational/observational design.

Kim and Clark (2006) and Rainio and Rimpela (2009) measured the association between young people's reported access to cigarettes at home and their smoking behaviour. Rainio and Rimpela (2009) also measured the impact of a total ban and a 'not total ban' (partial restrictions/no restrictions/cannot say) on smoking behaviour and home access. Huver et al. (2007) measured the association between smoking-specific parenting practices (parent-child communication about smoking, anti-smoking house rules, availability of tobacco products in the home, non-smoking agreement) as reported by young people, and young people's smoking behaviour.

## 5.5 Intervention coverage of barriers and facilitators

**Table 5.2** How interventions target access barriers and facilitators

Barrier/Facilitator	Possession laws	Retail interventions	School policies	Home policies
<i>Barrier 1: Age appearance</i>	N/A	Minimum sales age/tightened controls make purchases harder	N/A	N/A
<i>Barrier 2: Cost</i>	Fines incurred increase costs to the individual	State-imposed taxes increase cost	Increased risk leads to price rises in peer market	N/A
<i>Barrier 3: Risk</i>	Increases possibility/level of punishment	Increases in refusals heighten perception of risk	Increases possibility/level of punishment	Increases possibility/level of punishment
<i>Facilitator 1: Sociability</i>	N/A	N/A	N/A	N/A
<i>Facilitator 2: Visibility</i>	Young people hide tobacco to avoid penalties	N/A	Young people hide tobacco to avoid penalties	Restricts opportunities to see or engage in exchanges and/or sharing at home
<i>Facilitator 3: Adult complicity</i>	N/A	Penalties for retailers deter sales to young people	N/A	Parental supply of tobacco is curtailed

Drawing on our findings from the qualitative studies, we have identified which barriers to and facilitators of access to tobacco have been addressed in the different intervention types. These findings are summarised in Table 5.2. In particular, we judged *risk* to be addressed across all intervention types, since most interventions incurred some kind of strengthened restriction to access (see Section 4.4 on risk). *Visibility* was also commonly tackled; in our view, most extensively in possession law interventions, since any possession at any time is likely to incur a fine or warning, encouraging young people to hide their smoking or tobacco possession. The only barrier or facilitator identified by young people in the

qualitative studies but not addressed by the intervention studies is *sociability* (see Section 4.4.2). It is difficult to imagine what an intervention addressing sociability might ‘look’ like, although reducing visibility, particularly in schools, may reduce some aspects of sociability. The authors of one of the qualitative studies (Croghan et al. 2003) ultimately concluded that long-term reductions in smoking levels and changes in access behaviour are most likely to be achieved by breaking the link between tobacco and sociability and identity for young people. Finally, we included all studies that could address the non-retail supply of tobacco to young people, and although one study measured ‘proxy purchasing’ as an outcome (Rimpela and Rainio 2004) none of the interventions targeted this type of access. Gaps in the evidence from the surveys make it difficult to assess the prevalence of proxy purchasing, though young people in the qualitative studies indicated that it was an important source for them. Adult complicity and visibility appear to facilitate this kind of access. Making it illegal to purchase on behalf of young people (as in Scotland) and raising community awareness may thus be effective in tackling this type of access.

## 6 Discussion and conclusions

### 6.1 The access routes

The research examined for this review reveals that young people in the UK access tobacco easily. There is a pressing need to find ways to address this, and the findings demonstrate that it is important to consider both social and retail access routes. Though the limited evidence from surveys suggests otherwise, there is some indication from the qualitative studies that proxy purchasing may be a significant source. We therefore consider each of these access routes in relation to avenues for future research and possibilities for intervention.

#### *Social sources*

The syntheses reveal that social access via friends is the source used most commonly, and that it is also the preferred access method of both younger and occasional smokers. Interventions to prevent social access are therefore likely to have the broadest impact whilst also being particularly useful in deterring smoking initiation. For over a decade, systematic reviews examining the impact of retail interventions have been calling for interventions to target social access (Lantz et al. 2000). The systematic review by Richardson et al. (2009) identified four high quality systematic reviews, all of which concluded that without concomitant attempts to tackle social access, the apparent efficacy of retail interventions is undermined. To date, and as revealed in Chapter 5, little effort has gone into developing interventions specifically targeting social access.

The findings from the qualitative synthesis provide insights into possible avenues for action, in particular by highlighting how *sociability* and *visibility* are pull factors for access via friends and peers in schools. These findings are corroborated by other studies. One UK qualitative study, which did not meet the criteria for inclusion in this review, concluded that young people's smoking behaviour was 'more explicable when viewed as part of the process by which smoking is integrated within young peoples' social lives' (Barnard and Forsyth 1996). The qualitative review of international studies by Walsh and Tzelepis (2007) also found evidence that smoking provides a common activity through which young people bond with peers, and that tobacco access facilitates social interaction. The latter review also found evidence which corroborates the findings regarding visibility as a pull factor, and concluded that the studies in their synthesis 'emphasized the ubiquitous nature of adolescent cigarette sources' (p1310).

The assessment of intervention studies in Chapter 5 reveals a complete dearth of interventions targeting the facilitator of sociability. However, the qualitative data suggest that since the sociability of smoking is evident in young people's leisure activities, school provides a particular opportunity and place to target the sociability of sharing, exchanging and selling tobacco amongst peers. Developing school policies which target the apparently organised and very visible exchange of tobacco between young people in schools may thus be one key approach for reducing social access. A systematic review of studies on school-based interventions to prevent smoking found that the strongest and most consistent

evidence showed that policies which ban or punish smoking were effective (Aveyard et al. 2004). A recent study from Norway (Øverland et al. 2010) also found clear consistent associations between schools' restrictions on tobacco use and less use of tobacco. The Turner and Gordon (2004) study, included in our qualitative synthesis, suggests that the relationship between the *visibility* of the peer market in schools and rates of smoking is circular; thus if we can begin to tackle this visibility, this is likely to reduce smoking rates, which, in turn, will further reduce the visibility of the peer market in school and the socialising opportunities that the peer market provides.

### *Retail sources*

Qualitative and survey data show that retail access is an important access route for young people. Furthermore, the ability to access tobacco through retailers has a knock-on effect on young people's social markets and opportunities for exchange. For these reasons, it is important to address the retail sources of tobacco for young people. The patterns of retail access shown in surveys and qualitative data suggest that retail regulation implementation is variable, but where implemented consistently will deter access attempts. Small independent stores appear to be the easiest retail access points for young people. Moreover, young people report that some retailers willingly sell to underage smokers. Research is needed which explores both the reasons for, and ways to combat lax implementation of regulations in smaller stores. The systematic reviews by Stead and Lancaster (2005) and Richardson et al. (2009) found that sustained multi-component action can support consistent regulation implementation:

*Findings revealed that combined, successive retail inspections, public prosecutions and awareness of minimum age restrictions decrease illegal sales of tobacco. (Richardson et al. 2009, p1496)*

*Sustaining compliance requires regular enforcement, and the existing evidence suggests reduced effectiveness if checking occurs much less than four to six times a year. (Stead and Lancaster 2005, p7)*

As noted in Chapter 5, retail interventions have the potential to address multiple barriers to and facilitators of tobacco access. However, the qualitative synthesis suggests that sensitive approaches to regulation of this kind are needed, as young people's attitudes towards it are complex. Increased regulation may serve to inadvertently heighten the kudos of smoking as an act of rebellion against adult regulation. One potential intervention approach is to harness the apparently negative views of young people towards retailers who are complicit in their tobacco supply, such as that used by the Florida anti-tobacco 'Truth' campaign (Sly et al. 2001). This would need to be done sensitively and in collaboration with retailers so as to ensure that not all shopkeepers are tarnished with the same brush.

### *Proxy purchasing*

The qualitative data suggest that proxy purchasing is a significant access route for young people: study participants described friends, family and strangers buying

cigarettes for them. Proxy purchasing through family and peers was also reported by Walsh and Tzelepis (2007) in their international qualitative synthesis.

Whilst we found a lack of survey data which would enable us to understand the prevalence of proxy purchasing in the UK, it appears that some of those undertaking the surveys included in the review are beginning to recognise the significance of proxy purchasing. The most recent version of the Smoking Drinking And Drug Use survey (Fuller 2011), published since the syntheses were undertaken, collects data on proxy purchasing among young people in England for the first time. Although the data are not collected in a fashion that enables us to examine the significance of proxy purchasing in relation to other sources, the data clearly suggest that proxy purchasing is highly prevalent. In addition, another included survey (Black et al. 2009) will publish data on proxy purchasing in Scotland in December 2011. The Scottish data is collected alongside data on other 'usual sources' and so will allow for comparisons.

There were no interventions found which tackled young people's access through proxy purchasing. The qualitative data suggest that interventions targeting visibility and adult complicity will be most effective, such as youth possession laws, community awareness raising, or a legal ban on proxy purchasing such as that introduced recently in Scotland. However, the recently published and forthcoming evidence on proxy purchasing from the two surveys named above does suggest the possibility of comparing patterns of proxy purchasing in Scotland with patterns in England. The lack of survey data at the time of the review is particularly disappointing as it negates the possibility of assessing trends in proxy purchasing in Scotland before and after the introduction of proxy purchase laws there. Any extension of this type of intervention to other UK countries should be approached with caution, however, before the full significance of proxy purchasing in the UK is understood.

#### *Other sources*

Ease of access via the sources described above may be the reason that vending machines, stealing, the internet and the black market are used less often. However, it is imperative that we continue to assess prevalence rates via these sources, as the findings suggest that when access routes are blocked, young people are adept at finding alternatives. If regulation in both shops and schools is enforced successfully, they may turn to access routes that do not require interaction with retailers. The recent legislation on vending machines will prevent young people turning to this source, but efforts may still need to be focused on black market and internet access. Indeed, a survey study focusing on illicit tobacco in the UK (North of England Illicit Tobacco Survey 2009) found that one-third of 14-17-year-old smokers had accessed tobacco via the black market at some point, and that illicit tobacco (including that sourced through friends and family) may account for almost half of young people's total tobacco consumption. Although the focus of this study on a single source (informal retail) meant it was excluded from the review, the findings suggest that we should not underestimate the potential for this source to become more significant if current access patterns shift. Moreover, the findings about proxy purchasing suggest that we need also to continue collecting qualitative

data, as they may reveal new access routes on which prevalence data should be captured.

## 6.2 Strengths and limitations of the review

As far as we are aware, this is the first review on young people's tobacco access that analyses and synthesises, in a systematic way, the findings from a range of study types. The holistic nature of the review, combining epidemiological data, research on young people's perspectives and interventions that address non-retail tobacco access, provides a robust and contextualised evidence base for policy development. The robustness of this evidence base is further enhanced by state-of-the-art reviewing techniques; for example the extensive searching to identify relevant studies was made possible through text-mining techniques.

The review's findings are not only robust however, but grounded in data specific to the UK, making them entirely suited for supporting policy development in this country. Moreover, as this review gathered evidence during a period of significant policy initiatives targeting young people's tobacco access in the UK, it was able to assess the impact of recent changes such as the rise in age of purchase in 2007. The other key strength of this review is the focus on social sources, noted in many systematic reviews on tobacco access as a significant gap in knowledge.

There are however, some notable limitations to the review. These weaknesses are predominantly due to limitations in the evidence base rather than the methods employed in the review. First, because of the dearth of evaluations using robust designs, and because of the non-existence of UK-based evaluations, the review does not provide robust synthetic evidence on the effectiveness of non-retail access interventions. Second, the lack of survey studies collecting data on proxy purchasing means that we cannot verify the significance of this source; the qualitative evidence suggest that it is imperative to address this gap in knowledge and it appears that survey researchers are beginning to recognise this. Third, inconsistencies in the measures that were used in the surveys meant that some data could not be used where there was risk of double counting, meaning that rates of use of some sources may be slightly inaccurate.

However, the limitations of the evidence base are in part mitigated by the multi-method approach used in the review, particularly as the survey evidence and the qualitative evidence largely corroborate each other.

## 6.3 Conclusion and recommendations

The research examined for this review thus suggests that further research in three areas is needed to address the ease with which young people in the UK are currently able to access tobacco.

First, intervention research to address non-retail tobacco access needs to be conducted here in the UK. Two specific interventions strategies need exploring: strategies to target social access, the most plausible option being to tackle the exchange and purchase of tobacco in schools; and strategies to support independent retailers to enforce regulations.

Second, though it is heartening to see that UK prevalence data on proxy purchasing is beginning to emerge, a full understanding of the significance of this source is needed. Third, continued research on tobacco sources through both surveys and qualitative research is needed to ensure that we continue to address shifting patterns of access.

The recent introduction of Scottish laws aimed at reducing the availability of tobacco to under 18s provides an invaluable opportunity to address many of these issues through close monitoring of access trends in Scotland and assessing comparisons with trends in other UK countries. The Scottish laws include: making it an offence for under 18s to purchase tobacco; making it an offence for adults to buy tobacco for under 18s (proxy purchase); and giving courts the power to ban retailers from selling tobacco where they have continually broken the law.

## 7 Detailed methods

This chapter describes in detail the methods used to conduct the review. Here we provide a transparent account of the explicit and rigorous methods used to seek, identify, describe, appraise and synthesise the evidence. The review was conducted in two stages: a mapping exercise which described the characteristics of all relevant research for an interim report; and an in-depth review focusing on a particular subset of research identified by the Department of Health as most relevant for its needs, as reported here. This section reports the methods for each stage of the review.

### 7.1 User involvement

For systematic reviews to be relevant to policy and practice, potential users of the review must be involved in key stages of the review process (Peersman et al. 1997, Rees and Oliver 2007). User involvement was sought for this review through the Department of Health Tobacco Policy team and through key authors in the field. They advised on the review's scope at key points, and identified potentially relevant research studies.

In addition, consultations to be undertaken in January 2012 will involve gathering the views of young people on the findings of the review.

### 7.2 Including and excluding studies

#### 7.2.1 Screening for the descriptive map

Eligibility criteria were developed from reviewing previous youth tobacco research and policy and in consultation with the Department of Health Tobacco Policy team. To be included in the review, studies had to:

- be about sources of or access to tobacco;
- be about young people 11-18 years;
- be published in or after 1998 (1990 for intervention studies); and
- have a published abstract in English.

In addition, we sought primary research of the following designs:

- qualitative research from the UK in which young people discuss access to tobacco; or
- survey research capturing data on the range and/or prevalence of retail and non-retail sources used by young people in the UK; or
- intervention studies addressing non-retail access.

We were less certain about finding intervention studies than qualitative and survey studies. Thus, we set broad inclusion criteria to identify as much evidence as possible that could indicate the efficacy of interventions for reducing non-retail access. We cast the net for intervention studies wide by:

- including a range of study designs that offer some evidence of impact - such as trials, before and after studies and studies testing associations between variables - for example, looking at the association between smoking rates and access behaviour and parental smoking bans in the home;
- including a range of interventions directly and indirectly focusing on access, such as:
  - i. interventions with a *clear remit to reduce access* - for example, penalties for possession, including those imposed at state level, in the home or school; or
  - ii. interventions *indirectly addressing access* but which ultimately had an impact on access - e.g. smoking bans imposed in the home or school or behavioural interventions aiming to train young people to say no to offers of tobacco from peers; or
  - iii. *retail interventions*, such as the enforcement of the minimum age of purchase, where the subsequent effect on *non-retail access* is measured;
- accepting two outcome measures as evidence of effect: smoking behaviour and access behaviour. To be included, direct access interventions (type i), required only one of these outcomes to be measured, while indirect access interventions (types ii and iii) required both.

Eligibility criteria were applied to titles and abstracts. Full reports were obtained for those studies that appeared to meet the criteria or where there was insufficient information to be sure.

### 7.2.2 Screening for in-depth review

The initial round of screening was followed by a second round to identify a narrower subset of studies for in-depth analysis. Decisions about which studies to focus on in depth were taken with the Department of Health following the production of a descriptive map of studies meeting the above criteria. It was decided that the in-depth review would focus on studies with contextual relevance for UK policy development. Studies were taken forward to synthesis if they were:

- a) Qualitative studies from the UK
- b) Survey studies from the UK

As no intervention studies from the UK were identified in the initial round of screening they were not appraised and synthesised, but interrogated further to produce a more detailed map of intervention characteristics.

## 7.3 Identification of research

We searched over a hundred sources of information, which included websites with a tobacco and/or a young people focus, 35 electronic databases from the fields of health, public health, social science and social care, and data from 19 large surveys with both national and regional samples (see Appendix 4). For the databases, a comprehensive search strategy was developed and tested using

indexing and free-text terms in PubMed. This was then adapted for other databases. Searches were conducted in October and November 2010. We carried out citation chasing and contacted experts to find further studies. We also contacted the authors of all included qualitative studies for further information on the included studies, and for related or similar studies. This strategy identified over 65,000 citations. Studies were managed by EPPI-Reviewer, the EPPI-Centre's online review software (Thomas et al. 2010).

#### 7.4 Screening for eligibility using text-mining tools

Systematic reviews are robust, in part, because of extensive attempts to access as much of the available literature as possible. Extensive searching aims to minimise any impact of publication bias which could lead to misleading results. In this review, we were able to search more widely and sensitively than ever before due to the availability of innovative 'text-mining' and searching tools.

After removing duplicate references, those not in English and those not meeting our inclusion criterion for publication date, just under 36,000 titles and abstracts remained in our database. Initially, we piloted the application of our exclusion criteria on a subset of 150 studies. We used text-mining approaches to identify a highly relevant subset rather than simply taking a random sample of studies. As this approach identified more items suitable for inclusion than a random sample would identify, and because the excluded studies present in the sample were 'closer' to being relevant than would usually be the case, the process was a much more rigorous test of the exclusion criteria than would be usual at this stage. The team achieved an inter-rater reliability rate of over 80 percent for decisions to include or exclude before moving on to individual screening.

The next part of the process used a text-mining approach called 'active learning', as described by Wallace and colleagues (2010), in which a 'classifier' uses the results of manual screening to build reliable rules to include or exclude automatically. When using the active learning technique, however, we found the classifier to be very sensitive in relation to including studies; less than 2 percent of those it identified as potentially relevant were actually suitable for inclusion. We therefore supplemented the active learning process with a screening prioritisation approach, using the TerMine© term recognition software,<sup>4</sup> which increased our hit rate to about 7 percent.

In addition, we developed a list of key terms that were likely to be associated with excluded studies to enable the exclusion of groups of studies (for example, all the studies about 'mice' could be safely excluded). However, we were cautious about using this approach, as even within clusters that, on first sight, appeared to be irrelevant (e.g. 'asthma'), we found some relevant citations. Therefore, we used the results of group exclusions to compare with sets of studies that the classifier

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<sup>4</sup> <http://www.nactem.ac.uk/software/termine/>

had been uncertain about, enabling us to be more confident about excluding these studies.

We also tested the overall approach by estimating how many studies we would expect to include based on manual screening of a random sample of 661 titles and abstracts. We calculated that this would be an appropriately sized random sample using standard power calculation methods. The results indicated that approximately 1.81 percent, or 652, of our 36,000 studies would be relevant.

Using the combined text-mining approach described above we identified and screened just over 9,000 titles and abstracts manually. As a result of this, 674 were included on the basis of title and abstract. Based on our estimates of the overall inclusion rate, we had identified all potential items suitable for inclusion by screening less than one-quarter of the total number of studies, thereby saving a substantial amount of time. The inclusion criteria were then reapplied to the full reports of those included on the basis of title and abstract. See Figure 7.1 at the end of this chapter for details of the flow of studies through the review.

### **7.5 Unit of analysis: the study and not the report**

After we had identified the number of relevant documents, we matched up multiple reports of the same study in order that our understanding of each study drew on all available published data and so that we did not count the same study twice in our analysis.

One of the included studies (Auton and Hoang 2009) was reported in two papers (Auton and Hoang 2009, Hughes et al. 2011). The latter paper provides data on a subset of the total sample reported on in the former. Wherever possible we have conducted our analyses using the larger sample from the Auton and Hoang (2009) paper; however, for some analyses, it was necessary to use the data from Hughes et al. (2011).

### **7.6 Describing studies**

All studies were coded using the standard classification system (Peersman et al. 1997) and further codes were added to capture information specific to this review. Data were gathered on the aims of the research, the population under study (e.g. age range, type of smoker, gender), sample size, the sources of tobacco, and for the intervention studies, the dependent and independent variables.

The coding tool was tested with two researchers independently coding a sample from each study type and then comparing. When inter-rater agreement levels reached 80 percent, they went on to code individually.

Frequency analysis was conducted on each of the questions in the review coding tool for the interim report, which thus described the scope, relevance and quality of each group of studies, enabling decisions about the approach for in-depth review.

## 7.7 Data extraction

Two reviewers independently used a standardised tool to extract data from each of the survey and qualitative studies included in the in-depth review, and then met to agree a finalised version. Data were extracted on the:

- study aims and rationale;
- characteristics of participants;
- procedures for sampling, recruitment and consent;
- methods for data collection and analysis; and
- findings.

## 7.8 Assessing the quality and relevance of studies

Each of the studies included in the qualitative and survey syntheses was appraised for quality and relevance. Survey studies were assessed using six quality criteria; these were informed by those proposed for assessing the quality of epidemiological or correlational research as described by Wong et al. (2008), and by principles of good practice for critical appraisal of primary research (Centre for Reviews and Dissemination 2009). These quality criteria covered three main domains relating to sampling, data collection and data analysis. Each study was assessed according to whether:

- methods for sampling the population under study were appropriate;
- the response rate was reported;
- reliable and valid measurement tools were used;
- investigator(s) controlled for confounding variables when analysing associations;
- reviewers had concerns about the statistical methods used; and
- the length of follow-up in longitudinal studies was appropriate.

Qualitative studies were assessed using criteria developed and used in previous EPPI-Centre reviews (Rees et al. 2009) and informed by principles of good practice for conducting social research with the public (Harden et al. 2004). Each study was considered according to whether:

- steps were taken to strengthen sampling rigour;
- steps were taken to strengthen data collection rigour;
- steps were taken to strengthen the rigour of data analysis;
- study findings were grounded in/supported by data;
- the breadth and depth of findings were appropriate for the review; and
- young people's perspectives and experiences were privileged.

Mixed methods studies (n=4) were assessed using both sets of criteria. The relevance of each study was then assessed based on its aims, sample, methods for data collection and analysis and findings. All studies were then rated in terms of their overall quality and relevance; these two criteria were combined to give a measure of the overall 'usefulness' of each study. Studies were judged to be of high, medium or low usefulness using the algorithm in Table 7.1, and studies with a

low overall weighting were excluded from the synthesis. Assessments at each stage were made by two reviewers working independently; disagreements were discussed and resolved.

**Table 7.1** Algorithm for overall ‘usefulness’ rating combining quality and relevance

Usefulness rating	Criteria
High quality and relevance	High ratings for <i>both</i> quality and relevance or any combination of medium and high ratings for quality and relevance
Medium	Those with medium ratings for <i>both</i> quality and relevance
Low	Studies with a low rating for <i>either</i> quality or relevance (excluded from synthesis)

## 7.9 Methods for in-depth review: synthesis and in-depth descriptive map

In order to enhance the validity of the findings, we planned the programme of synthesis to ensure that the findings for each synthesis were developed independently. Variables to be explored in the meta-analysis were selected in advance of calculating weighted means to ensure that we were not biased by prior knowledge of where we might find significant results. The qualitative and survey syntheses were conducted concurrently but by different teams of researchers. This ensured that the qualitative findings about which sources are significant for young people were not biased by prior knowledge from the surveys about prevalence. The high level of corroboration between the survey data and the qualitative data is, therefore, not undermined in any way by reviewer bias. The one area in which we deliberately allowed analysis to be led by findings of the syntheses was in describing the characteristics of intervention studies. The aim at the outset was to try to map intervention characteristics in terms of the barriers and facilitators identified in the synthesis of qualitative studies.

### 7.9.1 Quantitative (surveys) synthesis

#### *Calculating an odds ratio effect size*

To calculate an odds ratio effect size for meta-analysis, we needed to construct a binary variable that represented source types (because more than two categories of a variable cannot be incorporated into an odds ratio effect size). We determined that retail versus non-retail sources would be of most interest in terms of possible policy interventions. For the purposes of this review, and following the typical labels used in the included studies, retail sources included supermarkets, off-licenses, newsagents and other shops, ice cream and other food vans, street markets and vending machines. Non-retail sources included social sources (peers, family members, neighbours), stealing and finding cigarettes.

We examined the studies to determine what variables were presented as covariates of source use. We found that:

- four studies reported source by smoking status (regular or occasional smoker) of the young person;
- three studies reported source by gender of the young person;
- four studies reported source by age of the young person.

Only one covariate could be used to calculate odds ratio effect sizes to avoid using the same data in multiple analyses. We selected ‘smoking status’, because it was the most likely to be of interest and it was the most frequently consistently reported variable (ages reported varied from study to study, making it impossible to directly compare by age across studies). Therefore the studies included in the analysis were Black et al. (2009), Croghan et al. (2003), Fuller (2009), and Auton and Hoang (2009).

Effect sizes were calculated using the formula:

$$OR = \frac{ad}{bc}$$

where OR = odds ratio effect size, and *a*, *b*, *c*, and *d* are the frequencies of observations as defined in the Table 7.2.

**Table 7.2** Contingencies

	7.9.2 Retail sources	7.9.3 Non-retail sources
Regular smokers	<i>A</i>	<i>B</i>
Occasional smokers	<i>C</i>	<i>D</i>

An *OR* effect size greater than 1 indicates that regular smokers are more likely to use retail sources than non-retail sources compared to occasional smokers, while an *OR* less than 1 suggests the opposite.

For three of the four studies reporting source of tobacco by smoking status, participants in the studies were able to indicate multiple sources (Auton et al. 2009, Black et al. 2009, Fuller 2009). To avoid some participants contributing more information to the analyses than others, the frequencies of tobacco use were weighted by the ratio of sources to participants in each smoking status group (regular versus occasional smokers). For example, if regular smokers in a given study reported using an average of 2.5 sources each, then the frequencies of both retail and non-retail sources for regular smokers in that study would be divided by 2.5. The result is that the frequencies in the contingency table add up to the total number of regular and occasional smokers.

A *Q*-test was run to assess the extent of homogeneity in the sample of studies (Lipsey and Wilson 2001). If there is statistically significant heterogeneity (i.e.

statistical differences between the effect sizes), then this suggests that the studies differ more than expected by chance. Heterogeneity is indicated when the  $p$ -value of the  $Q$ -test is less than 0.05.

This was followed by fixed and random effects meta-analyses, in which we calculated the overall mean effect size across the studies. Fixed effect models assume that the same ‘true’ relationship underlies all studies and that any differences between the effect sizes are due to sampling error (Hedges and Vevea 1998). In contrast, random effects models assume that the effect that is being estimated is the mean of different populations of studies and that there will be variation across the studies (Raudenbush 1994). The overall mean effect size is weighted to take into account the number of participants in each included study, because studies with larger samples should produce more precise estimates of the true relationship. The random effects model weight incorporates both within-study and between-study variance, while the fixed effect model weight only takes into account within-study variance. We computed both types of models as there is some debate over which is the most appropriate (Thomas et al. 2012, in press).

All analyses were conducted in PASW Statistics 18 and used macros developed by Wilson (2005) to run the  $Q$ -tests and fixed and random effects meta-analyses.

#### *Calculating weighted mean percentages*

Data on reported sources of cigarettes extracted from each study were then entered into Microsoft Excel as a common metric (frequencies and proportions) and imputed where necessary. In order to consider prevalence of each tobacco source across the studies, we calculated weighted mean percentages. Weighting the mean percentage when combining data from across a range of studies ensures that the contribution from each study reflects the size of that study; larger studies account for more of a share of the mean percentage than smaller studies. The weight for each study was calculated by working out each study's sample size as a proportion of the total number of participants across the studies. The percentage of young people stating that they used a particular source in each study was then multiplied by its relative weight. The individual weighted means were then summed to provide the overall weighted mean percentage.

#### *7.9.4 Qualitative synthesis*

The method we used in the interpretive synthesis of qualitative studies has been used in previous EPPI-Centre reviews of children's views; termed *thematic synthesis*, it is described in detail in Thomas and Harden (2008). Using this method, the findings and conclusions were analysed using the inductive coding tool in the EPPI-Centre's EPPI-Reviewer software (Thomas et al. 2010). Two reviewers independently examined the findings of each study in turn, assigning one or more codes to describe each sentence or paragraph within the text. When all studies had been looked at once, each of the studies was revisited and examined to see if any of the codes could be applied. When all studies had been looked at in this way, the reviewers met to discuss the concordance between their individual findings, looking at the resulting codes and their associated text, and considering the

significance of each. The inductive coding initially led to a large number of descriptive themes illustrating issues to do with individual sources used by young people. This rich contextual data was then organised into hierarchical themes for each source, including: the relative ease with which tobacco could be accessed, the customs and practices used for obtaining tobacco through each source, and the advantages and disadvantages of accessing through each source. A further level of analysis involved considering the findings across all sources and inferring the barriers to and facilitators of tobacco access for young people. The narrative account, which was written by both reviewers, indicates the strength of the evidence supporting each theme.

#### *7.9.5 Mapping interventions*

Unlike the synthesis aims of the qualitative and survey findings, the aim in mapping the interventions was to describe the kinds of interventions that have been attempted before. All intervention studies were coded using a pre-devised coding frame focusing on: research design; tobacco source addressed; the ‘treatment’ or intervention approach; and barriers and facilitators addressed (as identified from the qualitative studies). The coded extracts became the basis for the write-up, comparing across intervention types to gain an understanding of the purpose of each approach and its evidence base.

#### *7.9.6 Cross-study analysis*

The independent analyses for each included study type (surveys, qualitative studies, intervention studies) were brought together in two ways:

- a) assessing the level of concordance between the survey findings and the qualitative findings regarding young people’s sources of cigarettes and their patterns of access by gender, age and smoking status; and
- b) assessing the extent to which interventions addressed the barriers and facilitators identified by young people in the qualitative studies.

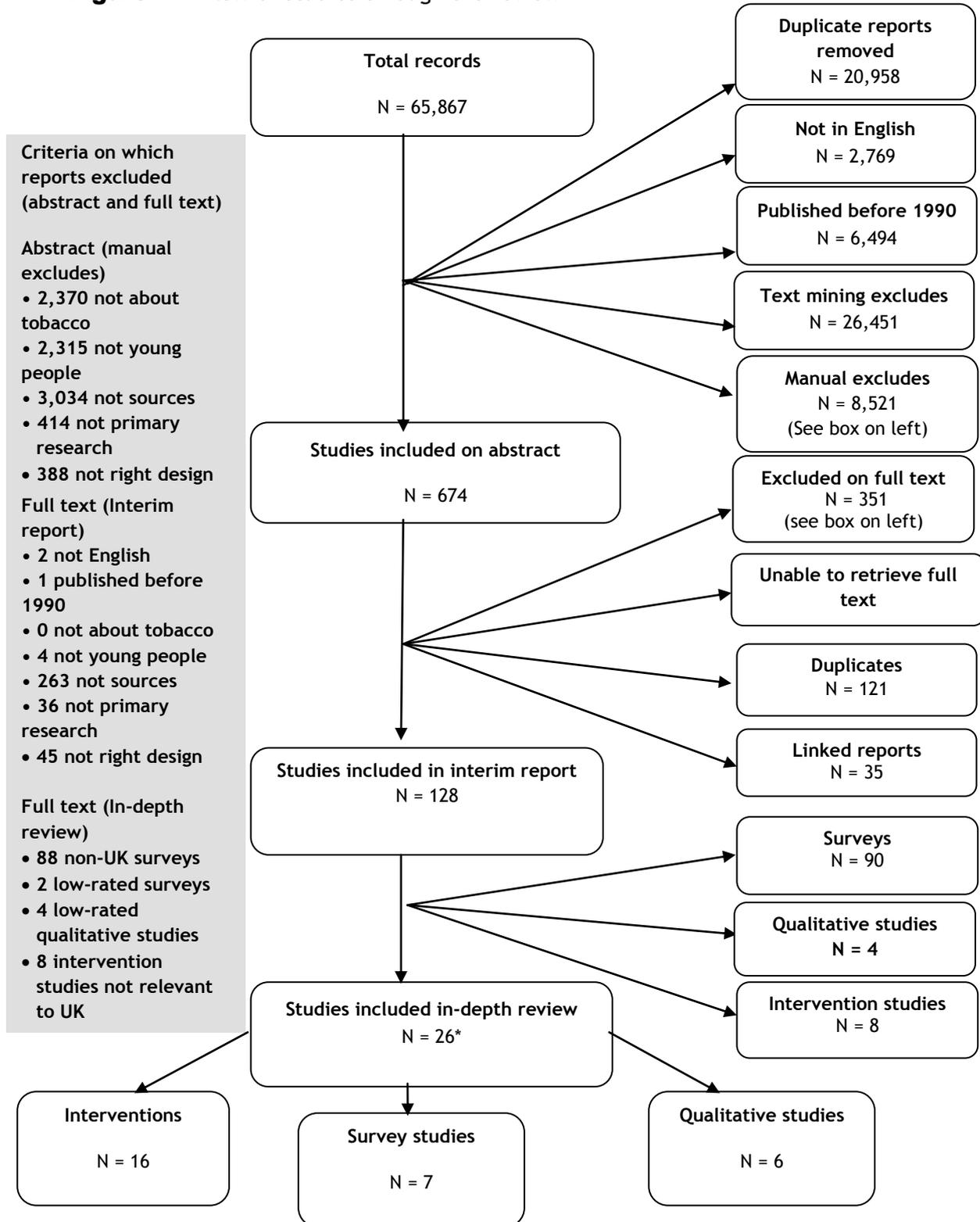
Thus the cross-study analysis draws the evidence into a coherent whole whilst also providing a further validity check on the independent syntheses, and enabling the identification of gaps or anomalies in the evidence.

### **7.10 Quality assurance**

To ensure consistency and accuracy in screening and coding, the work was done by pairs of reviewers working independently until the level of inter-rater reliability reached 80 percent.

To ensure the reliability and validity of data extraction and quality appraisal, all studies were assessed by pairs of reviewers, working independently first and then comparing their work to reach a consensus. Disagreements were resolved by the arbitration of a third party where required.

**Figure 7.1** Flow of studies through the review



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## Appendices

### Appendix 1: Included study summary tables (n=26)

Included: survey-only design (n=4)

Study	Aims	Focus on sources	Sources covered	Type of findings	Population
Auton 2009	Behaviour and attitudes towards smoking	Sole focus	<ul style="list-style-type: none"> <li>• Retail: specific shops</li> <li>• Retail: informal retail</li> <li>• Retail: vending machine</li> <li>• Social: friends</li> <li>• Social: parent/relative</li> <li>• Other source</li> </ul>	<ul style="list-style-type: none"> <li>• Sources for all YP</li> <li>• Sources by gender</li> <li>• Sources by age</li> <li>• Sources by smoking status</li> <li>• Sources pre- and post-2007</li> </ul>	Location: North West England Sample size: 13,902 Representativeness: regional Age: 14-17 yrs Other: none
Balding 2008	Information on personal background, nutrition, drugs, hygiene, medication, dental, relationships, mental health, HIV, exercise, leisure and money in order to identify priorities for health education planning, assessments and intervention programmes	Limited focus	<ul style="list-style-type: none"> <li>• Retail: shop</li> <li>• Retail: informal retail</li> <li>• Retail: vending machine</li> <li>• Social: friends</li> <li>• Social: parent/relative</li> <li>• Social: stolen/taken</li> <li>• Social: other social source</li> <li>• Social: proxy purchase</li> <li>• Other source</li> </ul>	<ul style="list-style-type: none"> <li>• Sources for all YP</li> <li>• Sources by gender</li> <li>• Sources by age</li> </ul>	Location: UK Sample size: 32,162 Age: 11-15 yrs Representativeness: national Other: none
Black 2009	Prevalence and trends in smoking, drinking and drug use	Major focus	<ul style="list-style-type: none"> <li>• Retail: shop</li> <li>• Retail: specific shops</li> <li>• Retail: informal retail</li> <li>• Retail: vending machine</li> <li>• Retail: internet</li> <li>• Social: friends</li> </ul>	<ul style="list-style-type: none"> <li>• Sources for all YP</li> <li>• Sources by gender</li> <li>• Sources by age</li> <li>• Sources by smoking status</li> <li>• Sources pre- and post-</li> </ul>	Location: Scotland Sample size: 10,063 Age: 12-16 yrs Representativeness: national Other: none

Study	Aims	Focus on sources	Sources covered	Type of findings	Population
			<ul style="list-style-type: none"> <li>• Social: parent/relative</li> <li>• Social: siblings</li> <li>• Social: purchase friend/family</li> <li>• Social: purchase other</li> <li>• Social: stolen/taken</li> <li>• Social: other social source</li> <li>• Other source</li> </ul>	2007	
Fuller 2009	Smoking, drinking and drug use. Behaviour, knowledge and attitudes	Major focus	<ul style="list-style-type: none"> <li>• Retail: shop</li> <li>• Retail: specific shops</li> <li>• Retail: informal retail</li> <li>• Retail: vending machine</li> <li>• Retail: internet</li> <li>• Social: friends</li> <li>• Social: parent/relative</li> <li>• Social: siblings</li> <li>• Social: purchase friend/family</li> <li>• Social: purchase other</li> <li>• Social: stolen/taken</li> <li>• Social: other social source</li> <li>• Other source</li> </ul>	<ul style="list-style-type: none"> <li>• Sources for all YP</li> <li>• Sources by gender</li> <li>• Sources by age</li> <li>• Sources by smoking status</li> <li>• Sources pre- and post-2007</li> </ul>	Location: England Sample size: 7,798 Age: 11-15 yrs Representativeness: national Other: none

Included: survey and qualitative design (n=3)

Study	Aims	Focus on sources	Sources covered	Type of findings	Type of findings	Population
<b>Croghan 2003</b>	The importance of social sources of tobacco to YP - the peer market for cigarettes in schools	Sole focus	SURVEY <ul style="list-style-type: none"> <li>• Retail: shop</li> <li>• Retail: vending machine</li> <li>• Social: friends</li> <li>• Social: purchase friend/family</li> <li>• Social: purchase other</li> <li>• Social: stolen/taken</li> <li>• Social: other social source</li> </ul>	QUALITATIVE <ul style="list-style-type: none"> <li>• Social sources</li> </ul>	<ul style="list-style-type: none"> <li>• Sources for all YP</li> <li>• Sources by smoking status</li> </ul>	<b>Location:</b> Birmingham <b>Sample size:</b> focus groups: 126; individual interviews: 42; survey: 662 <b>Age:</b> 13-15 yrs <b>Representativeness:</b> regional <b>Other:</b> none
<b>Milton 2008</b>	Emerging patterns of first tobacco use - tobacco use in the context of family and peer group	Major focus	SURVEY <ul style="list-style-type: none"> <li>• Social: friends</li> <li>• Social: parent/relative</li> <li>• Social: stolen/taken</li> <li>• Other source</li> </ul>	QUALITATIVE <ul style="list-style-type: none"> <li>• Retail sources</li> <li>• Social sources</li> <li>• Lesser used sources</li> </ul>	<ul style="list-style-type: none"> <li>• Sources for all YP</li> </ul>	<b>Location:</b> Liverpool <b>Sample size:</b> focus groups: 90; individual interviews: 37; survey: 76 <b>Age:</b> 11-11 yrs <b>Representativeness:</b> regional <b>Other:</b> smokers
<b>Turner 2004</b>	Variation in retail/social sources and differences in smoking rates - restrictions in schools	Major focus	SURVEY <ul style="list-style-type: none"> <li>• Retail: shop</li> <li>• Social: friends</li> <li>• Social: parent/relative</li> <li>• Social: siblings</li> <li>• Social: other social source</li> <li>• Social: stolen/taken</li> </ul>	QUALITATIVE <ul style="list-style-type: none"> <li>• Retail sources</li> <li>• Social sources</li> <li>• Proxy purchase</li> </ul>	<ul style="list-style-type: none"> <li>• Sources for all YP</li> </ul>	<b>Location:</b> Scotland <b>Sample size:</b> focus groups: 25 of 3-8 participants; survey: 896 <b>Age:</b> 13 yrs <b>Representativeness:</b> specific population <b>Other:</b> disadvantaged

*Included: qualitative-only design (n=3)*

<b>Study</b>	<b>Aims</b>	<b>Focus on sources</b>	<b>Sources covered</b>	<b>Population</b>
<b>Amos 2007</b>	The nature of the meaning and function of smoking for 15-year-old boys and girls	Major focus	<ul style="list-style-type: none"> <li>• Retail</li> <li>• Social</li> <li>• Proxy</li> <li>• Lesser</li> </ul>	<b>Location:</b> Edinburgh <b>Sample size:</b> 46 <b>Age:</b> 15-16 yrs <b>Representativeness:</b> specific pop. <b>Other:</b> smokers
<b>Borland 2009</b>	The perceived impact of increase in age of legal sale on ability to purchase and access cigarettes	Sole focus	<ul style="list-style-type: none"> <li>• Retail</li> <li>• Social</li> <li>• Proxy</li> <li>• Lesser</li> </ul>	<b>Location:</b> Scotland <b>Sample size:</b> 12 <b>Age:</b> 16-17 yrs <b>Representativeness:</b> specific pop. <b>Other:</b> smokers
<b>Robinson 2010</b>	Youth access behaviours following legislative action increasing the age of legal sale	Sole focus	<ul style="list-style-type: none"> <li>• Retail</li> <li>• Proxy</li> <li>• Lesser</li> </ul>	<b>Location:</b> Birmingham <b>Sample size:</b> 85 <b>Age:</b> 12-15 yrs <b>Representativeness:</b> specific pop. <b>Other:</b> disadvantaged

Included: intervention studies (n=16)

Study	Design	Addresses which kind of access?	Addresses which barriers/facilitators?	Intervention type	Outcomes	Population
<b>Chaloupka 1996</b>	Correlational/observational	Social (peers)	Visibility Risk Price	School policies	<ul style="list-style-type: none"> <li>Smoking behaviour</li> </ul>	<b>Location:</b> USA <b>Sample size:</b> 110,717 <b>Age:</b> 13-18 <b>General population:</b> national sample
<b>Darling 2006</b>	Correlational/observational	Social (peers)	Visibility Risk Price	School policies	<ul style="list-style-type: none"> <li>Smoking behaviour</li> <li>Access behaviour</li> <li>Other - knowledge, influence, self-concept, awareness of initiatives</li> </ul>	<b>Location:</b> New Zealand <b>Sample size:</b> 2,658 <b>Age:</b> 14-17 <b>General population:</b> national sample
<b>Forster 1998</b>	RCT	All (possession)	Adult complicity (shops) Risk Price Visibility	<ul style="list-style-type: none"> <li>Retail intervention measuring sources</li> <li>Possession laws</li> </ul>	<ul style="list-style-type: none"> <li>Smoking behaviour</li> <li>Access behaviour</li> <li>Other - perceived availability - retail and social</li> </ul>	<b>Location:</b> USA <b>Sample size:</b> 6,269 <b>Age:</b> 13-16 <b>General population:</b> regional sample
<b>Huver 2007</b>	Correlational/observational study	Social (family)	Adult complicity Visibility Risk	Home restrictions	<ul style="list-style-type: none"> <li>Smoking behaviour</li> <li>Other - intention to smoke</li> </ul>	<b>Location:</b> Netherlands <b>Sample size:</b> 482 <b>Age:</b> 12-18 <b>General population:</b> regional sample
<b>Jason 2008</b>	RCT	All (possession)	Risk Price Visibility	Possession laws	Smoking behaviour	<b>Location:</b> USA <b>Sample size:</b> 25,404 <b>Age:</b> 12-16 <b>General population:</b> regional sample

<b>Katzman 2002</b>	Correlational/observational	Retail but consequences for social access measured (see also school policies)	Adult complicity (shops) Price	<ul style="list-style-type: none"> <li>• School policies</li> <li>• Retail interventions measuring sources</li> </ul>	<ul style="list-style-type: none"> <li>• Smoking behaviour</li> <li>• Access behaviour</li> </ul>	<b>Location:</b> USA <b>Sample size:</b> 10,644 <b>Age:</b> 14-18 <b>Specific population:</b> national sample - smokers only
<b>Kim 2006</b>	Correlational/observational	Social (family)	Adult complicity (Home)	Home restrictions	Smoking behaviour	<b>Location:</b> USA <b>Sample size:</b> 2,697 <b>Age:</b> 13-17 <b>Specific population:</b> national sample - low SES female never smokers and smokers
<b>Levinson 2007</b>	Pre- and post-test	Retail but consequences for social access measured	Adult complicity (shops)	Retail intervention measuring sources	Access behaviour	<b>Location:</b> USA <b>Sample size:</b> 1,009 <b>Age:</b> 14-18 <b>General population:</b> regional sample
<b>Lewit 1997</b>	Correlational/observational	Social (peers)	Visibility Risk Price	School policies	<ul style="list-style-type: none"> <li>• Smoking behaviour</li> <li>• Other - intention to smoke</li> </ul>	<b>Location:</b> USA <b>Sample size:</b> 15,432 <b>Age:</b> 13-16 <b>General population:</b> national sample
<b>Livingood 2001</b>	Correlational/observational	All (possession)	Risk Price Visibility	Possession laws	<ul style="list-style-type: none"> <li>• Smoking behaviour</li> <li>• Other - awareness of enforcement, perception of the impact of the penalties</li> </ul>	<b>Location:</b> USA <b>Sample size:</b> 2088 <b>Age:</b> 11-18 <b>General population:</b> regional sample

<b>Nonnemaker 2002</b>	Correlational/ observational	Social (peers)	Visibility Risk Price	School policies	Smoking behaviour	<b>Location:</b> USA <b>Sample size:</b> approx. 14,700 <b>Age:</b> 12-18 <b>General population:</b> national sample
<b>Rainio 2009</b>	Correlational/ observational	Regulation (home)	Adult complicity Visibility Risk	Home restrictions	Access behaviour	<b>Location:</b> Finland <b>Sample size:</b> 4,943 <b>Age:</b> 14-16 <b>Specific population:</b> national sample - smokers only
<b>Rimpela 2004</b>	Correlational/ observational	Retail but consequences for social access and proxy purchasing measured	Adult complicity (shops) Age appearance Risk	Retail interventions measuring sources	Access behaviour	<b>Location:</b> Finland <b>Sample size:</b> 306,936 <b>Age:</b> 12-18 <b>General population:</b> national sample
<b>Schneider 2009</b>	Pre- and post- test	Retail but consequences for social access measured	Adult complicity (shops) Age Risk	Retail interventions measuring sources	<ul style="list-style-type: none"> <li>• Smoking behaviour</li> <li>• Access behaviour</li> <li>• Other - prevalence of vending machines</li> </ul>	<b>Location:</b> Germany <b>Sample size:</b> 780 <b>Age:</b> 12-15 <b>General population:</b> regional
<b>Sundh 2005</b>	Pre and post test	Retail (intro. of min. age law) but consequences for: Social (buy from friends)	Age Adult complicity (shops) Risk	Retail interventions measuring sources	Access behaviour	<b>Location:</b> Sweden <b>Sample size:</b> 41,622 <b>Age:</b> 13, 15, 17 <b>General population:</b> regional sample
<b>Taurus 2001</b>	Correlational/ observational	Social (peers)	Visibility Risk Price	School policies	Smoking behaviour	<b>Location:</b> USA <b>Sample size:</b> approx 33,000 <b>Age:</b> 13-16 <b>General population:</b> national sample

## Appendix 2: Details of excluded studies

*Excluded: survey design (n=2)*

Study	Aims	Reason for exclusion	Details
<b>Charlton 1999</b>	Issues relating to refusal or acceptance of cigarettes in the context of gender, self-perception and refusal skills	Low relevance	Measured one source only - offers from friends
<b>North of England Illicit Tobacco Survey 2009</b>	Understanding of the illicit tobacco market	Low relevance	Measured one source only - illicit tobacco

*Excluded: survey and qualitative design (n=1)*

Study	Aims	Reason for exclusion	Details
<b>Lucas 1999</b>	Circumstances of smoking initiation - reasons for higher prevalence among girls than boys	Low relevance	<ul style="list-style-type: none"> <li>• Survey measured two unspecific source categories - obtaining tobacco for themselves or being offered tobacco.</li> <li>• Nothing in focus group data directly related to sources.</li> </ul>

*Excluded: qualitative design (n=3)*

<b>Study</b>	<b>Aims</b>	<b>Reason for exclusion</b>	<b>Details</b>
<b>Brown 2009</b>	Perceptions of the effectiveness of tobacco control on social norms and smoking behaviour	Low relevance	Minimal data on tobacco access with no analysis by authors on tobacco access.
<b>Cullen 2010</b>	Young women's non-retail acquisition and use of tobacco	Low quality	No information on methods beyond stating that 'participant observation, group and individual interviews, bulletin board postings and visual participatory methods' were used.
<b>Stewart-Knox 2005</b>	The mechanisms through which peer-related social factors operate to encourage young people to smoke	Low relevance	Very limited information on group dynamics, sharing etc.

### Appendix 3: Source categories used in the individual studies

*Details of retail source categories as described by each study*

Studies	Retail: shop	Retail: Informal retail	Retail: Vending machine	Retail: Internet	Retail: Supermarket	Retail: Newsagent	Retail: Off-licence	Retail: Garage shop
<b>Auton</b>	-	Street sellers/ neighbours/ private houses/ vans	Vending machines	-	Supermarket	Newsagent	Off-licence	-
<b>Balding</b>	From shop	Duty free	Vending machine	-	-	-	Off-licence	-
<b>Black</b>	Buy from shops*	Buy from market	Buy from a machine**	Buy from internet	Supermarket	Newsagent/ tobacconist/ sweetshop	-	Garage shop
<b>Croghan et al.</b>	Buy from shop	-	Buy from machine	Bought from the internet	-	-	-	-
<b>Fuller</b>	Bought from any shop*	Bought from street markets	Bought from a vending machine	-	Supermarket	Newsagent/ tobacconist/ sweetshop	-	Garage shop
<b>Milton</b>	-	-	-	-	-	-	-	-
<b>Turner</b>	Shops or vans	-	-	-	-	-	-	-

\*The studies by Black and Fuller provided an overall percentage of young people who bought from any type of shop, but also provided the breakdown in terms of type of shop.

\*\* Black also reported data for the following source - buy from a van such as an ice cream van or burger van - but this could not be used because of the potential for double counting

## Details of social source categories as described by each study

Studies	Social: Friend	Social: Parent/relative	Social: Sibling	Social: other social source	Social: Purchase family/friend	Social: Social purchase other	Social: Stolen/taken	Social: Proxy purchase
<b>Auton</b>	Brothers/sisters/friends over 16*	Parents/guardians	-¥	-	-	-	-	-
<b>Balding</b>	From friends	From a parent + from a relative‡	-	Given them	-	-	Stolen	Someone bought them for me
<b>Black</b>	Given by friends	Given mother/father	Given brother or sister	-	Buy from friends or relatives	Buy from someone else	Take cigarettes	-
<b>Croghan et al.</b>	Free from friends*	-	-	Social source unspecified	Buy from student	Buy from other	Steal from student±	-
<b>Fuller</b>	Given by friends	Given parents	Given brother or sister	-	Bought from friends or relatives	Bought from someone else	Found/taken	-
<b>Milton</b>	From friends	Given parents + given other relatives‡	-	-	-	-	Steal parent + steal other relative	-
<b>Turner</b>	Pupils at my school*	From parents	From siblings	Someone else	-	-	Steal	-

\*A number of studies had alternative categories for friends which had to be excluded from the analysis due to the risk of double counting. These included the following:- Auton brothers/sisters/friends under 16; Croghan - 'borrowed from friends'; Turner - 'Friends outside school'.

‡ Two studies had two categories - one for parents and one for other relatives. However, for these studies, it was possible to safely conflate the data without the possibility of double counting - for Balding because 0% of respondents selected the 'relative' and for Milton because in this study categories were mutually exclusive.

¥ The Auton study collapsed data for siblings and friends - these data were used in calculations for friends only

± The Croghan study also had a category of 'steal from other' - excluded from analysis

*Details of other categories reported in individual studies*

<b>Studies</b>	<b>Other sources</b>
<b>Auton</b>	Other
<b>Balding</b>	Other sources
<b>Black</b>	Get them some other way
<b>Croghan et al.</b>	
<b>Fuller</b>	Other
<b>Milton</b>	*tried smoking whilst fetching a parents cigs + found in street + left lying in ashtray
<b>Turner</b>	-

\*Collapsed sources as categories in this study are mutually exclusive.

## Appendix 4: Search strategy

### *Electronic databases/topic-specific websites*

- Action on Smoking and Health (ASH)
- Advertising Education Forum
- Alcohol, Drug and Tobacco Study Group
- ASH Scotland
- ASH Wales
- Asksource
- Applied Social Sciences Index and Abstracts (ASSIA)
- Australian Education Index
- Barnardo's
- Bibliography of Nordic Criminology
- BNI (British Nursing Index)
- British American Tobacco Documents Archive
- British Education Index
- British Library Integrated Catalogue
- C2-SPECTR (Campbell Collaboration Social, Psychological, Educational and Children's Society Criminological Trials Register)
- Children's Society
- Cochrane Database of Systematic Reviews and CENTRAL (Cochrane Library)
- Centre for Tobacco Control Research
- Child and Adolescent Health Research Unit
- Children in Scotland
- Children in Wales
- Children's Research Centre
- Clearing the Air Scotland
- Cochrane Tobacco Addiction Group trials register
- Community Guide to Preventive Services
- Conference Papers Index
- CrimDoc
- Criminal Justice Abstracts
- Current Contents
- Database of Abstracts of Reviews of Effectiveness (DARE)
- Dart-Europe theses
- Database of Promoting Health Effectiveness Reviews (DOPHER)
- EconLit
- Economic and Social Research Council Research register
- EMBASE (Excerpta Medica Database)
- ERIC (Education Resources Information Centre)
- European Commission - CORDIS library
- Fabian Society
- Faculty for Public Health
- FADE Library - North West Grey Literature Service
- FDA-CDC Youth Tobacco Prevention
- Girlguiding UK
- Health Promis (Database of the Health Development Agency)
- HMIC (Health Management Information Consortium)
- HSTAT (Health Services/Technology Assessment Texts)
- IBSS (International Bibliography of the Social Sciences)
- IBZ Online

- IDOX information service
- Index to Theses
- Joseph Rowntree Foundation
- JSTOR
- Kings Fund library
- Legacy
- London Public Health Observatory - Tobacco
- Medline
- National Children's Bureau
- National Criminal Justice Reference Service Abstracts
- National Research Register
- National Youth Agency
- NHS Economic Evaluations Database (NHS EED)
- NHS Evidence
- NHS Health Scotland Library
- NICE
- NSPCC electronic library on child protection
- NSPCC website
- Nuffield Foundation
- Online research base (Northern Ireland)
- Public Affairs Information Services (PAIS)
- Policy Hub
- ProQuest Dissertations and Theses - UK and Ireland
- PsycINFO
- Public Health Conferences list
- Roy Castle Lung Cancer Foundation
- ScienceDirect
- Scottish government website
- SHEU - research news bulletin
- System for Information on Grey Literature in Europe Archive (SIGLE)
- Smoking and Health Resource Library
- Social Issues Research Centre
- Social Policy and Practice
- Social Policy Digest
- Social Science Research Network
- Social Services Abstracts
- Society for Research on Nicotine and Tobacco
- Sociological Abstracts
- Social Science Citation Index (SSCI)
- Tobacco Control Database (WHO)
- Tobacco in Scotland
- Tobacco Industry Tracking Database
- Tobacco Law and Policy Database
- Tobacco Use Behaviour Research
- TRIP (Turning Research Into Practice)
- Trials Register of Promoting Health Interventions (TROPHI)
- UK Centre for Tobacco Control Studies
- UK Tobacco Industry Advertising Documents Database
- US Center for Substance Abuse Prevention
- Welsh Government Social Research
- World Advertising Research Centre

- Young Minds
- ZETOC (British Library Table of Contents Database)

### *Surveys*

- 2002 Youth Smoking Survey (Canada)
- Australian Secondary School Alcohol and Drug (ASSAD) Survey
- Control of Adolescents Smoking - study (CAS)
- Council of European Social Science Data and Archives
- Eurodata Research Archive (University of Mannheim)
- European School Survey Project on Alcohol and other Drugs (ESPAD)
- Global Youth Tobacco Survey (GYTS)
- Liverpool Young People Study
- National Youth Tobacco Survey (USA)
- SAMSHA's Office of Applied Studies
- Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS)
- SHEU - healthy lifestyle surveys
- Survey on Smoking, Drinking, and Drug Use Among Young People in Scotland
- Survey on Smoking, Drinking, and Drug Use Among Young People in England
- The HABITS study
- UK Data Archive
- UK national statistics
- WHO Survey of Health Behaviour in School-aged Children (HBSC)
- WHO Tobacco Atlas

### *Citation searching*

- Google Scholar

### *Conference proceedings*

- British Sociological Association

### *Personal contacts*

- Advisory group members asked for further research they have conducted or know of
- Authors of included studies contacted for further reports or knowledge of other research

### *Reference lists*

- Reference lists of all included studies scanned for potentially relevant citations



## Appendix 6: Meta-analysis results: are regular smokers more likely to use retail sources than occasional smokers?

- Regular smokers are 2.6 times more likely to use retail sources than social sources compared to occasional smokers

In order to examine whether apparent differences between groups of smokers were significant, we conducted a statistical meta-analysis. To calculate an odds ratio effect size, we needed to construct a binary variable that represented source types (because more than two categories of a variable cannot be incorporated into an odds ratio effect size). We determined that retail versus non-retail sources would be of most interest in terms of possible policy interventions. As only one covariate could be used to calculate odds ratio effect sizes, to avoid using the same data in multiple analyses, we selected regular versus occasional smokers as being of the most interest. These selections were made in advance of the above analyses.

The Q-test of homogeneity was statistically significant,  $Q(3) = 48.09, p < 0.001$ . This suggests that the fixed effect model was not appropriate for these data as there is more variation between the effect sizes than expected by chance (Lipsey and Wilson, 2001). Thus we focus on the results of the random effects model (results for both fixed and random effects models are presented in Table A6.1).

The overall mean effect size for the random effects model was 2.65 (95% confidence interval = 1.46, 4.81). This is interpreted to mean that regular smokers are 2.65 times more likely to use retail sources (compared to social sources) than occasional smokers.<sup>5</sup> However, the significance of the Q-test, together with the large random error variance component ( $v = 0.33$ ) and wide confidence interval, indicate that the strength of this relationship varies from study to study.

**Table A6.1:** Results of the fixed and random effects meta-analyses (n = 4)

Model	Mean OR	-95%CI	+95%CI	p
Fixed effect	1.84	1.61	2.10	<.001
Random effects	2.65	1.46	4.81	<.01

*Note.* Mean OR = mean odds ratio effect size; -95%CI = lower 95% confidence interval boundary, +95%CI = upper 95% confidence interval boundary, p = significance value.

There was statistically significant variation in the four effect sizes included in the meta-analysis. This suggests that there are some unexplained differences between the studies. Unfortunately, due to lack of data, we are unable to test possible explanatory variables of these differences (such as age differences in the

<sup>5</sup> Although logged odds ratios were used in the analyses as per Lipsey and Wilson, 2001, the results were converted back to regular odds ratios using the exponential transformation for easier interpretation.

participants across studies), which would normally be explored through meta-regression. More data are needed to determine the sources of variation amongst the studies; however the findings from the analysis of sources by weighted mean percentages comparing age, gender and smoking status suggest that all three factors play a role in where young people access cigarettes. It is also possible that at least some of the statistical variation is due to the small number of effect sizes: estimates tend to be less precise when they are based on little information and the accuracy of the estimates is likely to increase with an increased number of studies (Raudenbush 1994).

Given that the effect sizes from all four studies were in the same direction, we can be fairly confident in the direction of the observed relationship (i.e., that regular smokers are more likely to use retail sources than social sources compared to occasional smokers), although the strength of the relationship is less certain.

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