Children's smoking and exposure to others' smoke

9

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Summary

- This chapter describes smoking among children aged 8-15. It also presents information on where children of that age were exposed to other people's tobacco smoke, and the duration of exposure for children aged 0-15. This is accompanied by salivary cotinine data, an objective measure of secondhand smoke exposure. For the first time in HSE, data are also provided on the use by children aged 13-15 of non-tobacco nicotine delivery products, including e-cigarettes. Data from HSE 2011, 2012 and 2013 have been aggregated where possible to provide robust sample sizes.
- Among children aged 8-15, 8% of boys and 7% of girls reported that they had ever smoked a cigarette.
- A small proportion (1%) of children aged 8-15 reported that they were regular smokers (at least one cigarette per week). This was higher among older children: 4% of boys aged 15 and 6% of girls aged 15 reported that they smoked regularly.
- The proportion of children aged 8-15 who had ever smoked varied markedly between regions. Among boys, the proportion who had ever smoked was lowest in the North West (4%) and highest in the North East (16%). Among girls, this proportion varied between 3% in the East Midlands and London and 12% in the West Midlands and the East of England.
- Among children aged 13-15 who reported that they had ever smoked, 20% of boys and 23% of girls reported having smoked in the last week.
- The proportion of children aged 0-12 who were looked after by a smoker for more than two hours per week was similar across age groups in boys (7% aged 0-4, 8% aged 5-12); however, there was an increase with age among girls, from 6% aged 0-4 to 11% aged 5-12.
- For both sexes, the average reported number of hours per week of exposure to other people's smoke increased with age.
- Among children aged 0-15, the mean reported number of hours per week exposed to others' smoke decreased from 2.6 hours for boys and 2.7 hours for girls in 2007-2008 to 1.0 hour for boys and 1.2 hours for girls in 2011-2013.
- Among both boys and girls aged 4-15 who were cotinine-validated non-smokers (saliva cotinine less than 12ng/ml), cotinine levels were higher for those aged 4-12 than those aged 13-15. The older children were more likely to have undetectable cotinine (levels below 0.1ng/ml).
- Children from lower income households were more likely to be exposed to secondhand smoke.
- Among non-smoking children, the geometric mean cotinine level was much higher among those living in households where one or more people smoked in the home on most days compared with those living in non-smoking households.

- Geometric mean cotinine levels were higher among non-smoking children with one or more parents who currently smoked cigarettes than those in households with neither parent smoking.
- Multinomial logistic regression was used to examine factors associated with levels of secondhand smoke exposure (objectively measured) in cotinine-validated non-smokers aged 4-15. Key influences on the saliva cotinine levels among non-smoking children were age, living in the most deprived IMD (Index of Multiple Deprivation) quintile, parental smoking, whether people smoked inside the home on most days, and whether or not the child had smoked in the past.
- Only a very small proportion of children aged 13-15 reported current or previous use of any non-tobacco nicotine delivery product, including e-cigarettes.

9.1 Introduction

Each year in the UK, 207,000 children aged 11-15 start smoking.[1] Extensive research in the UK and worldwide demonstrates the negative effects of smoking on health (see Chapter 8). Smoking contributes to a number of health conditions, including many cancers and respiratory, digestive and circulatory diseases.[2] Individuals who start smoking at a young age have higher age-specific rates for all types of tobacco-related cancers, linked primarily to their earlier exposure to the harmful toxins from cigarettes. Young smokers also experience more short- and long-term respiratory symptoms than their non-smoking peers, such as coughing, wheezing and phlegm. Smoking can lead to impaired lung growth in children and young adults. Girls who start smoking at a young age are 79% more likely to develop bronchitis or emphysema in adulthood than those who began smoking as adults.[3] Further, smoking both aggravates asthma symptoms in those already diagnosed and increases the risk of asthma in young people with no history of the condition.[4]

Those aged 11-16 who smoke can experience high rates of dependence on cigarettes, showing signs of addiction within four weeks of starting to smoke. It has been suggested that smoking a single cigarette is a risk indicator of becoming a regular smoker up to three years later.[5]

Secondhand tobacco smoke, also known as passive smoking, environmental tobacco smoke, or tobacco smoke pollution, has negative impacts on health. Exposure to tobacco smoke affects children's lung function,[6,7] subsequent lung function as adults,[8,9] and the risk of chronic disease as adults.[10,11] Children are particularly at risk from the effects of this exposure.[12] They have more rapid respiratory rates, so they take proportionately more secondhand smoke into their lungs than adults. Their developing organs are also at greater risk from exposure to toxins. Exposure to secondhand smoke causes illnesses including cot death, asthma, and middle-ear disease. Exposure to secondhand smoke can also cause childhood cancers, cancer in adulthood, meningitis, and the initiation of cardiovascular disease.[3]

A much debated topic recently has been the use of electronic cigarettes (e-cigarettes), driven by their growing popularity. E-cigarettes deliver nicotine that is vapourised and inhaled from a liquid form via a battery-powered device that simulates cigarette smoking (see Chapter 8).[13] Over the past few years the availability and usage of e-cigarettes has been rising.[14] Evidence from the US suggests a doubling in use of e-cigarettes among high-school students between 2011 and 2012.[15]

E-cigarettes are controversial (see Chapter 8). They are promoted by some as a useful tool for smokers looking to stop conventional tobacco use because they provide vaporised nicotine to the user without the other chemicals that come from real cigarette smoke.[16] However, the existence and extent of any harmful effects of inhaling nicotine from e-cigarettes and their product safety are not yet known.[17] There is currently little restriction on advertising, with some using the glamorous images of cigarette advertising of the mid-20th century. Additionally, their use being allowed in most enclosed public spaces has raised concerns that e-cigarettes could renormalize smoking. The uptake of e-cigarettes by non-smokers before moving on to traditional cigarettes is an emerging public health concern. Currently e-cigarettes come in a variety of flavours including bubble gum and cherry, which may increase their appeal to children.[18] Some argue there has been a worrying mirroring of big tobacco tactics in the marketing of e-cigarettes towards young people.[19]

Tobacco consumption continues to be a key public health priority.[20] The 1998 White Paper on tobacco *Smoking Kills*[21] set a target to reduce smoking prevalence (proportion of regular smokers, defined as usually smoking at least one cigarette per week) among those aged 11-15 to 9% by 2010. In October 2007, it became illegal to sell tobacco products to anyone under the age of 18 (rather than 16) in England and Wales. The Health Act 2009[22] prohibited the sale of tobacco products from vending machines from 2011, and prohibited the display of tobacco products in supermarkets and large stores from April 2012; the ban will also include small shops from April 2015. This extends the overall ban on promoting tobacco products in public in ways that are believed to be particularly attractive to non-smokers and

young potential smokers.[23] The proportion of children aged 8-15 who have ever smoked fell from around 18%-21% between 1997 to 2003, to 10% of boys and 7% of girls in 2012.[24]

The White Paper *Healthy Lives, Healthy People: A tobacco control plan for England,* published in 2011, set out the coalition government's strategy for reducing tobacco use in the next five years, with the stated aim 'to reshape social norms to make smoking less desirable, less acceptable, and less accessible'.[25] The plan acknowledged that tobacco use amongst adults must be addressed in order to reduce the number of young people who take up smoking. One of the three national ambitions was to reduce the proportion of 15 year olds who are regular smokers (defined as smoking at least one cigarette per week) to 12% or lower by the end of 2015[25] from 15% in the Smoking, Drinking and Drug Use among young people (SDD) survey in 2009.[26] In HSE 2008, the proportion of those aged 15 who were regular smokers was 8% of boys and 9% of girls.[23]

The Health Act 2006 introduced changes in the law aimed at reducing exposure to secondhand smoke and reducing the prevalence of smoking among young people.[27] This smokefree legislation, implemented in July 2007, prohibited smoking in enclosed public spaces, including the workplace. This was unlikely to have a major, direct effect on the age group covered in this chapter, although there may have been indirect effects, for example through the influence of changes in smoking habits by other household members, particularly where they smoked. HSE 2008 data showed that fewer children aged 0-12 were looked after for at least two hours per week by someone who smoked following implementation of the smokefree legislation.[23] Subsequent analyses showed a rise in the proportion of children with no detectable cotinine, and an increase in the proportion of children living in smoke-free homes despite one or both parents smoking.[28]

This chapter examines the prevalence of smoking among children aged 8-15, and the exposure to other people's smoke of children aged 0-15. The chapter looks in particular at objective measures of children's passive smoking exposure, measured by analysis of saliva cotinine samples among those aged 4-15. This chapter builds upon previous analyses assessing levels of smoking, variations among social groups and change in the reported number of hours exposed to others' smoke since implementation of the smokefree legislation.[23] In addition, this chapter also examines for the first time in HSE the prevalence of self-reported current use of non-tobacco nicotine delivery products (NDP), including e-cigarettes, among children aged 13-15. Data from HSE 2011, 2012 and 2013 have been aggregated where possible to provide robust sample sizes.

9.2 Methods and definitions

9.2.1 Questions about cigarette smoking

This section summarises key features of data collection related to smoking. More details are provided as endnotes; the full details can be found in Volume 2 of this report, *Methods and Documentation*.[29]

Questions on children's smoking have been included in the HSE every year since 1995.[30] Parents were present when children were interviewed. Questions about cigarette smoking were therefore collected by self-completion questionnaire to ensure greater privacy and encourage honest answers. Parents can see the blank questionnaire before it is given to the child but not the completed booklet.[31]

For the first time, children aged 13-15 in HSE 2013 were also asked about current or previous use of non-tobacco nicotine delivery products including e-cigarettes and nicotine chewing gum, lozenges, mini lozenges, patches, inhalers, mouth and nasal spray.

9.2.2 Exposure to other people's smoke

Parents/guardians were asked whether those aged 0-12 were looked after for at least two hours a week by someone who smoked while looking after them. In addition, a responsible adult was asked a question to establish how many people smoked inside the home on most

days. Those aged 13-15 were asked (in the self-completion booklet) how many hours a week they were exposed to other people's smoke. The self-completion booklets for those aged 8-15 also contained questions about whether children were often near people who were smoking in different locations, and if so, whether this bothered them.

9.2.3 Cotinine measurements

Saliva samples were taken from children aged 4-15 during the nurse visit and were analysed for cotinine. This is a metabolite of nicotine which provides an indicator of recent exposure to tobacco or its smoke. Cotinine is generally considered the most useful of the various biological markers that are indicators of smoking.[32] The measurement of cotinine in the HSE provides an objective check on self-reported smoking behaviour. When analysed in a specialist laboratory, as is done for HSE, low levels are also a sensitive marker of exposure to other people's smoke.

Cotinine has a half-life in the body of between 16-20 hours, so it will detect regular smoking but may not detect occasional smoking if the last occasion was several days ago. Sources of cotinine other than tobacco can for practical purposes be ignored.[33]

Cotinine levels for this survey were measured using a very sensitive method.[34] The limit of detection is 0.1ng/ml. Levels below this indicate no or minimal exposure to tobacco smoke. In this report, cotinine levels of 12ng/ml or above have been used to indicate personal smoking, while levels between 0.1ng/ml to below 12ng/ml are used to indicate exposure to secondhand smoke among non-smokers. The upper limit has been revised from the threshold of 15ng/ml used in previous HSE reports, following research using HSE 1996-2004 data, which showed a lower optimal cotinine cut-point to distinguish between personal and passive smoking when smoking prevalence is lower.[35]

9.2.4 Analysing the data

In the current HSE design, a sample of around 2,000 children are interviewed each year, and around 1,500 go on to have a nurse visit. Around 800 children aged 8-15 fill in self completion questions about smoking, and around 700 children aged 4-15 provide saliva samples. For most analyses in this chapter, data from HSE 2011, 2012 and 2013 have been aggregated to increase sample sizes. Different tables are based on different age groups because they were asked different questions.

Weights were applied to all data to correct for non-response: different weights were applied to interview and to cotinine data (see Section 7, Volume 2, *Methods and documentation* or the Quick Guide to HSE 2013[29]).

Table 9.13 shows the factors associated with objectively measured secondhand smoke (SHS) exposure in these cotinine-validated, self-reported non-smokers aged 4-15 using multinomial logistic regression.[36,37] In this analysis, the outcome variable representing SHS exposure levels had three categories: undetectable cotinine (levels below 0.1ng/ml); some SHS exposure (cotinine levels of 0.1 to less than 1.0ng/ml); and high SHS exposure (cotinine levels of 1.0ng/ml to less than 12.0ng/ml). Undetectable cotinine was chosen as the reference category. Multinomial logistic regression coefficients can be suitably transformed to allow interpretation as relative risk ratios (RRRs). RRRs express the ratio of the probability of one outcome category over the probability of the baseline outcome category.

9.2.5 Definitions

Geometric means

Tables 9.9 to 9.12 show geometric mean cotinine values for self-reported and cotinine validated non-smokers aged 4-15. Children aged 8-15 were included in these analyses if they reported that they smoked cigarettes less than weekly, if at all, and had a cotinine value of less than 12ng/ml; all children aged 4-7 were assumed to be non-smokers. Geometric means have been calculated as they take less account of extreme values that might distort the average or mean.[38]

Cotinine-validated non-smokers

Children below the age of 8 were not asked about smoking, and all aged 4-7 are assumed not to smoke currently. Those aged 8-15 are included as cotinine-validated non-smokers if they said that they did not currently smoke (i.e. did not smoke at least one cigarette a week; those who smoked sometimes but not every week are included as non-smokers), and this is confirmed by a cotinine level of less than 12ng/ml.

9.3 Smoking prevalence

9.3.1 Smoking status by age and sex

8% of boys and 7% of girls aged 8-15 had ever smoked a cigarette. The proportion who reported that they had tried a cigarette increased with age, as shown in Figure 9A. Figure 9B shows the proportion of children aged 13-15 who reported that they smoked regularly (at least one cigarette per week); the survey did not identify any regular smokers below this age.

Table 9.1, Figures 9A and 9B

Figure 9A

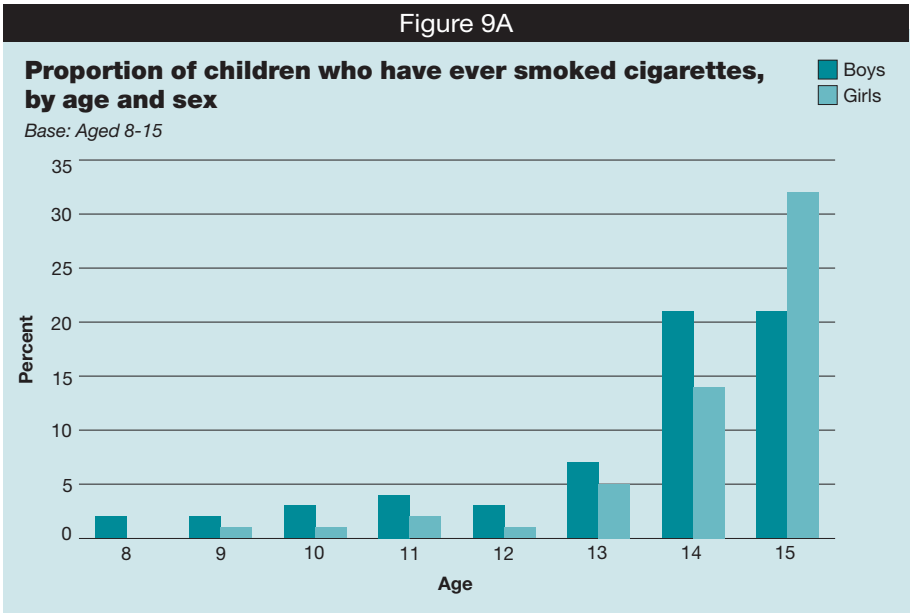
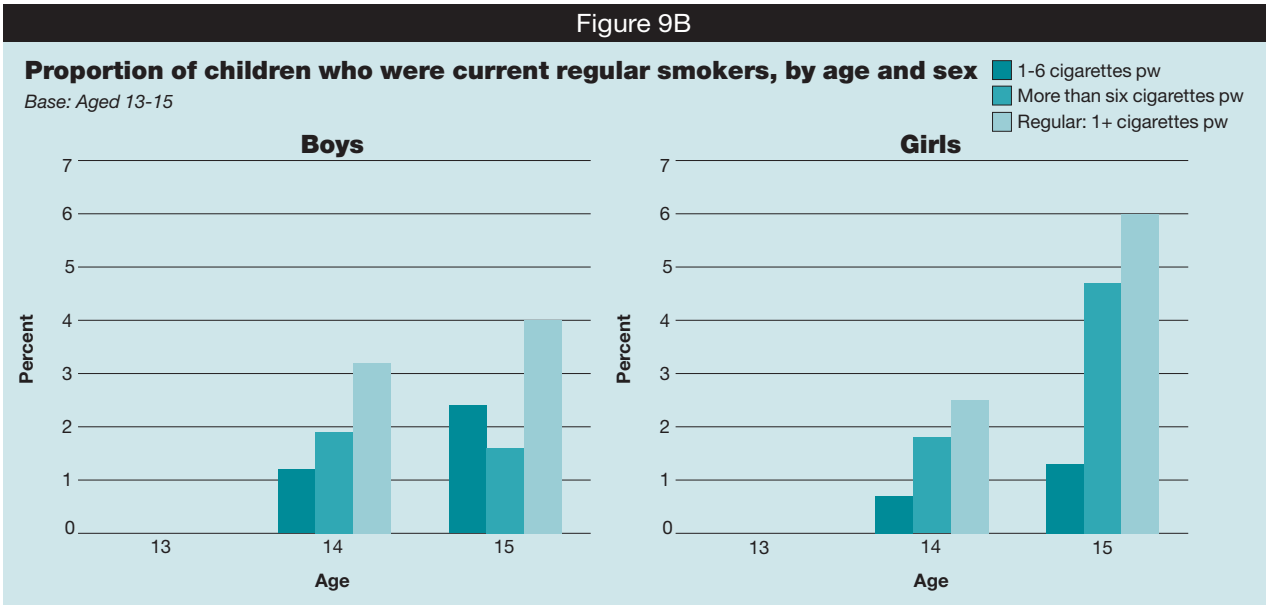


Figure 9B



9.3.2 Smoking status by region

The proportions of children aged 8-15 who reported that they had ever smoked varied markedly between regions, as shown in Figure 9C. Among boys, the proportion who had ever smoked was lowest in the North West and highest in the North East. Among girls, this proportion was lowest in the East Midlands and London and highest in the West Midlands and East of England. The pattern by region for regular smoking (at least one cigarette per week) was also different for boys and girls (see Figure 9D). **Table 9.2, Figures 9C and 9D**

Figure 9C

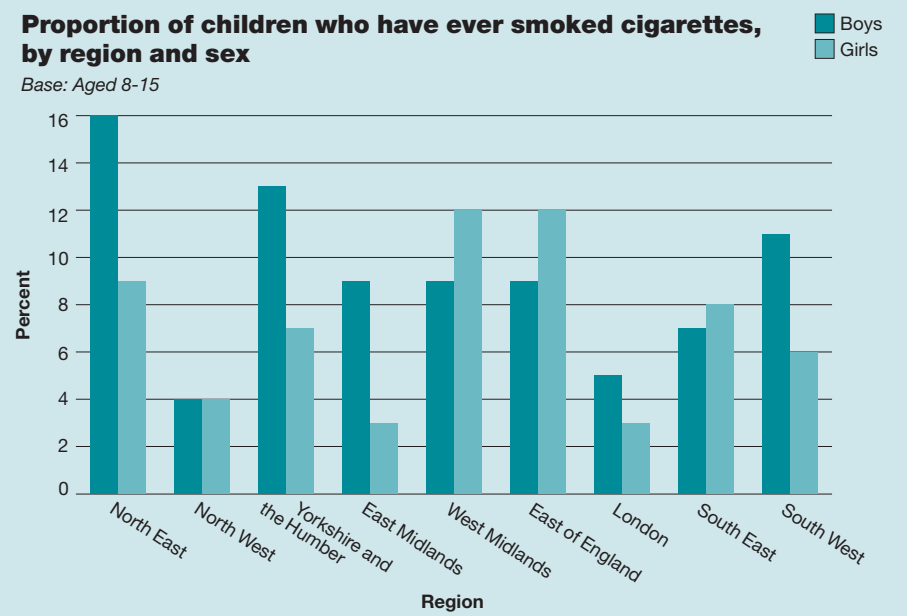
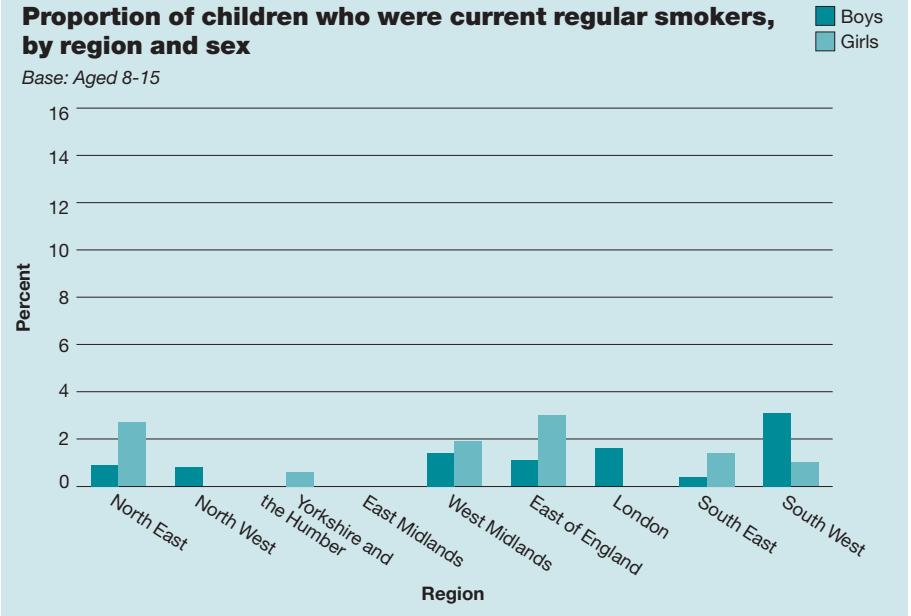


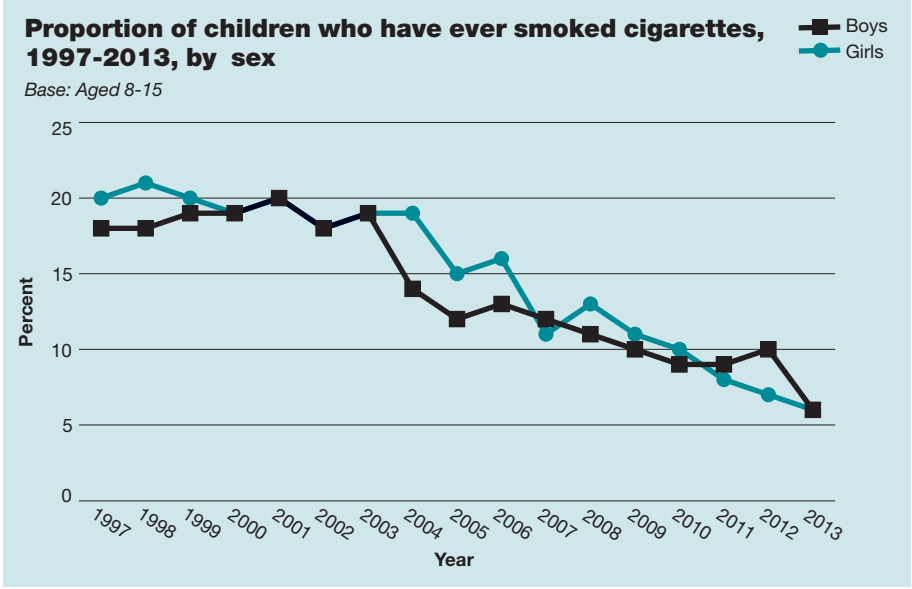
Figure 9D



9.3.3 Trends over time

Trend data on smoking and other key variables are available in *'Health Survey for England – 2013 Trend Tables'* on the Health and Social Care Information Centre's website.[39] The proportion of children aged 8-15 who reported that they had ever smoked a cigarette decreased substantially between 1997 and 2013. **Figure 9E**

Figure 9E

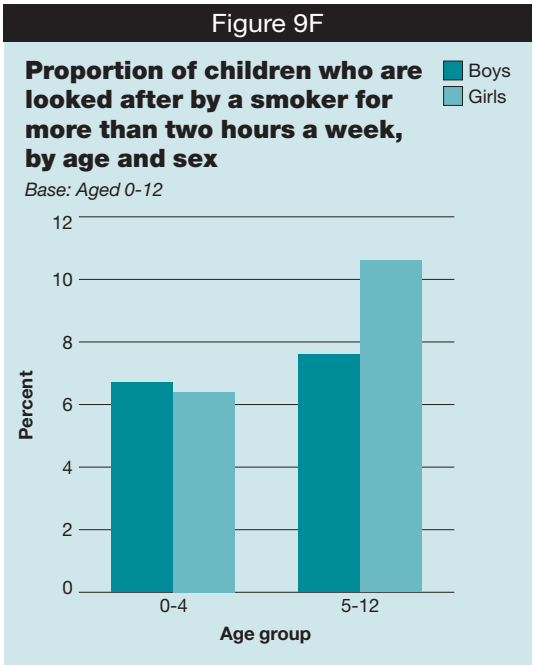


9.4 Reported secondhand smoke exposure

9.4.1 Exposure to smoke from carers

Based on parental report, 7% of boys and 9% of girls aged 0-12 were looked after by a smoker for more than two hours a week. This proportion increased with age more sharply in girls than boys, as shown in Figure 9F. **Table 9.4, Figure 9F**

Figure 9F



9.4.2 Exposure to other people's smoke

Figure 9G shows the average number of hours per week of reported exposure to other people's smoke, and Figure 9H shows the proportion exposed for at least an hour per week. In each case, there was an increase with age.

To assess changes over time in reported exposure to other people's smoke, HSE data from 2007 and 2008 is compared with combined data from 2011, 2012 and 2013. For both sexes, the mean reported number of weekly hours exposed to other people's smoke

decreased from 2007-08 to 2011-13. This pattern was confirmed by the decrease in the proportion of children exposed to other people's smoke for one or more hours per week; this decrease was especially pronounced for children aged 13-15. **Table 9.6, Figures 9G, 9H**

Figure 9G

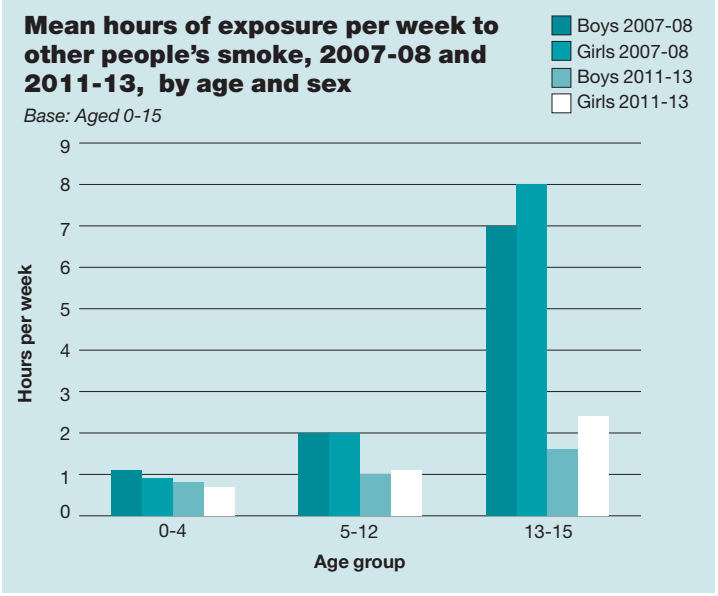
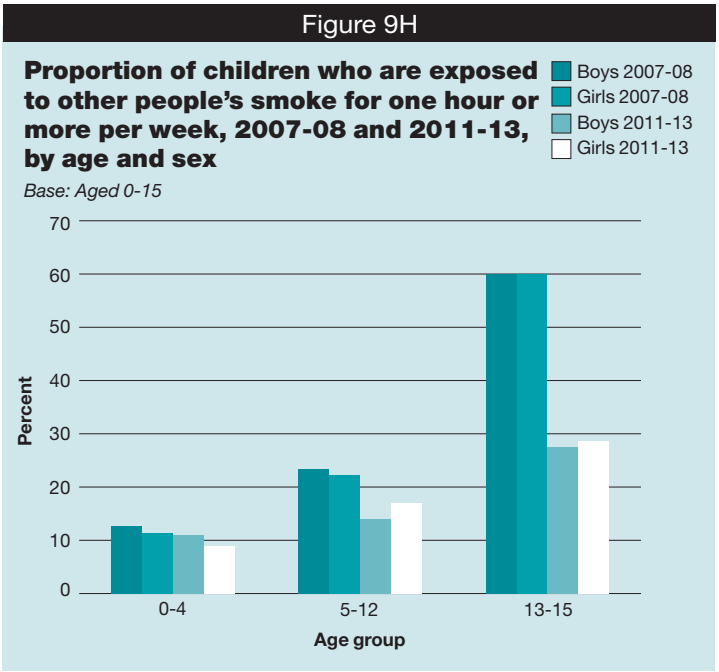


Figure 9H

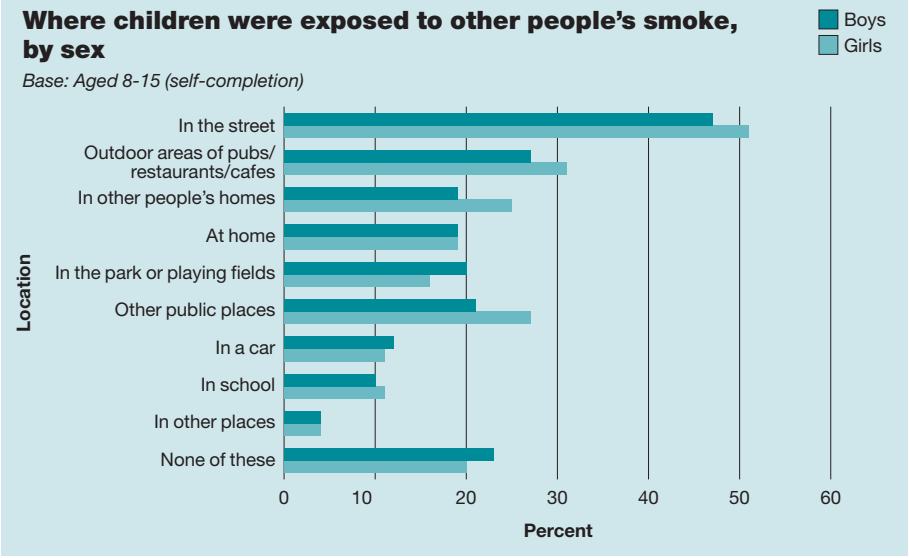


9.4.3 Locations of exposure to other people's smoke

Children aged 8-15 were asked about locations where they were often near to people who were smoking. The most frequently mentioned specific locations were in the street, outdoor areas of pubs/restaurants/cafes, and 'other public places'. Girls were more likely than boys to report exposure to other people's smoke in the outdoor areas of pubs/restaurants/cafes, 'other public places' and in other people's homes. Boys were more likely than girls to report exposure to other people's smoke in the park or playing fields.

Children who reported that they were often near to people smoking were asked whether they felt bothered by this. Girls were more than likely than boys to report being bothered by exposure to other people's smoke. **Table 9.7, Figure 9I**

Figure 9I



9.5 Objectively measured secondhand smoke exposure

9.5.1 Cotinine analysis

Saliva samples were taken from children aged 4-15 during the nurse visit from which cotinine measurements were derived. Of 2,217 boys and 2,230 girls interviewed, 1,124 boys and 1,175 girls provided a valid cotinine measurement. Table 9.8 compares the characteristics of children with a valid cotinine measurement with the total core sample who were eligible for inclusion. Among both boys and girls, the youngest participants (those aged 4-6) were slightly less likely to give a sample (some small children find it difficult to produce sufficient quantities of saliva for analysis). Weighting has been applied to the cotinine sample to adjust for this (and any other) imbalance in response. **Table 9.8**

9.5.2 Cotinine levels among non-smokers, by age and sex

Among both boys and girls aged 4-15 who were cotinine-validated non-smokers, 59% of boys and 63% of girls had undetectable levels of cotinine (less than 0.1ng/ml). The proportions of non-smokers with detectable cotinine (levels between 0.1 and less than 12ng/ml, indicative of passive smoking or occasional own smoking) were higher for those aged 4-12 than those aged 13-15 (see Figure 9J). A similar pattern was confirmed by the geometric mean cotinine levels. **Table 9.9, Figure 9J**

9.5.3 Cotinine levels among non-smokers, by equivalised household income

Cotinine levels among non-smoking children aged 4-15 varied significantly by quintile of equivalised household income, as shown in Figure 9K. Geometric mean cotinine levels decreased as income quintile increased, indicating that children from lower income households were more likely to be exposed to secondhand smoke.

The pattern of geometric means across equivalised income quintiles was confirmed by the proportions of non-smokers with undetectable cotinine (levels below 0.1ng/ml).

Table 9.10, Figure 9K

9.5.4 Cotinine levels among non-smokers, by number of people smoking regularly in the home

As might be expected, non-smoking children living in households where one or more people smoked in the home on most days had a much higher geometric mean cotinine level than children living in non-smoking households. A similar pattern was confirmed by the proportions of non-smokers with undetectable cotinine (levels below 0.1ng/ml), as shown in Figure 9L. **Table 9.11, Figure 9L**

Figure 9J

Proportion of non-smoking children with a detectable cotinine level, by age and sex

Base: Cotinine-validated non-smokers aged 4-15

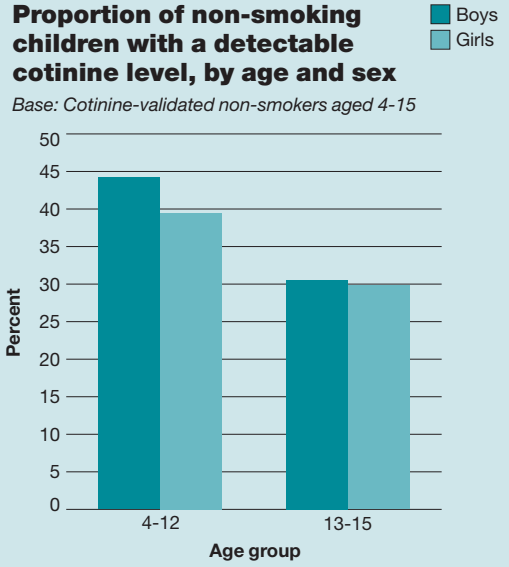


Figure 9K

Cotinine levels in non-smoking children, by equivalised household income

Base: Cotinine validated non-smokers aged 4-15

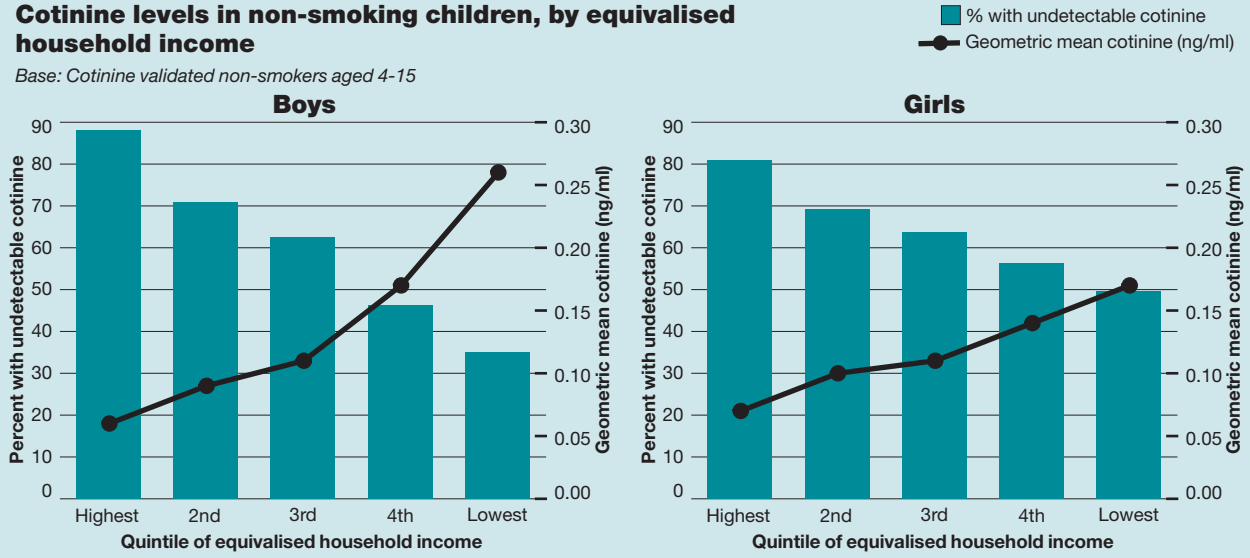
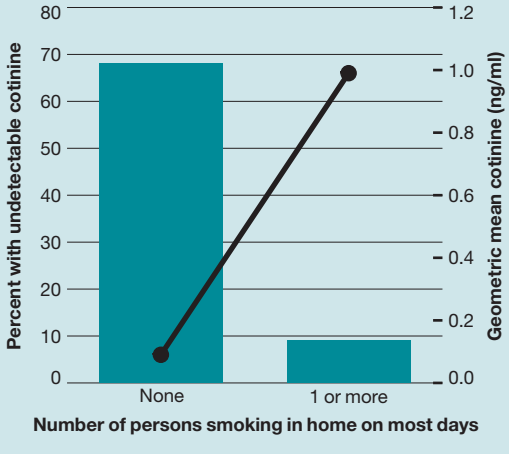


Figure 9L

Cotinine levels by number of people smoking regularly in the home

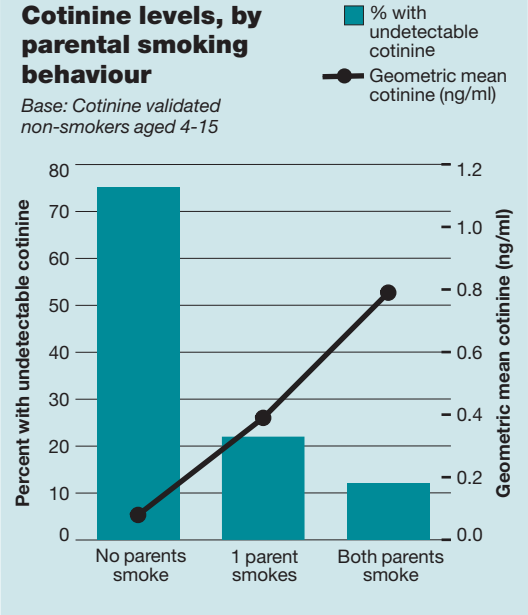
Base: Cotinine validated non-smokers aged 4-15



9.5.5 Cotinine levels among non-smokers, by parental smoking

Similarly, non-smoking children with one or more parents who currently smoked cigarettes had a higher geometric mean cotinine level than children with no parents reporting being current smokers. A similar pattern was confirmed by the proportions of non-smokers with undetectable cotinine (levels below 0.1ng/ml). **Table 9.12, Figure 9M**

Figure 9M



9.5.6 Factors associated with objectively measured secondhand smoke exposure

This section presents the results of a multinomial logistic regression[36] among children aged 4-15 with a valid cotinine assay, and who did not currently smoke. The regression model examines the association between objectively measured secondhand smoke exposure (the outcome variable), and a number of potential risk factors (independent variables). The analysis indicates the contribution of each risk factor once the other variables have been taken into account. A forward stepwise selection procedure was carried out to identify variables that contributed significantly to the regression model. In this analysis, the outcome variable representing secondhand smoke (SHS) exposure levels had three categories:

- undetectable cotinine (levels below 0.1ng/ml)
- some SHS exposure (cotinine levels of 0.1-less than 1.0ng/ml)
- high SHS exposure (cotinine levels of 1.0ng/ml to less than 12.0ng/ml).

Results are presented as relative risk ratios (RRR) and are shown in Table 9.13.[37] For each categorical variable, the relative risk of some SHS exposure or high SHS exposure is presented relative to a reference category, which is given a value of 1. A relative risk ratio greater than 1 indicates higher risk of being exposed to SHS, while a risk ratio less than 1 indicates lower odds of being exposed to SHS. 95% confidence intervals are shown for each risk ratio. If the confidence interval does not include 1, the relative risk ratio for that category is significantly different from the reference group.

The levels of secondhand smoke exposure among non-smoking children were categorised by saliva cotinine levels. The following factors were key influences on exposure to SHS, and were more strongly associated with high exposure to SHS:

- living in the most deprived quintile of IMD (Index of Multiple Deprivation)
- whether anyone smoked in the home on most days
- reported hours of exposure to other people's smoke
- parental smoking behaviour
- whether or not the child had smoked in the past.

Levels of secondhand smoke exposure decreased with age, confirming the pattern described earlier. **Table 9.13**

9.6 Use of non-tobacco nicotine delivery products including e-cigarettes

There are only data from 2013 on use of nicotine delivery products among children aged 13-15, and the sample size is very small, so it is not possible to give definitive results. However, only very small numbers of children aged 13-15 reported current or past use of non-tobacco nicotine delivery products. Of those who reported ever use of non-tobacco nicotine delivery products, nicotine chewing gum and e-cigarettes were the most common products used.

Some of the children who had ever used e-cigarettes reported that they had never smoked a cigarette.

9.7 Discussion

9.7.1 Smoking initiation and prevalence

HSE data shows declines in the level of smoking initiation and prevalence. Trend data on smoking, available in *'Health Survey for England – 2013 Trend Tables'* on the Health and Social Care Information Centre's website,[39] show that the proportions of children aged 8-15 who reported that they had ever smoked declined substantially between 1997 and 2013 (from 19% to 6%).

The proportion of children engaged in regular smoking (at least one cigarette per week) remains at low levels. 2% of children aged 8-15 were regular smokers in 2008, compared with 1% in 2011-2013. Among children aged 13-15 who reported that they had ever smoked, HSE data also shows a decrease in the proportion of children who smoked in the last week. Among children aged 13-15 in 2011-2013 who reported that they had ever smoked, 20% of boys and 23% of girls reported having smoked in the last week. The equivalent figures for boys and girls in 2008 were 23% and 25% respectively.

Recent declines in the level of smoking initiation and prevalence among children may indicate changing social norms around smoking behaviour, as well as the success of measures such as the ban on the sale of cigarettes from vending machines (from October 2011) and a ban on the display of tobacco products in retail outlets (from April 2012 in large shops).[40] Declines in cigarette smoking prevalence among adults (see Chapter 8) would also have had a positive impact on the levels of children's smoking, including increases in the percentage of parents who were non-smokers and a marked increase in the adoption of smoke-free homes by parents who themselves still smoked.[28]

9.7.2 Comparisons with other data

Even with the precautions taken for smoking data collection from children in HSE, there is still a risk that children will under-report smoking because they are worried that parents might see their answers. Comparison with the survey of Smoking, Drinking and Drug Use among Young People (SDD),[41] conducted annually in secondary schools among children aged 11-15, indicates that both smoking and alcohol use are under-reported in home-based interview surveys compared with surveys carried out under 'examination conditions' in schools (Table 9A). For example, in SDD 2013, 3% of boys aged 11-15 and 4% of girls aged 11-15 were regular smokers compared with 1% of boys and girls of the same age in HSE 2011-2013.

However, when including those with saliva cotinine levels of 12ng/ml or more, indicating personal tobacco or nicotine use, the prevalence of assumed current smoking was similar in both surveys. The pattern for self-reported smoking was confirmed by higher levels of smoking in the last week amongst children who had ever smoked in SDD 2013 (Table 9B).

Tables 9A, 9B

Table 9A

Prevalence of regular cigarette smoking among children aged 11-15, comparison of HSE (2011-2013) and SDD (2013), by age and sex

Children aged 11-15

	11	12	13	14	15	Total
	%	%	%	%	%	%
HSE 2011-2013 self-reported						
Boys	-	-	-	3	4	1
Girls	-	-	-	3	6	1
HSE 2011-2013 self-reported regular smoking or cotinine level 12ng/ml or more[a]						
Boys	1	-	1	10	9	4
Girls	1	1	-	4	14	4
SDD 2013						
Boys	1	0	1	2	8	3
Girls	0	0	1	7	8	4

[a]This analysis includes the one self-reported 'never smoker' who reported current use of e-cigarettes.

Table 9B

Prevalence of cigarette smoking in the last week by children aged 13-15, comparison of HSE (2011-2013) and SDD 2013, by sex

Children aged 13-15 who have ever smoked

	Total
	%
HSE 2011-2013	
Boys	20
Girls	23
SDD 2013	
Boys	28
Girls	27

Both SDD 2013 and HSE 2011-2013 show that levels of regular smoking among children aged 15 (8% and 5%, respectively) were already well below the Government target[25] of 12% by 2015.[41]

9.7.3 Levels and locations of self-reported exposure to other people's smoke

The average number of self-reported weekly hours of exposure to others' smoke decreased significantly from 2007-08 to 2011-13. In HSE 2011-13, almost four-fifths of girls and boys aged 8-15 reported no weekly hours of exposure to other people's smoke. However, almost half of children aged 8-15 reported exposure to other people's smoke in the street. This presumably reflects the reality of children walking past smokers in the street but infrequently and/or briefly enough that it does not contribute to significant duration of exposure.

9.7.4 Objectively measured exposure to other people's smoke

Children's exposure to other people's smoke takes place largely in the home, and is overwhelmingly determined by parental smoking.[42] Analyses in this chapter show that levels of objectively measured secondhand smoke exposure are substantially higher among children living in low income households, in homes where one or more people smoke most days, and in households where one or more parents currently smokes.

Declines in the levels of children's exposure to tobacco smoke in England have been well documented.[28,42,43,44] Figure 9N shows that the rise in the proportion of non-smoking children with undetectable saliva cotinine levels has continued since it was last reported in 2008.[28] As shown in Figure 9O, this is far greater among those with no parents who smoke than among children with one or two parents who are current smokers. However, an increasing proportion of children now live in homes where no-one smokes most days within the home (Figure 9P), even where parents are current smokers. **Figures 9N, 9O and 9P**

9.7.5 Use of non-tobacco nicotine delivery products

Many secondary schools across the UK have already banned e-cigarettes, based on fears they are encouraging pupils to take up smoking. Cancer Research UK recently declared the regulation of e-cigarettes a "child protection issue".[18] In response to concerns about the use of e-cigarettes, an amendment to the 2014 Children and Families Bill will ban persons under the age of 18 from buying e-cigarettes. The same legislation will also ban people from knowingly buying tobacco on behalf of someone under the age of 18.

Figure 9N

Proportion of non-smoking children with undetectable cotinine, 1998 to 2011-13,

Base: Cotinine-validated non-smokers aged 4-15

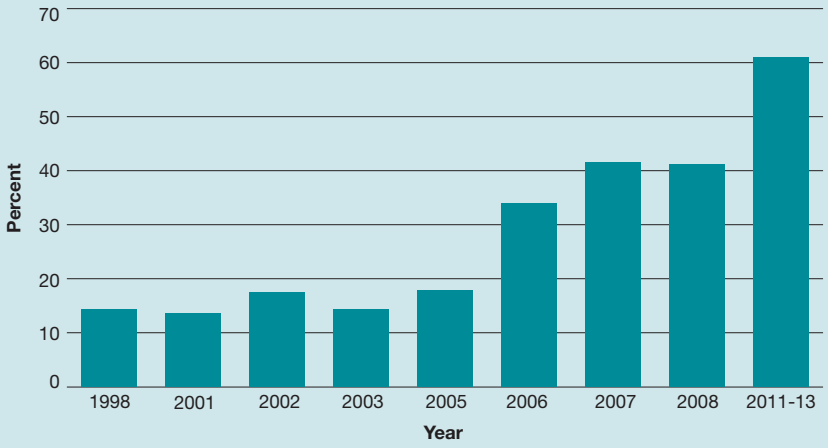


Figure 9O

Proportion of non-smoking children with undetectable cotinine, 1998 to 2011-13, by parental smoking

Base: Cotinine-validated non-smokers aged 4-15

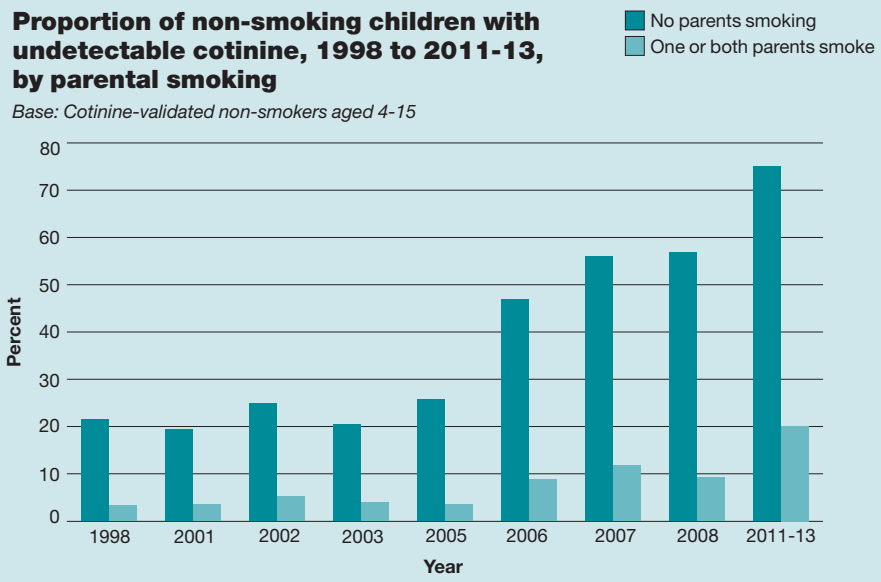
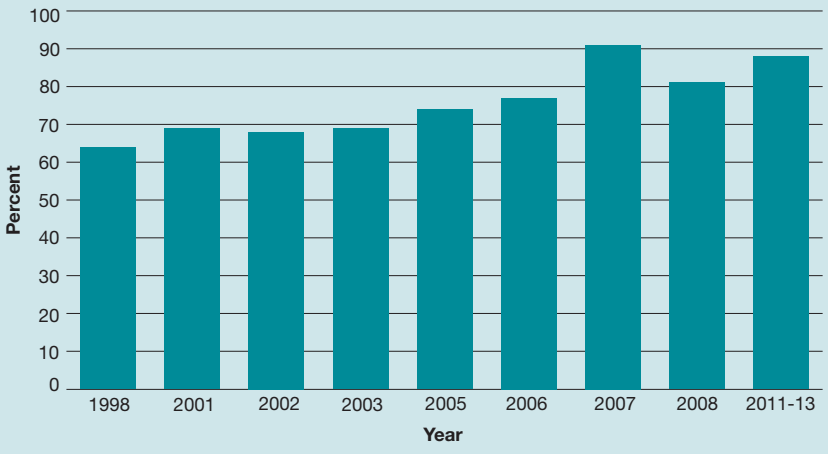


Figure 9P

Proportion of non-smoking children living in a home where no-one smokes most days

Base: Cotinine-validated non-smokers aged 4-15



Data from HSE 2013 show that a very small minority of children aged 13-15 reported current or previous use of non-tobacco nicotine delivery products. Of those who had ever tried non-tobacco nicotine delivery products, nicotine chewing gum and e-cigarettes were the most common products used; and some of those who reported using e-cigarettes stated that they had never smoked cigarettes. More years of data collection are necessary to monitor the use of non-tobacco nicotine delivery products.

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30 Children aged 8-15 were asked whether they had ever tried a cigarette, and if so how often they smoked cigarettes (if at all) and how many cigarettes they had smoked in the last week (if any).

31 After answering the self-completion questionnaire, the child hands the booklet directly to the interviewer.

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36 A multinomial logistic regression is a classification method that generalises logistic regression for situations where there are more than two possible discrete outcomes. It is a model that is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variable, given a set of independent variables. In this analysis, the outcome variable representing secondhand smoke (SHS) exposure levels had three categories: undetectable cotinine (levels below 0.1ng/ml); some SHS exposure (cotinine levels of 0.1 to less than 1.0ng/ml); and high SHS exposure (cotinine levels of 1.0ng/ml to less than 12.0ng/ml).
http://en.wikipedia.org/wiki/Multinomial_logit

37 Logistic regression provides an odds ratio, while the results of multinomial logistic regression are estimated as relative risk ratios (RRRs). For example, suppose that for boys aged 4-15 the predicted probabilities for undetectable cotinine, some SHS exposure, and high SHS exposure were 0.60, 0.25 and 0.15 (these probabilities sum to 1); equivalent figures for girls of the same age were 0.60, 0.30 and 0.10. Among boys, the relative risk (RR) for being in some SHS exposure versus no exposure equalled 0.42 (i.e. 0.25/0.60); and the RR for being in high SHS exposure versus no exposure 0.25. Among girls, the relative risk (RR) for being in some SHS exposure versus no exposure equalled 0.50 (i.e. 0.30/0.60); and the RR for being in high SHS exposure versus no exposure equalled 0.17. Using girls as the reference category in order to enable comparison between the sexes, the RRR comparing boys versus girls equalled 0.83 for being in some SHS exposure versus no exposure (i.e. 0.42/0.50). Similarly, the RRR comparing boys versus girls equalled 1.50 for being in high SHS exposure versus no exposure (0.25/0.17).

38 Geometric means have been presented for non-smokers as their cotinine data have a very skewed distribution: there are large numbers of extremely low values and a small number of very high values. Using the arithmetic mean is not appropriate as this can be distorted with such a distribution. The geometric mean is an average calculated by multiplying the cotinine values and taking the nth root, where n is the number of values. The geometric mean takes the outliers with very high values into account by estimating the typical value (or central tendency) of the set of data. Confidence intervals around the estimate are presented rather than standard errors.

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Tables

Notes on the tables

1. The group on which the figures in the table are based is stated at the upper left corner of the table.
2. The data in most tables have been weighted. See Volume 2, Chapter 7 of this report for more detail. Both unweighted and weighted sample sizes are shown at the foot of each table.
3. The following conventions have been used in tables:
   - \- no observations (zero value)
   - 0 non-zero values of less than 0.5% and thus rounded to zero
   - [ ] used to warn of small sample bases, if the unweighted base is less than 50. If a group's unweighted base is less than 30, data are normally not shown for that group.
4. Because of rounding, row or column percentages may not add exactly to 100%.
5. 'Missing values' occur for several reasons, including refusal or inability to answer a particular question; refusal to co-operate in an entire section of the survey (such as the nurse visit or a self-completion questionnaire); and cases where the question is not applicable to the participant. In general, missing values have been omitted from all tables and analyses.

Table 9.1

Self-reported cigarette smoking status of children aged 8-15, by age and sex

Children aged 8-15 *2011-2013*

Self-reported smoking status	Age								Total
	8	9	10	11	12	13	14	15	
	%	%	%	%	%	%	%	%	%
Boys									
Never smoked	98	98	97	96	97	93	79	79	92
Only smoked once or twice	1	1	3	4	2	7	10	14	5
Used to smoke, but don't now	1	1	-	0	0	-	6	3	2
Smoke sometimes, not every week	-	-	-	-	-	0	2	1	0
Smoke 1-6 cigarettes per week	-	-	-	-	-	-	1	2	1
Smoke more than 6 cigarettes per week	-	-	-	-	-	-	2	2	1
Have ever smoked	*2*	*2*	*3*	*4*	*3*	*7*	*21*	*21*	*8*
All regular smokers (one or more cigarettes a week)	-	-	-	-	-	-	*3*	*4*	*1*
Girls									
Never smoked	100	99	99	98	99	95	86	68	93
Only smoked once or twice	-	1	1	2	0	4	9	16	4
Used to smoke, but don't now	-	-	-	-	-	1	2	6	1
Smoke sometimes, not every week	-	-	-	-	1	1	1	4	1
Smoke 1-6 cigarettes per week	-	-	-	-	-	-	1	1	0
Smoke more than 6 cigarettes per week	-	-	-	-	-	-	2	5	1
Have ever smoked	-	*1*	*1*	*2*	*1*	*5*	*14*	*32*	*7*
All regular smokers (one or more cigarettes a week)	-	-	-	-	-	-	*3*	*6*	*1*
Bases (unweighted)									
Boys	*158*	*143*	*149*	*146*	*149*	*131*	*144*	*155*	*1175*
Girls	*144*	*154*	*145*	*159*	*155*	*155*	*142*	*136*	*1190*
Bases (weighted)									
Boys	*150*	*143*	*139*	*146*	*150*	*145*	*166*	*177*	*1216*
Girls	*122*	*138*	*137*	*154*	*152*	*159*	*149*	*138*	*1149*

Table 9.2

Self-reported cigarette smoking status of children aged 8-15, by region and sex

Children aged 8-15 *2011-2013*

Self-reported smoking status	Region								
	North East	North West	Yorkshire & the Humber	East Midlands	West Midlands	East of England	London	South East	South West
	%	%	%	%	%	%	%	%	%
Boys									
Never smoked	84	96	87	91	91	91	95	93	89
Only smoked once or twice	13	3	7	8	7	7	2	4	6
Used to smoke, but don't now	2	1	5	1	1	1	2	1	2
Smoke sometimes, not every week	-	-	1	1	-	-	-	2	-
Smoke 1-6 cigarettes per week	1	-	-	-	-	1	1	0	2
Smoke more than 6 cigarettes per week	-	1	-	-	1	-	1	-	1
Have ever smoked	*16*	*4*	*13*	*9*	*9*	*9*	*5*	*7*	*11*
All regular smokers (one or more cigarettes a week)	*1*	*1*	*-*	*-*	*1*	*1*	*2*	*0*	*3*
Girls									
Never smoked	91	96	93	97	88	88	97	92	94
Only smoked once or twice	4	4	5	2	7	5	2	4	4
Used to smoke, but don't now	1	-	2	1	2	3	-	1	-
Smoke sometimes, not every week	1	-	-	-	1	1	1	2	1
Smoke 1-6 cigarettes per week	-	-	-	-	1	-	-	1	-
Smoke more than 6 cigarettes per week	3	-	1	-	1	3	-	0	1
Have ever smoked	*9*	*4*	*7*	*3*	*12*	*12*	*3*	*8*	*6*
All regular smokers (one or more cigarettes a week)	*3*	*-*	*1*	*-*	*2*	*3*	*-*	*1*	*1*
Bases (unweighted)									
Boys	*89*	*169*	*92*	*104*	*130*	*124*	*157*	*199*	*111*
Girls	*90*	*163*	*128*	*110*	*114*	*132*	*146*	*211*	*96*
Bases (weighted)									
Boys	*55*	*174*	*109*	*106*	*141*	*124*	*191*	*203*	*113*
Girls	*51*	*151*	*132*	*104*	*110*	*133*	*168*	*209*	*91*

Table 9.3

Self-reported cigarette smoking in the last week by children aged 13-15, by sex

Children aged 13-15 who have ever smoked[a] *2011-2013*

Whether smoked in the last week	Total
	%
Boys	
Yes	20
No	80
Girls	
Yes	23
No	77
Bases (unweighted)	
Boys	*70*
Girls	*70*
Bases (weighted)	
Boys	*73*
Girls	*67*

[a] Fewer than 1% of children aged 8-12 reported that they had smoked in the last week, and therefore this age group has not been included in the table.

Table 9.4

Exposure to smoke from carers of children aged 0-12, by age and sex

Children aged 0-12 *2011-2013*

Exposure to smoke from carers[a]	Age group		Total
	0-4	5-12	
	%	%	%
Boys			
Looked after by a smoker for more than 2 hours a week	7	8	7
Not looked after by a smoker for more than 2 hours a week	93	92	93
Girls			
Looked after by a smoker for more than 2 hours a week	6	11	9
Not looked after by a smoker for more than 2 hours a week	94	89	91
Bases (unweighted)			
Boys	*1189*	*1470*	*2659*
Girls	*1038*	*1529*	*2567*
Bases (weighted)			
Boys	*1103*	*1550*	*2654*
Girls	*1044*	*1528*	*2572*

[a] Reported by parents in the CAPI interview.

Table 9.5

Reported weekly hours of exposure to other people's smoke for children aged 0-15, by age and sex

Children aged 0-15[a] *2011-2013*

Hours per week exposed to smoke	Age group			Total
	0-4	5-12	13-15	
Boys				
% not exposed	89	86	72	84
% 1-14 hours a week	10	12	24	14
% 15-28 hours a week	1	1	2	1
% over 28 hours a week	1	1	1	1
Mean number of hours exposed to others' smoke per week	0.8	1.0	1.6	1.0
Standard error of the mean	0.15	0.15	0.30	0.12
Median	0.0	0.0	0.0	0.0
Girls				
% not exposed	91	83	71	84
% 1-14 hours a week	8	15	23	14
% 15-28 hours a week	0	1	3	1
% over 28 hours a week	1	1	2	1
Mean number of hours exposed to others' smoke per week	0.7	1.1	2.4	1.2
Standard error of the mean	0.16	0.13	0.37	0.11
Median	0.0	0.0	0.0	0.0
Bases (unweighted)				
Boys	*1185*	*1461*	*505*	*3151*
Girls	*1035*	*1519*	*486*	*3040*
Bases (weighted)				
Boys	*1066*	*1492*	*613*	*3171*
Girls	*1009*	*1470*	*541*	*3020*

[a] Children aged 13-15 answered these questions for themselves in a self-completion booklet, whereas parents of children aged 0-12 answered on their behalf during the CAPI interview.

Table 9.6

Reported weekly hours of exposure to other people's smoke for children aged 0-15, 2007-2008 and 2011-2013, by age and sex

Children aged 0-15[a] *2007-2008, 2011-2013*

Hours per week exposed to smoke	Age group 2007-2008				Age group 2011-2013			
	0-4	5-12	13-15	**Total**	0-4	5-12	13-15	**Total**
Boys								
% not exposed	87	77	40	74	89	86	72	84
% 1-14 hours a week	10	19	49	21	10	12	24	14
% 15-28 hours a week	1	3	6	2	1	1	2	1
% over 28 hours a week	2	2	5	2	1	1	1	1
Mean number of hours exposed to others' smoke per week	1.1	2.0	7.0	2.6	0.8	1.0	1.6	1.0
Standard error of the mean	0.25	0.23	0.95	0.24	0.15	0.15	0.30	0.12
Median	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Girls								
% not exposed	89	78	40	75	91	83	71	84
% 1-14 hours a week	10	19	46	20	8	15	23	14
% 15-28 hours a week	1	2	6	2	0	1	3	1
% over 28 hours a week	1	2	8	2	1	1	2	1
Mean number of hours exposed to others' smoke per week	0.9	2.0	8.0	2.7	0.7	1.1	2.4	1.2
Standard error of the mean	0.18	0.23	0.89	0.22	0.16	0.13	0.37	0.11
Median	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Bases (unweighted)								
Boys	*810*	*1295*	*707*	*2812*	*1185*	*1461*	*505*	*3151*
Girls	*822*	*1259*	*686*	*2767*	*1035*	*1519*	*486*	*3040*
Bases (weighted)								
Boys	*1262*	*1054*	*551*	*2867*	*1066*	*1492*	*613*	*3171*
Girls	*1211*	*977*	*525*	*2712*	*1009*	*1470*	*541*	*3020*

[a] Children aged 13-15 answered these questions for themselves in a self-completion booklet, whereas parents of children aged 0-12 answered on their behalf during the CAPI interview.

Table 9.7

Self-reported locations of exposure to other people's smoke for children aged 8-15, by sex

Children aged 8-15 *2011-2013*

Location of exposure	Sex	
	Boys	Girls
	%	%
Not exposed[a]	80	78
At home[b]	19	19
In other people's homes[b]	19	25
In a car[b]	12	11
In the street[b]	47	51
Outdoor areas of pubs/ restaurants/cafes[b]	27	31
In the park or playing fields[b]	20	16
Other public places[b]	21	27
In school[b]	10	11
In other places[b]	4	4
None of these[b]	23	20
Whether bothered by exposure to other people's smoke[c]		
Yes	50	57
No	50	43
Bases (unweighted)		
All[a]	*1385*	*1397*
Self-completion[b]	*1166*	*1185*
Whether bothered by exposure[c]	*871*	*922*
Bases (weighted)		
All[a]	*1431*	*1351*
Self-completion[b]	*1209*	*1142*
Whether bothered by exposure[c]	*907*	*899*

[a] Children aged 13-15 answered these questions for themselves in a self-completion booklet, whereas parents of children aged 0-12 answered on their behalf during the CAPI interview.

[b] Based on children aged 8-15 with valid answers on the self-completion questionnaire. Children who reported no weekly hours of exposure to other people's smoke were included in this analysis: some children reported no weekly hours of exposure but did mention locations where they were exposed to other people's smoke. Children could select more than one answer.

[c] Children who reported at least one location of exposure to other people's smoke.

Table 9.8

Comparison of smoking status in those in whom saliva cotinine was measured with the total sample, by age, smoking status and sex

Aged 4-15 and eligible for cotinine measurement *2011-2013*

Age and smoking status	Boys		Girls	
	Sample with cotinine assay	Total sample	Sample with cotinine assay	Total sample
	%	%	%	%
Age (4-15)				
4-6	20	26	20	26
7-9	24	24	26	24
10-12	26	23	28	25
13-15	30	27	26	24
Smoking status (8-15)[a]				
Never smoked	90	92	94	93
Only smoked once or twice	6	5	4	4
Used to smoke, but don't now	2	2	1	1
Smoke sometimes, not every week	0	0	1	1
Smoke 1-6 cigarettes per week	1	1	0	0
Smoke more than 6 cigarettes per week	1	1	0	1
Have ever smoked	*10*	*8*	*6*	*7*
All regular smokers (one or more cigarettes a week)	*2*	*1*	*1*	*1*
Bases (unweighted)				
Aged 4-15	*1124*	*2217*	*1175*	*2230*
Aged 8-15 (with valid smoking status)	*713*	*1175*	*755*	*1190*
Bases (weighted)				
Aged 4-15	*1158*	*2270*	*1141*	*2177*
Aged 8-15 (with valid smoking status)	*742*	*1216*	*726*	*1149*

[a] Smoking status questions were asked only of those aged 8-15.

Table 9.9

Saliva cotinine levels of cotinine-validated non-smokers[a] aged 4-15, by age and sex

Aged 4-15 with a valid cotinine assay, and did not currently smoke[b] *2011-2013*

Saliva cotinine (ng/ml)	Age group		Total
	4-12	13-15	
Boys			
% with undetectable cotinine[c]	56	70	59
Median[d]	0.0	0.0	0.0
75th centile	0.3	0.2	0.3
90th centile	1.3	1.0	1.2
95th centile	2.2	3.1	2.2
Geometric mean saliva cotinine[e]	0.14	0.10	0.13
Confidence interval	(0.12, 0.15)	(0.09, 0.12)	(0.11, 0.14)
Girls			
% with undetectable cotinine[c]	61	70	63
Median[d]	0.0	0.0	0.0
75th centile	0.3	0.1	0.2
90th centile	1.2	0.9	1.1
95th centile	2.4	1.9	2.3
Geometric mean saliva cotinine[e]	0.12	0.10	0.12
Confidence interval	(0.11, 0.14)	(0.08, 0.12)	(0.11, 0.13)
Bases (unweighted)			
Boys	*778*	*256*	*1034*
Girls	*837*	*255*	*1092*
Bases (weighted)[f]			
Boys	*813*	*263*	*1076*
Girls	*804*	*246*	*1050*

[a] All aged 4-7 are assumed not to smoke currently. Those aged 8-15 are included if:
i) they said that they did not currently smoke (i.e. did not smoke at least one cigarette a week; those who smoked sometimes but not every week are included as non-smokers), and
ii) this is confirmed by a cotinine level of less than 12ng/ml.

[b] Questions on current or previous use of nicotine delivery products (including e-cigarettes) were asked only of those aged 13-15 in HSE 2013. One child aged 13-15 who reported current use of NDPs had a cotinine value above 12ng/ml, and so was excluded from this table. Uptake of NDPs was not known for children of similar age in 2011-2012, but was probably lower than in 2013, at least for e-cigarettes.

[c] The lower limit of detection of even the very sensitive assay used is 0.1ng/ml. Levels below this are considered to represent no or minimal exposure to tobacco smoke.

[d] Centiles are values of a distribution that divide it into 100 equal parts. For example, the 75th centile is the value of a distribution where 75% of the cases have values at or below the 75th centile and 25% have values above it. The median is the 50th centile.

[e] Geometric means have been presented for non-smokers as the distribution of cotinine levels is very skewed, with most values being very low. The geometric mean is a measure of central tendency of a distribution, which minimises the effects of extreme values (see endnote 38). Confidence intervals around the estimate are presented rather than standard errors.

[f] Data have been weighted to correct for non-response to the saliva sample.

Table 9.10

Saliva cotinine levels of cotinine-validated non-smokers[a] aged 4-15, by equivalised household income and sex

Aged 4-15 with a valid cotinine assay, and did not currently smoke[b] — *2011-2013*

Saliva cotinine (ng/ml)	Equivalised household income quintile				
	Highest	2nd	3rd	4th	Lowest
Boys					
% with undetectable cotinine[c]	88	71	63	46	35
Median[d]	0.0	0.0	0.0	0.1	0.2
75th centile	0.0	0.1	0.2	0.5	0.9
90th centile	0.1	0.5	1.0	2.2	2.0
95th centile	0.4	0.8	1.5	3.9	2.7
Geometric mean saliva cotinine[e]	0.06	0.09	0.11	0.17	0.26
Confidence interval	(0.05, 0.07)	(0.07, 0.10)	(0.09, 0.14)	(0.14, 0.22)	(0.20, 0.34)
Girls					
% with undetectable cotinine[c]	81	69	64	56	50
Median[d]	0.0	0.0	0.0	0.0	0.1
75th centile	0.0	0.1	0.2	0.3	0.5
90th centile	0.1	0.7	1.1	1.4	1.7
95th centile	0.3	2.6	1.8	2.7	3.4
Geometric mean saliva cotinine[e]	0.07	0.10	0.11	0.14	0.17
Confidence interval	(0.06, 0.07)	(0.08, 0.12)	(0.09, 0.14)	(0.11, 0.17)	(0.13, 0.23)
Bases (unweighted)					
Boys	*169*	*195*	*189*	*182*	*181*
Girls	*166*	*213*	*190*	*213*	*169*
Bases (weighted)[f]					
Boys	*169*	*188*	*192*	*196*	*213*
Girls	*154*	*186*	*175*	*212*	*183*

[a] All aged 4-7 are assumed not to smoke currently. Those aged 8-15 are included if:
i) they said that they did not currently smoke (i.e. did not smoke at least one cigarette a week; those who smoked sometimes but not every week are included as non-smokers), and
ii) this is confirmed by a cotinine level of less than 12ng/ml.

[b] Questions on current or previous use of nicotine delivery products (including e-cigarettes) were asked only of those aged 13-15 in HSE 2013. One child aged 13-15 who reported current use of NDPs had a cotinine value above 12ng/ml, and so was excluded from this table. Uptake of NDPs was not known for children of similar age in 2011-2012, but was probably lower than in 2013, at least for e-cigarettes.

[c] The lower limit of detection of even the very sensitive assay used is 0.1ng/ml. Levels below this are considered to represent no or minimal exposure to tobacco smoke.

[d] Centiles are values of a distribution that divide it into 100 equal parts. For example, the 75th centile is the value of a distribution where 75% of the cases have values at or below the 75th centile and 25% have values above it. The median is the 50th centile.

[e] Geometric means have been presented for non-smokers as the distribution of cotinine levels is very skewed, with most values being very low. The geometric mean is a measure of central tendency of a distribution, which minimises the effects of extreme values (see endnote 38). Confidence intervals around the estimate are presented rather than standard errors.

[f] Data have been weighted to correct for non-response to the saliva sample.

Table 9.11

Saliva cotinine levels of cotinine-validated non-smokers[a] aged 4-15, by number of people smoking regularly in the home

Aged 4-15 with a valid cotinine assay, and did not currently smoke[b] — *2011-2013*

Saliva cotinine (ng/ml)	People smoking regularly in the home	
	No people smoking regularly in the home	One or more people smoking regularly in the home
% with undetectable cotinine[c]	68	9
Median[d]	0.0	1.1
75th centile	0.1	2.6
90th centile	0.5	5.2
95th centile	1.1	6.9
Geometric mean saliva cotinine[e]	0.09	0.99
Confidence interval	(0.09,0.10)	(0.77,1.26)
Bases (unweighted)	*1875*	*251*
Bases (weighted)[f]	*1868*	*258*

[a] All aged 4-7 are assumed not to smoke currently. Those aged 8-15 are included if: i) they said that they did not currently smoke (i.e. did not smoke at least one cigarette a week; those who smoked sometimes but not every week are included as non-smokers), and ii) this is confirmed by a cotinine level of less than 12ng/ml.

[b] Questions on current or previous use of nicotine delivery products (including e-cigarettes) were asked only of those aged 13-15 in HSE 2013. One child aged 13-15 who reported current use of NDPs had a cotinine value above 12ng/ml, and so was excluded from this table. Uptake of NDPs was not known for children of similar age in 2011-2012, but was probably lower than in 2013, at least for e-cigarettes.

[c] The lower limit of detection of even the very sensitive assay used is 0.1ng/ml. Levels below this are considered to represent no or minimal exposure to tobacco smoke.

[d] Centiles are values of a distribution that divide it into 100 equal parts. For example, the 75th centile is the value of a distribution where 75% of the cases have values at or below the 75th centile and 25% have values above it. The median is the 50th centile.

[e] Geometric means have been presented for non-smokers as the distribution of cotinine levels is very skewed, with most values being very low. The geometric mean is a measure of central tendency of a distribution, which minimises the effects of extreme values (see endnote 38). Confidence intervals around the estimate are presented rather than standard errors.

[f] Data have been weighted to correct for non-response to the saliva sample.

Table 9.12

Saliva cotinine levels of cotinine-validated non-smokers[a] aged 4-15, by parental smoking

Aged 4-15 with a valid cotinine assay, and did not currently smoke[b] — *2011-2013*

Saliva cotinine (ng/ml)	Parental smoking[c]			Total
	No parental smoking	One parent smokes	Both parents smoke	
% with undetectable cotinine[d]	75	22	12	61
Median[e]	0.0	0.5	1.0	0.0
75th centile	0.0	1.2	2.8	0.3
90th centile	0.3	2.8	6.3	1.2
95th centile	0.8	3.6	9.3	2.3
Geometric mean saliva cotinine[f]	0.08	0.39	0.79	0.12
Confidence interval	(0.07, 0.08)	(0.32, 0.47)	(0.51, 1.23)	(0.11, 0.13)
Bases (unweighted)	*1597*	*431*	*95*	*2123*
Bases (weighted)[g]	*1581*	*440*	*102*	*2122*

[a] All aged 4-7 are assumed not to smoke currently. Those aged 8-15 are included if: i) they said that they did not currently smoke (i.e. did not smoke at least one cigarette a week; those who smoked sometimes but not every week are included as non-smokers), and ii) this is confirmed by a cotinine level of less than 12ng/ml.

[b] Questions on current or previous use of nicotine delivery products (including e-cigarettes) were asked only of those aged 13-15 in HSE 2013. One child aged 13-15 who reported current use of NDPs had a cotinine value above 12ng/ml, and so was excluded from this table. Uptake of NDPs was not known for children of similar age in 2011-2012, but was probably lower than in 2013, at least for e-cigarettes.

[c] Information on parental smoking was not known for parents within co-operating households who did not participate in the interview.

[d] The lower limit of detection of even the very sensitive assay used is 0.1ng/ml. Levels below this are considered to represent no or minimal exposure to tobacco smoke.

[e] Centiles are values of a distribution that divide it into 100 equal parts. For example, the 75th centile is the value of a distribution where 75% of the cases have values at or below the 75th centile and 25% have values above it. The median is the 50th centile.

[f] Geometric means have been presented for non-smokers as the distribution of cotinine levels is very skewed, with most values being very low. The geometric mean is a measure of central tendency of a distribution, which minimises the effects of extreme values (see endnote 38). Confidence intervals around the estimate are presented rather than standard errors.

[g] Data have been weighted to correct for non-response to the saliva sample.

Table 9.13

Factors associated with objectively measured second-hand smoke exposure (SHS) in cotinine-validated non-smokers aged 4-15

Aged 4-15 with a valid cotinine assay, and did not currently smoke[a] *2011-2013*

Some SHS exposure[b]	N	Relative risk ratio	95% C.I.[c]		High SHS exposure[d]	N	Relative risk ratio	95% C.I.[c]	
Base (weighted)	579		Lower	Upper	*Base (weighted)*	250		Lower	Upper
Age (p<0.001)					**Age (p<0.001)**				
4-7[e]	246	1			4-7[e]	91	1		
8-12	230	0.69	0.52	0.91	8-12	109	0.52	0.32	0.84
13-15	103	0.35	0.25	0.50	13-15	50	0.17	0.09	0.31
Sex (p=0.066)					**Sex (p=0.371)**				
Boys[e]	310	1			Boys[e]	129	1		
Girls	269	0.79	0.62	1.01	Girls	121	0.84	0.57	1.23
IMD[f] (p<0.001)					**IMD[f] (p<0.001)**				
Least deprived/2nd/3rd/4th quintile[e]	421	1			Least deprived/2nd/3rd/4th quintile[e]	151	1		
Most deprived	157	2.40	1.69	3.41	Most deprived	99	3.87	2.25	6.67
Reported exposure to other people's smoke (p<0.001)					**Reported exposure to other people's smoke (p<0.001)**				
None[e]	452	1			None[e]	145	1		
One or more hours per week	126	2.56	1.81	3.62	One or more hours per week	105	4.07	2.47	6.71
People smoking regularly in the home (p=0.004)					**People smoking regularly in the home (p<0.001)**				
None[e]	488	1			None[e]	105	1		
One or more	90	3.02	1.41	6.46	One or more	145	16.44	6.93	39.04
Parental smoking behaviour[g] (p<0.001)					**Parental smoking behaviour[g] (p<0.001)**				
None[e]	327	1			None[e]	69	1		
One or more parents smoke	252	6.54	4.62	9.27	One or more parents smoke	181	10.45	6.35	17.21
Own smoking status (p=0.013)					**Own smoking status (p<0.001)**				
Never smoked[a,e,h]	556	1			Never smoked[a,e,h]	221	1		
Ever smoked	23	2.45	1.21	4.97	Ever smoked	29	7.31	3.36	15.88

[a] Excluding children who reported smoking in the past week or with a saliva cotinine level of 12ng/ml or above. Questions on current or previous use of nicotine delivery products (including e-cigarettes) were asked only of those aged 13-15 in HSE 2013. One child aged 13-15 who reported current use of NDPs had a cotinine value above 12ng/ml, and so was excluded from this table. Uptake of NDPs was not known for children of similar age in 2011-2012, but was probably lower than in 2013, at least for e-cigarettes.

[b] 'Some SHS exposure' is defined as cotinine levels of 0.1 to less than 1.0ng/ml, and is compared with those with undetectable cotinine (levels below 0.1ng/ml).

[c] Confidence Interval.

[d] 'High SHS exposure' is defined as cotinine levels of 1.0ng/ml to less than 12.0ng/ml, and is compared with those with undetectable cotinine (levels below 0.1ng/ml).

[e] Reference category.

[f] The Index of Multiple Deprivation 2010 combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score at the small area level in England.

[g] Information on parental smoking was not known for parents within participating households who did not complete the interview.

[h] Children aged 4-7 are assumed to be never smokers.